sustainability

Special Issue Reprint

Digital Business Models in Network Management

Edited by
Adam Jabłoński

mdpi.com/journal/sustainability

MDPI

Digital Business Models in Network Management

Digital Business Models in Network Management

Editor

Adam Jabłoński

MDPI

Basel • Beijing • Wuhan • Barcelona • Belgrade • Novi Sad • Cluj • Manchester

Editor
Adam Jabłoński
WSB University in Poznan
Poznan, Poland

Editorial Office
MDPI
St. Alban-Anlage 66
4052 Basel, Switzerland

This is a reprint of articles from the Special Issue published online in the open access journal *Sustainability* (ISSN 2071-1050) (available at: https://www.mdpi.com/journal/sustainability/special_issues/Digital_Business_Models).

For citation purposes, cite each article independently as indicated on the article page online and as indicated below:

Lastname, A.A.; Lastname, B.B. Article Title. *Journal Name* **Year**, *Volume Number*, Page Range.

ISBN 978-3-0365-8800-1 (Hbk)
ISBN 978-3-0365-8801-8 (PDF)
doi.org/10.3390/books978-3-0365-8801-8

Contents

About the Editor . . . . . **vii**

Preface . . . . . **ix**

Samar Abdalla, Joseph Amankwah-Amoah and Amgad Badewi
Sharing-Economy Ecosystem: A Comprehensive Review and Future Research Directions
Reprinted from: *Sustainability* **2023**, *15*, 2145, doi:10.3390/su15032145 . . . . . **1**

Peter M. Bican and Alexander Brem
Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable "Digital"?
Reprinted from: *Sustainability* **2020**, *12*, 5239, doi:10.3390/su12135239 . . . . . **17**

Julia Keidel, Peter M. Bican and Frederik J. Riar
Influential Factors of Network Changes: Dynamic Network Ties and Sustainable Startup Embeddedness
Reprinted from: *Sustainability* **2021**, *13*, 6184, doi:10.3390/su13116184 . . . . . **33**

Joon-ho Kim, Seung-hye Jung, Jung-sik Roh and Hyun-ju Choi
Success Factors and Sustainability of the K-Pop Industry: A Structural Equation Model and Fuzzy Set Analysis
Reprinted from: *Sustainability* **2021**, *13*, 5927, doi:10.3390/su13115927 . . . . . **53**

Jerzy Niemczyk, Rafał Trzaska, Maciej Wilczyński and Kamil Borowski
Business Models 4.0 Using Network Effects: Case Study of the Cyfrowy Polsat Group
Reprinted from: *Sustainability* **2021**, *13*, 11570, doi:10.3390/su132111570 . . . . . **75**

Jimmyn Parc and Shin Dong Kim
The Digital Transformation of the Korean Music Industry and the Global Emergence of K-Pop
Reprinted from: *Sustainability* **2020**, *12*, 7790, doi:10.3390/su12187790 . . . . . **95**

Norhuda Salim, Mohd Nizam Ab Rahman, Dzuraidah Abd Wahab and Ariff Azly Muhamed
Influence of Social Media Usage on the Green Product Innovation of Manufacturing Firms through Environmental Collaboration
Reprinted from: *Sustainability* **2020**, *12*, 8685, doi:10.3390/su12208685 . . . . . **111**

Alfonso Unceta, Xabier Barandiaran and Asier Lakidain
Digitalisation of Creative Industries Fostered by Collaborative Governance: Public Innovation Labs in Gipuzkoa
Reprinted from: *Sustainability* **2021**, *13*, 2568, doi:10.3390/su13052568 . . . . . **129**

Ozge Yasar and Tulay Korkusuz Polat
A Fuzzy-Based Application for Marketing 4.0 Brand Perception in the COVID-19 Process
Reprinted from: *Sustainability* **2022**, *14*, 16407, doi:10.3390/su142416407 . . . . . **149**

Wen Zhang, Yuting Yang and Huigang Liang
A Bibliometric Analysis of Enterprise Social Media in Digital Economy: Research Hotspots and Trends
Reprinted from: *Sustainability* **2023**, *15*, 12545, doi:10.3390/su151612545 . . . . . **171**

About the Editor

Adam Jabłoński

Adam Jabłoński is Associate Professor and Head of the Management and Quality Institute of UWSB MERITO University in Poznań. He is also President of the Board of a reputable management consulting company, OTTIMA Plus Ltd. Katowice, and Vice President of the Association Southern Railway Cluster Katowice, which supports development in railway transport and innovation transfer and cooperation with European railway clusters (European Railway Clusters Initiative member). He holds a Postdoctoral degree from the University of Łódź (Department of Management), Poland, specializing in Management Science (Business Models, Strategic Management). Working as a management consultant since 1997, his experience and expertise have grown through his contact with several leading companies in Poland and abroad. He is the author of various studies and business analyses in the Strategic Performance Management Concept and Value Based Management, and a designer of Digital and Social Business Models fields. He has also written and co-written several monographs and over 100 scientific articles in management, published both in Poland and abroad. Currently, he is also a member of the Scientific Boards of International Journals (inter alia, Management Decision (Impact Factor—5.589)), and he is a Scientific Reviewer in different entities (USA, India, Canada, Switzerland). He is also a Member of the Academy of Management, USA. He is the author of numerous monographs, publications, articles, and scientific concepts published in Poland and internationally in prestigious publishing houses, including Taylor & Francis Group, Routledge, Palgrave Macmillan, Springer Nature, Cambridge Scholar Publishing, Nova Publishers, and IGI Global. He is also the author of many scientific articles published in world-renowned journals, a speaker at many scientific and industry conferences and congresses, and an initiator of many scientific and business ventures.

Preface

The digital economy creates new conditions for creating entrepreneurial solutions. Technology determines the emergence of innovative business models, the existence of which would not be possible without the potential of such technologies. The unlimited ingenuity of contemporary entrepreneurs is currently focused on the search for innovative solutions in the sphere of using the opportunities offered by digital technology. Previous solutions that use the traditional channels of economic activity are replaced with proposals stemming from resources based on the Internet and information and communication technologies. This allows one to design business initiatives whose impact, in many cases, allows one to reach a level of global impact quickly. The economics of the digital economy are the factors that stimulate the emergence of business models in the digital economy. These include ideas such as the sharing economy, the remix economy, the access economy, the creative economy, the reputation economy, the gift economy, the experience economy, the collaborative economy/wikinomics, and the trust economy.

The concepts presented have had a key impact on the profound changes in business and society in terms of a new approach to understanding business and work processes. Building communities based on communication platforms also allow for commercialization and capitalization, creating opportunities to obtain desired environmental, economic, and social effects. It should be noted that the development of new paradigms in the science of management and economics results from transformations in the global economy, where ideas and concepts arise in various places, often thanks to global access to information and knowledge through technological, Internet-based platforms. This is the most crucial assumption of this Special Issue.

This Issue requires extensive research and analysis.

Based on the above-mentioned assumptions, the key issues to answer are the following:

What is the best way to understand digitalization in the context of business models?

What is the best way to build and operationalize digital business models?

What is the best way to use new concepts of the economy to build effective business models?

What is the best way to use the network approach to build digital business models?

What is the best way to achieve the network effect for building effective digital business models?

What is the best way to manage communities in digital business models created?

What is the best way to implement sustainability in digital business models?

What is the best way to build digital models of sustainable business?

Adam Jabłoński

Editor

sustainability

MDPI

Review

Sharing-Economy Ecosystem: A Comprehensive Review and Future Research Directions

Samar Abdalla *, Joseph Amankwah-Amoah * and Amgad Badewi

Department of Management, Kent Business School, University of Kent, Kent ME4 4TE, UK
* Correspondence: sa2009@kent.ac.uk (S.A.); j.amankwah-amoah@kent.ac.uk (J.A.-A.)

Abstract: This research study reviews the literature on the participants in the sharing economy (SE) ecosystem and its impact on the participants, creating and capturing value through increasing the understanding of the ecosystem's novel models. The review classifies the participants in the SE ecosystem into primary and secondary participants. The classification is based on the connection to the core network/ecosystem and the role of the participants in the ecosystem. The primary participants are subdivided into groups: customers are subdivided into New Customers (NC) and Current Customers (CC); providers into Product Providers (PP) and Service Providers (SP); and mediators are subdivided into Small and Medium Mediators (SMM) and Large Mediators (LM). The secondary participants are governments sub-grouped into Local Governments (NG) and National Governments (NG); Theories and methodologies within the academic literature on the sharing economy ecosystem are also examined. The study also analyses the influence of digital sharing and explores the value of digital technologies in management strategies and the value of the integration between participants of SE businesses. Recommended future research directions are outlined according to the conducted review.

Keywords: sharing economy; digital economy; participants; ecosystem; digital business model; sustainability

Citation: Abdalla, S.; Amankwah-Amoah, J.; Badewi, A. Sharing-Economy Ecosystem: A Comprehensive Review and Future Research Directions. *Sustainability* **2023**, *15*, 2145. https://doi.org/10.3390/su15032145

Academic Editor: Adam Jabłoński

Received: 28 November 2022
Revised: 9 January 2023
Accepted: 18 January 2023
Published: 23 January 2023

1. Introduction

SE is a new phenomenon that is growing around the world. Based on a PWC (PricewaterhouseCoopers) report on SE, the related business will grow by 2133% in 12 years [1]. In addition, previous studies identified a critical pathway for the participants in the sharing economy ecosystem. However, to understand the integration between them and the value that has impacted such integration, there is a need to conduct a conceptual paper to have a clear vision of the SE ecosystem and the participants' role within it. Leung et al. [2] identified the different participants in the SE ecosystem. Although previous studies on SE have provided valuable insights into its ecosystem and relevance to business disciplines [3], they have not specified a particular group of participants, such as customers. Instead, they have been presented as one group without indicating whether they are new or old customers. As a result, they have not been identified as critical elements in the various sharing businesses, distinguished by their specific economic, social, and environmental perspectives [4]. However, understanding the perspectives of a level of subgroups provides the critical insight needed to enrich the investigations into the participants and the integration between them in the SE ecosystem. Moreover, the value of each participant has not been previously explained, even though understanding the importance of the development of SE platforms is critical to achieving sustainable growth.

SE results in more sustainability within the sharing economy [5]. Digital technologies have been recognised as critical tools in SE. Sutheland and Jararhi [6] examined technology as a valuable tool for SE ecosystems. However, its impact on the integration between participants has not been examined in previous studies, which focus on how the technology used in one field may differ from that used in another on SE platforms which assured that

the technologies play an essential role in the SE ecosystem. Therefore, it is vital to identify how digital technologies can impact the social and environmental aspects despite the absence of trust. In addition, Laurell and Sandström [7] discuss market logic and its impact on business. Furthermore, many studies consider the technological impact perspectives, providing a better conceptualisation of SE, but without giving a clear understanding of the value of the technological impact on business sustainability due to the integration between the participants [8,9]. In some studies, digital technology is described as a leading factor in developing business [10], while other researchers dispute this, seeing it as a platform [11,12].

Many articles have also discussed SE-related topics, such as previously mentioned digital technologies in the SE ecosystem and how SE is presented and used through digital channels [13]. The debate around the participants in SE has led the researcher in this study to highlight the value of technology in participants' integration and sustainability. Many studies have examined particular participants and analysed them. As a result, there has been an increase in the awareness and understanding of ecosystems; creating and capturing value through novel models was the focus of attention [14]. However, these studies do not understand the value of the participant's role. For example, is each participant in the ecosystem playing the same role, or do they play primary and secondary roles within it? Accordingly, the research has two objectives. The first objective is to understand the value of technologies in integrating SE participants and their impact on business sustainability. The second objective is to clarify the role of the participants in the SE ecosystem by subdividing them into groups and developing a framework to explain the primary and secondary roles they play in each group.

The research contributes to the sharing economy (SE) ecosystem literature. It first adds to the debate about SE participants by explaining operationalisation and integrating multiple participants in economically viable and sustainable urban reconfigurations in shared mobility. The review contributes to the literature by classifying the participants in the SE ecosystem into primary and secondary groups based on their role within the ecosystem, as detailed in the reviewed articles, which specify the role and the value of each participant in the SE ecosystem. Second, the review contributes to the literature by subdividing the participants in the SE ecosystem into groups. For example, customers are subdivided into New Customers (NC) and Current Customers (CC), providers into Product Providers (PP) and Service Providers (SP), and government into Local Government (NG) and National Government (NG). Furthermore, Mediators are subdivided into Small and Medium Mediators (SMM) and Large Mediators (LM). Nevertheless, it helps to highlight the gap in previous studies that presented participants in general terms. For example, customers in the reviewed studies are not specified as new or current. In addition, previous studies do not specify between Local and National Governments. Second, such subdivisions contribute to the literature by further understanding the participants considered in previous studies. Third, the research presents a framework for understanding the value of technologies in integrating SE participants and business sustainability. It also highlights the primary and secondary participants in the SE ecosystem. Fourth, the research develops a more robust understanding of the potential roles of technology in improving the integration between the participants in the SE ecosystem. In practical terms, the study develops an integrative model that can be used by private and public managers for potential expectations for understanding participants' performance in the SE business. Furthermore, the study explains the value of integration over the short and long term for the sustainability of businesses.

2. Literature Review

This section aims to investigate the participants' role in the SE ecosystem. The study starts with a search for a comprehensive definition of SE. Then, it extends the search so that ecosystem definitions and participants in the SE ecosystem can be identified. The following section aims to establish definitions of the SE ecosystem participants. These are examined

through an intensive review of the various definitions of the terms "SE" and "ecosystem," together with that of the participants.

Who Are the Participants in the SE Ecosystem?

Starting by considering the term SE, which has many definitions, it was found that various terms are related to it. Dredge and Gyimóthy [15] found 17 such terms, including collaboration consumption, peer-to-peer, and digital economy. Some of these definitions were based on the researchers' understanding of the meaning of SE, which could contradict each other, as they represent the points of view of the different authors. As Görög [16] states, "Although sharing economy phenomenon is clear, it has no bright understanding between academics and practitioners too" [16] (p. 176). The points of view will probably not come together in one definition [17] (p. 1). One definition could be related to the economic system: "a comprehensive definition for the SE, an economic system in which an online platform connects the supply and demand sides to facilitate transactions of giving temporary access to idle resources" [2] (p. 45). However, the explanation provided by Lim [5] of the development of the sharing concept combined with the timeline starting from 1900. In the 1950s, the selling concept was introduced, which developed into marketing in the 1960s. The 1970s was the start of the social market, while the 1980s to the 2000s saw the collaboration concept. Lim's [5] definition was more precise: "The sharing economy is a marketplace that consists of entities (e.g., consumers, organisations) that innovatively and sustainably shape how marketing exchanges of valuable products and resources are produced and consumed through sharing, which can occur when entities take part in (e.g., divide and distribute) the actual or life-cycle use of a product or resource and communicate some form of information, which can be scaled using technology". [5] (p. 7). Belk [18], also differentiated between the definition of the sharing economy and collaboration consumption. His definition of SE involved "true sharing, entailing temporary access rather than ownership, no fees or compensation, and the use of digital platforms. Most of the commercial platforms included in the sharing economy not belong there" [18] (p. 1597). Moreover, the definition of collaboration consumption involved "people coordinating the acquisition and distribution of a resource for a fee or other compensation. By including other compensation." [18] (p. 1597). However, the definition of collaboration consumption is still related to the SE framework. Therefore, it could be considered one of the definitions of SE, as there is no consistent definition.

Ecosystems are becoming increasingly known and understood; new models are being developed to capture value [19]. The ecosystem has many definitions related to several elements. For example, Thomas and Ritala [20] defined it as a set of mutual understandings among ecosystem participants regarding the central, enduring, and distinctive characteristics of the ecosystem value proposition (p. 14). However, Wallace [21] employs an environmental understanding to define the ecosystem as "the point at which one or more humans consume the asset [of nature] is the point where the service occurs and should be evaluated" (p. 240). Danley and Widmark [22] identify ecosystem definitions from the service and conceptual prospects. They conclude that the Millennium Ecosystem Assessment configured a comprehensive definition of ecosystem services as "the benefits people obtain from ecosystems" [23] (p. V). Haines-Young and Potschin [24] adopt a definition in the same direction: "the outputs of ecosystems (whether natural, semi-natural or highly modified) that most directly affect the well-being of people" (p. 9).

In addition, Peltoniemi and Vuori [25] define the ecosystem as a "system of organisms occupying a habitat, together with those aspects of the physical environment with which they interact" (p. 2). Therefore, it is necessary to review several definitions to understand the meaning of the participants' terms and whether there are differences between researchers in reaching a definition. For example, Verba et al. [26] define participation as an "activity that is intended or has the consequence of affecting, either directly or indirectly, government action" (p. 7). In comparison, Park and Perry [27] identified participation as "individual and collective engagement in public affairs" (p. 191). However, nowadays,

participants work digitally, participating online. Lutz et al. [28] define online participation as "the creation and sharing of content on the Internet addressed at a specific audience and driven by a social purpose" (p. 881). In addition, Morozov and other auothers [29–31] considers online participants as affiliation businesses, not peer-to-peer businesses.

3. Review Methodology

According to Cheng [32], the review methodology followed the same guidelines. Table 1 shows 6 phases of the adapted method. The first phase is to determine the purpose of the study, the second phase is setting the search strategy to inform the search process for the review, and then followed by the third phase is the search strings by using keywords such as "sharing economy", "consumption of collaboration", "Participants", "Ecosystem", and "Digital technologies". Several articles related to SE were found during the initial research. A combination of keywords was used in the search to identify relevant studies about participants in SE platforms, such as "sharing economy AND Ecosystem", "participants AND Sharing Economy", and "sharing economy AND Review". The fourth phase is to use the above keywords to search in a database for articles with titles, abstracts, or keywords that contain these keywords. A search on Google Scholar and Scopus was performed, as well as investigations on ScienceDirect, JSTOR, Emerald, Elsevier, and Wiley. The fifth phase is the screening and inclusion criteria, and the sixth phase is the exclusion criteria. The total number of articles selected for further analysis was 70; 27 articles were related and used. Each is organised by the author, the year of publication, the theoretical lens, the data sources, and the main findings, and classifying the article based on the participant role (primary and secondary). The 27 papers provide insight into the relationship between the participants of the sharing economy ecosystem, in addition to 21 articles focusing on SE (definition) for the terms of SE, Participants, and the Ecosystem.

Table 1. Systematic review and protocols adopted.

Review Phases	Description	Focus on the Review
Purpose	Aim of the literature review	To review the previous studies on the participants of the SE ecosystem
Search strategy	Plan to inform the search process for the review	Using keywords to search specified databases informed by screening and exclusion criteria
Search strings	Combination of keywords used to conduct the search for literature	"Sharing economy", "consumption of collaboration", " Participants", "Ecosystem" "Digital technologies". A combination of keywords was used in the search to identify relevant studies about participants in SE platforms, such as "sharing economy AND Ecosystem", "participants AND Sharing Economy," and "sharing economy AND Review."
Databases	Independent online database with citation data and indexes of scholarly writings	A search on Google Scholar and Scopus was performed, as well as investigations on ScienceDirect, JSTOR, Business Source Ultimate, Emerald, and Wiley.
Screening and inclusion criteria	Conditions for selecting and including review sources	The screening criteria for the review are as follows: • Empirical and theoretical peer-reviewed journal articles • Sharing economy studies • Research on "participants" and "Sharing economy ecosystem" concepts and challenges
Exclusion criteria	Conditions for omitting publications during the review process	The exclusion criteria for the review are as follows: • Duplicates • Master's theses, doctoral dissertations, textbooks, and unpublished working papers • Articles that use the term "Sharing Economy" and "Collaboration consumption" beyond the scope of participants of the SE Ecosystem criteria.

Summarises the Studies Reviewed on Participants in the SE Ecosystem

Table 2 classifies the participants in the SE ecosystem into primary and secondary participants. The classification is based on the connection to the core network/ecosystem

and the role of the participants in the ecosystem. The primary participants are subdivided into groups: customers are subdivided into New Customers (NC) and Current Customers (CC); providers into Product Providers (PP) and Service Providers (SP); and mediators are subdivided into Small and Medium Mediators (SMM) and Large Mediators (LM). The secondary participant is sub-grouped into governments into Local Government (NG) and National Governments (NG). Theories and methodologies within the academic literature on the sharing economy ecosystem are also examined.

Table 2. Summary of the studies reviewed on participants in the SE ecosystem.

Author	Theoretical Lens	Data Sources	Key Findings	Primary Participants	Secondary Participants
Martin [9]	Socio-technical transitions, theory, and framing theory	Conceptual paper	Economic opportunity, sustainable consumption, and sustainability are three methods used by those seeking to empower the niche.	Mediators (LM)	Government (NG)
Cheng [32]	Tourism Theory Hospitality theory	Conceptual Paper	Researchers organise their research into five streams or clusters that help identify potential new directions	Customers (CC)	Mediators (N/A)
Hamari et al. [8]	Self-determination theory	Data collected from an online survey on customers' attitudes and collaboration consumption	The gap between attitude and behaviour is relatively small in comparison to the studies of technology adoption in general	Customers (CC)	N/A
Böcker and Meelen [33]	Self-determination theory. Hierarchical needs theory	Data collected from an online survey on sharing motivations	It is essential to differentiate between the various types of business in SE	Providers (SP)	N/A
Laurell and Sandström [7]	Institutional theory	Conceptual paper	Tensions create a state of instability related to SE as a contemporary phenomenon	Mediators (LM)	Governments (NG)
Lan et al. [34]	Social identity theory	Data collected from an in-depth analysis of real-life factors (a case study of MOBIK) and interviews focused on business value across the SE participants	A sustainable sharing business must identify and realise value co-creation behaviours in SE	Customers (CC) and Providers (SP)	Mediators (LM)
Miralles et al. [35]	Organisation theory	Data were collected from a comparative case study across 18 AFNs identifying five SE models of AFNs with unique shared resources and organisational mechanisms	Participants pool their resources, including production, marketing, and distribution	Mediators (SMM)	Providers (PP)
Ganapati and Reddick [36]	Economic theory	Conceptual paper	A harsher form of capitalism could be considered in the sharing practice	Government (LG)	Customers (CC) and Providers (SP)
Cheng et al. [12]	Expectancy-disconfirmation theory	Data were collected from 294 questionnaires from Chinese mobile car-hailing service providers	Competence, empathy, and information congruency are key in quality offline services.	Providers (SP)	N/A
Jin et al. [37]	Neo-Marxist theory	Conceptual paper	There is a close relationship between the digital divide and the intelligent city concept in SE	Providers (SP)	Customers (CC)
Sutherland and Jarrahi [6]	Design Theory	Conceptual paper	There are two types of SE organising models: centralised and decentralised	Customers (CC)	N/A

Table 2. *Cont.*

Author	Theoretical Lens	Data Sources	Key Findings	Primary Participants	Secondary Participants
Boons and Bocken [38]	Transition theory	Conceptual paper	Increasing the level of protection increases the chances of a successful niche in social engineering systems	Mediators (LM)	Providers (SP)
Mauri et al. [39]	Social theory; signalling theory	Conceptual paper	Sharing platform managers could reduce transactional uncertainty by helping sellers understand what additional features they should include in their profiles	Customers (CC)	Mediators (LM)
Ma et al. [40]	Self-determination theory and production theory	Data were collected from 50 stakeholder interviews with representatives of sharing mobility businesses in China	Changing consumption patterns and the growth of supply chains in the new SE	Mediators (SMM)	Government (NG)
Leunget al. [2]	Tourism theory. economic theory	Conceptual paper	SE should take steps to manage its external impacts through collaboration	Providers (SP)	Government (LG)
Eckhardt et al. [3]	Social theory and theory of social production	Conceptual paper	SE can be used to understand all facets of marketing, including consumer behaviour and culture	Customers (CC)	Providers (SP)
Simon and Roederer [41]	Lifespan theory and Self-determination theory	Data were collected from an online questionnaire with customers interested in flat sharing	The presence of other sharers directly and robustly impacts customer satisfaction in flat sharing	Customers (NC)	N/A
Pies et al. [4]	Social theory	Conceptual paper	Business models with SE hybridity face three challenges requiring managerial governance and communication abilities	Mediators (SMM)	Government (NG)
del Mar Alonso-Almeida et al. [42]	Social theory	Data collected from surveys conducted during various events with 384 postgraduate students regarding the level of consumer awareness	Through SE participation, consumers become more aware of their consumption habits, creating new materialism	Customers (CC)	N/A
Govindan et al. [43]	Iterative theory	Data were collected from in-depth interviews and workshops conducted with 38 industrial managers	The barriers to industrial SE can be attributed to a lack of trust and transparency, a lack of business models, or an absence of technology platforms	Mediators (SMM)	N/A
Hossain [44]	Diverse theories; self-determination theory, Economic theory	Conceptual paper	Difficult tasks are often involved in emulating SE firms	Mediators (LM)	Government (NG)
Sands et al. [45]	Social exchange theory self-determination theory	Conceptual paper	Provides an overview of the types of SE actors	Providers (SP)	Mediators (SMM)
Lim [5]	Marketing Theory	Conceptual paper	By enabling consumers to become producers, SE leads to greater competition	Providers (SP)	Customers (CC)
Song et al. [46]	Economic theory	Conceptual paper	Peer-to-peer trading has more economic advantages than pure producers and consumer models	Providers (PP)	Customers (NC)

Table 2. *Cont.*

Author	Theoretical Lens	Data Sources	Key Findings	Primary Participants	Secondary Participants
Shen et al. [47]	Social exchange theory	Conceptual paper	Prosumers are now being considered when evaluating brand value in SE	Providers (SP)	Mediators (LM)
Pereira and Silva [48]	Institutional theory	Data were collected from seven interviews with public and private agents (socio-technical actors)	There is a potential conflict of interest between public and private agents as a consequence of the integration of these several initiatives	Mediators (LM)	Government (NG)

4. Results

This review examined valuable insight into the participants of the SE ecosystem. It classifies the participants in the SE ecosystem into primary and secondary participants. The classification is based on the connection to the core network/ecosystem and the role of the participants in the ecosystem.

4.1. Primary Participants vs. Secondary Participants

The primary participants are subdivided into groups: customers are subdivided into New Customers (NC) and Current Customers (CC); providers into Product Providers (PP) and Service Providers (SP); and mediators are subdivided into Small and Medium Mediators (SMM) and Large Mediators (LM). The secondary participant is sub-grouped into local government (NG) and National Government (NG).

4.1.1. Customers (Primary)

Customers are the beneficiaries of the products or services from producers or providers through mediators. The review subdivides customers into New Customers (NC) and Current Customers (CC). As shown in Table 2, customers are among the primary participants in the SE ecosystem, according to most of the reviewed articles. Furthermore, Current Customers (CC) were associated with the National Government (NG) and the Local Government (LG) [36]. In contrast, NC is not associated with any government in the reviewed articles. Furthermore, NC was linked only to Product Providers (PP) [46], while CC was attached only to the Service Providers (SP) [5,34,37]. Moreover, CC was connected to both the Large Mediators (LM) and the Small and Medium Mediators (SMM) [34].

4.1.2. Mediators (Primary)

Mediators are the platforms that mediate the provider's services or products. The review subdivides the mediators into Large Mediators (LM) and Small and Medium Mediators (SMM). As shown in Table 2, the mediators were the primary participants in the SE ecosystem in most of the reviewed articles [9,44]. Furthermore, the LM and the SMM were only associated with the National Government (NG) [4,7,9,40]. In addition, the LM was only linked to the Service Providers (SP) [34,38]. In contrast, the SMM was related to both Service Providers (SP) [45] and Product Providers (PP) [35].

4.1.3. Providers (Primary)

Providers are the producers of products or provide services to customers. Therefore, the review subdivides them into Service Providers (SP) and Product Providers (PP). As can be seen in Table 2, the providers were the primary participants in the SE ecosystem in most of the reviewed articles. Furthermore, the SP were the leading group in the reviewed papers and was mainly linked to the LM and SMM [34,38,45]. In contrast, the PP were only connected to the SMM [35]. Moreover, they were associated with NC [46]. Furthermore, the SP were only related to the CC [5,34,37] and the LG [2].

4.1.4. Government (Secondary)

The government is the authority that manages the relations between the ecosystem participants through regulations to organise and protect their commitments. Therefore, the review subdivided government into the National Government (NG) and Local Government (LG). As shown in Table 2, the government was a secondary participant in the SE ecosystem in most of the reviewed articles. Furthermore, the NG was the leading group in the reviewed papers and was mainly linked to the LM and the SMM [4,7,9,40]. In addition, the NG and the LG were linked to the CC [36]. At the same time, LG was only connected to the SP [36].

In addition to the above findings, others are related to the SE ecosystem participants and their relevance, including different elements of all the marketing and management domains, such as consumer behaviour, empirical modelling, and strategy [3]. These elements are linked to the different business models, characterised by specific economic, social, and environmental perspectives, resulting from the value creation adopted by SE initiatives [4]. Furthermore, development in SE platforms is essential to achieve sustainable growth and compromise through the required sacrifice of business profits. However, SE leads to more sustainability in the concept patterns of sharing industries [5]. Sutherland and Jararhi [6] focused on technology as a reliable tool to connect the participants of the SE ecosystem. They highlighted the significant variation in the technologies used from one field to another on SE platforms. Technologies play an essential role in the SE ecosystem. "The technologies studied under the sharing economy vary significantly, from ride-sharing services to distributed currencies to freelancing platforms. Research perspectives vary similarly, including tourism, governance, design and digital gig work" [6] (p. 24). Moreover, Laurell and Sandström [7] discuss the market and non-market logic tensions.

Furthermore, many studies considering the technological impact perspectives are due to SE research variation across many fields, providing a better conceptualisation of SE technologies and mediation [8,9]. Therefore, sharing is considered a distinctive consumption preference [13]. Furthermore, online business and mobile applications help to facilitate modern SE transactions driven by the sharing purpose [8]. The review also provides valuable insights into the study participants' roles. First, it divides the functions into primary and secondary groups inside the same ecosystem, which is helpful in understanding the participants' impacts through the previous studies, as it shows that the mediators, customers, and providers are primary participants inside the SE ecosystem. At the same time, the government is a secondary participant in the ecosystem.

Generally, the main findings are that the participants have a common focal point: they work under the concept of the system's organisms. Moreover, interactions between all participants in the SE ecosystem improve the sharing business's performance and sustainability [49]. In the summaries of their main findings, most of the previous literature has focused on different participants in the SE ecosystem. However, in these studies, the ecosystem participants were not fully integrated, although sharing business remains more sustainable, and sharing still leads to more sustainability related to the ability of platforms.

4.2. Methods Used in the Reviewed Articles

The methods used in the reviewed articles were varied, although conceptual papers constituted 32% of the overall reviews. Interviews constituted 29%; online surveys 21%; and online questionnaires and case studies 13%. In addition, 68% of the studies in the review adopt a non-empirical approach versus 32% that adopt the empirical approach, as shown in Figure 1.

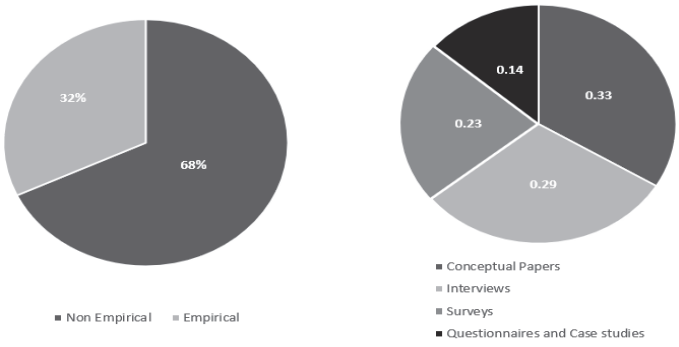

Figure 1. Methods used in the reviewed articles.

4.3. Theories Used in the Reviewed Articles

This section highlights and explains the most frequently used theories related to the study participants. Furthermore, Table 3 presents previous studies' most frequent theories and examples. First, the social theory focuses on the different challenges for social business. An example of the use of theory is Pies et al. [4]. They used this theory to explain the challenges of hybrid business models. Moreover, del Mar Alonso-Almeida et al. [42] presented the social theory in their study to clarify how customers became more aware of consuming habits. The second theory in Table 3 is the self-determination theory which is focused on participation and is not linked directly to sustainability unless positive attitudes also accompany it. An example of the use of a view is Böcker and Meelen [33]. They used this theory to explain the essential differences between the various business types in SE. Sands et al. [45] and Andonopoulos et al. [45] refer to this theory to explain the providers and mediator relationship. The third and final theory in Table 3 is the economic theory. It explains the lack of regulation and policies impacting SE business. Song et al. [46] used this theory to explain why peer-to-peer trading has more economic advantages.

Table 3. Most frequently used theories.

Theory	Number of Articles	Explanation	Examples of Previous Studies
Social theory	5	Different challenges for social business.	Mediators (SMM) and Government (NG): Pies et al. [4] Customers (CC): del Mar Alonso-Almeida et al. [42]
Self-determination theory	4	Participation is not linked directly to sustainability unless positive attitudes also accompany it.	Providers (SP): Böcker and Meelen [33] Providers and Mediators: Sands et al. [45] Customers (CC): Hamari et al. [8].
Economic theory	4	The lack of regulation and policies impacts SE business.	Providers (PP) and Customers (NC): Song et al. [46] Mediators (LM) and Government (NG): Hossain [44]

4.4. Consequences of the Technologies Value on the Participants

In addition, the framework in Figure 2 highlights the consequences for participants. It explains the value of the technologies presented in Table 4. Starting with the mediators as they obtain value from the technologies as they improve business sustainability. Next, the providers value the technologies as they support engagement with market needs. Finally, the

customers obtain value from the technologies as they increase customer satisfaction. Finally, the government obtains value from the technologies as they enhance the economy's performance.

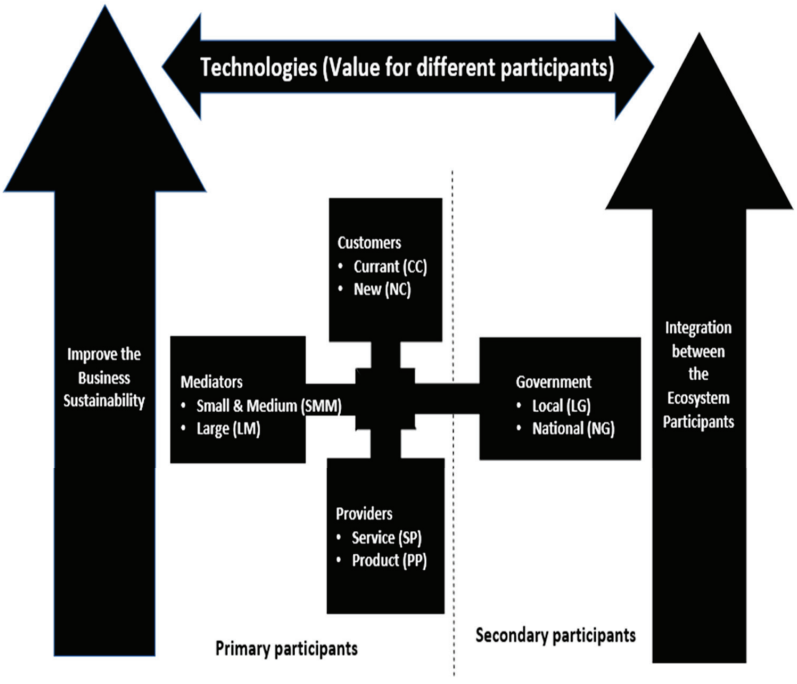

Figure 2. An integrated framework of the sharing economy ecosystem.

Table 4. Consequences of the technologies value on the Participants.

Participants	Consequences
Mediators	Mediators obtain value from the technologies: • Improve the business sustainability • Growth of the business revenue • Adopt the innovative business model
Providers	Providers obtain value from the technologies: • Support engagement with market needs • Improve the market standers due to the competition
Customers	Customers obtain value from the technologies • Increase customer satisfaction • Improve the quality and the prices of the products and services • Provides varieties of services and products
Government	Government obtains value from the technologies • Enhance the economy's performance • Enhance the government's services • Enhance the government's influence

5. Discussion

The research has two objectives. The first objective is to understand the value of technologies in integrating SE participants and their impact on business sustainability. The second objective is to clarify the role of the participants in the SE ecosystem by subdividing

them into groups and developing a framework to explain the primary and secondary roles they play in each group. The findings indicate that the primary participants are mediators, providers, and customers, and the secondary participant is the government. In addition, the framework presented in Figure 2 explains the needs for the technologies in the SE participants. Therefore, SE has grown as an alternative to traditional business forms of ownership, provided by digital entities that allow users to connect [50].

Consequently, markets can be created that compete with traditional businesses [51]. Furthermore, the social factor in sharing business adds flexibility and freedom to SE models [18]. Again, digital transformation and the increase in the use of the internet help to mediate transactions between providers and customers [52], increase trust between strangers [51], and significantly reduce the cost of transactions [53]. Although, many kinds of research focus on Service Providers and consumers in the SE ecosystem and on several topics related to these participants. For instance, the challenges they face, including the impact of the trust-based concept on commercial sharing [54] and how this could be treated by improving business communication. The research also considered how organisations understand their need to innovate their SE business model, which is essential for their continuity and to cope with SE market changes. In addition, the recognition of the debate around several topics related to SE mainly explored the role of the SE participants. For example, recent research has mentioned digital technologies in the SE ecosystem and how the SE impacts the economic and social aspects [32]. The researchers provide deep insights into the value of actors in the SE ecosystems, which is a significant element in the sharing practice. Nevertheless, using digital platforms often requires contributions from various parties [55]. Moreover, it represents a fundamental challenge inside the SE platforms [48]. It is crucial, considering that the actors are empowered to establish marketplaces even in the smallest communities and change the price policy in a specific industry. However, they need to integrate their management strategy with the dynamic nature of SE, not by creating a direct value [56]. Furthermore, actors in SE will lead to more sustainability [45], which is a significant element in any business model. As a whole, the outcomes of an ecosystem depend directly on the participants' behaviour. Lutz et al. [57] agree with Morozov [29] and claim that online participants are quite passive. In addition, Andreotti et al. [30] focus on participants" behaviour and claim that "personal values and attitudes can be assumed to affect the relationship be-tween motives and (non-)participatory behavior. Again, socio-economic variables may be associated with distinct attitudes or value sets" (p. 15).

5.1. Theoretical Implications

The theoretical implications of this study highlighted the value of integrating the different SE theories, digital sharing, and participant behaviour. In addition, it classifies the participants into primary and secondary participants. It divides them into groups to help better understand their role in the SE ecosystem, leading to the potential development of the current theories. This study helps understand the SE ecosystem participants and their impact on their interactions. The research builds a stronger foundation between theories and practice. The review supported institutional theory (the discursive institutionalist approach). The review contributes to the theory by employing the theoretical perspective used in the reviewed articles on the participants in the SE ecosystem. Furthermore, it presents and identifies the knowledge by extending the findings and the discussions of the review into a holistic view of the participants. The research also contributes by understanding the impact of the integration of the participants on the business model. As a whole, the outcomes of an ecosystem depend directly on the participants' behaviour.

5.2. Managerial Implications

From a managerial standpoint, the analysis of the elements of the SE ecosystem provides insights into dealing with the sector. The review has considered the current needs of the SE business, covering many sectors, such as hospitality, transportation, information, education, food, energy, and fashion. Furthermore, SE and collaborative consumption

were shown to be connected. They digitally support businesses' connection with the communities, which have grown exponentially in recent years. The growth of digital use helps to explore further opportunities and integration with SE businesses, which could lead to massive changes in the services and goods provided by the participants in the SE ecosystem [58–61].

Nevertheless, by exploring the roles of participants at multiple levels of the SE ecosystem, this study sheds light on developing new business models that can significantly impact SE businesses in both their current and new contexts [62–64]. It is beneficial for governments to create a regulatory atmosphere that fosters a more friendly business environment to create conditions for the growth of businesses in order to create more job opportunities. Furthermore, the study enhanced the understanding of the needs of small and medium businesses and the expectations of governments. Moreover, governments played a secondary role in the SE ecosystem. Therefore, governments must strengthen, develop, and enforce small and medium businesses to play a primary role in the SE ecosystem.

Accordingly, connectivity has increased, with the commercialisation of ownership and the agency of technology identified as the main trends. While the SE concept has been long-established, digital technologies in this field have only recently been developed. Many SE researchers have discussed the SE ecosystem and how it is more efficient in generating new business and opens up many networks to consumers, providing them with needed goods or services. Furthermore, some recent studies have explored and explained the roles of the participants in SE, which has helped to increase business size, which is predicted to grow by up to USD 3.5 billion by 2025 [5,65]. Therefore, this paper intends to contribute by providing a condensed review of the SE ecosystem to explain the future impact of new social and economic configurations and the development of the SE platform and business model elements.

6. Conclusions

We conclude that classifying participants into primary and secondary helps business leaders understand each participant's current role and develop the secondary participants in the ecosystem to improve SE business in the future. Furthermore, the subdivision of the participants into groups sheds light on each participant type. In addition, the improvement in digital technologies positively reflects the integration between the participants in the SE ecosystem, which leads to more business sustainability. As shown in Figure 2, a framework is suggested that explains the value of the technologies to improve the integration between the participants and the impact on business sustainability. Moreover, the framework describes the role of the participants inside the SE ecosystem by classifying them as primary and secondary and subdividing them into groups to provide a clear understanding of which groups are considered in previous studies, as shown in Figure 2. More insights are needed into these types to understand how specific groups perform in SE and develop strategies according to SE business needs.

7. Directions for Future Studies

This paper found answers for a few future studies recommended in some reviewed articles. As shown in Table 5, some key themes from the review were explored. However, there remain unanswered questions. The table highlights the key themes in the thought, what has been learned from it, and what we still need to know.

Table 5. Key themes and directions for future studies.

Participants	What We Know	What We Need to Know
Mediators	Integrating the private and public sectors contributes to the stability of SE.	Could the integration between the private and public sectors affect the efficiency and cost of the sharing practice? [48]
Providers	Prosumers are more motivated to share business than providers.	Advanced technology impacts the services providers' business positively (increases the awareness of their business) or negatively (increases the value of negative online reviews) [12].
Customers	Current customers are braver in exploring services and products than new ones.	What technology could impact the new customers of the sharing business? [8]
Government	The government's role in the SE ecosystem is as a secondary participant.	Can policymakers help to enhance the influence of the government in becoming a primary participant in the SE ecosystem? [36]

This study highlighted that it is worth considering the value of the technologies in integrating the participants in the SE ecosystem, together with business performance and sustainability. This research helps to highlight the significant influence of digital technologies on the integration between participants in the studies conducted in the last five years. Based on the review, the theoretical and managerial implications focused on the value that returns to the business from integrating the participants in the SE ecosystem. There is, however, no evidence for this point. Therefore, it would be helpful for future research to consider more values of the integration of the SE participants.

Author Contributions: Conceptualization, S.A., J.A.-A. and A.B.; methodology, S.A. and J.A.-A.; formal analysis, S.A., J.A.-A. and A.B.; investigation, S.A., J.A.-A. and A.B.; data curation, S.A., J.A.-A. and A.B.; writing—original draft preparation, S.A. and J.A.-A.; writing—review and editing, S.A., J.A.-A. and A.B.; visualization, S.A., J.A.-A. and A.B.; project administration, S.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data is contained within the article.

Conflicts of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. PWC. Sharing or Paring? Growth of the Sharing Economy. 2020. Available online: https://www.pwc.com/hu/en/kiadvanyok/assets/pdf/sharing-economy-en.pdf (accessed on 24 February 2022).
2. Leung, X.Y.; Xue, L.; Wen, H. Framing the sharing economy: Toward a sustainable ecosystem. *Tour. Manag.* **2019**, *71*, 44–53. [CrossRef]
3. Eckhardt, G.M.; Houston, M.B.; Jiang, B.; Lamberton, C.; Rindfleisch, A.; Zervas, G. Marketing in the sharing economy. *J. Mark.* **2019**, *83*, 5–27. [CrossRef]
4. Pies, I.; Hielscher, S.; Everding, S. Do hybrids impede sustainability? How semantic reorientations and governance reforms can produce and preserve sustainability in sharing business models. *J. Bus. Res.* **2020**, *115*, 174–185. [CrossRef]
5. Lim, W.M. The sharing economy: A marketing perspective. *Australas. Mark. J.* **2020**, *28*, 4–13. [CrossRef]
6. Sutherland, W.; Jarrahi, M.H. The sharing economy and digital platforms: A review and research agenda. *Int. J. Inf. Manag.* **2018**, *43*, 328–341. [CrossRef]
7. Laurell, C.; Sandström, C. The sharing economy in social media: Analysing tensions between market and non-market logics. *Technol. Forecast. Soc. Chang.* **2017**, *125*, 58–65. [CrossRef]
8. Hamari, J.; Sjöklint, M.; Ukkonen, A. The sharing economy: Why people participate in collaborative consumption. *J. Assoc. Inf. Sci. Technol.* **2016**, *67*, 2047–2059. [CrossRef]
9. Martin, C.J. The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecol. Econ.* **2016**, *121*, 149–159. [CrossRef]

10. Lustig, C.; Pine, K.; Nardi, B.; Irani, L.; Lee, M.K.; Nafus, D.; Sandvig, C. Algorithmic authority: The ethics, politics, and economics of algorithms that interpret, decide, and manage. In Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems, San Jose, CA, USA, 7–12 May 2016; pp. 1057–1062.
11. Möhlmann, M.; Zalmanson, L. Hands-on the wheel: Navigating algorithmic management and Uber drivers. In Proceedings of the International Conference on Information Systems (ICIS), Seoul, Republic of Korea, 10–13 December 2017.
12. Cheng, X.; Fu, S.; de Vreede, G.J. A mixed method investigation of sharing economy driven car-hailing services: Online and offline perspectives. *Int. J. Inf. Manag.* **2018**, *41*, 57–64. [CrossRef]
13. Schor, J.B.; Fitzmaurice, C.J. Collaborating and connecting: The emergence of the sharing economy. In *Handbook of Research on Sustainable Consumption*; Edward Elgar Publishing: Cheltenham, UK, 2015.
14. Adner, R. Ecosystem as structure: An actionable construct for strategy. *J. Manag.* **2017**, *43*, 39–58. [CrossRef]
15. Dredge, D.; Gyimóthy, S. The collaborative economy and tourism: Critical perspectives, questionable claims and silenced voices. *Tour. Recreat. Res.* **2015**, *40*, 286–302.
16. Görög, G. The Definitions of Sharing Economy: A Systematic Literature Review. *Management* **2018**, *13*, 175–189. [CrossRef]
17. Acquier, A.; Daudigeos, T.; Pinkse, J. Promises and paradoxes of the sharing economy: An organising framework. *Technol. Forecast. Soc. Chang.* **2017**, *125*, 1–10. [CrossRef]
18. Belk, R. Sharing versus pseudo-sharing in Web 2.0. *Anthropologist* **2014**, *18*, 7–23. [CrossRef]
19. Rietveld, J.; Schilling, M.A. Platform competition: A systematic and interdisciplinary review of the literature. *J. Manag.* **2021**, *47*, 1528–1563. [CrossRef]
20. Thomas, L.D.; Ritala, P. Ecosystem legitimacy emergence: A collective action view. *J. Manag.* **2022**, *48*, 515–541. [CrossRef]
21. Wallace, K.J. Classification of ecosystem services: Problems and solutions. *Biol. Conserv.* **2007**, *139*, 235–246. [CrossRef]
22. Danley, B.; Widmark, C. Evaluating conceptual definitions of ecosystem services and their implications. *Ecol. Econ.* **2016**, *126*, 132–138. [CrossRef]
23. Assessment, Millennium Ecosystem. *Ecosystems and Human Well-Being: Wetlands and Water*; World Resources Institute: Washington, DC, USA, 2005.
24. Haines-Young, R.; Potschin, M. *Common International Classification of Ecosystem Services (CICES, Version 4.1)*; European Environment Agency: Copenhagen, Denmark, 2012; Volume 33, p. 107.
25. Peltoniemi, M.; Vuori, E. Business ecosystem as the new approach to complex adaptive business environments. *Proc. eBusiness Res. Forum* **2004**, *2*, 267–281.
26. Verba, S.; Schlozman, K.L.; Brady, H.E. *Voice and Equality: Civic Voluntarism in American Politics*; Harvard University Press: Cambridge, MA, USA, 1995.
27. Park, H.M.; Perry, J.L. Do campaign websites really matter in electoral civic engagement? Empirical evidence from the 2004 post-election internet tracking survey. *Soc. Sci. Comput. Rev.* **2008**, *26*, 190–212. [CrossRef]
28. Lutz, C.; Hoffmann, C.P.; Meckel, M. Beyond just politics: A systematic literature review of online participation. *First Monday* **2014**, *19*, 1–36. [CrossRef]
29. Evgeny, M. The Brave New World of Slacktivism. *Foreign Policy*; 19 May 2009. Available online: https://www.npr.org/templates/story/story.php?storyId=104302141 (accessed on 27 November 2022).
30. Andreotti, A.; Anselmi, G.; Eichhorn, T.; Hoffmann, C.P.; Micheli, M. Participation in the Sharing Economy. *SSRN* **2017**. [CrossRef]
31. Chen, H.; Chiang, R.H.; Storey, V.C. Business intelligence and analytics: From big data to big impact. *MIS Q* **2012**, *36*, 1165–1188. [CrossRef]
32. Cheng, M. Sharing economy: A review and agenda for future research. *Int. J. Hosp. Manag.* **2016**, *57*, 60–70. [CrossRef]
33. Böcker, L.; Meelen, T. Sharing for people, planet or profit? Analysing motivations for intended sharing economy participation. *Environ. Innov. Soc. Transit.* **2017**, *23*, 28–39. [CrossRef]
34. Lan, J.; Ma, Y.; Zhu, D.; Mangalagiu, D.; Thornton, T.F. Enabling value co-creation in the sharing economy: The case of mobike. *Sustainability* **2017**, *9*, 1504. [CrossRef]
35. Miralles, I.; Dentoni, D.; Pascucci, S. Understanding the organisation of sharing economy in agri-food systems: Evidence from alternative food networks in Valencia. *Agric. Hum. Values* **2017**, *34*, 833–854. [CrossRef]
36. Ganapati, S.; Reddick, C.G. Prospects and challenges of sharing economy for the public sector. *Gov. Inf. Q.* **2018**, *35*, 77–87. [CrossRef]
37. Jin, S.T.; Kong, H.; Wu, R.; Sui, D.Z. Ridesourcing, the sharing economy, and the future of cities. *Cities* **2018**, *76*, 96–104. [CrossRef]
38. Boons, F.; Bocken, N. Towards a sharing economy—Innovating ecologies of business models. *Technol. Forecast. Soc. Chang.* **2018**, *137*, 40–52. [CrossRef]
39. Mauri, A.G.; Minazzi, R.; Nieto-García, M.; Viglia, G. Humanise your business. *Role Pers. Reput. Shar. Economy. Int. J. Hosp. Manag.* **2018**, *73*, 36–43.
40. Ma, Y.; Rong, K.; Luo, Y.; Wang, Y.; Mangalagiu, D.; Thornton, T.F. Value Co-creation for sustainable consumption and production in the sharing economy in China. *J. Clean. Prod.* **2019**, *208*, 1148–1158. [CrossRef]
41. Simon, F.; Roederer, C. When social intrusiveness depletes customer value: A balanced perspective on the agency of simultaneous sharers in a commercial sharing experience. *Psychol. Mark.* **2019**, *36*, 1082–1097. [CrossRef]
42. del Mar Alonso-Almeida, M.; Perramon, J.; Bagur-Femenías, L. Shedding light on sharing ECONOMY and new materialist consumption: An empirical approach. *J. Retail. Consum. Serv.* **2020**, *52*, 101900. [CrossRef]

43. Govindan, K.; Shankar, K.M.; Kannan, D. Achieving sustainable development goals through identifying and analysing barriers to industrial sharing economy: A framework development. *Int. J. Prod. Econ.* **2020**, *227*, 107575. [CrossRef]
44. Hossain, M. Sharing economy: A comprehensive literature review. *Int. J. Hosp. Manag.* **2020**, *87*, 102470. [CrossRef]
45. Sands, S.; Ferraro, C.; Campbell, C.; Kietzmann, J.; Andonopoulos, V.V. Who shares? Profiling consumers in the sharing economy. *Australas. Mark. J.* **2020**, *28*, 22–33. [CrossRef]
46. Song, P.; Zhou, Y.; Yuan, J. Peer-to-peer trade and the economy of distributed PV in China. *J. Clean. Prod.* **2021**, *280*, 124500. [CrossRef]
47. Shen, L.; Qin, C.; Luo, C. A Grounded Theory Approach to Brand Value Networks: The Prosumption Logic Standpoint. *Am. J. Ind. Bus. Manag.* **2020**, *10*, 841. [CrossRef]
48. Pereira, C.H.T.; Silva, M.E. Understanding the Integration of Socio-Technical Actors for Sharing and Sustainable Urban Mobility. *Braz. Bus. Rev.* **2021**, *17*, 706–724. [CrossRef]
49. Carrigan, M.; Magrizos, S.; Lazell, J.; Kostopoulos, I. Fostering sustainability through technology-mediated interactions: Conviviality and reciprocity in the sharing economy. *Inf. Technol. People* **2020**, *33*, 919–943. [CrossRef]
50. Carroll, E.; Romano, J. *Your Digital Afterlife: When Facebook, Flickr and Twitter Are Your Estate, What is Your Legacy?* New Riders: Hoboken, NJ, USA, 2010.
51. Mittendorf, C. What Trust Means in the Sharing Economy: A Provider Perspective on Airbnb.com. In Proceedings of the 22nd Americas Conference on Information Systems (AMCIS 2016), San Diego, CA, USA, 11–14 August 2016.
52. Kumar, V.; Lahiri, A.; Dogan, O.B. A strategic framework for a profitable business model in the sharing economy. *Ind. Mark. Manag.* **2018**, *69*, 147–160. [CrossRef]
53. Henten, A.H.; Windekilde, I.M. Transaction costs and the sharing economy. *info* **2016**, *18*, 1–15. [CrossRef]
54. Köbis, C.N.; Soraperra, I.; Shalvi, S. The consequences of participating in the sharing economy: A transparency-based sharing framework. *J. Manag.* **2021**, *47*, 317–343. [CrossRef]
55. Chen, Y.; Richter, J.I.; Patel, P.C. Decentralised governance of digital platforms. *J. Manag.* **2021**, *47*, 1305–1337.
56. Ciulli, F.; Kolk, A. Incumbents and business model innovation for the sharing economy: Implications for sustainability. *J. Clean. Prod.* **2019**, *214*, 995–1010. [CrossRef]
57. Lutz, C.; Hoffmann, C.P. The dark side of online participation: Exploring non-, passive and negative participation. *Inf. Commun. Soc.* **2017**, *20*, 876–897. [CrossRef]
58. Zheng, F.; Kang, C.; Song, Q.; Liu, M. Entropy-Maximization-Based Customer Order Allocation of Clothing Production Enterprises in the Sharing Economy. *Sustainability* **2022**, *14*, 15106. [CrossRef]
59. Chen, G.; Cheng, M.; Edwards, D.; Xu, L. COVID-19 pandemic exposes the vulnerability of the sharing economy: A novel accounting framework. *J. Sustain. Tour.* **2020**, *30*, 1141–1158. [CrossRef]
60. Acquier, A.; Carbone, V.; Massé, D. How to create value (s) in the sharing economy: Business models, scalability, and sustainability. *Technol. Innov. Manag. Rev.* **2019**, *9*, 5–24. [CrossRef]
61. Fang, Y.H.; Li, C.Y. Does the sharing economy change conventional consumption modes? *Int. J. Inf. Manag.* **2022**, *67*, 102552. [CrossRef]
62. Mont, O.; Palgan, Y.V.; Bradley, K.; Zvolska, L. A decade of the sharing economy: Concepts, users, business and governance perspectives. *J. Clean. Prod.* **2020**, *269*, 122215. [CrossRef] [PubMed]
63. Rojanakit, P.; de Oliveira, R.T.; Dulleck, U. The sharing economy: A critical review and research agenda. *J. Bus. Res.* **2022**, *139*, 1317–1334. [CrossRef]
64. Zahoor, N.; Al-Tabbaa, O.; Khan, Z.; Wood, G. Collaboration and internationalisation of SMEs: Insights and recommendations from a systematic review. *Int. J. Manag. Rev.* **2020**, *22*, 427–456. [CrossRef]
65. Curtis, S.K.; Lehner, M. Defining the sharing economy for sustainability. *Sustainability* **2019**, *11*, 567. [CrossRef]

sustainability

MDPI

Article

Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable "Digital"?

Peter M. Bican [1,*] and Alexander Brem [2,3]

[1] Chair of Technology Management, University of Erlangen-Nuremberg, 90762 Fürth, Germany
[2] Institute of Entrepreneurship & Innovation, University of Stuttgart, 70569 Stuttgart, Germany; alexander.brem@ets.uni-stuttgart.de
[3] Mads Clausen Institute, University of Southern Denmark, 6400 Sønderborg, Denmark
* Correspondence: peter.bican@fau.de

Received: 12 April 2020; Accepted: 12 June 2020; Published: 28 June 2020

Abstract: Digitalization plays a major role in contributing towards the United Nations Sustainable Development Goals. Without transformation of existing businesses, both economic and environmental challenges of the future cannot be solved sustainably. However, there is much confusion on interrelationships and terms dealing with digitization or digitalization: Digital business model, digital transformation, digital entrepreneurship. How do these terms interrelate with and to digitalization, and how do they support firms to grow sustainably? To answer this question, we identified seven core digital-related terms based on a structured literature search within the management and economics domain, namely: Digital, Business Model, Digital Business Model, Digital Technology, Digital Innovation, Digital Transformation, and Digital Entrepreneurship. Thereafter, we analyzed prior literature for deriving a common understanding and definition as a basis for interrelations within a conceptual framework. Definitions were presented in a case study setup with twelve innovation and research and development (R&D) managers from various business units of a German high-tech company. Based on these insights, we propose a conceptual framework on how Digital Readiness, Digital Technology, and Digital Business Models might sustainably relate to Innovation, moderated by a Digital Transformation Process. With this approach, we aim to equip practitioners and researchers alike in handling and addressing change through digitalization sustainably.

Keywords: digitalization; business model; digital business model; digital technology; digital innovation; digital transformation; digital entrepreneurship; sustainable business model

1. Introduction

As digitalization or digitization has been gaining momentum in recent years, it is here to last [1]. This is supported by impressive numbers: Around 39.1 million results on Google for the search term "digital transformation", 818 thousand for "digital business model", 311 thousand for "digital entrepreneurship", and, altogether, 7.3 billion results for the search term "digital" (Google search query, performed with the respective search terms on May 10th, 2020). Apparently, digital *whatever* is not only a dominant topic in industry and academia, but especially when talking about transforming business models into a sustainable and circular economy. There is no conference, no new business model, and no political discussion that lacks a reference to "digital" or its often-used siblings, Innovation 4.0 or Industry 4.0. However, a common understanding of the various terms is lacking, especially in academia. Confusion is paramount (as with other contemporary concepts, like Artificial Intelligence), and "digital" risks deteriorating into a mere buzzword [2]. Further complicating the digital conundrum, digital terms and interrelations are not only perceived differently between the various fields of study,

but also within specific research fields, like social sciences or engineering. The same applies to different constructs of "digital": How these can be understood if they comprise new ways of identifying and addressing consumers or if "digital" is simply about technology, or about framing a new business model—it all remains opaque.

Without a common understanding and interrelations, roots, applications, effects, and, ultimately, sustainable measures are hard to build, develop, and discuss [3]. Without these interrelations, the academic discourse lacks the basis upon which to build. Therefore, it is key to have a common understanding of these interrelations, as this is a prerequisite for exchanging and building knowledge and, ultimately, applying "digital" to sustainable economic and environmentally friendly activities [4]. This entails the necessity for a common understanding of the most prevalent terms of the digital environment and their relations.

With this paper, we aim at addressing this necessity. In a multi-method approach, based on a review of current literature, we identified seven core digital-related terms within the management and economics literature, namely: Digital, Business Model, Digital Business Model, Digital Technology, Digital Innovation, Digital Transformation, and Digital Entrepreneurship. Through the analysis of prior literature, we derived a common understanding and definition of these terms, as well as their potential interrelations. We scrutinized these interrelations in a focus group on digital business models with innovation and research and development (R&D) managers from various business units to derive a common understanding. Based on this, we developed a conceptual framework, connecting these previously unconnected digital terms. With this conceptual framework, practitioners and researchers alike are better equipped in handling and addressing change through "digital" sustainably.

2. Background: Mapping the Academic Confusion

The most basic forms of digital terminologies, often employed synonymously, are digitization and digitalization. Digitization refers to a technical process, i.e., "the integration of digital technologies into everyday life" [5]. Seeing this technical process through the lenses of information technology on coding and programming, digitization describes analog information that is transformed into a digital format, for example, through making physical products programmable or communicable [6,7]. Contrastingly, digitalization is depicted " ... as a socio-technological process of applying digitization techniques to broader social and institutional contexts that render digital technologies' infrastructures" [8,9].

Analyzing firms in terms of their respective industries and industry-specific knowledge sources, the industry taxonomy counts digital firms in the field of science-based firms [10–12]. This field covers electronics, chemicals, and related sectors. This is fostered through recent advances in integrating external knowledge, for example, through platforms [13]. Hanelt et al. [14] nonetheless refrain from a distinction of digitization on industry level. To them, digitization has to be analyzed on the product level, thereby differing between and within industries. Three archetypes are distinguished by the level of digitization, ranging from no digitization to fully digitized: (1) Purely physical products, (2) digitally enhanced physical products, and (3) fully digitized products [14]. Reflecting on the industry and product level, these differing views on "digital" in firms raise the question of if these are not affected by firms' underlying business models or, specifically, digital business models.

Firms' business models can be seen as " ... a system of interconnected and interdependent activities that determines the way the firm "does business" with its customers, partners, and vendors" [15]. This view also accounts for the necessary activities to fulfill these needs and their interdependencies, and the benefits reaped for the firm [15,16]: It is " ... the rationale of how an organization creates, delivers, and captures value" [17]. As a structural template, business models identify firms' value proposition, the associated network, cost as well as revenue sources, and other key differentiators [18–20].

The "digital" in the digital business model can be seen as enhanced resource optimization through digital technologies, like with Uber-like mobility-sharing schemes or Software as a Service (SaaS), interacting between entities and systems [21–23]: "A business model is digital if changes in digital technologies trigger fundamental changes in the way business is carried out and revenues are

generated" [24]. These changes are epitomized in the distinction between place (i.e., before internet business models) and space (i.e., digital world) [25]: "[I]t was a world that was tangible, product-based, and oriented toward customer transactions. Today, many industries—all moving at different rates—are shifting toward a digital world of 'space': More intangible, more service-based, and oriented toward customer experience" [25]. Weill and Woerner [25] present three components that, to them, are at the center of a digital business's value proposition: Platform, content, and experience. Further characteristics of digital business models identified by prior literature comprise: Their intangible nature, implying a potential unlimited re-usability of data collected over multiple functional conditions [26], amendments to classical product architecture [6], increased reciprocal exchange between information and telecommunication technologies and digital business models [27], and software-based capabilities that enhance existing functionalities [6,28,29]. However, efficiency advances might come at the cost of an increased complexity beyond comprehension compared to previous product architectures [30,31].

As "digital" comprises deep technology aspects, digital technology forms the basis of innovations in platform and digital environments [13,22,32,33]. To shed light on the underlying definitions of digital technologies, the EU Commission proposes four main categories: "Mobile, social media, cloud, and data analytics" [34]. As they form technology ecosystems, new innovations supersede their predecessors by evolving from them [35]. This can be understood as a transformative change to how business is being conducted [36]. Digital technologies are highly interconnected, enabling and enhancing information processing capacities [37,38]. This integrated engineering fostered through digital technology drives adoption along all elements of the value chain, rendering existing process less important: " ... all participating entities can be supplied with access to real-time information and control is distributed to the shop-floor level" [39]. In this way, digital technologies become the orchestrators of innovation, with differing effects and outcomes depending on purpose and context [31].

Applying and building upon existing, well-known technologies can lead to digital innovations like the GoPro or FitBit [40]. In the Schumpeterian thinking (e.g., [41]), digital innovations can be seen " ... as the carrying out of new combinations of digital and physical components to produce novel products" [7]. These digital innovations are often characterized by radical change and their disruptive nature, thereby overcoming barriers to enter previously closed markets [7,42]. Participation in digital innovation is not limited to very few, since access to digital technology is the only hindrance [43]. Widespread deployment of digital technology, fostered through rapid price declines and ever-increasing digital performance, provided this access and opened the diffusion of unbound digital innovation to the masses [43,44]. "Given the above conceptualization, digital innovation management refers to the practices, processes, and principles that underlie the effective orchestration of digital innovation" [31]. Thereby, innovation becomes faster, with an increased lack of control [2]. "Accordingly, every digital innovation process can be viewed as a constant discovery, manifestation, and combination of one or more design patterns wherein each pattern identifies a new and different relationship between at least two components of the digital technology functions" [31].

These new and different relationships also characterize digital transformation, however, on a different level: Digital transformation "[brings] together firms from previously unrelated industries" [7]. Data exchange, data generation, data analysis, and data adaption to processible information are seen as necessary and important competences in mastering this process of digital transformation [20,45]. With these abilities at hand, the inevitable organizational change by digital technologies and digital business models might lead to an improved business result [46]. The digital transformation does not stop at the often-referenced process level [47]: It bears profound implications for all business aspects, like business models, services, products, etc., and involves the actions of all participants, like customers [20,48]. Consequently, Kaltum et al. [49] argue that " ... digital transformation is a profound change and accelerates business activities, processes, competencies, and models to fully exploit the changes and opportunities in digital technology and its impact on society in a strategic and prioritized way".

This impact on society has not been neglected by politics, claiming the ever-growing significance of digital activities in entrepreneurship. "Digital entrepreneurship embraces all new ventures and

the transformation of existing businesses by creating and using novel digital technologies" [34]. Here, digital technology and digital artifacts are distinctive characteristics of venture creation [50,51]. With new platforms, networks, and systems, further development and enhancement of existing infrastructures are the aims [8]. By means of "digital", the pursuit of opportunities offers significant potential for previously excluded groups, enhancing the democratizing nature of entrepreneurship [52]. Within the group of digital entrepreneurs, digital technology entrepreneurs actively engage in digital technology and services to create their ventures, moving digital entrepreneurs' borders beyond existing ecosystems [40]. Their drive to success is grounded in science and an understanding and application of technologies [40].

Reflecting on prior literature relating to "digital", as outlined above, motivated us to derive a framework for further analysis. However, before deriving a framework of digital interrelations, the findings of our analysis of relevant literature on "digital" are presented in Table 1.

Table 1. Findings on digital terms.

Term	Findings from Literature
Business Model	Firms 'interaction with suppliers, customers, and partners as rationale of firms' value propositions
Digital-Digitization	A technical process where analog information is transformed into a digital format
Digital-Digitalization	Application of digitization techniques as socio-technological process
Digital Business Model	Augmented resource optimization, characterised by intangibility, and centering around experience, platform, and content
Digital Technology	Highly interconnected orchestrator of innovation with transformative change to business
Digital Innovation	Innovation process as constant discovery through new combinations of physical and digital, opening participation for a wider access-base
Digital Transformation	Enhanced (data) exchange with (unrelated) partners encompassing profound changes and implications for all business aspects
Digital Entrepreneurship	Embracing new ventures and transformation in pursuit of opportunities by opening up entrepreneurship for the excluded

Starting from the more abstract and general digitization and digitalization to digital formats incorporated within digital business models [6,7], this provides a first glance on how the digital constituents of a conceptual framework might interact and interrelate (see with Figure 1). Thereby, the enhanced resource optimization for more sustainable businesses is driven through digital technologies [21–23], forming the basis of digital innovations in platforms and digital environments [13,22,32,33]. These digital innovations inevitably result in organizational change through digital technologies and digital business models, paving their way to digital transformation of organizations, bearing profound and sustainable implications for all business aspects [20,46,48]. This also affects the way new ventures interact, laying ground for digital entrepreneurship [8], and, more specifically, by moving digital entrepreneurs' borders beyond existing ecosystems to digital technology entrepreneurship [40]. This development is reflected in the conceptual framework, as presented in Figure 1.

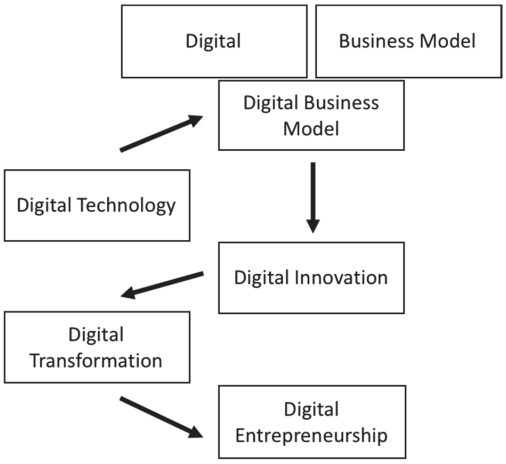

Figure 1. Proposed basis for a conceptual framework.

This forms the basis for our empirical examination in the next step.

3. Materials and Methods: A Case Study Approach

For new phenomena where no prior literature is available, qualitative research can help to found patterns and propositions for future research. In this understanding, it is important to find an appropriate case that fits as a first empirical indication to derive generalizable results. Yin [53] uses the term "unique case" for that challenge. This implies that such a chosen case must be specific regarding the underlying research problem on the one hand, and generic to be applicable for many other research subjects on the other hand.

Hence, our single-case analysis was conducted at a high-technology firm that was affected by the process of digitalization in a special way. Predominately active in business-to-business (B2B) ventures, the firm is a so-called traditional German Mittelstand hidden champion (<20.000 employees), active in various business fields (see the main business activities in Table 2). The industry is rather traditional, but major changes were also observed in recent years in terms of digitalization, both in internal and production processes, as well as in external customer demand. "Digital" became a constituent of nearly every meeting and initiative. Even though our level of analysis is a single firm, the business fields are diverse, stemming from the firm's development over time (see with Table 2), and enable a broader view and varied insights.

Table 2. Characteristics of the case study firm.

Industry/Branch	Employees	No Participants
Aviation	5500	2
Controls/Appliances	3600	1
Corporate Departments	200	1
Defence	2500	1
Metal	3500	5
Metering	1700	1

We conducted a twofold analysis (see with Figure 2): First, before the focus group, we conducted a pre-assessment of digital taxonomies through an online questionnaire. We then presented and discussed the results from the preliminary online questionnaire and the interrelated digital literature derivation in a focus group workshop onsite. Focus group workshops are appropriate to further reflect

on and challenge the findings from literature and the questionnaire-based pre-assessment of digital taxonomies, as opportunities for different views of participants and clarification of responses emerge, which enables one to evaluate and value opinions and positions [54–56]. Thereby, the literature-based findings on "digital" were presented as a starting point. Based on that, a moderated discussion took place about if and how the suggested relationships are perceived in the individual firm branch setup.

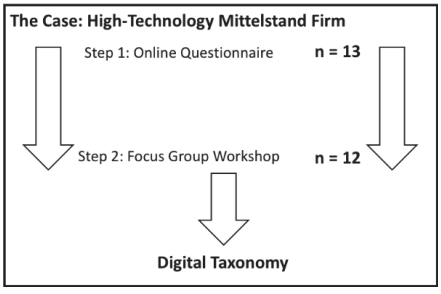

Figure 2. Methodology.

The online questionnaire was distributed anonymously to fifteen innovation managers from seven different business divisions of the above case-study firm. In the questionnaire, we presented participants with the following: In addition to assessing personal and firm-related information, two questions, each with seven sub-categories, were asked: (1) "Please define the following terms in your own understanding" (terms: Digital, Business Model, Digital Business Model, Digital Technology, Digital Innovation, Digital Transformation, Digital Entrepreneurship), and (2) "Does your firm provide a definition of the following terms and, if so, please include the respective definition" (terms: Digital, Business Model, Digital Business Model, Digital Technology, Digital Innovation, Digital Transformation, Digital Entrepreneurship). Thirteen managers participated, whereof eight managers answered all questions presented.

During a half-day workshop, the focus group workshop was performed with twelve innovation managers from eleven different business divisions of this firm, following the steps outlined by [56]. All participants were male, predominantly aged between forty and fifty years, and with an average firm tenure of between two and twenty-seven years.

4. Results

4.1. Online Questionnaire

The preliminary online questionnaire revealed unconcise answers: Participants did not reveal a common understanding of the different digital terms, understanding the digital terms in various ways. To present an overview of and graphically depict the understanding of the different terms asked during this pre-assessment, we created a summarizing word-cloud, highlighting the key words from the most commonly mentioned answers, as seen in Figure 3:

As can be seen, identified key topics were related to financial terms ("earn", "money", "value"), as well as terms commonly used to represent the antagonism of the digital and the pre-digital business landscapes, like "platform", analog, or "x . . . ". Other key terms were distributed evenly, both digital-related (like "processing") and unspecified (like "innovations").

In detail, "digital" was described by one respondent as "IT-based, acquired and transmitted via electronic systems". The opposite of analog, computer-based, or the combination of "0" and "1" were also named commonly, grounding the overall definition in machine-applied settings. Contrarily, the business model itself was more compatible in the economic and business realm: "Concept to generate economic value out of a solution." It was mainly described as a (business-related) process to generate revenues by investing

and exchanging resources with the aim of value creation, or, put simply: "How do I earn money with what and how I do it?" The convergence between the two was mentioned as a "concept to generate economic value out of a solution that is based on electronic data processing." In addition to a business model focused on data collection, processing, or data management through digital technologies and media, illustrations "of components required to earn money by using digital platforms" were highlighted.

Figure 3. Word-cloud summarizing the digital terms.

This also transfers into the definition of Digital Technology as a "segment of technology that is based on electronic data acquisition, processing, or analysis." This digital component view has been prevalent in respondents' answers, also extending to digital values or innovations. In turn, Digital Innovations are understood as a "novel concept that is economically viable and based on electronics/data." Building on the prior definitions of Digital Business Models, Digital Innovations are seen as new, market-ready ideas incorporating optionalities stemming from digitalization, successfully transforming inventions (i.e., execution) into the digital world. These new Digital Innovations are also seen as being on the brink of replacing existing methods and solutions.

This idea of replacement leads into respondents' answers to Digital Transformation: "Significant change of an existing environment due to transferring major processes to digital solutions." Change is the predominant response associated, as a "way from the analog world to the digital world." Industries are consequently adjusting to adapt to the continuous usage of data, digital technologies, and digital platforms, eventually re-shaping products, work environments, and the economy. This is also fostered through the entrepreneurship active in Digital Business Models. "The culture and spirit around digital innovation" are seen as fundamental to Digital Entrepreneurship. Thereby, new firms are being set up to bring Business Models relating to Digital Innovation and Digital Transformation to the market and add value. They show a high intensity towards optimization, customer interaction, and utilization of Digital Technologies.

Compared to the individual views of the respondents above, solely four out of 12 respondents were able to provide answers to their firm's view on all of the above discussed "digital" topics. From these four firm-related responses, the following could be disseminated: "Digital" is seen as being '"based on sensors, controls, and electronics" and automating manual processes. This resembles the Business Model, described as the "concept of generating economic value with a solution", supported by tools that model Business Models. With a digital component, these become Digital Business Models, generating economic value through a digital solution (however, following the same principles). For Digital Innovation, one respondent mentioned that, in the future, every innovation is digital, whereas other respondents specified it more as an electronics-based (hardware, software) innovation. Contrary to those, one respondent treated Digital Innovation as any other innovation. These Digital

Technologies rapidly and increasingly change industries through Digital Transformation, with one respondent claiming that each transformation is digital in the future. In this wake, digitalization increases up to every firm being digital in the future, with Digital Entrepreneurship harming existing businesses. This is fostered by enlarging the business bases through its digital potential.

4.2. Focus Group Workshop

The results from our literature review and the responses from the preliminary online questionnaire formed the basis for the focus group workshop, revealing the following results: First, different frameworks were discussed, starting from the original derived framework (Figure 1). As with the results of the preliminary online questionnaire, no common definitions and understandings could be agreed upon. The following two figures (Figures 4 and 5) condensed the different variants of relationships being discussed.

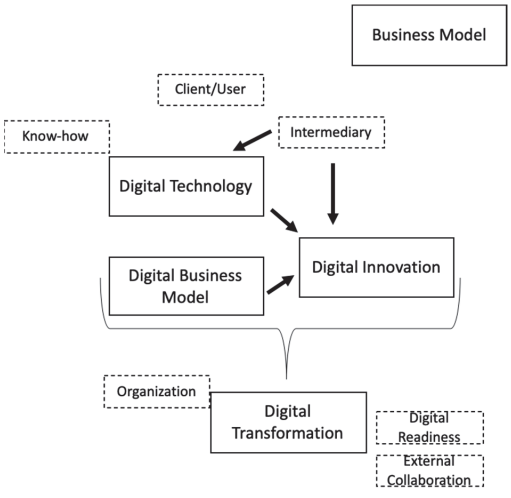

Figure 4. Framework development part 1.

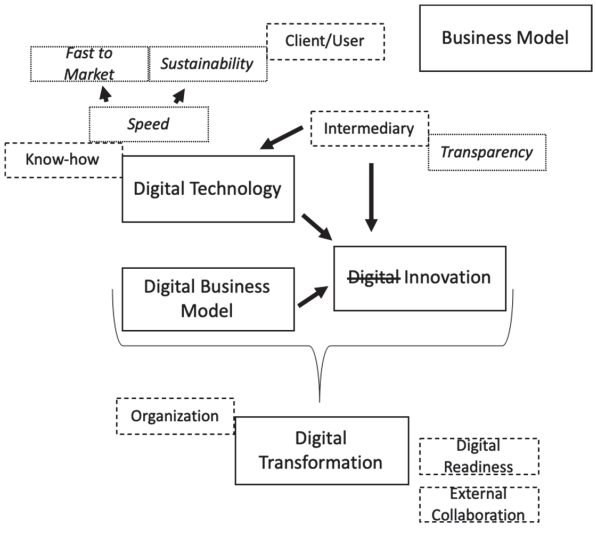

Figure 5. Framework development part 2.

As a first step of the focus group workshop, participants eliminated the terminologies of Digital and Digital Entrepreneurship presented before. As one participant framed it, these terminologies are already included within the remaining terminologies and lack any inherent distinction. Furthermore, the Business Model was shifted aside as the top term. Then, the framework was extended by the following mitigating factors: Client/user influence, know-how, intermediary, organization, digital readiness, and external collaboration. Digital Technology, grounded in know-how, and Digital Business Model directly influence Digital Innovation, whereas intermediaries affect Digital Technology (direct effect) and Digital Innovation (direct and indirect effect).

Digital Transformation is not only seen as the outcome of the interplay between Digital Technology, Digital Business Model, and Digital Innovation, but is also influenced by the organization, its digital readiness, and external collaborations to foster the Digital Transformation. "External collaborations are a crucial factor in managing the digital transformation", as one participant noted. "Without digital readiness, implementing digital technologies, digital business models, or mastering digital transformation is impossible", mentioned another participant, reflecting one of the main concerns that surfaced during the focus group workshop. However, discussions within the focus group workshop led participants to further adjustments of their redefined framework, leading to Figure 5.

"Which innovations aren't digital anymore and why should digital innovation be different from innovation itself?" one participant asked, leading the focus group to strip the Digital Innovation of the Digital. Furthermore, some of the above newly included factors were extended to success-enabling components: The factor of know-how, influencing Digital Technology, is reliant on speed, which, in turn, is reliant on being sustainable and fast to market, to eventually influence Digital Technology's success. Transparency is a major component, both of chance and concern, in enabling successful intermediary roles in Digital Technology and Innovation. Client and user involvement is important to eventually foster the Digital Transformation, especially as these digital solutions need to be implemented with speed, but still provide a sustainable future for the respective business.

Finally, the following key factors were revealed: Everyone is affected by "digital", though not everyone needs to act. (Digital) Innovation is double-edged: Even though most processes need to be digitalized, a platform conversion of businesses and clients does not always provide a viable option and does not make economic sense for all applicable cases. This is advanced by the constant need to innovate and to keep track of novel developments, which are required by constant change in business activities and pressure to innovate.

Business activities most threatened by "digital" are those of low-margin and commodity businesses. Successful business lines should be continued as before, and should not be amended to "digital" per se. For example, one of the participants mentioned a fully functional, non-digital ecosystem between suppliers, customers, and the firm itself. Shifting to a platform-based digital business model might not only render the old business model obsolete within the functioning ecosystem, but also open the gates for new competition that previously had no viable market access in the existing ecosystem, driving down margins with no additional value to the firm. Throughout the focus group workshop, participants understood Digital Transformation overwhelmingly as an underlying process affecting all other instances and terminologies of "digital". The Business Model itself encompasses all terminologies of "digital", leading eventually to Digital Transformation.

5. Discussion: A Conceptual Framework for Research and Practice

Not only in academia, as was posited in the introduction, is confusion paramount when it comes to addressing a common understanding of the various "digital" terms. As introduced earlier, it is key to have a common understanding as a prerequisite for exchanging and building knowledge sustainably [4]. Our literature review, the results from the questionnaire, and the focus group workshop revealed that a common understanding is not prevalent, but needs to be developed. In particular, the answers to the questionnaire revealed that even though the respondents had their personal views

on the different digital terminologies, only four could reply and provide answers with regards to their employers' view.

This uncertainty and confusion indicates that definitions of digital terminologies are necessary, but might be sufficiently defined if centered on a limited number of key terms. However, the difficulty persists in universally agreeing on common definitions: Digital Innovations might not be a term necessary to be defined, since the way of deciding between a "digital" or "normal" innovation seems unclear and unreasonable. Is not any innovation being characterized by similar preconditions and "digital" just a result of constant innovative developments? Digital Business Models, however, depend on the underlying business and core values [57] and would need to be defined individually, depending on each firm's unique value propositions and leadership character [58,59]. Digital Transformation is influenced by various factors like customer focus, customer proximity, margin pressure, speed of change within respective business activities, or—as put by our focus group—by Digital Readiness and external collaboration.

Even though no common understanding of "digital" could be agreed upon, the above findings are condensed in Table 3 to offer a proposition of the definitions and interrelations of the different digital terms for future discussions.

Table 3. Proposed definitions and interrelations.

Term	Proposed Definitions and Interrelations
Business Model	Top term encompassing all terminologies of Digital interacting the pathway to Digital Transformation of firms' value propositions
Innovation	Constant discovery through new combinations and interdependent on economic viability, while opening participation for a wider access-base
Digital Readiness	Basis as organizational necessity for implementation of anything Digital
Digital Technology	Highly interconnected orchestrator of know-how-influenced innovation, enabling transformative change through speed and sustainable market activities
Digital Business Model	Enhanced resource optimization, characterised by intangibility, businesses' uniqueness, and core values, centering around experience, platform, and content
Digital Transformation	Outcome of Digital interplay as underlying process, contingent internally (organization) and externally (cooperation), while embracing profound change and implications

The results helped to reshape the interrelation of digital terms that was first derived from the literature and the proposition for a conceptual framework (as in Figure 1). Incorporating these thoughts and results from the questionnaire and the focus group workshop led to a refinement of the proposed conceptual framework (Figure 6).

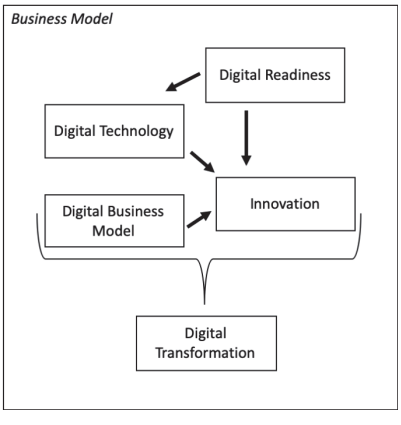

Figure 6. The conceptual framework of "digital".

Embedded within the firm's overall business model, the different digital terms and innovations thrive to eventually master the Digital Transformation [20,60] sustainably. Rather than being a step-in-process to Digital Entrepreneurship, Digital Transformation spans all relations within the digital framework. In the same view, Kaltum et al. [49] argue that Digital Transformation is the means to capitalize on everything related to "digital". This extends the work of Yoo et al. [7] in that Digital Transformation does not only enable distinct firms to come together, but also all activities within firms relating to digitalization and, eventually, innovation within their respective business models, transcending previously defined inner-firm organizational boundaries, as agile methods upended previously fixed innovation approaches [61]. Innovation in itself lies at the center of Digital Technology and Digital Business Models [62], with Digital Readiness surfacing as an organizational enabler within the conceptual framework of "digital". The results also demonstrate that, independent of any "digital"-related activities, activities need to be closely aligned and adjusted according to each firm's individual business model [2,15,17,63]. In this way, it is ensured that digitalization and, ultimately, Digital Transformation are sustainable and not only for digitalization's sake and without any effect or reasoning for firms' underlying (Digital) Business Models.

In this way, Figure 6 supports managers in understanding and navigating the digital terminology by handling the intensity of customer interaction, the intensity of the respective competitive environment, and the level of digital technologies present within each respective industry. One key factor revealed by the focus group was that the loss of direct access to clients should be avoided by all means and not handed over to intermediaries inconsiderately. Digitalization should not be ignored, but also not be approached with panic or blind rushes into things—it is not a revolution [64]. For instance, if your current non-digital business is performing, it might make sense to continue with it if this is a special market area where no one else is expected to enter. If you make it digital too early, this might lead to cannibalizing your own business, in case the margins in the new setup are lower.

This refers back to the established discussion about the innovator's dilemma [65]. An example in this context is the publishing industry. With the changing ecosystem, it becomes apparent that a new business model is needed, but the question is of when it will be the right time to move from print to digital [66]. With the new digital approach of emerging technology companies, it might leapfrog a whole business in a short period of time, which will be challenging for companies that are not prepared for it [67].

Business models need to be analyzed as to their future readiness and sustainability impact, as both economic and environmental sustainability are an intertwined challenge for businesses that cannot be tackled in isolation [68,69]. In doing so, "digital" plays a vital role in contributing towards the goals of the United Nations Sustainable Development Goals, where economic and environmental issues are at the heart of solving the challenges of the future [70]. For firms to be able to navigate these complex challenges, transforming their existing business models into Digital Business Models, with short- and long-term effects for resource allocation and reduced resource utilization towards a circular economy, becomes paramount for sustainable market activities [69,71]. The concept of a circular economy supports firms in operationalizing sustainable developments, which can be fostered through "digital" [72,73]: Through digital business models, potentially alongside intermediary integration where unavoidable, supply chains are enabled to reduce parts needed and to avoid waste, as well as to digitally transform the business model for sustainable value capture and value creation beyond mere resource consumption, while also being able to strengthen and deepen customer interaction [72,74,75]. Businesses can grow sustainably without increasing their environmental footprint. In other words: "I don't think digital is very different from other stuff, in that we still think the brick and the play system is at the core of what we do [. . .] But digital is an opportunity for us to enhance that"—Niels Christiansen, CEO of The Lego Group [76].

So overall, is there a sustainable digital after all? The answer is, as in many cases, it depends; apparently, there is no automatism. So for instance, if a new digital approach saves resources like in cases of virtual conferences instead of onsite conferences with participants from all over the world,

the answer would be a straight yes. However, in other contexts, the answer might even be a straight no; for example, if a new digital offer leads to high negative effects on the environment, like in the case of cryptocurrencies with a very high energy demand all over the world.

6. Limitations/Further Research

This research is based on a case study of a single firm in Germany. Further research might want to expand this to other European companies. Beyond that, results might differ in the Asian or US contexts. Another limitation is the fact that this firm was an established traditional Mittelstand firm with a certain size. An analysis of SMEs (small and medium-sized enterprises) in this context will offer further interesting insights and differences. We chose a multi-method approach primarily grounded in qualitative research. Our online questionnaire and the focus group workshop have limitations of their own, which are inherent within the respective research methods. However, at this exploratory stage, the findings revealed should also spur future discussions and research on this topic. Building on these preliminary findings, a longitudinal study with different employee levels would pose an interesting option to gain more detailed and validated insights, preferably towards a taxonomy of "digital". Future research on digital might operationalize sustainability even further, for instance in the context of different individual sustainability levels and actions [77]. Finally, it would also be interesting to analyze failure cases of digital strategies, e.g., in terms of bad timing. This would also offer key insights into the dynamics of digitalization.

Author Contributions: P.M.B. coordinated the project, data collection and analysis, and drafted/revised this article; A.B. provided conceptual input and comments, and contributed to writing/revising main parts of the article. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Nylén, D.; Holmstro, M.J. Digital Innovation Strategy: A Framework for Diagnosing and Improving Digital Product and Service Innovation. *Bus. Horiz.* **2015**, *58*, 57–67. [CrossRef]
2. Kaplan, A.M.; Haenlein, M. Siri, Siri in my hand, who is the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Bus. Horiz.* **2019**, *62*, 15–25. [CrossRef]
3. Bican, P.M.; Brem, A. Managing innovation performance: Results from an industry-spanning explorative study on R&D key measures. *Creat. Innov. Manag. J.* **2020**. [CrossRef]
4. Suddaby, R. Construct clarity in theories of management and organization. *Acad. Manag. Rev.* **2010**, *35*, 346–357.
5. Fors, A.C. The Ontology of the Subject in Digitalization. In *Handbook of Research on Technoself: Identity in a Technological Society*; Information Science Reference: Hershey, PA, USA, 2013; pp. 45–63.
6. Yoo, Y. Computing in everyday life: A call for research on experiential computing. *MIS Q.* **2010**, *34*, 213–231. [CrossRef]
7. Yoo, Y.; Henfridsson, O.; Lyytinen, K. The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research. *Inf. Syst. Res.* **2010**, *21*, 724–735. [CrossRef]
8. Sussan, F.; Acs, J.Z. The digital entrepreneurial ecosystem. *Small Bus. Econ.* **2017**, *49*, 55–73. [CrossRef]
9. Tilson, D.; Lyytinen, K.; Sørensen, C. Research commentary-digital infrastructures: The missing IS research agenda. *Inf. Syst. Res.* **2010**, *21*, 748–759. [CrossRef]
10. Pavitt, K. Sectoral patterns of technical change: Towards a taxonomy and a theory. *Res. Policy* **1984**, *13*, 343–373. [CrossRef]
11. Archibugi, D. Pavitt's taxonomy sixteen years on: A review article. *Econ. Innov. New Technol.* **2001**, *10*, 415–425. [CrossRef]
12. Bogliacino, F.; Pianta, M. Innovation and employment: A reinvestigation using revised Pavitt classes. *Res. Policy* **2010**, *39*, 799–809. [CrossRef]
13. Gawer, A.; Cusumano, M.A. Industry Platforms and Ecosystem Innovation. *J. Prod. Innov. Manag.* **2014**, *31*, 417–433. [CrossRef]

14. Hanelt, A.; Piccinini, E.; Gregory, R.W.; Hildebrandt, B.; Kolbe, L.M. Digital Transformation of Primarily Physical Industries-Exploring the Impact of Digital Trends on Business Models of Automobile Manufacturers. In Proceedings of the 12th Internationalen Tagung Wirtschaftsinformatik, Osnabrück, Germany, 4–6 March 2015; pp. 1313–1327.
15. Amit, R.; Zott, C. Creating value through business model innovation. *MIT Sloan Manag. Rev.* **2012**, *53*, 41.
16. Schallmo, D.R.A. *Geschäftsmodelle Erfolgreich Entwickeln und Implementieren: Mit Aufgaben und Kontrollfragen*, 1st ed.; Springer: Berlin, Germany, 2013.
17. Osterwalder, A.; Pigneur, Y.; Smith, A. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, 1st ed.; Wiley and Sons: New York, NY, USA, 2010.
18. Zott, C.; Amit, R. The Fit between Product Market Strategy and Business Model: Implications for Firm Performance. *Strateg. Manag. J.* **2008**, *29*, 1–26. [CrossRef]
19. Chesbrough, H. Business Model Innovation: Opportunities and Barriers. *Long Range Plan.* **2010**, *43*, 354–363. [CrossRef]
20. Schallmo, D.; Williams, C.A.; Boardman, L. Digital Transformation of Business Models—Best Practice, Enablers, and Roadmap. *Int. J. Innov. Manag.* **2017**, *21*, 1740014. [CrossRef]
21. Li, W.; Badr, Y.; Biennier, F. Digital ecosystems: Challenges and prospects. In Proceedings of the International Conference on Management of Emergent Digital EcoSystems, Addis Ababa, Ethiopia, 28–31 October 2012; ACM: New York, NY, USA, 2012; pp. 117–122.
22. Bharadwaj, A.; El Sawy, O.A.; Pavlou, P.; Venkatraman, N. Digital business strategy: Toward a next generation of insights. *MIS Q.* **2013**, *37*, 471–482. [CrossRef]
23. Planing, P. Will digital boost circular? Evaluating the impact of the digital transformation on the shift towards a circular economy. *Int. J. Manag. Cases* **2017**, *19*, 22–31.
24. Veit, D.; Clemons, E.; Benlian, A.; Buxmann, P.; Hess, T.; Spann, M.; Kundisch, D.; Leimeister, J.M.; Loos, P. Business Models - An Information Systems Research Agenda. *Bus. Inf. Syst. Eng.* **2014**, *6*, 45–53. [CrossRef]
25. Weill, P.; Woerner, S.L. Optimizing your digital business model. *MIT Sloan Manag. Rev.* **2013**, *54*, 71–78. [CrossRef]
26. Yoo, Y. The Table Has Turned: How can IS field contribute to the technology and innovation management? *J. AIS* **2013**, *14*, 227–236.
27. Bradley, S.P.; Madnick, S.; Kim, C. *Digital Business*; Chicago Business Press: Chicago, IL, USA, 2015.
28. Adomavicius, G.; Bockstedt, J.C.; Gupta, A.; Kauffman, R.J. Making sense of technology trends in the information technology landscape: A design science approach. *MIS Q.* **2008**, *32*, 779–809. [CrossRef]
29. Gao, L.S.; Iyer, B. Analyzing complementarities using software stacks for software industry acquisitions. *J. Manag. Inform. Syst.* **2006**, *23*, 119–147. [CrossRef]
30. Parida, V.; Sjödin, D.; Reim, W. Reviewing literature on digitalization, business model innovation, and sustainable industry: Past achievements and future promises. *Sustainability* **2019**, *11*, 391. [CrossRef]
31. Nambisan, S.; Lyytinen, K.; Majchrzak, A.; Song, M. Digital innovation management: Reinventing innovation management research in a digital world. *MIS Q.* **2017**, *41*, 223–238. [CrossRef]
32. Autio, E.; Thomas, L. *Tilting the Playing Field: Towards an Endogenous Strategic Action Theory of Ecosystem Creation*; Nambisan, S., Ed.; World Scientific Reference on Innovation Volume 3: Open Innovation, Ecosystems and Entrepreneurship: Issues and Perspectives, 111-140; World Scientific Publishing: Hackensack, NJ, USA, 2018.
33. Gawer, A.; Cusumano, M.A. *Platform Leadership How Intel, Microsoft, and Cisco Drive Industry Innovation*; Harvard Business Review Press: Cambridge, MA, USA, 2002.
34. EU. *ENTR/E4-Fuelling Digital Entrepreneurship in Europe*. Background Paper; European Commission 2018; EU Commission Strategic Policy Forum on Digital Entrepreneurship. Available online: http://ec.europa.eu/DocsRoom/documents/5313/attachments/1/translations (accessed on 10 January 2019).
35. Basalla, G. *The Evolution of Technology*; Cambridge University Press: Cambridge, IL, USA, 1988.
36. Fitzgerald, M.; Kruschwitz, N.; Bonnet, D.; Welch, M. Embracing digital technology: A new strategic imperative. *MIT Sloan Manag. Rev.* **2014**, *55*, 1.
37. Li, H.; Wu, Y.; Cao, D.; Wang, Y. Organizational mindfulness towards digital transformation as a prerequisite of information processing capability to achieve market agility. *J. Bus. Res.* **2019**. [CrossRef]
38. Ting, D.S.W.; Carin, L.; Dzau, V.; Wong, T.Y. Digital technology and COVID-19. *Nat. Med.* **2020**, *26*, 459–461. [CrossRef]

39. Brettel, M.; Friederichsen, N.; Keller, M.; Rosenberg, M. How virtualization, decentralization and network building change the manufacturing landscape: An Industry 4.0 Perspective. *Int. J. Mech. Ind. Sci. Eng.* **2014**, *8*, 37–44.
40. Giones, F.; Brem, A. Digital technology entrepreneurship: A definition and research agenda. *Technol. Innov. Manag. Rev.* **2017**, *7*, 44–51. [CrossRef]
41. Schumpeter, J.A. Change and the Entrepreneur. *Essays JA Schumpeter* **1934**, *4*, 45–91.
42. Brynjolfsson, E.; McAfee, A. *Race against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*; Digital Frontier Press: USA, 2011.
43. Von Hippel, E. *Democratizing Innovation*; MIT Press: Cambridge, MA, USA, 2005.
44. Boland, R.J.; Lyytinen, K.; Yoo, Y. Wakes of Innovation in Project Networks: The Case of Digital 3-D Representations in Architecture, Engineering, and Construction. *Organ. Sci.* **2007**, *18*, 631–647. [CrossRef]
45. BMWi. *Industrie 4.0 und Digitale Wirtschaft—Impulse für Wachstum, Bescha Ftigung und Innovation*; Bundesministerium für Wirtschaft und Energie: Berlin, Germany, 2015.
46. Wade, M. *A Conceptual Framework for Digital Business Transformation*; IMD: Lausanne, Switzerland, 2015.
47. Jabłoński, M.; Jabłoński, A. Social Factors as a Basic Driver of the Digitalization of the Business Models of Railway Companies. *Sustainability* **2019**, *11*, 3367. [CrossRef]
48. Matt, C.; Hess, T.; Benlian, A. Digital Transformation Strategies. *Bus. Inf. Syst. Eng.* **2015**, *57*, 339–343. [CrossRef]
49. Kaltum, U.; Widodo, A.; Widiasmono, A. Local TV Goes to Global Market through Digital Transformation. *Acad. Strateg. Manag. J.* **2016**, *15*, 221–229.
50. Nambisan, S. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrep. Theory Pract.* **2017**, *41*, 1029–1055. [CrossRef]
51. Nambisan, S.; Baron, R.A. On the costs of digital entrepreneurship: Role conflict, stress, and venture performance in digital platform-based ecosystems. *J. Bus. Res.* **2019**, in press. [CrossRef]
52. McAdam, M.; Crowley, C.; Harrison, R.T. Digital girl: Cyberfeminism and the emancipatory potential of digital entrepreneurship in emerging economies. *Small Bus. Econ.* **2020**. [CrossRef]
53. Yin, R.K. *Case Study Research and Applications: Design and Methods*, 6th ed.; Sage Publications: Thousand Oaks, CA, USA, 2017.
54. Freeman, T. "Best practice" in focus group research: Making sense of different views. *J. Adv. Nurs.* **2006**, *56*, 491–497. [CrossRef]
55. Seal, D.W.; Bogart, L.M.; Ehrhardt, A.A. Small group dynamics: The utility of focus group discussions as a research method. *Group Dyn. Theory Res. Pract.* **1998**, *2*, 253–266. [CrossRef]
56. Stewart, D.W.; Shamdasani, P.N. *Focus Groups: Theory and Practice*, 3rd ed.; Sage Publications: London, UK, 2015.
57. Standing, C.; Mattsson, J. "Fake it until you make it": Business model conceptualization in digital entrepreneurship. *J. Strateg. Mark.* **2018**, *26*, 385–399. [CrossRef]
58. Conley, J.G.; Bican, P.M.; Ernst, H. Value articulation: A framework for the strategic management of intellectual property. *Calif. Manag. Rev.* **2013**, *55*, 102–120. [CrossRef]
59. Seijts, G.H.; Gandz, J. Transformational change and leader character. *Bus. Horiz.* **2018**, *61*, 239–249. [CrossRef]
60. Ordieres-Meré, J.; Remón, T.P.; Rubio, J. Digitalization: An Opportunity for Contributing to Sustainability From Knowledge Creation. *Sustainability* **2020**, *12*, 1460. [CrossRef]
61. Brand, M.; Tiberius, V.; Bican, P.M.; Brem, A. Agility as an innovation driver: Towards an agile front end of innovation framework. *Rev. Manag. Sci.* **2019**. [CrossRef]
62. Omidi, A.; Dal Zotto, C.; Norouzi, E.; Valero-Pastor, J.M. Media Innovation Strategies for Sustaining Competitive Advantage: Evidence from Music Download Stores in Iran. *Sustainability* **2020**, *12*, 2381. [CrossRef]
63. Chen, J.; Zhang, R.; Wu, D. Equipment Maintenance Business Model Innovation for Sustainable Competitive Advantage in the Digitalization Context: Connotation, Types, and Measuring. *Sustainability* **2018**, *10*, 3970. [CrossRef]
64. Kaplan, A.M.; Haenlein, M. Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Bus. Horiz.* **2016**, *59*, 441–450. [CrossRef]
65. Christensen, C.M. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*; Harvard Business Review Press: Cambridge, MA, USA, 2013.
66. Ammon, T.; Brem, A. Digitale Ökosysteme und Deren Geschäftsmodelle: Analyse und Implikationen für Klassische Buchverlage. In *Digitalisierung und Innovation*; Springer Gabler: Wiesbaden, Germany, 2013; pp. 91–121.

67. Brem, A.; Viardot, E. Revolution of Innovation Management: The Digital Breakthrough. In *Revolution of Innovation Management*; Palgrave Macmillan: London, UK, 2017.
68. Saarikko, T.; Westergren, U.H.; Blomquist, T. The internet of things: Are you ready for what's coming? *Bus. Horiz.* **2017**, *60*, 667–676. [CrossRef]
69. Li, X.; Cao, J.; Liu, Z.; Luo, X. Sustainable Business Model Based on Digital Twin Platform Network: The Inspiration from Haier's Case Study in China. *Sustainability* **2020**, *12*, 936. [CrossRef]
70. Secundo, G.; Ndou, V.; Del Vecchio, P.; De Pascale, G. Sustainable development, intellectual capital and technology policies: A structured literature review and future research agenda. *Technol. Forecast. Soc. Chang.* **2020**, *153*, 119917. [CrossRef]
71. Minatogawa, V.L.F.; Franco, M.M.V.; Rampasso, I.S.; Anholon, R.; Quadros, R.; Durán, O.; Batocchio, A. Operationalizing Business Model Innovation through Big Data Analytics for Sustainable Organizations. *Sustainability* **2019**, *12*, 277. [CrossRef]
72. Centobelli, P.; Cerchione, R.; Chiaroni, D.; Del Vecchio, P.; Urbinati, A. Designing business models in circular economy: A systematic literature review and research agenda. *Bus. Strategy Environ.* **2020**, *29*, 1734–1749. [CrossRef]
73. Kirchherr, J.; Reike, D.; Hekkert, M. Conceptualizing the circular economy: An analysis of 114 definitions. *Resour. Conserv. Recycl.* **2017**, *127*, 221–232. [CrossRef]
74. George, G.; Merrill, R.K.; Schillebeeckx, S.J. Digital Sustainability and Entrepreneurship: How Digital Innovations Are Helping Tackle Climate Change and Sustainable Development. *Entrep. Theory Pract.* **2020**. [CrossRef]
75. Holmström, J.; Liotta, G.; Chaudhuri, A. Sustainability outcomes through direct digital manufacturing-based operational practices: A design theory approach. *J. Clean. Prod.* **2017**, *167*, 951–961. [CrossRef]
76. Lego's Niels Christiansen: Picking Up the Pieces. *Financial Times*. 19 August 2018. Available online: https://www.ft.com/content/955ec4de-8f3f-11e8-bb8f-a6a2f7bca546 (accessed on 20 August 2018).
77. Brem, A.; Puente-Díaz, R. Are you acting sustainably in your daily practice? Introduction of the Four-S model of sustainability. *J. Clean. Prod.* **2020**, 122074. [CrossRef]

sustainability

MDPI

Article

Influential Factors of Network Changes: Dynamic Network Ties and Sustainable Startup Embeddedness

Julia Keidel [1], Peter M. Bican [1,*] and Frederik J. Riar [2]

[1] Chair of Technology Management, University of Erlangen-Nuremberg, 90762 Fürth, Germany; keidel.j.julia@gmail.com
[2] Institute of Management, Karlsruhe Institute of Technology, 76133 Karlsruhe, Germany; frederik.riar@kit.edu
* Correspondence: peter.bican@fau.de

Abstract: This research investigated influential factors on changes in networks of startups through a qualitative exploratory case study approach. Based on interviews with founders in Germany and selected stakeholders in entrepreneurial networks combined with a network mapping approach, we developed a framework of influential factors on network changes. In essence, this framework categorizes factors into sustainable resource acquisition, knowledge and skill acquisition, interpersonal factors, and interorganizational factors. Overall, our research contributes to a better understanding of factors that impact network changes by providing a construct with potential for theoretical standardization. In addition, this research offers important managerial implications.

Keywords: startup; entrepreneurship; entrepreneurial firm; network; network changes; influential factors; ties; relationships

Citation: Keidel, J.; Bican, P.M.; Riar, F.J. Influential Factors of Network Changes: Dynamic Network Ties and Sustainable Startup Embeddedness. *Sustainability* **2021**, *13*, 6184. https://doi.org/10.3390/su13116184

Academic Editor: Adam Jabłoński

Received: 21 April 2021
Accepted: 19 May 2021
Published: 31 May 2021

1. Introduction

Networks have received increasing attention as contributors to sustainable entrepreneurial success since they benefit entrepreneurial capacity in terms of finances, technologies, marketing, and social aspects [1]. Since Aldrich and Zimmer [2], the observation of networks has developed from static approaches to dynamic ones because scholars considered that this matches the characteristics of startups as their needs for various resources, like technological capability or investments [3], are constantly changing [3,4]. Besides these resources, which served as a factor for network changes [3,5–9], additional factors have only been researched in a very fragmented manner and through varying network perspectives. For instance, Kocka et al. [10] elaborated influential factors on changes of the overall network of one industry. Additionally, the factors of network change have also been investigated by observing the egocentric network of one firm [1], since changes within this network also affected changes in the overall network of an industry [10]. Furthermore, networks were investigated on different levels defined as interpersonal, interunit, or interorganizational networks [11]. Even though these three levels could be defined separately, it has been difficult in entrepreneurial research to examine them independently [12]. This is because, as Johannisson and Mønsted [13] noted, entrepreneurs who acted on the interorganizational level as representatives of their startup still influenced all decisions and actions of the startup by their personal intention and conviction. In addition, the categorization of the identified factors consisted of different constructions. Soetanto et al. [3], for example, used a classification according to internal and external factors, while Larson [8] analyzed the factors according to the different stages of development of the ties.

It is evident that it has been challenging to merge all the existing methodologies into one comprehensive framework. To address these shortcomings in the current literature, we study what factors influence network changes in entrepreneurial firms at the interpersonal and interorganizational level. To fully exploit the initially mentioned positive impact of entrepreneurial networks on sustainable entrepreneurial success as, for example, was

investigated by Brüderl and Preisendörfer [14], it is important to provide a comprehensive overview of factors which impact entrepreneurial ties and hence the entrepreneurial network as a whole [15].

This paper provided a comprehensive framework for the categorization of influential factors, thereby addressing the applicability of the factors already elaborated in the literature and investigating new influential factors. This was accomplished through a qualitative exploratory case study approach. In the following section, the theoretical background of networks and their dynamic nature is introduced. Afterwards, the methodological approach of the paper is presented, including data collection and analysis. Based on the data analysis, the findings are presented and discussed afterwards. Finally, theoretical as well as practical implications are demonstrated and suggestions for further research are derived.

2. Theory

2.1. Definitions

Over the last decades, two distinct research streams developed within the research of entrepreneurial networks [16,17]. One stream investigated networks as an independent variable influencing the performance of startups [14,18–26]. The other, less-researched stream considered networks as a dependent variable, i.e., why and how networks evolve [3,6,8,11,15,27–29].

In general, Brass et al. [11] p. 795 defined networks "as a set of nodes and the set of ties representing some relationship, or lack of relationship, between the nodes". Although this definition made clear that a tie always consists of at least two nodes, in the past researchers as, for instance, Birley [22], Martin et al. [6], or Soetanto et al. [3,30] considered only one side of the tie. Turning to the main components of networks, Hoang and Antoncic [16] divided them into three main terms: network content, network structure, and network governance. The main purpose of networks was to exchange resources, including information, ideas, advice, emotional support, and knowledge [14,22]. In addition, ties could be especially helpful for startups to build their own reputation [31]. To access those different kinds of content, it was important to take position within the network. This position within the network was characterized by the pattern of direct and indirect ties to certain actors, which was defined as network structure. This second component could be measured both by means of network size, which was defined as the number of direct ties of the investigation unit, and network density, which was defined as the number of interconnections between the network partners [16]. In terms of the network governance, trust played a critical role. This was because trust in the mutual fulfillment of expectations could replace legal contracts and, thus, create cost advantages for both partners [16]. This aspect could in turn be associated with the network content component, as failed network governance could lead to reputation loss [32]. Trust could also influence the depth of cooperation since partners who trusted each other were more likely to share strategically relevant assets [23].

2.2. Patterns of Network Change

To identify changes within networks, it is necessary to clarify different change patterns. They can be divided into the structural and the relational dimensions [3]. These dimensions are closely linked to the main components of networks explained above. First, structural network change can be defined by tie creation and tie deletion since the structure of networks is measured by the network size [10]. Second, based on network governance, changes within the relational dimension are measured by the strength of a tie, which Granovetter [33] p. 1361 characterized as "the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services". Strong ties provide mutual trust, defined as a part of network governance, and, thus, access to more confident information [34]. On the contrary, weak ties provide more diverse information because these ties link partners that would otherwise be disconnected through bridging holes [33,34]. In

sum, we build on these change patterns, that are, tie creation, tie deletion, and changes in the strength of the tie [11,35,36].

2.3. Process Theories

The ability to observe these patterns of network changes comes with understanding of change processes. Thus, different process constructs defined as life-cycle, teleological, evolutionary, and dialectic process theories investigated by van de Ven and Poole [37] came into use within entrepreneurial research. The approach applied by most authors, for instance Hite and Hesterly [38] or Lechner and Dowling [21], was the life-cycle process theory. This theory divides the business cycle of firms into different phases such as the startup birth or growth and therefore benefited the analysis of process data in a structured way.

2.4. Factors Identified in the Literature

Turning to the already-identified influential factors (see Appendix A) on network changes, some authors chose networks of firms in general as the unit of investigation [5,7,11], while others specifically investigated networks of startups [3,6,8,9]. The first factor that was widely known both in entrepreneurial and overall organizational literature was the procurement of critical resources to survive as a firm [3,5–9,39].

Regarding factors investigated within the overall organizational research, Galaskiewicz [5] summarized other factors in his study that affected tie creation of a firm and, consequently, changes in networks. One factor that drives firms to collaborate with others is uncertainty [5]. Decisions must be made based on fragmentary information about the environment. Therefore, firms rely on network partners to achieve a better information flow and, thus, to reduce the uncertainty they faced in the environment [5]. The next factor determined by Galaskiewicz [5] was the improvement of legitimacy. Firms must assert themselves on the market and demonstrate compliance with various standards and regulations. This pressure motivates them to cooperate with other recognized firms to improve their legitimacy [5]. Brass et al. [11] argued that firms with network experience tended to expand their network with new and diverse partners. Thus, learning is another factor that can influence the approach of networking and therefore the networks themselves [11,40]. Ahuja et al. [7] also contributed with additional factors influencing tie creation. They stated that, on the one hand, added value, defined within their paper as agency, was important to develop a new tie [7]. On the other hand, convenience in terms of geographical proximity or identity-based similarity was an influential factor [7].

In the field of entrepreneurial research, Soetanto et al. [3] made a significant contribution to influential factors on networks of startups. They elaborated several factors, which they divided into internal and external obstacles [3]. Internal obstacles were defined as the lack of marketing knowledge and sales skills, managerial and financial skills, technological capability, access to research and development facilities, and investments [3]. External obstacles were defined as the lack of knowledge about customer or market demand, dealing with technological change, with the competition, and industrial structure, with regulations, standardization and bureaucracy, and with the lack of market demand [3]. In summary, there were a lack of resources, knowledge, and skills in areas critical to success. Larsons' [8] paper also contributed to network research in the field of entrepreneurship. She examined three phases of forming new ties, "preconditions, conditions to build the exchange structures, and the final phase of integration and control" [8] p. 98. Factors that positively influence the precondition phase are prior relationships and personal reputations [8]. This suggests that the social context can form a solid basis for economic relations, as trust is already present on a personal level [8]. Another factor enhancing tie creation is the firms' reputation, since ties are more likely to be established with companies that offer high quality products [8]. In terms of conditions to build the exchange structures, trust and the development of reciprocity enhance the tie creation and strengthening process [8]. Trust grows with the successful iteration of action and reaction, defined as the development of

reciprocity [8]. Another influential factor for tie creation is mutual economic advantage, where Larson [8] found that it was not the economic value, per se, but growth that was important. Within the last phase of tie formation, it is important that operational and strategic integration take place to strengthen the tie [8]. Operational integration enhances the communication between the two firms [8], whereas strategical integration increases the interdependence of the firms in terms of joint projects or processes [8]. Martin et al. [6] also identified trust as an influential factor for tie creation. In line with Soetanto et al. [3], they also argued that obstacles influenced network changes [6]. Furthermore, they took characteristics of the founder into consideration by identifying the educational level and the level of intrinsic motivation of the founder as influencing factors [6]. Thus, educated and intrinsically motivated founders are more likely to form ties [6]. Another new factor that Martin et al. [6] elaborated in terms of the founders' characteristics, in line with Danso et al. (2016), was that risk-taking propensity was positively related to the creation of new ties since new ties always provide some sort of risk. The next factor that enhances tie creation is joint innovation projects, which can enhance the technological capability of a startup [6]. The last factor that was identified by Drummond et al. [9] was social media, which serves as a new way to create ties within the network of startups.

3. Methodology

3.1. Qualitative Exploratory Single Case Study Approach

Based on a qualitative research approach, we aimed to develop a better understanding of factors that influence network changes in entrepreneurial firms at the interpersonal and interorganizational level. Qualitative work is suitable to gain deeper insights providing first conceptualizations to stimulate further theory constellations [13,16,41,42]. Furthermore, especially in the field of network research, many authors such as Hite [15], Jack et al. [1], and Steier and Greenwood [27] have also applied the case study approach and, regarding the research question, Yin [43] proposed that "what" questions, which are of an exploratory nature, could be answered with an exploratory case study approach. Specifically, this paper applied a single-case approach. On the one hand, the individual ties within the interpersonal and interorganizational subunits of the startup can be investigated as an embedded single-case study [43]. On the other hand, the selected case, which is described below, is a common case, which made it possible to capture the everyday life and dynamic actions of startups [43].

To conduct this exploratory single-case study, the startup movelab was chosen as the research unit. Movelab has developed a specific line of nutritional supplements primarily for tennis players and, thus, they sell their products currently only within the tennis industry, which Hoang and Antoncic [16] determined as favorable for valid study results. Movelab launched their product line in Germany in 2017. All of their products are also produced in Germany, which was an important strategical aspect for them. To better connect their customers, products are sold under the brand name 'dropshot'. In addition, the strategy of movelab is to grow with little capital and without external investment. To extend their brand's reach, they wanted to penetrate the national market in the tennis industry first before expanding into other niche sports and international marketplaces. Therefore, networking was an important resource for them. These factors rendered movelabs' network approach perfectly suitable for an investigation on the interpersonal and interorganizational level. Interunit networks were not analyzed as movelab did not yet have separate units.

3.2. Data Collection

We began by gaining a detailed understanding of the current literature on our research objective. Then, in line with Soetanto et al. [3], two semi-structured interviews in combination with a network mapping approach of movelabs' network were conducted with one founder of movelab to generate the broadest possible database. In general, network mapping approaches enhanced the experience of the data collection for both the

interviewer and the interviewee [44]. Coviello [44] also stated that it helped to capture important information about each tie, the content, for example, in a more structured way. Network maps also help frame the change processes that occur in the network in a more systematic manner [38]. Soetanto et al. [3] used this visualization technique themselves to identify influential factors on network change. One network map was created for each interview session with the founder, in accordance with the life-cycle process theory of van de Ven and Poole [37]. The first map represented the network of the startup phase of movelab. The second one represented the growth phase, which movelab had reached. Both network maps were accompanied by semi-structured interviews about the network and the development it went through in the respective phase. The founder himself is a tennis player and tennis coach. He is responsible for all the network activities of the startup since is already embedded in the tennis industry. Thus, within each interview of approximately one hour, he provided deep insights into the network activities of movelab. In addition to and after the interview sessions with the founder of movelab, eight of movelabs' network partners were interviewed. They come from different areas of the tennis industry, including startups that organize events or manufacture tennis products, and also established firms that provide a digital platform for tennis players or award scholarships to college to young tennis players. The length of the interviews varied from nineteen minutes to almost two hours and they were all tape-recorded. An overview of all interview partners is provided in Table 1.

Table 1. Chronological list of the interview partners.

Interviewee	Firm	Industry Sector	Date of the Interview	Length [hour:min]
B1	movelab	National startup Distribution of nutritional supplements primarily for tennis players	13.08.2020 15.08.2020	1:03 1:38
B2		Internationally established firm Mediation of sports scholarships in the USA	24.08.2020	0:26
B3		Tennis Coach Coaching of tennis players at national and international level	24.08.2020	0:28
B4		National startup Provider of fitness events as a complement to other sporting events	26.08.2020	0:19
B5		Nationally established firm Internet platform for tennis players in Germany	25.08.2020	0:30
B6		National startup Upcycling of old tennis tarpaulins into accessories	25.08.2020	0:26
B7		Internationally established firm Distribution of sportswear for different categories	31.08.2020	1:04
B8		Tennis school Tennis training and distribution of tennis products	31.08.2020	0:42
B9		International startup Sale of merchandise for tennis players	26.08.2020	0:39

The questions of the semi-structured interviews with the network partners were based on their collaboration with movelab. Thus, the statements made by the founder could be verified and the partnerships were illuminated from two sides. In addition, the network partners could report on their own network experiences with other companies to generate

further information. Therefore, the interview guideline (see in Appendix B) for the network partners was divided into four blocks of questions, such as 'how did you get in touch with movelab' or 'what are the goals of the partnership with movelab and how did they change over time'. The questions were intended to clarify changes in movelabs' network. Therefore, both the three-network components content, government, and structure and the different change patterns served as support for the interview guidelines. The questions were also phrased following the guidelines by Soetanto et al. [3]. Larson [8] also worked with a similar interview approach to collect data for the antecedents of network changes. The data collection took place over one month and all interviews were conducted via Zoom or via telephone.

3.3. Data Analysis

After the interviews were conducted, they were transcribed verbatim using MAXQDA software. Using the framework of Mayring [45], the interviews were then subjected to a qualitative content analysis, also utilizing the MAXQDA software. To extract the factors taken from the literature as well as additional recognizable factors from the interviews, the structuring approach was combined with the inductive category formation of Mayring [45]. At first, the transcripts were reduced to passages that described network changes. After this data reduction, a coding guide (Table 2) was created, which served as the comprehensive framework to clearly categorize the various influential factors. An additional category was created for the coding of new aspects, from which new influential factors were subsequently defined inductively. Before the encoding was completed, a test run was conducted to refine or change the categories if necessary. After finishing the data analysis, a second person coded the interviews, and any differences were discussed and solved jointly.

Table 2. Coding Guideline.

Main Categories	Subcategories	Explanation
Resource acquisition Soetanto, Huang, & Jack (2018)		
	Technological capability	Support for the development of new products is needed.
	Access to research and development facilities	Appropriate facilities are needed to develop innovative products.
	Investments	Financial means are needed to survive.
	Market demand	Generation of reach and awareness of potential new customers/ existing customers.
Knowledge and skill acquisition Soetanto, Huang, & Jack (2018)		
	Knowledge about customer demand/ market	The product must meet the needs of the customer and it must be sold in the right marketplaces.
	Technological change	The startup must keep pace with technological development.
	Competition and industrial structure	Startups must be able to stand up to other companies within the industry.
	Regulations, standardization, and bureaucracy	To increase efficiency, processes are standardized, or bureaucratic hurdles are overcome together.
	Marketing knowledge and sales skills	Startups must know how to promote their products properly, increase the reach and increase the sales volume.

Table 2. *Cont.*

Main Categories	Subcategories	Explanation
	Managerial and financial skills	Structured organization within the startup and solid financial plans are necessary.
Interpersonal factors Martin et al. (2019)		
	Trust	Trust enhances closer collaboration.
	Development of reciprocity norms	An unwritten balance of actions and reactions between two partners.
	Educational level	The educational level tends to be directly proportional to networking skills.
	Intrinsic motivation	Intrinsic motivation can have a positive effect on the search for new opportunities.
	Prior relations and personal reputations	The good reputation/ prior relation of a person can increase the tendency to cooperate with that person and vice versa.
	Learning	Experiences can shape the process of networking.
	Reduction of uncertainty	Founders tend to collaborate with each other in uncertain situations.
	Identity-based similarity	Two founders with similar mindsets or situations tend to collaborate.
Main categories	Subcategories	Explanation
Interorganizational factors Martin et al. (2019)		
	Risk-taking propensity	The risk that a new tie entails must be taken.
	Joint innovation projects	The implementation of innovation projects in isolation can be challenging.
	Added value	Ties must generate added value.
	Improvement of legitimacy	Startups must assert themselves within the industry.
	Geographical proximity	The partners are in the same geographical area.
	Mutual economic advantage	Both partners profit economically from the tie.
	Firm reputation	The good reputation of a firm/ startup can increase/ decrease the tendency towards collaboration.
	Operational and strategic integration	Joint processes or strategies are developed.
	Social media	Digital platforms that enable to represent the firm/ startup.
Additional category Mayring [45]		Text passages that cannot be assigned to any category above.

4. Findings

At first, movelabs' network development was briefly explained using the two network maps. Figures 1 and 2 show that the network of movelab has changed significantly from the startup phase to the growth phase. As shown, the number of network partners and the density of the network increased, even though some ties of the startup phase were

dissolved. The second noticeable aspect was that the partners, with whom they were strongly connected, represented through the red borders, have changed over time.

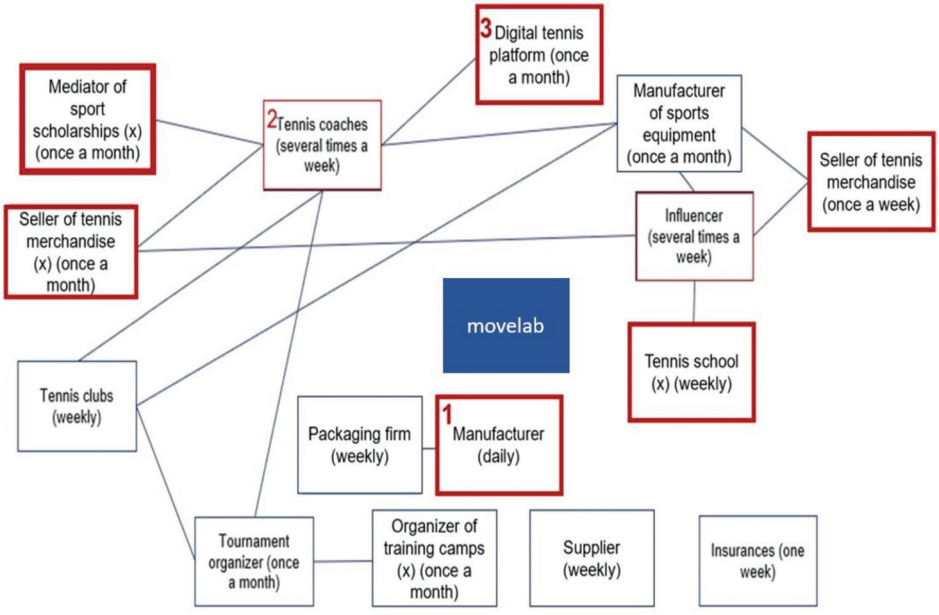

Figure 1. Network of movelab in the startup phase.

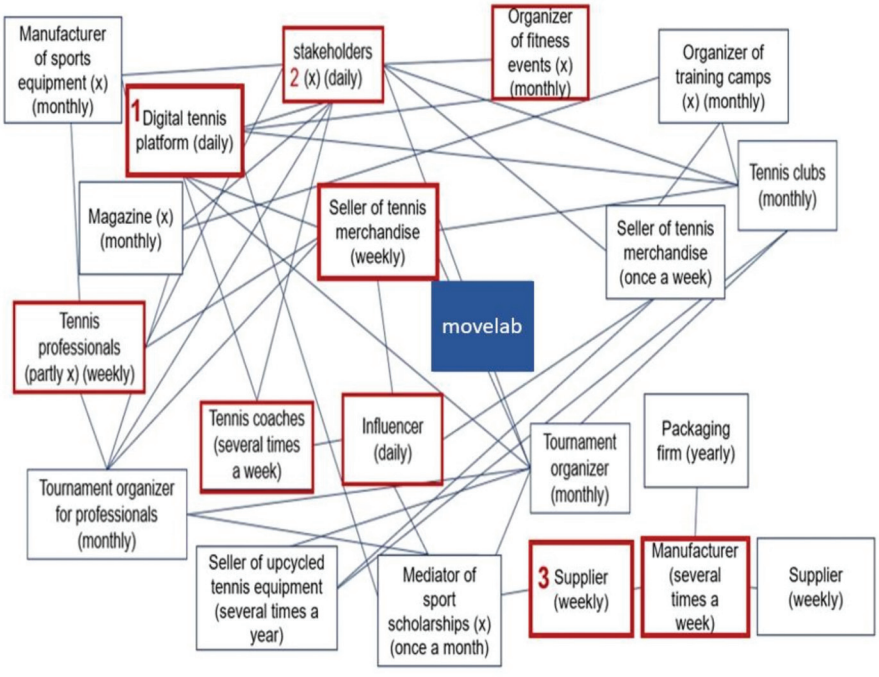

Figure 2. Network of movelab in the growth phase.

Transferring to the results of the encoded interviews, tie creation was the most frequently observed change pattern. This was followed by network changes through changes in the tie strength. Tie deletion was the least-mentioned change pattern. After this short introduction to the different networks of movelab, the findings of the interviews, as shown in Table 3, were discussed. The factors that could not be confirmed were not mentioned at all or only mentioned up to four times in the interviews.

Table 3. Applicability of factors from the literature and newly investigated factors.

Occurring Factors from Literature	Non Occurring Factors from Literature	Newly Identified Factors
Market demand	Investments	Financial means
Technological capability	Access to research and development facilities	Versatile and new content/offers for new or existing customers
Managerial knowledge and financial skills	Regulations, standardization, and bureaucracy	Time constraints within the startup
Marketing knowledge and sales skills	Competition and industrial structure	Unfulfilled expectations
Knowledge about customer demand/market	Technological change	Events
Identity-based similarity	Reduction of uncertainty	Common target group
Learning	Educational level	Firm development
Prior relations and personal reputations	Operational and strategical integration	Potential for further ties
Intrinsic motivation	Geographical proximity	Short communication channels and decision processes
Development of reciprocity norms	Risk-taking propensity	
Trust and friendship		
Social Media		
Mutual economic advantage		
Improvement of legitimacy		
Added value		
Joint (innovation) projects		

4.1. Resource Acquisition

Within the first main category, resource acquisition, the factor market demand was most frequently mentioned and strongly associated with tie creation. To increase market demand, it was important to extend the reach and to generate awareness among the customers. Therefore, the interviewed startups created ties to combine their reaches as stated by interviewee B9: 'Then, of course, give each other reach (...) and, as a final aspect, the sales idea that we can perhaps use cross-selling aspects through the sales of the bars. That maybe the person who buys the bar from us will spontaneously buy a shirt from our collaboration partner with it.' Technological capability is also a factor, and was often included in the transcripts and caused tie creations. On the one hand, movelab created several ties to outsource the production of their products. On the other hand, due to their increasing experience, they were asked by a network partner to develop a product themselves as interviewee B9 explained: '[. . .] they are absolute specialists in the development of such products, where we have no clue.'

The first newly identified factor influencing tie creation was the provision of versatile content or offers for new or existing customers. For instance, interviewee B5 relied on this concept as one reason for the collaboration with movelab, as he explained: 'And on the other hand it is always interesting for us to provide new content for our tennis players and to keep our target group busy.' Another new factor, that was mainly related to tie creation, was financial means. On the one hand, ties were created to save financial means since those collaborations were not based on cash flow. On the other hand, ties were created

to increase the financial means of the startup. The last aspect was the startups' shortage of financial means, which either was a reason for new tie creation 'to combine the power of two startups' as stated by interviewee B6 or tie deletion, because the budget was not sufficient to maintain a collaboration.

4.2. Knowledge and Skill Acquisition

The factors of managerial knowledge and financial skills, marketing knowledge and sales skills, and knowledge about customer demand/ market were all mentioned several times throughout the interviews. One example that was given by interviewee B1 was the entry of the two shareholders of movelab who joined in the growth phase of the startup and provided new knowledge: 'When they joined, we changed our whole store system. We automated everything a lot more, so that the company could really grow faster, and processes were simplified.' Additionally, movelab contacted its marketing-experienced manufacturer regarding correct health claims on the packaging of its products and, thus, their tie strengthened. To gain knowledge about the customer demand, movelab integrated tennis players such as interviewee B7 into the product development process to acquire feedback from a potential end customer, which enhanced the strength of the tie: 'Plus, that I was able to test it actively on the court. It is all about things like whether I get very thirsty when I eat the bar, or things like that.' There were no new factors identified within this main category.

4.3. Interpersonal Factors

Prior relations and personal reputations significantly drove new tie creation, as affirmed by interviewee B1: 'That was really an advantage, which I still notice, that this tennis niche or every other sports niche, if you are embedded you really get a lot of advantages from it [. . .]. And that is how a network is built, because you are recommended to others and [. . .] contacts automatically increase.' Another influential factor on tie creation that was mentioned by half of the interviewees was identity-based similarity. Interviewee B9 explained: '[. . .] [T]wo young brands or two young companies, that basically fits.' The development of reciprocity, trust, and the newly added component friendship or intrinsic motivation all benefited the strength of ties. Additionally, learning both caused decreases and increases in the strength of ties. Furthermore, a newly identified factor defined as time constraints within the startup only had an adverse effect on the strength of ties. Interviewee B5 summarized it as follows: 'This is mostly due to us, however, because we sometimes do not have the resources to take care of all partnerships properly.'

4.4. Interorganizational Factors

The most outstanding factor within the last main category was the social media factor. Social media represented a new way to get to know partners, as claimed by interviewee B6: 'That has become common practice via Instagram in our case, [. . .] it works via messages there, [. . .].' It also provided new opportunities for collaboration and, hence, strengthened ties. Other factors from the literature mainly drove tie creations such as improvement of legitimacy, added value, and the firm reputation. Firm reputation could be expanded on the new aspect quality of products, since good quality of products drove other startups to collaborate with this startup, as expressed by interviewee B4: 'Movelab is official nourishing partner of a German internet platform for tennis players. [. . .] this is not a garage dealer, but there is a brand behind it. And the product has a really high quality.' A newly identified factor that drove tie creation was a common target group of both partners. The second newly identified factor driving tie creation was the potential for further tie creation. The tie of movelab to a magazine in the tennis industry helped them to reach out to further contacts, as explained by interviewee B1: 'This tennis magazine cup to which numerous companies were invited, some of which are now here on the network card. You could really maintain the contacts there and find new contacts, like our shareholders, like the provider of the German internet platform for tennis players.'

A factor that drove changes within the strength of a tie was joint innovation projects, which was renamed for this paper as joint projects, because many of the interviewees had non-innovative joint projects. For instance, joint product development strengthened the tie, especially in the phase of product launch and advertisement. Both tie strength and tie creation were driven by mutual economic advantage, but also by the new factors defined as events and short communication channels and decision processes.

Unfulfilled expectations emerged as a factor associated with tie deletion. Nearly all the interviewees have mentioned this factor as a reason for tie deletion. Another new aspect that served as an influential factor for tie deletion, tie creation, and well as changes in the tie strength was firm development. On the one hand, startups tended to collaborate with other firms to grow further. On the other hand, existing ties decomposed if the two partners developed in different directions in terms of goals, strategies, and mindsets. These findings are discussed below.

5. Discussion

In the following, we discuss our findings in light of the current literature. We then explain our theoretical contributions and managerial implications, and conclude with our study's limitations and future research.

5.1. Confirmed Factors from the Literature

The influence of social media on tie creation and tie strength elaborated by Drummond et al. [9] was strongly confirmed by the interviewees. While Drummond et al. [9] focused on the platforms Facebook and Twitter, the platform most frequently used by the interviewed firms and startups was Instagram, as explained by interviewee B7: 'Because I think I get all the information I need from Instagram, because you can see how this startup works at a glance. They have a certain language, a certain appearance to the outside.'

An interesting aspect that interviewee B7 added was that the presence of a profile on the platform LinkedIn could provide a more professional appearance of startups. This, in turn, could encourage new tie creations since such a profile could represent a higher level of respectability. Furthermore, for movelab it is strategically important to build ties with influencers on social media platforms, as explained by interviewee B1: 'But we are also in constant contact with influencers and many micro-influencers, as I like to call them, sometimes they bring us more than someone who has twenty thousand followers, but you know that of the twenty thousand, eighteen thousand follow only because they somehow find the pictures beautiful and not the real content behind them.'

Thus, the network of movelab could be expanded by social media to include a further type of network partners. Consequently, the social media factor benefits both creation of awareness and expansion of reach among customers, which are characteristic components of the next influential factor on tie creation: market demand. This can be associated with the work of Brüderl and Preisendörfer [14], in which they researched the impact of networks on the success of a startup and found that, in order to survive as a startup, it is necessary to attract enough customers [14], consistent with interviewee B1: 'Through a German internet platform for tennis players we have now a reach of over two hundred thousand tennis players, to whom we reach out via the newsletter and that is [. . .] the largest tennis network in Germany.' In summary, nowadays, it is very important for startups to expand the market demand through ties with the help of various digital solutions.'

Another factor driving the creation of the tie to the provider of a German internet platform for tennis players was prior relations and personal reputations, as the stakeholders of movelab already knew the managing directors of the provider of a German internet platform for tennis players. Many of the interview partners such as interviewee B5 stated that 'the tennis industry is a very, very small niche. Nearly everyone knows each other.' Hence, this factor, evaluated by Larson [8], could be confirmed. Another reinforcing aspect about this factor was provided by interviewee B1. Even though movelabs' initial approach was to also contact tennis coaches via cold calls, they quickly noticed that this type of

networking was not as effective as contacting already-known tennis coaches. This, in turn, refers to the learning factor [7,11]. The founder of movelab learned from the experiences within the existing ties. However, rather than forming new and diverse ties in the network as claimed by Brass et al. [11], movelab adapted the intensity, and consequently the strength of certain ties strategically [35]. Interviewee B5 explained, for example, that the tie between their firm and movelab intensified when they realized that isolated actions were not having the desired effect.

In contrast, movelab weakened their tie to tennis coaches when they experienced that the promotion of their products through this tie was not as successful as they initially thought. Staying within the main category of interpersonal factors, the assumption of Larson [8] that trust affected increases in tie strength was confirmed by the interviews. For instance, interviewee B6 mentioned: 'For example, before the first event, where we did not know each other, this was of course a different way of talking to each other than it is today. You somehow exchange views on some topics more openly or you exchange difficulties you face.' Not only does trust drive the exchange of success-critical assets as Uzzi [23] already assumed, it also furthers the exchange of strategical information. In some ties, this trust developed into friendship between the founder of movelab and the network partner, which is why the factor of trust was expanded to include friendship.

Besides this, the level of identity-based similarity also drove tie creations, as expressed by interviewee B6: 'I think that especially when it comes to two startups. That means that neither of us have a huge [amount] of people or budget.' Therefore, it is less the social or ethnic background, as described by Ahuja et al. [7] or by Zelekha and Dana (2019), but much more similar problems and similar goals that create such ties. Thus, the factor identified by Ahuja et al. [7] is applicable in this paper, even if not to the full extent. The interviewees mentioned the term added value several times throughout the interviews. Ahuja et al. [7] stated that this added value serves as a reason for all kinds of network changes, such as tie creation, tie deletion, tie strengthening, and tie weakening. The interviewees, however, most frequently stated that added value was an important factor for the creation and strengthening of ties, but only one interviewee B9 mentioned that added value was a motivating factor for tie deletion as well: 'Personally, I do not think it is bad or even quite good that ties dissolve and then you do something new. [. . .] Because you create space for new ideas again.' In line with the observations of Galaskiewicz [5], an important aspect for the interview partners in terms of tie creation was the improvement of legitimacy. However, an interesting aspect was that for the startup movelab this factor was more important in the startup phase, as explained by interviewee B1: 'Before that we were not known at the very beginning. And that is when [. . .] we were happy to be surrounded by big brands. [. . .] And now we are slowly becoming a brand, people know us better and better and then you do not have to surround yourself with other big brands anymore.' Therefore, this factor was particularly influential in the startup phase.

5.2. Unsupported Factors from Prior Literature

Besides the findings supporting the literature, there are also results contrary to the literature. An outstanding aspect is that reduction of uncertainty was not mentioned by any interviewee, even though it is widely known in the entrepreneurial literature that entrepreneurs face a greater degree of uncertainty than established firms [46]. The reason for this could be that interview partners are more likely to share goals and visions with unknown interviewers than uncertainties, as these may contain strategical information. The factors of access to research and development facilities and technological change determined by Soetanto et al. [3] could not be confirmed by the interviewees. This can be explained by the fact that movelab and most of their network partners do not provide highly technology-based products whose development requires significant technical knowledge or is influenced by technological change. Due to movelabs' strategy to grow with little capital and without external investments, the factor investment assumed by Soetanto et al. [3] could not be identified in this paper.

Furthermore, contrary to Martin et al. [6] the educational level of any network partner was not mentioned at all by the interviewees, although many of the interview partners, for instance the founder of movelab, have a university degree. Only two of the network partners of movelab contributed to the factor regulations, standardization, and bureaucracy, and therefore it was not considered as applicable. For instance, interviewee B7 mentioned that movelab might have created the tie between the startup and the firm to evade regulations, standardization, and bureaucracy, since they did not sign any contract. This brings up the new aspect that startups not only need partners to help them deal with regulations and standards, as Soetanto et al. [3] already stated, but also that explicitly informal ties are established to avoid these standards and bureaucratic hurdles. The last factor which could not be confirmed within the paper was geographical proximity, which is probably linked to the fact that, nowadays, the digital tool landscape and different social media platforms serve as an efficient basis for digital collaboration [9]. Only one aspect was mentioned that limited the flexibility of a collaboration, expressed by interviewee B8: 'The fact that Bamberg and Haßfurt is not a long distance. This is not something that I have to order from the catalog, but I call, and if necessary, I can pick it up quickly by myself.' For the delivery of physical products, geographical proximity can therefore be advantageous. In summary, not all factors found in both the overall organizational and entrepreneurial literature could be confirmed in this paper.

5.3. Newly Identified Factors

Finally, after evaluating the applicability of the factors identified in previous literature, the new factors investigated within this paper will be discussed. Especially in times of digitalization and social media [47], the interviewees stated that it is becoming more important to continuously provide customers with new, varied content and worthwhile offers. Additionally, this was driven by new digital business models in which new added value must be communicated to the customers, as interviewee B5 described: 'But you can also become a premium member for a fee. [. . .] You get shopping vouchers from other partners, for example Tennis Warehouse and we are always looking for new offers for our premium members.' This was the reason for the firm entering a tie with movelab.

Consequently, provision of new and versatile content and offers for new or existing customers can be identified as a factor influencing the creation of ties and, sometimes, also the strengthening of ties since even existing ties initiated new projects to generate new content. Another reinforcing aspect for this influential factor was the COVID-19 pandemic, as expressed by interviewee B9: 'And then [. . .] movelab once again came to my mind. Simply because, I think it was also during COVID-19. [. . .] The tennis market was dead then too because nobody played. And I was looking for content.' Even though Kuckertz et al. [48] argued that startups could adapt to such crisis situations much faster, they still suggested that they should actively use their network to deal with the special situation. However, even in an offline world, it is becoming increasingly important to present one's own brand in a harmonious environment, which mainly drove the interviewed firms and startups to include movelab as a new partner into their events.

This finding complemented the work of Drummond et al. [9], in which they stated that ties were only strengthened through joint events. Especially with regard to the organization of joint events, short communication channels and decision-making processes had a positive influence both on the strength of ties and tie creations, as stated by interviewee B9: 'Young brand, which is also open for collaboration and [. . .] also because it is very important that we have brands with whom we can implement such a project quickly and easily. This is often difficult in larger firms. Because it takes ages to get through all the authorities.' Thus, this serves as an influential factor that is particularly applicable within entrepreneurial research.

A factor that impacts both tie creations and tie deletions is financial means. This is a key factor in sustainable business development [49]. Startups are often constrained by their budget, which drives many of them to look for new investments [3,50,51]. Since

movelab aims to grow without external capital, they found another way to reach their goals. They created ties with other startups or firms that were not purely based on cash flow. Of course, many of their ties were also aimed at increasing the financial means, as interviewee B1 explained: 'So one thing at the moment is clearly the provider of a German internet platform for tennis players (...), because it (...) has created completely new possibilities for us to reach our end customers. [. . .], they have a platform with over two hundred thousand tennis members and are well known in Germany. Therefore, it was extremely important for us and has almost tripled our current revenue since the start of the collaboration.'

Finally, financial means also caused tie deletions due to the above mentioned budget constraints, as interviewee B9 suggested: 'They were too expensive. [. . .] We kind of had a special welcome startup deal or something for the first eighteen months and then the contract ran out.' Another factor that caused tie deletion was unfulfilled expectations. This factor occurred in situations such as missing deadline compliance, one sided commitment, dissatisfaction of the customers, and unsuccessful joint projects. Deadline compliance is an important aspect in terms of collaboration, since the partner relies on it, as expressed by interviewee B6: 'And that is one of the most important things, when someone sets a deadline, that you are finished by that date and there was, for example, a tie where [. . .] at the beginning there was of course trust [. . .]. Of course, this has decreased, because you cannot work on such a basis [. . .]. 'Besides this reliability, it is also relevant that both sides put effort into the tie, as explained by movelabs' network partner B7: 'It all sounds great, but of course if the implementation is not done by both sides, then it is just bad. [. . .] If one side does not commit to the partnership it is always bad.' She explicitly mentioned, that for startups which are very open-minded and work in a less bureaucratic way, reliability and constant commitment was even more important to maintain a tie successfully. An overview of the influential factors discussed in the sections above is given in Table 4.

Table 4. Influential factors on the different types of network changes from the discussion.

Influential on Tie Creation	Influential Factors on Tie Strength	Influential Factors on Tie Deletion
Social media	Learning	Financial means
Market demand	Trust and friendship	Unfulfilled expectations
Identity-based similarity	Added value	
Prior relations and personal reputation	Short communication channels and decision-making processes	
Improvement of legitimacy	Joint events	
Financial means		
Joint events		
Short communication channels and decision-making processes		
Provision of new and versatile content		

6. Conclusions

The results of this research provide both theoretical contributions and managerial implications centering on factors that influence network changes for sustainable business development. These are discussed in the next sections.

6.1. Theoretical Contributions

Whereas previous research focused on the factors that influence tie creation and the strength of the tie, this paper also investigated factors for tie deletion. Thus, for a comprehensive evaluation of network changes, all three patterns should be taken into consideration in future research. Furthermore, previous papers used different categories to cluster the

influential factors on network changes. As can be seen, the four main categories defined in this paper, namely resource acquisition, knowledge and skill acquisition, interpersonal factors, and interorganizational factors also cover all new factors investigated within the research. This implies that the four main categories are comprehensive and could serve as a first standardized framework for future theoretical work. Apart from that, this paper included the network partners of the investigated startup into the interviews in order to generate a broader database. This approach provided multi-layered and multi-perspective insights. The methodological approach of mapping the networks of movelab, also applied by Soetanto et al. [3,30], was helpful for the founder to memorize the network of their startup phase and as well as helpful for the data analysis to perceive the changes within the network immediately.

6.2. Managerial Implications

Besides the theoretical impact of this paper, the first managerial implication should be to use more renowned social media platforms to network with other firms since this strengthens the startups' professional reputation and, thus, has a positive influence on the creation of new ties. In general, the social media representation of the startup is important for the attraction of potential network partners. Thus, startups should try to be constantly present in social media and use posts to market their values and convictions strategically. Another factor that drove partner firms of movelab to collaborate with the startup was the short communication channel and decision path. Therefore, startups should try to keep these short and simple processes despite team expansion and growth.

Furthermore, startups often seek additional investments to grow further. As can be determined using the case of movelab, another way to grow is to create open-minded and diverse ties with different partners to reach the startup's goals without external investments. Creating new ties is also a satisfactory way to offer the existing or potential customers new and versatile content to build up a reputation. However, besides new tie creation, a focus for startups should also be to maintain already-existing ties since this factor was indicated as influential for the changes in tie strength up to tie deletion. In addition, startups should follow deadlines within the tie to meet the expectations of the partner and avoid tie deletion. This, of course, applies to both partners. The last factor causing tie deletion that startups can actively tackle is one-sided commitment. The amount of effort invested into the tie is directly linked to the satisfaction of both partners. Consequently, for startups, it is important to discover a maintainable number of network partners with whom they can actively achieve their goals at the same time.

6.3. Limitations and Further Research

This paper had certain limitations. First, this paper investigated the factors based on the single case of the startup movelab. Due to certain characteristics of movelab, such as growing on low capital, a generalization of the findings is challenging [43]. Therefore, a next step could be to replicate this study based on a multiple-case study approach using startups of different industries with varying growth and business strategies. Regarding the unconfirmed factors of investment and technological change, especially in high-tech industries, a renewed execution of the study could provide interesting results. Furthermore, the database only covered the startup phase and the growth phase of movelab since movelab is currently in this second stage. Future literature could assess the applicability of the factors within later phases of startups, such as in the maturity stage. Moreover, it would be especially interesting whether the factors causing network changes within unsuccessful startups are directly linked to their decline or death.

Besides that, the impact of external shocks, such as the COVID-19 pandemic, on network changes for sustainable business development should be investigated in greater detail [52]. Additionally, as already postulated by Soetanto et al. [3], interpersonal factors should be further investigated since the educational level [6] and the reduction of uncertainty [5] could be more important in startups embedded into other industries.

Author Contributions: Conceptualization, J.K., P.M.B. and F.J.R.; methodology, J.K. and P.M.B.; data collection and analysis, J.K.; writing—original draft preparation, J.K.; writing—review and editing, P.M.B. and F.J.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Framework for influential factors on network changes.

Main Categories	Subcategories
Resource acquisition Soetanto, Huang, & Jack (2018)	
	Technological capability
	(Access to research and development facilities)
	(Investments)
	Market demand
	Financial means
Knowledge and skill acquisition Soetanto, Huang, & Jack (2018)	
	Knowledge about customer demand/market
	(Technological change)
	(Competition and industrial structure)
	(Regulations, standardization, and bureaucracy)
	Marketing knowledge and sales skills
	Managerial and financial skills
Interpersonal factors Martin et al. (2019)	
	Trust and friendship
	Development of reciprocity norms
	(Educational level)
	Intrinsic motivation
	Prior relations and personal reputations
	Learning
	(Reduction of uncertainty)
	Identity-based similarity
	Time constraints within the startup team
Main categories	Subcategories

Table A1. *Cont.*

Main Categories	Subcategories
Interorganizational factors Martin et al. (2019)	
	(Risk-taking propensity)
	Joint innovation projects
	Added value
	Improvement of legitimacy
	(Geographical proximity)
	Mutual economic advantage
	Firm reputation and quality of products
	(Operational and strategic integration)
	Social media
	Unfulfilled expectations
	Firm development
	Events
	Potential for further tie creation
	Common target group
	Short communication channels

Appendix B. Interview Guidelines

Interview Questionnaire—Founder
Startup Phase
Structural questions:

- Please draw a sketch of your network during the concept generation phase.
- Please draw lines between the contacts that are connected.
- Please draw arrows that represent the direction of the connection.

Relational questions:

- Please use red color to circle the strong ties.
- What was the content/main goal of each tie?
- How often do you communicate with the certain partner?
- Which tie was the most important one within this phase?
- What was the content of this tie?
- Why was it the most important tie?
- Where did you meet this partner?
- When and why was this tie established?

Questions about network changes

- Which partner helped you to generate your business idea?
- Where did you meet your initial partners? Did you contact them for economic reasons, or did you know them personally?
- Which benefits provided each tie for the startup?

Questions about motives and goals

- Which tasks or problems were solved in the startup phase?
- How were these problems solved?
- Which partners were involved in the solution process?
- Which goals did you have for the startup in the startup phase?

- Were there any partnerships within your network that inspired you to move on to other directions?

Growth Phase
Structural questions

- Please draw a sketch of your network during the growth phase. You can refer to the previous sketch of the network from the first phase.
- Please draw lines between the contacts that are connected.
- Please draw arrows that represent the direction of the new connection.

Relational questions

- Please use red color to circle strong ties.
- What is the content/ main goal of each new tie?
- How often does the startup communicate with the new partners?
- What is the most important tie in the growth phase?
- What is the content of this tie?
- Why was it the most important one?
- Where did you meet this partner?
- When and why was this tie established?

Already established ties

- Can you tell me about goals or contents that changed within ties? Why did they change?

Deleted ties

- Why was this tie deleted?

New ties

- In which situations did you look out for new partners?
- Where did you meet your new partner?
- Why did this tie occur in this phase?
- Can you tell me about failed tie creation approaches?

Questions about motives and goals

- Which tasks or problems are you trying to solve in the current phase?
- How are you trying to solve these problems?
- Which partners are involved in the solution process?
- Which goals do you currently have for the startup? If the goals changed in contrast to the startup phase, why did they change?
- Are there any partnerships within your network that inspired you to move on to other directions?

Interview Questionnaire—Network partner
Key data

- How and where did you meet movelab?
- Who initiated the tie?
- How long did you work and collaborate with movelab?
- Why was the cooperation with movelab approved initially?
- How regularly do you have contact with movelab? Has the regularity changed during the collaboration (daily, once a week, more than once a week, monthly, yearly)?
- Can you tell me about contacts to companies that also have contact with movelab? If so, how have they developed over time?

Questions about the tie to movelab

- What aspects does your tie to movelab include? How and why has the content of your tie to movelab changed?
- What are the goals of your tie to movelab? How and why have the goals of your tie changed compared with the beginning?

- Which tasks or problems have you already been able to master together with movelab?
- What benefits does the tie to movelab have?
- Which aspects of the tie to movelab do you find particularly good and why?
- How has the basis of trust with movelab developed over time and, above all, why has it developed in this way?

Questions about the own network experiences

- Can you tell me about goals or content of other ties (with startups) that have changed over time? Why have they changed?
- Can you tell me about weak ties that have evolved into strong ties (or vice versa)? Why have they developed in this way?
- How has the basis of trust developed over time with the longer ties?

New ties

- Why are new ties added to the network?
- Where do you get to know these partners?
- What advantages do new ties offer?
- What are the reasons why ties in the network disappear? Can you tell me about your own experiences?

References

1. Jack, S.; Dodd, S.D.; Anderson, A.R. Change and the development of entrepreneurial networks over time: A processual perspective. *Entrep. Reg. Dev.* **2008**, *20*, 125–159. [CrossRef]
2. Aldrich, H.; Zimmer, C. Entrepreneurship Through Social Networks. In *The Art and Science of Entrepreneurship*; Sexton, D.L., Smiler, R.W., Eds.; Ballinger: Cambridge, MA, USA, 1986; Volume 33, pp. 3–23.
3. Soetanto, D.; Huang, Q.; Jack, S. Obstacles, Networking Approaches and Entrepreneurial Network Changes. *Eur. Manag. Rev.* **2018**, *15*, 171–189. [CrossRef]
4. Jack, S.; Moult, S.; Anderson, A.R.; Dodd, S. An entrepreneurial network evolving: Patterns of change. *Int. Small Bus. Journal: Res. Entrep.* **2010**, *28*, 315–337. [CrossRef]
5. Galaskiewicz, J. Interorganizational Relations. *Annu. Rev. Sociol.* **1985**, *11*, 281–304. [CrossRef]
6. Martin, D.; Romero, I.; Wegner, D. Individual, Organizational, and Institutional Determinants of Formal and Informal Inter-Firm Cooperation in SMEs. *J. Small Bus. Manag.* **2018**, *57*, 1698–1711. [CrossRef]
7. Ahuja, G.; Soda, G.; Zaheer, A. The Genesis and Dynamics of Organizational Networks. *Organ. Sci.* **2012**, *23*, 434–448. [CrossRef]
8. Larson, A. Network Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Relationships. *Adm. Sci. Q.* **1992**, *37*, 76. [CrossRef]
9. Drummond, C.; McGrath, H.; O'Toole, T. The impact of social media on resource mobilisation in entrepreneurial firms. *Ind. Mark. Manag.* **2018**, *70*, 68–89. [CrossRef]
10. Koka, B.R.; Madhavan, R.; Prescott, J.E. The Evolution of Interfirm Networks: Environmental Effects on Patterns of Network Change. *Acad. Manag. Rev.* **2006**, *31*, 721–737. [CrossRef]
11. Brass, D.J.; Galaskiewicz, J.; Greve, H.R.; Tsai, W. Taking Stock of Networks and Organizations: A Multilevel Perspective. *Acad. Manag. J.* **2004**, *47*, 795–817. [CrossRef]
12. ODonnell, A.; Gilmore, A.; Cummins, D.; Carson, D. The network construct in entrepreneurship research: A review and critique. *Manag. Decis.* **2001**, *39*, 749–760. [CrossRef]
13. Johannisson, B.; Mønsted, M. Contextualizing Entrepreneurial Networking. *Int. Stud. Manag. Organ.* **1997**, *27*, 109–136. [CrossRef]
14. Brüderl, J.; Preisendörfer, P. Network Support and the Success of Newly Founded Business. *Small Bus. Econ.* **1998**, *10*, 213–225. [CrossRef]
15. Hite, J.M. Evolutionary Processes and Paths of Relationally Embedded Network Ties in Emerging Entrepreneurial Firms. *Entrep. Theory Pr.* **2005**, *29*, 113–144. [CrossRef]
16. Hoang, H.; Antoncic, B. Network-based research in entrepreneurship: A critical review. *J. Bus. Ventur.* **2003**, *18*, 165–187. [CrossRef]
17. Slotte-Kock, S.; Coviello, N. Entrepreneurship Research on Network Processes: A Review and Ways Forward. *Entrep. Theory Pr.* **2010**, *34*, 31–57. [CrossRef]
18. Butler, J.E.; Hansen, G.S. Network evolution, entrepreneurial success, and regional development. *Entrep. Reg. Dev.* **1991**, *3*, 1–16. [CrossRef]
19. Davidsson, P.; Honig, B. The role of social and human capital among nascent entrepreneurs. *J. Bus. Ventur.* **2003**, *18*, 301–331. [CrossRef]
20. Watson, J. Modeling the relationship between networking and firm performance. *J. Bus. Ventur.* **2007**, *22*, 852–874. [CrossRef]

21. Lechner, C.; Dowling, M. Firm networks: External relationships as sources for the growth and competitiveness of entrepreneurial firms. *Entrep. Reg. Dev.* **2003**, *15*, 1–26. [CrossRef]
22. Birley, S. The role of networks in the entrepreneurial process. *J. Bus. Ventur.* **1985**, *1*, 107–117. [CrossRef]
23. Uzzi, B. Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Adm. Sci. Q.* **1997**, *42*, 35. [CrossRef]
24. Zimmer, C.; Aldrich, E.H. Resource Mobilization through Ethnic Networks. *Sociol. Perspect.* **1987**, *30*, 422–445. [CrossRef]
25. Brand, M.J.; Croonen, E.P.M.; Leenders, R.T.A.J. Entrepreneurial networking: A blessing or a curse? Differential effects for low, medium and high performing franchisees. *Small Bus. Econ.* **2017**, *50*, 783–805. [CrossRef]
26. Jiang, X.; Liu, H.; Fey, C.; Jiang, F. Entrepreneurial orientation, network resource acquisition, and firm performance: A network approach. *J. Bus. Res.* **2018**, *87*, 46–57. [CrossRef]
27. Steier, L.; Greenwood, R. Entrepreneurship and the Evolution of Angel Financial Networks. *Organ. Stud.* **2000**, *21*, 163–192. [CrossRef]
28. Schutjens, V.; Stam, E. The Evolution and Nature of Young Firm Networks: A longitudinal Perspective. *Small Bus. Econ.* **2003**, *21*, 115–134. [CrossRef]
29. Greve, A.; Salaff, J.W. Social Networks and Entrepreneurship. *Entrep. Theory Pr.* **2003**, *28*, 1–22. [CrossRef]
30. Soetanto, D. Examining change in entrepreneurial networks: Using visualisation as an alternative approach. *Eur. Manag. J.* **2019**, *37*, 139–150. [CrossRef]
31. Stuart, T.E.; Hoang, H.; Hybels, R.C. Interorganizational Endorsements and the Performance of Entrepreneurial Ventures. *Adm. Sci. Q.* **1999**, *44*, 315. [CrossRef]
32. Jones, C.; Hesterly, W.S.; Borgatti, S.P. A General Theory of Network Governance: Exchange Conditions and Social Mechanisms. *Acad. Manag. Rev.* **1997**, *22*, 911. [CrossRef]
33. Granovetter, M.S. The Strength of Weak Ties. *Am. J. Sociol.* **1973**, *78*, 1360–1380. [CrossRef]
34. Ruef, M. Strong ties, weak ties and islands: Structural and cultural predictors of organizational innovation. *Ind. Corp. Chang.* **2002**, *11*, 427–449. [CrossRef]
35. Huggins, R.; Thompson, P. Entrepreneurial networks and open innovation: The role of strategic and embedded ties. *Ind. Innov.* **2017**, *24*, 403–435. [CrossRef]
36. Arregle, J.; Batjargal, B.; Hitt, M.A.; Webb, J.W.; Miller, T.; Tsui, A.S. Family Ties in Entrepreneurs' Social Networks and New Venture Growth. *Entrep. Theory Pr.* **2015**, *39*, 313–344. [CrossRef]
37. Van De Ven, A.H.; Poole, M.S. Explaining Development and Change in Organizations. *Acad. Manag. Rev.* **1995**, *20*, 510. [CrossRef]
38. Hite, J.M.; Hesterly, W.S. The evolution of firm networks: From emergence to early growth of the firm. *Strat. Manag. J.* **2001**, *22*, 275–286. [CrossRef]
39. Wahyuningtyas, S.Y.; Hanoteau, J.; Vial, V. The role of social networks in entrepreneurial ecosystems: The case of #StartupLokal in Jakarta. *Glob. Bus. Organ. Excel.* **2018**, *37*, 22–29. [CrossRef]
40. Riar, F.J.; Bican, P.M.; Fischer, J. It wasn't me: Entrepreneurial failure attribution and learning from failure. *Int. J. Entrep. Ventur.* **2021**, *13*, 113–136. [CrossRef]
41. Hill, J.; McGowan, P.; Drummond, P. The development and application of a qualitative approach to researching the marketing networks of small firm entrepreneurs. *Qual. Mark. Res. Int. J.* **1999**, *2*, 71–81. [CrossRef]
42. Jack, S.L. Approaches to studying networks: Implications and outcomes. *J. Bus. Ventur.* **2010**, *25*, 120–137. [CrossRef]
43. Yin, R.K. *Case Study research and Applications: Design and Methods*, 6th ed.; SAGE Publications, Inc: Los Angeles, CA, USA, 2018.
44. Coviello, N.E. Integrating qualitative and quantitative techniques in network analysis. *Qual. Mark. Res. Int. J.* **2005**, *8*, 39–60. [CrossRef]
45. Mayring, P. *Qualitative Inhaltsanalyse: Grundlagen und Techniken*, 12th ed.; Beltz Verlag; Weinheim, Germany, 2015.
46. Koudstaal, M.; Sloof, R.; Van Praag, M. Risk, Uncertainty, and Entrepreneurship: Evidence from a Lab-in-the-Field Experiment. *Manag. Sci.* **2016**, *62*, 2897–2915. [CrossRef]
47. Bican, P.M.; Brem, A. Digital Business Model, Digital Transformation, Digital Entrepreneurship: Is There A Sustainable "Digital"? *Sustainability* **2020**, *12*, 5239. [CrossRef]
48. Kuckertz, A.; Brändle, L.; Gaudig, A.; Hinderer, S.; Reyes, C.A.M.; Prochotta, A.; Steinbrink, K.M.; Berger, E.S. Startups in times of crisis—A rapid response to the COVID-19 pandemic. *J. Bus. Ventur. Insights* **2020**, *13*, e00169. [CrossRef]
49. Hommel, K.; Bican, P. Digital Entrepreneurship in Finance: Fintechs and Funding Decision Criteria. *Sustainability* **2020**, *12*, 8035. [CrossRef]
50. Riar, F.J.; Hienerth, C.; Jensen, M.B. Digital due diligence activities and goal setting in equity crowdfund-ing: Exploring the differences between novice and experienced investors. *Int. J. Entrep. Ventur.* **2021**, *13*, 1–26.
51. Hohl, L.; Bican, P.M.; Guderian, C.C.; Riar, F.J. Gender Diversity Effects in Investment Decisions. *J. Entrep.* **2021**, *30*, 134–152. [CrossRef]
52. Guderian, C.C.; Bican, P.M.; Riar, F.J.; Chattopadhyay, S. Innovation management in crisis: Patent analytics as a response to the COVID-19 pandemic. *R&D Manag. J.* **2021**, *51*, 223–239.

sustainability

MDPI

Article

Success Factors and Sustainability of the K-Pop Industry: A Structural Equation Model and Fuzzy Set Analysis

Joon-ho Kim [1], Seung-hye Jung [2], Jung-sik Roh [3] and Hyun-ju Choi [4,*]

[1] The Cultural Policy Laboratory, Sangmyung University, Chungcheongnam-do 31006, Korea; kshy4u@naver.com
[2] School of Dance, Kyung Hee University, Seoul 02447, Korea; goldencats_shj@naver.com
[3] Department of Dance, Yongin University, Gyeonggi-do 17092, Korea; rohjs@naver.com
[4] Department of Cultural & Arts Management, Sangmyung University, Chungcheongnam-do 31066, Korea
* Correspondence: hyunju_choi@naver.com

Abstract: As the popularity of K-pop grows, the industry is contributing to the positive perceptions of South Korea's overall national brand value. This has led to it being considered a strategic industry worth cultivating. However, many people are unsure of its sustainability. To address this, our study investigates the factors that are key to the industry's success—K-pop industry success factors—and their relationship with sustainability (SNS citizenship behavior and tourist behavioral intention). The study surveyed 1247 global viewers (eight countries) who listen to K-pop via TV, radio, and the Internet, watch K-pop videos on YouTube, and search information related to K-pop on SNS. The collected data were analyzed using two statistical techniques: structural equation model (SEM) analysis and fuzzy set-quality comparative analysis (fsQCA). (1) According to the SEM analysis, of the K-pop success factors, three factors demonstrated a statistically significant positive influence on SNS citizenship behavior: casting, producing/promotion, and content. (2) SNS citizenship behavior showed a statistically significant positive influence on tourist behavioral intention. (3) According to the fsQCA results, casting, training, social media, content, and SNS citizenship behavior were commonly derived at least three times, indicating that these are key factors impacting tourist behavioral intention. (4) In summary, results confirmed that, with the exception of producers, the five K-pop success factors, casting, training, producing/promotion, social media, and content, are crucial to sustainability and to increasing tourist behavioral intention.

Keywords: success factors of K-pop; sustainability; eight countries; global viewers; structural equation model analysis; fuzzy set-quality comparative analysis

Citation: Kim, J.-h.; Jung, S.-h.; Roh, J.-s.; Choi, H.-j. Success Factors and Sustainability of the K-Pop Industry: A Structural Equation Model and Fuzzy Set Analysis. *Sustainability* **2021**, *13*, 5927. https://doi.org/10.3390/su13115927

Academic Editor: Adam Jabłoński

Received: 15 April 2021
Accepted: 21 May 2021
Published: 24 May 2021

1. Introduction

K-pop, or Korean pop music, refers to popular music that has gained mainstream popularity in South Korea, also simply referred to as *gayo* (歌謠). Popular music from the Anglosphere is called pop in Korean, and popular music from countries outside the Anglosphere are named by attaching the country's initial to "pop." Thus, the term "K-pop" was born [1,2]. As Korean pop songs have gained popularity overseas, K-pop has become widely recognized and consumed in other countries [1,2].

In the past, K-pop's overseas expansion was concentrated only in Asia [3]. Today, however, K-pop has developed a following of loyal fans around the world, across several nationalities [4]. Similar to pop genres borne in the U.S. and Europe, K-pop has been able to extend beyond Asia and become a new type of global pop [5].

Today, K-pop idols' singing and dancing are no longer unfamiliar in the U.S., Canada, Europe, South America, and even Africa [4]. However, there are still many questions regarding the sustainability of South Korea's K-pop industry [5]. Although it has clearly won the adoration of many fans around the world, it is inaccurate to say that it has risen to the top of the global music market [6]. As much as K-pop is consumed at high

levels in many countries, the industry must work to eliminate obstacles to become truly sustainable [6].

The primary source of K-pop's sustainable power is word of mouth via social network services (SNS) [7]. Through the internet, global K-pop fans frequently recommend and comment on SNS, such as Facebook and Instagram, spreading information and positive word of mouth about K-pop idols (i.e., SNS citizenship behavior). Such fan commentary continuously improves the genre's reputation. These activities have led to an explosive rise in fans [8–10]. Korean Entertainment agencies see the voluntary SNS citizenship behavior of K-pop fans as a means of providing maximum publicity at a minimal cost. From a marketing perspective, the use of SNS is considered the wisest move in the industry [11].

In fact, K-pop promotion and distribution based on social media (e.g., YouTube) have grown large enough to be considered important activities in the content market [12,13]. As K-pop's popularity skyrockets, researchers have pointed out the need for the industry to form contracts with multimedia platforms and establish and implement promotional strategies in overseas markets [14,15]. In addition to pop music from the U.S. and the UK, K-pop is now released under official global licenses. Consequently, it has been a long time since K-pop created a sensation purely through live performances rather than through marketed events [16].

This K-pop craze has created a huge fervor in the traditional global music market as well. However, its most vital component remains the voluntary SNS citizenship behavior of its fans on Facebook, Instagram, and the like, as well as its dissemination through YouTube [7–13]. Indeed, the effect of social media on the K-pop production environment is significant. For example, entertainment agencies invest heavily in music videos and devote extensive effort to such content [16], as this content is the first to spread through SNS [17]. Among its most popular stars, the group BTS (Bangtan Sonyeondan) can amass over one million views in a single day for a music video [16,18].

The music videos of K-pop performances and these stars' unique visuals have served a crucial role in attracting fans [18–21]. High-quality music videos that showcase various concepts along with catchy music are the gateway for captivating overseas fans [18,21]. In addition to music videos, agencies produce a variety of content customized for different regions and countries while making use of the language caption feature to provide it in many languages. It is no surprise that these companies also use extensive data analytics on the inflow of local fans on different platforms as the basis for future promotional plans [22–24].

Beyond its current success and expansion, K-pop's popularity has contributed to improving South Korea's overall national brand value [25]. This fact has led scholars to consider K-pop a sustainable national strategic industry worth cultivating [26]. Specifically, under its national brand image, the overseas expansion of the K-pop culture has had the derivative effect of increasing goodwill toward Korean products, language, food, fashion, and other industries such as medical care and tourism [25,27–29]. To support its sustainability, the internal and external conditions and success factors facing the K-pop music industry need to be investigated to find ways to enhance its competitiveness and promote its growth [25,27–29].

As of yet, however, the research on K-pop has failed to determine its success factors and perform empirical evaluations linked to sustainability, that is, sustainable behavior (e.g., SNS citizenship behavior and tourist behavioral intention). To fill this gap, the objective of this study is to first derive the success factors of K-pop and then empirically test whether they can increase SNS citizenship behavior and increase tourist behavioral intention. To that end, we established the following two research questions:

Research Questions

RQ1. *What is the influence of K-pop success factors on SNS citizenship behavior, a sustainability variable, as perceived by global viewers?*

RQ2. *What is the influence of SNS citizenship behavior on tourist behavioral intention, a sustainability variable, as perceived by global viewers?*

2. Literature Review

2.1. K-Pop Success Factors

A key question is: How did K-pop break through language and cultural barriers to succeed in the global music market? To answer this, we analyze the success factors of K-pop from the perspectives of production, consumption, and distribution. To this end, we applied the "cultural diamond" model frequently used when analyzing cultural phenomena factors in the sociology of art [30,31]. As shown in Figure 1, we developed a K-pop cultural diamond model, which consists of four points connected by lines to create the diamond. The points are the derived success factors, which include creators and content, the consumers, and their SNS citizenship behavior, the sustainability variable.

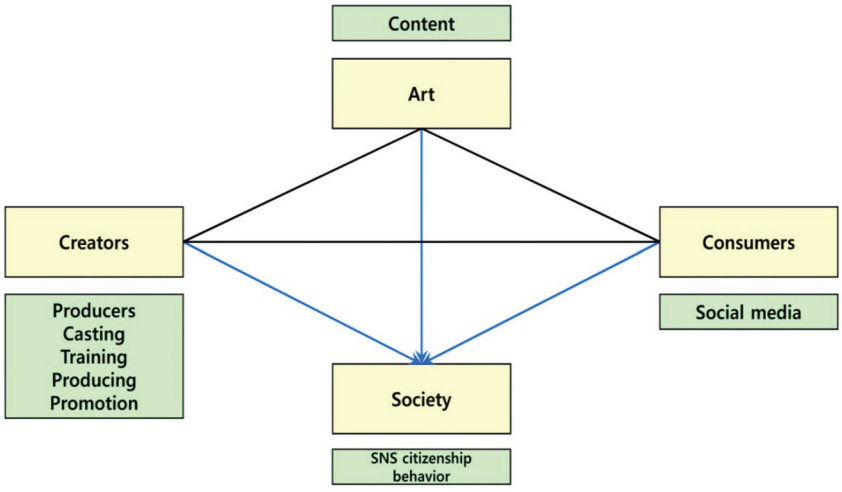

Figure 1. Cultural diamond model (applying K-pop success factors).

These figure elements can be explained as follows. (1) Producers. These are the key players in the industry for K-pop's success in overseas markets. These entertainment agencies are responsible for systematizing the entire production process of casting, training, producing, and promotion for overseas markets [6,21,26,32]. That is, entertainment agencies have systematized the production process and carefully prepared to enter overseas markets from a long-term perspective. Specifically, many studies have described Korea's well-developed system of intense training of possible K-pop idols to pick out just a few stars to create a differentiated competitive advantage [6,21,26,32]. The implication is that, even from the planning stage, agencies target the global market and polish the skills of idol groups. The specifics of the systematization of the entire production process, from casting to promotion, include the following.

(a) In terms of casting, agencies focus on discovering hidden "gems." They devote their efforts to discovering talent, assuming that "half of all quality gems would be successful." They also hold global auditions to discover talent overseas [32]. (b) In terms of training, agencies have looked at the best entertainers as long-term investments. These agencies act as powerful gatekeepers, cultivating only the best uncovered "gems" from among many potential idols while pouring money and investment into development training [26].

(c) In terms of producing, the K-pop industry sources talent globally for its creative needs. Agencies maximize the quality of K-pop albums by involving the world's premier experts in each artistic field. They divide the production stage labor using a wide range of experts from various nationalities and fields [6]. (d) In terms of promotion, the industry utilizes a network of local partners. With the aim of ultimately entering the international market, even at the first planning stage, agencies minimize the uncertainty and risk of overseas expansion through partnerships with local companies. They also have overcome cultural barriers in the short term by releasing albums specialized for local markets [21].

(2) Distribution. Agencies have reduced their costs and the time of overseas expansion by actively utilizing social media, enabling fans to easily and voluntarily spread content. Namely, agencies use the social media platforms YouTube, Facebook, and Twitter to reduce their costs and the time required to expand overseas. Notably, entertainment agencies have recognized social media as the core platform for K-pop consumption. This means that they use this as their key distribution channel and produce content suitable for this media [9,14,33].

(3) Consumers. The K-pop consumers are familiar with technology, enjoy the K-pop culture, and freely express their opinions, allowing its popularity to spread quickly. In other words, K-pop's main consumers are social media and technology savvy. They not only listen to and admire K-pop, but are also part of a new culture of entertainment where K-pop is the subject. In some European and South American countries where there are no customized promotions or local expansion, the local consumers have created online fan clubs on social media to share opinions and comments [15,34,35].

(4) Content. Based on three key factors, namely singing ability, choreography, and visuals, K-pop idols have transformed and captivated consumers worldwide. The K-pop industry has fused Western pop styles with easy melodies that suit Eastern sentiments, which has secured universal mass appeal and gained popularity across nationalities. K-pop provides showy spectacles through highly synchronized group dances and point dances. The industry has also continuously changed sensuous fashions and styles whenever new songs are released [13,16,18,36].

All of the above can be considered the K-pop industry's important success factors: the producers, casting, training, producing/promotion, social media, and content. The next question is: How do these six success factors influence SNS citizenship behavior, the sustainability variable, as perceived by global K-pop viewers? Ultimately, we want to discover whether tourist behavioral intention can be increased through such behavior.

2.2. Sustainability

Sustainability research is the study of whether nature can maintain diversity, productivity, balanced ecosystems, and proper functions [37–39]. The exploitation and destruction of nature, propelled by the development of science and technology, has exceeded the earth's capacity to purify itself and has resulted in the destruction of many ecosystems and other disasters. As a result, sustainability research has emerged to investigate how we can protect and live in harmony with the natural environment [37–39]. In other words, the field looks at the balance between the conflicting interests of sustainability and sustainable development and economic development and environmental protection [40–43].

In 2015, the United Nations proposed 17 Sustainable Development Goals [44]. Under the promise "leave no one behind," the plan has been to achieve these goals in both developed and developing countries by 2030 [45–47]. Looking at these 17 goals, we can see that sustainability does not only apply to environmental issues. The goals include the pursuit of balanced development in emerging countries and to create a world free of pain and discrimination based on gender, region, race, and nationality [45–47]. Table 1 presents these 17 goals.

Table 1. 17 sustainable development goals.

No	Item	Description
1	No Poverty	End poverty in all its forms everywhere.
2	Zero Hunger	End hunger, improve food security and nutrition, and promote sustainable agriculture.
3	Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages.
4	Quality Education	Ensure inclusive and equitable quality education for all and promote lifelong learning opportunities.
5	Gender Equality	Achieve gender equality and empower all women and girls.
6	Clean Water and Sanitation	Ensure access to water and sanitation for all and sustainable management.
7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all.
8	Decent Work and Economic Growth	Promote inclusive and sustainable economic growth, employment, and decent work for all.
9	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation
10	Reduced Inequality	Reduce inequality within and among countries.
11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient, and sustainable.
12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns.
13	Climate Action	Take urgent action to combat climate change and its impacts.
14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
16	Peace and Justice, Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17	Partnerships to achieve the Goal	Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Among these goals, there are three that encompass the success factors for a sustainable K-pop industry, "Decent Work and Economic Growth," "Responsible Consumption and Production," and "Partnerships to achieve the Goal"; thus, these can be integrated into our study. In our study, we use SNS citizenship behavior as a parameter and tourist behavioral intention as the dependent variable for sustainability (sustainable behavior).

2.3. SNS Citizenship Behavior

Citizenship behavior refers to behavior that contributes to the psychological environment of an organization, such as helping others even when not required [48,49]. Citizenship behavior is covered mainly in organizational behavior research [50–53]. Such research covers the voluntary behaviors of the organization's members that enhance organizational efficiency, regardless of the official rewards provided by the organization. This includes behavior such as punctuality, assisting fellow colleagues, and refraining from arguing [50–53].

Customer citizenship behavior shifts the theory of organizational citizenship to the customer's perspective. Customer citizenship behavior refers to behaviors that customers voluntarily perform in the service delivery process [54,55]. Bettencourt [56] was the first to study organizational citizenship behavior from a customer perspective in terms of retail store customers. He explained that customer citizenship behavior includes the three

concepts of customer loyalty, customer cooperation, and customer participation. Customer loyalty is customer behavior that demonstrates loyalty to and promotes an organization's interests beyond the customer's individual interests, signifying that the customer acts as a promoter of the company. Customer cooperation indicates the extent that customers trust and evaluate the company's delivery of services as competent, signifying that they enjoy performing a human resource role. Finally, customer participation is customer behavior such as active and responsible engagement in a service company's management and development activities in the role of consultant [56].

SNS citizenship behavior refers to the prosocial and responsible behaviors of SNS users who voluntarily engage in activities other than their roles on SNS [57,58]. As discussed above, this definition applies the basic theory and concept of organizational citizenship behavior to SNS, that is, behaviors other than work roles for enhancing organizational performance [57,58]. Here, we define SNS citizenship behavior as the degree that global viewers who search for K-pop-related information create new information or material related to K-pop and share it rapidly with others on SNS.

Based on the underlying theory of citizenship behavior in the context of the K-pop industry, we investigate the applicability of two sustainable development goals: "Responsible Consumption and Production" and "Partnerships to achieve the Goal." We hypothesize that, among global viewers who follow K-pop, when they are satisfied with their experiences, they are highly likely to continue to listen, watch, and talk about K-pop [2,59]. Additionally, sharing and providing information related to K-pop with others on SNS leads to voluntary SNS citizenship behavior [11,14,35,60–63]. Such activities, like recommending K-pop to other global viewers or word of mouth, can increase consumer loyalty to K-pop [20,64]. This means that these behaviors can enable sustainable and responsible production related to K-pop. Thus, the sustainable global audience for K-pop can be built and expanded through SNS [9,65,66].

2.4. Tourist Behavioral Intention

Many scholars and social science studies have investigated behavioral intention, an outcome variable based on customer satisfaction [67–70]. In those, scholars often treat revisit intention and recommendation intention as the measurement variables [71–73]. Behavioral intention is also recognized as an intermediate variable between individual attitude and behavior, signifying the individual's subjective state. This is considered the individual's belief and will to engage in a specific future behavior [74–77]. It is also defined as customer loyalty, consisting of the reuse intention and the word-of-mouth intention. Specifically, favorable behavioral intention leads to recommendation to others, accompanying others, positive word of mouth, reuse, promotion of loyalty, and willingness to pay premium prices [78–81].

Tourism is defined as the act of temporarily leaving one's home to visit a new place for pleasure. Tourism is also used within the broader concept of travel, which includes visiting friends and relatives (VFR) and traveling for business [82]. Tourist behavioral intention can be defined as the process of searching, purchasing, using, evaluating, and disposing of products or services that tourists expect to meet their needs [82]. It can also be described as the internal or external behaviors arising from a tourist's purchase decision and final behavior in purchasing and using/consuming a product or service [83]. Tourist behavioral intention requires potential tourist characteristics and conditions that lead to tourism travel, such as cost, time, and information, which are essential to establishing a specific behavior. That is, once conditions related to cost, time, and information are satisfied, the subject's desire for a specific tourist behavior may increase. The assumption is that this increased desire leads to tourist behavioral intention [84,85]. Tourist behavioral intention also occurs from socialized needs. That is, economic conditions, time-related conditions, and stimuli from information provided by tourism businesses, which act as basic conditions for encouraging specific tourist behavior while influencing the desire

for tourism. This resulting desire is connected to various stimuli and motivates tourism, ultimately leading to tourist behavioral intention [82,86,87].

In the context of K-pop, we define a tourist's behavioral intention as the individual's desire or plan to travel to South Korea [19,88,89]. Based on the underlying theory of behavioral intention, we investigate further whether the two sustainable development goals of "Decent Work and Economic Growth" and "Responsible Consumption and Production" are applicable to K-pop tourism. As discussed, K-pop has spread widely through SNS, such as YouTube, Facebook, and Twitter, with remarkable speed and has impacted the growth of the Korean Wave [7–13]. Namely, more tourists visit Korea to watch K-pop performances on SNS [25,90]. Consequently, South Korea's fashion, beauty, and medical care industries have been affected by this K-pop craze as well [13,91,92].

To encourage this phenomenon, companies are designing specific performances and products for overseas tourists that link K-pop content with tourist shopping; and these are garnering immense popularity [19,20]. The implication is that the K-pop craze can promote sustainable economic growth in Korea's cultural industries and culture and arts sector as well as fuel high-quality jobs [93,94]. Tourists visiting Korea, driven by the K-pop craze, engage in sustainable consumption in other industries such as K-pop-related fashion, beauty, and medical care [19,20].

2.5. Current Research

Kim [95] conducted a study on K-pop's success factors and effective overseas expansion strategies. According to that study, the two factors that led to K-pop's successful overseas expansion were (a) competitiveness of K-pop contents (content) and (b) K-pop media strategy. The competitiveness of K-pop content was divided further into (a) global localization strategy (producing/promotion), (b) idol development system (casting), and (c) competitiveness of K-pop stars (training). The most eye-catching aspect of K-pop's charm among global fans has been the "idol groups' performances" (content). Meanwhile, in terms of "K-pop media strategy," the study found that the spread of K-pop was accelerated through the adept usage of social media. These success factors give rise to voluntary citizenship behavior, including sharing information in real time among global fans on SNS, and play a crucial role in K-pop's overseas expansion success.

Jun [96] conducted a study on the factors of K-pop's overseas expansion based on the "diamond model." According to that study, K-pop's overseas expansion factors include (a) internationalization strategy (targeting overseas markets), (b) evolution of the management system (emergence of corporate entertainment agencies, systemization/specialization of organizations), the training system (star production system through training, open audition programs by entertainment agencies/broadcasters), and globalization of production (collaboration with overseas experts for production). In terms of content, the study mentioned the following factors as essential in K-pop's overseas expansion: (a) sincerity in the idol singer's lyrics and storytelling throughout the album (creating bonds of sympathy), (b) visual elements such as song and dance (performance), and (c) the idol singer's personality (e.g., appearance, talent).

In researching the global K-pop fans as consumers, the studies report a shift from passive consumers to active ones, indicating that communication and information sharing between fans and the K-pop idols through SNS is underway. In fact, the influence of the SNS media such as YouTube and others has shifted the paradigm of K-pop distribution and led to fans' active participation. As a result, global K-pop fans share information via SNS and naturally end up engaging in SNS citizenship behavior.

As noted earlier, citizenship behavior is behavior that contributes to the psychological environment of an organization, such as helping others voluntarily [48]. It is vital because it creates common values and enhances efficiency [49–53]. Over time, scholars have begun to study customer citizenship behavior from a marketing perspective [54,55]. Balaji [97] described customer citizenship behavior as the voluntary behavior of customers who do not receive explicit customer benefits. Studies have reported that these behaviors have a

significant influence on the interests and performance of companies and even improve the quality of service [55,98,99]. Considering this, we use tourist behavioral intention as an outcome variable of SNS citizenship behavior, which ultimately relates to the customer's loyalty behavior. Based on the above discussion, we posed the following hypotheses.

2.6. Hypotheses

Hypothesis 1 (H1). *Producers will have a positive influence on SNS citizenship behavior, a sustainability variable.*

Hypothesis 2 (H2). *Casting will have a positive influence on SNS citizenship behavior, a sustainability variable.*

Hypothesis 3 (H3). *Training will have a positive influence on SNS citizenship behavior, a sustainability variable.*

Hypothesis 4 (H4). *Producing/promotion will have a positive influence on SNS citizenship behavior, a sustainability variable.*

Hypothesis 5 (H5). *Social media will have a positive influence on SNS citizenship behavior, a sustainability variable.*

Hypothesis 6 (H6). *Content will have a positive influence on SNS citizenship behavior, a sustainability variable.*

Hypothesis 7 (H7). *SNS citizenship behavior will have a positive influence on tourist behavioral intention, a sustainability variable.*

3. Methods

3.1. Research Model

Underlying our research methodology with the theoretical concepts referenced above and variables in existing studies, we designed a research model to investigate the perspectives of global viewers who listen to K-pop via TV, radio, and the internet, watch K-pop videos on YouTube, and search information related to K-pop on SNS. To this end, we developed a questionnaire survey to collect data from K-pop fans. We then empirically analyzed how the success factors of K-pop as perceived by these global K-pop viewers influenced sustainability (SNS citizenship behavior and tourist behavioral intention variables). Ultimately, we investigated how K-pop SNS citizenship behavior influenced tourist behavioral intention. Our research model is shown in Figure 2.

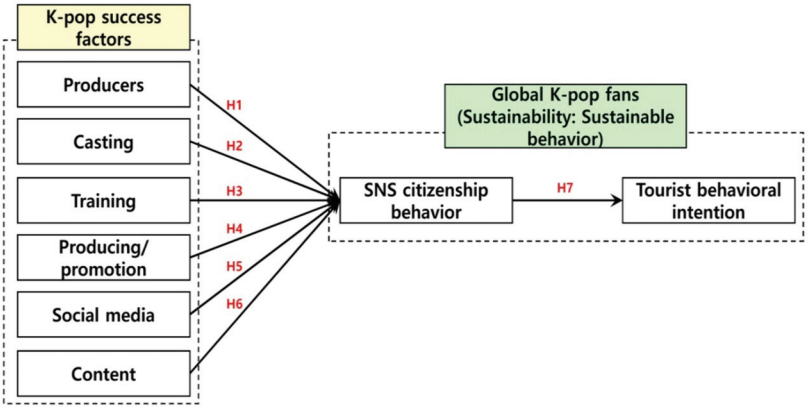

Figure 2. Research model.

3.2. Survey Design and Measurement

To measure K-pop perceptions, our questionnaire survey included variables based on prior research that we modified and supplemented according to the purpose of this study. The survey comprised seven variables measured by four items, with the exception of SNS citizenship measured by five items. The 37 items were each measured on a 5-point Likert scale (1 = Not at all to 5 = Very much). Table 2 shows the operational definitions and measurements of the variables used in this study.

Table 2. Survey variables and measures.

Variable		Operational Definition	Measurement Item	Study (Sources)
Independent variable	Producers	Degree of systematic processes and systematization related to K-pop production	Korea systemized the manufacturing process for the K-pop craze.	Chang [100] Kim [101]
			Korea carefully prepared to enter the overseas market from a long-term perspective for the K-pop craze.	
			From the planning stage, Korea targeted the global market and polished the skills of idol groups for the K-pop craze.	
			Korea systemized the entire manufacturing process forming promotion for the K-pop craze.	
	Casting	Degree of various efforts to discover K-pop talent	For the K-pop craze, Korea fully devoted its efforts to discovering talent, recognizing that half of all uncovered gems would be successful.	Chang [100] Kim [101] Kim [102]
			For the K-pop craze, Korea selected trainees through various channels, including official auditions and the recommendations of acquainted celebrities.	
			For the K-pop craze, Korea prioritized talent and hidden potential in its evaluations.	
			Korea actively discovered overseas talent through global auditions for the K-pop craze.	
	Training	Degree of comprehensive training to develop K-pop talent	Korean agencies played the role of a powerful gatekeeper for the K-pop craze.	Chang [100]
			For the K-pop craze, dedicated teams of experts in Korea provided training focused on, for example, singing, dancing, and English.	
			For the K-pop craze, Korea trained trainees intensely in a continuous survival style.	
			For the K-pop craze, Korea divided roles such as singing, acting, and choreography based on the trainees strongest talents and combined them to create the best synergy.	
	Producing/ promotion	Degree of production of high-quality albums and wide promotions suited for the global market in relation to K-pop	For the K-pop craze, Korea maximized the quality of albums by involving the world's premier experts in each creative field.	Chang [100]
			For the K-pop craze, Korea overcame cultural barriers in a short period of time by releasing albums specialized for local markets.	
			For the K-pop craze, Korea optimized, for example, lyrics, music videos, and fashion for local cultures in album production.	

Table 2. *Cont.*

Variable		Operational Definition	Measurement Item	Study (Sources)
			For the K-pop craze, Korea widely utilized K-pop recorded in the local language for local dramas, movies, and commercials, among others.	
	Social media	Degree to which real-time information on various K-pop content is provided or communicated through SNS	For the K-pop craze, Korea used social media such as YouTube, Facebook, and Twitter.	An and Jeong [103] Chang [100] Cho and Sim [100]
			For the K-pop craze, Korea greatly utilized the infectious nature of social media to enable quick word-of-mouth for overseas expansion.	
			For the K-pop craze, Korean idols shared news about performances and recent updates through social media.	
			For the K-pop craze, Korean idols expanded emotional exchange by directly communicating with overseas fans via social media.	
	Content	Degree of additional originality and efforts to secure popular appeal after optimizing a variety of K-pop content	For the K-pop craze, Korea has fused Western pop styles with easy melodies that suit Eastern sentiments.	Chang [100] Cho and Sim [104] Lee et al. [105] Wen and Cha [106]
			For the K-pop craze, Korea has secured universal mass appeal that can gain popularity across nationalities.	
			For the K-pop craze, Korea has provided showy spectacles through highly synchronized group dances and point dances.	
			For the K-pop craze, Korea has constantly changed sensuous fashions and styles when a new song is released.	
Parameter	SNS citizenship behavior	The degree to which good information or a material related to K-pop is produced and rapidly shared on SNS	I will share and provide K-pop-related information to people around me through SNS sites.	Kim et al. [58]
			I will share positive opinions about K-pop-related information to people around me through SNS sites.	
			I will always think about how to share K-pop-related information to people around me through SNS sites.	
			I will extract, process, and then share the core content of K-pop-related information to people around me through SNS sites.	
			I will always think about whether K-pop-related information can be helpful to people around me through SNS sites.	
Dependent variable	Tourist behavioral intention	Extent of desire or plans to actually travel to Korea	I want to travel to Korea even if it is expensive.	Choi et al. [88] Kwak et al. [19] Meng et al. [89]
			I want to travel to Korea even if there are cultural differences and a language barrier.	
			I want to travel to Korea even if transportation is inconvenient.	
			I want to travel to Korea even if it is far.	

3.3. Survey Respondents

The study participants were global viewers who listen, watch, and discuss K-pop. We conducted two rounds of the survey from October 2019 to October 2020 using Entrust Survey (http://entrustsurvey.com accessed on 23 October 2019) and Netpoint Enterprise Inc. (http://www.netpoint.co.kr/), global research agencies. The survey was provided in English or French. The respondents were from eight countries: the Philippines, Singapore, Australia, the UK, France, the U.S., Canada, and South Africa. From the two global research agencies, we received valid responses from 1247 participants. Table 3 shows the details of the collected valid sample.

Table 3. Demographic characteristics (n = 1247).

Item		Frequency	%
Gender	Male	618	49.6
	Female	629	50.4
Age	20 s	308	24.7
	30 s	326	26.1
	40 s	311	24.9
	50 s	302	24.2
Education	High school graduate	313	25.1
	Technical college graduate	276	22.1
	College graduate	515	41.3
	Graduate school graduate	143	11.5
Monthly income(Mean)	Under $1000	270	21.7
	$1000–$2000	268	21.5
	$2001–$3000	205	16.4
	$3001–$4000	155	12.4
	$4001–$5000	151	12.1
	Over $5000	198	15.9
Nationality	Philippines	150	12.0
	Singapore	156	12.5
	Australia	161	12.9
	UK	150	12.0
	France	170	13.6
	US	150	12.0
	Canada	160	12.8
	South Africa	150	12.0

3.4. Data Analysis

We analyzed the data using the programs IBM SPSS Ver. 18.0, SmartPLS Ver. 3.3.3, and fsQCA Ver. 3.0, as follows. First, we conducted a frequency analysis to examine the demographic characteristics, a reliability analysis using Cronbach's alpha to test the reliability of the metrics, and a factor analysis to test validity. Our procedures also included a correlation analysis to examine the closeness (i.e., correlation) of the variables. Finally, we used structural equation model (SEM) analysis to examine causality between the core variables of the study. We also carried out a fuzzy set-quality comparative analysis (fsQCA).

4. Results

4.1. Reliability and Validity

We examined the reliability and validity of all variables in the study in relation to the survey items. The results are shown in Table 4. Based on the analysis, Cronbach's alpha for all variables was a minimum of 0.847, indicating very high reliability. In addition, the loading of each factor was a minimum of 0.802, also indicating high validity, and the average variance extracted (AVE) was at least 0.686. A multicollinearity analysis confirmed the properties closely related to the independent variables; the variance inflation factor (VIF) was 4.019 or less, indicating no multicollinearity problem. Therefore, we were able to verify the reliability and validity of the variables in the study.

Table 4. Reliability and validity.

Variable	Item	Convergent Validity			Cronbach's Alpha	Multicollinearity
		Outer Loadings	Composite Reliability	AVE		VIF
Producers	Producers1	0.852	0.921	0.745	0.886	2.271
	Producers2	0.869				2.252
	Producers3	0.876				2.447
	Producers4	0.854				2.242
Casting	Casting1	0.837	0.907	0.710	0.864	2.059
	Casting2	0.859				2.239
	Casting3	0.850				2.083
	Casting4	0.824				1.832
Training	Training1	0.839	0.897	0.686	0.847	1.880
	Training2	0.831				1.934
	Training3	0.802				1.765
	Training4	0.840				1.994
Producing/ promotion	Producing/promotion1	0.839	0.907	0.710	0.864	1.964
	Producing/promotion2	0.848				2.109
	Producing/promotion3	0.846				2.139
	Producing/promotion4	0.836				1.996
Social media	Social media1	0.852	0.919	0.741	0.884	2.370
	Social media2	0.853				2.292
	Social media3	0.872				2.402
	Social media4	0.865				2.180
Content	Content1	0.806	0.909	0.714	0.867	1.885
	Content2	0.866				2.227
	Content3	0.846				2.099
	Content4	0.861				2.151
SNS Citizenship behavior	SNS citizenship behavior1	0.903	0.957	0.816	0.944	3.576
	SNS citizenship behavior2	0.902				3.559
	SNS citizenship behavior3	0.916				3.985
	SNS citizenship behavior4	0.913				4.019
	SNS citizenship behavior5	0.883				3.172

Table 4. *Cont.*

Variable	Item	Convergent Validity			Cronbach's Alpha	Multicollinearity
		Outer Loadings	Composite Reliability	AVE		VIF
Tourist behavioral intention	Tourist behavioral intention1	0.910	0.947	0.817	0.925	3.341
	Tourist behavioral intention2	0.916				3.776
	Tourist behavioral intention3	0.879				2.557
	Tourist behavioral intention4	0.910				3.493

(Note) Survey items: Likert 5-point scale (1 = not at all, 5 = very much); (Note) Outer Loadings > 0.70; (Note) Composite Reliability > 0.70; (Note) Average Variance Extracted (AVE) > 0.5; (Note) Cronbach's Alpha > 0.70.; (Note) Variance Inflation Factor (VIF) < 10.0.

4.2. Correlation Analysis

Table 5 shows the results of the discriminant validity analysis (correlation analysis). Our results indicated that the AVE square root exceeded the correlation coefficient for each variable. This verified the discriminant validity of the variables in the study.

Table 5. Correlation analysis.

Variable	Producers	Casting	Training	Producing	Social Media	Contents	SNS Citizenship Behavior	Tourist Behavioral Intention
Producers	**0.863**	-	-	-	-	-	-	-
Casting	0.771	**0.843**	-	-	-	-	-	-
Training	0.780	0.800	**0.828**	-	-	-	-	-
Producing	0.767	0.807	0.802	**0.842**	-	-	-	-
Social media	0.723	0.706	0.738	0.744	**0.861**	-	-	-
Content	0.726	0.712	0.744	0.766	0.784	**0.845**	-	-
SNS citizenship behavior	0.402	0.498	0.433	0.483	0.384	0.425	**0.903**	-
Tourist behavioral intention	0.433	0.470	0.447	0.480	0.435	0.446	0.499	**0.904**

(Note) The bold diagonal lines indicate the square root of the AVE.

4.3. Hypothesis Testing

We tested our hypotheses via SEM analysis using SmartPLS Ver. 3.3.3. For the SEM analysis, we performed resampling 500 times using the bootstrapping technique (Han and Kim, 2021; Kim et al., 2019, 2020; Kwak et al., 2019; Lee and Kim, 2020). Bootstrapping is a non-parametric procedure that can test the statistical significance of various PLS-SEM model results, including the path coefficient, Cronbach's alpha, HTMT, and R^2 values [19,20,107–109].

As detailed in Table 6, the results of the SEM analysis are as follows. First, among the success factors of K-pop, casting ($\beta = 0.326$, $t = 6.241$, $p < 0.01$), producing/promotion ($\beta = 0.223$, $t = 3.788$, $p < 0.01$), and content ($\beta = 0.107$, $t = 1.968$, $p < 0.10$) showed a statistically significant positive effect on SNS citizenship behavior with casting ($\beta = 0.326$) having the greatest influence on it. In contrast, producers, training, and social media did not have a statistically significant effect on SNS citizenship behavior. This meant that Hypothesis 2, Hypothesis 4, and Hypothesis 6 were supported, whereas Hypothesis 1, Hypothesis 3, and Hypothesis 5 were not. Second, SNS citizenship behavior ($\beta = 0.499$, $t = 19.464$, $p < 0.01$) had a statistically significant positive influence on tourist behavioral intention. Therefore, Hypothesis 7 was supported.

Table 6. Structural equation model analysis results.

	Path			β Value	Sample Mean	Standard Deviation	*t* Value	*p* Value	Hypothesis
H1	Producers	→	SNS Citizenship behavior	−0.059	−0.055	0.048	1.216	0.225	Not supported
H2	Casting	→	SNS Citizenship behavior	0.326	0.328	0.052	6.241	0.000	Supported
H3	Training	→	SNS Citizenship behavior	−0.002	−0.002	0.051	0.042	0.966	Not supported
H4	Producing/ promotion	→	SNS Citizenship behavior	0.223	0.222	0.059	3.788	0.000	Supported
H5	Social media	→	SNS Citizenship behavior	−0.052	−0.060	0.054	0.955	0.340	Not supported
H6	Content	→	SNS Citizenship behavior	0.107	0.111	0.054	1.968	0.050	Supported
H7	SNS citizenship behavior	→	Tourist behavioral intention	0.499	0.498	0.026	19.464	0.000	Supported

4.4. Mediated Effect Test

In addition, we analyzed whether SNS citizenship behavior had a mediated effect in the relationship between the success factors of K-pop and tourist behavioral intention using SmartPLS Ver. 3.3.3. Table 7 shows the results, revealing that the three factors, casting, producing/promotion, and content, all had mediated effects in the path of K-pop success factors → SNS citizenship behavior → tourist behavioral intention. This means that these three factors increased SNS citizenship behavior, through which tourist behavioral intention would also increase. In contrast, the three factors, producers, training, and social media, did not have any mediated effect in the path of K-pop success factors → SNS citizenship behavior → tourist behavioral intention.

4.5. Fuzzy Set-Quality Comparative Analysis (fsQCA)

To determine the models of the explanatory variables leading to high tourist behavioral intention, the outcome variable, we set the explanatory variables as the K-pop success factors (producers, casting, training, producing/promotion, social media, and content) and SNS citizenship behavior and performed the fsQCA. Regarding fsQCA, a standard analysis was conducted and the results of an intermediate solution were confirmed [110]. Table 8 shows the results.

First, there were three models (Models 1 to 3) leading to high tourist behavioral intention. The solution coverage was 0.749 and the solution consistency was 0.897. As these exceed the recommended coverage and consistency levels of 0.2 and 0.8, respectively, the results were deemed suitable [111].

Table 7. Mediated effect test results.

	Path					β Value	Sample Mean	Standard Deviation	*t*-Value	*p*-Value	Mediated Effect
1	Producers	→	SNS Citizenship behavior	→	Tourist behavioral intention	−0.029	−0.028	0.024	1.212	0.226	No
2	Casting	→	SNS Citizenship behavior	→	Tourist behavioral intention	0.162	0.164	0.028	5.831	0.000	Yes
3	Training	→	SNS Citizenship behavior	→	Tourist behavioral intention	−0.001	−0.001	0.026	0.042	0.966	No
4	Producing/ promotion	→	SNS Citizenship behavior	→	Tourist behavioral intention	0.111	0.111	0.030	3.688	0.000	Yes
5	Social media	→	SNS Citizenship behavior	→	Tourist behavioral intention	−0.026	−0.030	0.027	0.949	0.343	No
6	Contents	→	SNS Citizenship behavior	→	Tourist behavioral intention	0.053	0.055	0.027	1.956	0.051	Yes

Table 8. Fuzzy set-quality comparative analysis results.

	Model	Raw Coverage	Unique Coverage	Consistency
1	(high) producers * (low) casting * (high) training * (high) social media * (high) contents * (high) SNS citizenship behavior	0.299	0.004	0.941
2	(high) casting * (high) training * (high) producing/promotion * (high) social media * (high) contents * (high) SNS citizenship behavior	0.716	0.422	0.935
3	(low) producers * (low) casting * (low) training * (low) producing/promotion * (low) social media * (low) contents * (low) SNS citizenship behavior	0.237	0.027	0.837

(Note) Solution Coverage: 0.749; Solution Consistency: 0.897; (Note) Low: refers to a complement set and is interpreted as a low condition.

(a) Model 1: (high) producers, (low) casting, (high) training, (high) social media, (high) content, and (high) SNS citizenship behavior were confirmed to be important in creating tourist behavioral intention (coverage = 0.299, consistency = 0.941). (b) Model 2: (high) casting, (high) training, (high) producing/promotion, (high) social media, (high) content, and (high) SNS citizenship behavior were confirmed to be important in creating tourist behavioral intention (coverage = 0.716, consistency = 0.935). (c) Model 3: (low) producers, (low) casting, (low) training, (low) producing/promotion, (low) social media, (low) content, and (low) SNS citizenship behavior were confirmed to be important in creating tourist behavioral intention (coverage = 0.237, consistency = 0.837).

In summary, according to the fsQCA results, casting, training, social media, content, and SNS citizenship behavior were commonly derived at least three times, indicating that they were key factors impacting tourist behavioral intention. We also observed based on the SEM and fsQCA results that with the exception of producers, the five success factors of K-pop (casting, training, producing/promotion, social media, and content) were crucial in increasing tourist behavioral intention.

5. Discussion and Conclusions

5.1. Summary of Research

Current research has failed to determine empirically the success factors for the K-pop industry linked to sustainability, that is, sustainable behavior (e.g., SNS citizenship

behavior and tourist behavioral intention). To fill this gap, we investigated the success factors of K-pop (producers, casting, training, producing/promotion, social media, and content) and sustainability (sustainable behavior).

To this end, we surveyed 1247 global viewers (629 females, 50.4%) who listen to K-pop via TV, radio, and on the internet, watch K-pop videos on YouTube, and search information related to K-pop on SNS. The survey respondents were from eight countries: the Philippines, Singapore, Australia, the UK, France, the U.S., Canada, and South Africa. We analyzed the collected data using two statistical techniques: SEM analysis and fsQCA.

The key results were as follows: first, according to the SEM, of the K-pop success factors, three factors demonstrated a statistically significant positive influence on SNS citizenship behavior: casting, producing/promotion, and content. These findings support those of Jun [96] and Kim [95].

The details are as follows: (a) Entertainment agencies have selected trainees through diverse channels, such as official global auditions and recommendations by celebrities, and actively discovered (casting) foreign talent [32].

(b) Beginning in the song brainstorming stage, these agencies have collected various ideas from external sources and utilized diverse experts from different nationalities and fields to divide labor in the producing stage [6,20,21,26,32].

(c) Entertainment agencies have established partnerships with local leading entertainment agencies and record labels in target countries; the Korean agencies designed the overall concepts while the partners have carried out specific local promotions and secured distribution networks in local markets. They also optimized lyrics, music videos, fashion, for example, for the local culture, produced albums, and widely promoted the K-pop recorded in the local language in local dramas, movies, and commercials [6,20,21,26,32].

(d) By fusing Western pop styles with easy melodies that suit Eastern sentiments, the K-pop industry has ensured universal mass appeal that can gain popularity across nationalities. The industry also provides showy spectacles through highly synchronized group dances and point dances and constantly changes sensuous fashions and styles when new songs are released. The K-pop agencies also actively avoid sexual and violent elements common in R&B and hip-hop, mainstream genres of pop, emphasizing a differentiated message of innocence and passion. Thus, K-pop content is perfected based on three key factors: singing ability, choreography, and visuals [13,16,18,36].

In addition, the influence of new media, such as YouTube and other SNS platforms, has shifted the paradigm of K-pop distribution and led to fans' active participation [95,96]. Therefore, the three K-Pop success factors of casting, producing/promotion, and content maximize information sharing among global K-pop fans via SNS, which, in turn, naturally increases SNS citizenship behavior.

Second, SNS citizenship behavior also showed a statistically significant positive influence on tourist behavioral intention. We confirmed that there was a mediated effect in the path of casting, producing/promotion, content → SNS citizenship behavior → tourist behavioral intention. These findings support the research of Di et al. [98], Hur et al. [99], and van Tonder et al. [55]. In looking at the K-pop success factors, we found that the higher the perceptions of the casting, producing/promotion, and content, the more satisfied the global K-pop fans were with K-pop. In other words, these factors lead to voluntary SNS citizenship behavior. As global K-pop fans attach themselves emotionally to their favorite K-pop idols and search continuously for various K-pop-related information, voluntary SNS citizenship behavior arises. Thus, among the K-pop success factors, as the level of casting, producing/promotion, and content increases, fans become more likely to voluntarily engage in SNS citizenship behavior. These global K-pop fans reflect selfless, altruistic behavior on SNS. Their voluntary SNS citizenship behavior creates positive effects such as sustainable and responsible production related to K-pop [9,65,66], ultimately leading to tourist behavioral intention.

Third, according to the fsQCA results, casting, training, social media, content, and SNS citizenship behavior were commonly derived at least three times, marking them as key

factors of tourist behavioral intention. In summary, the SEM and fsQCA results confirmed that, with the exception of producers, there are K-pop five success factors (casting, training, producing/promotion, social media, and content) that are crucial to increasing tourist behavioral intention. These findings are described in detail as follows:

(a) Systematic casting/training. Entertainment agencies have systemized processes such as professionally casting and training trainees, and these idol groups have grown into differentiated K-pop talent [26,32]. (b) Promotional method. Agencies have reduced their costs and time in overseas expansion by utilizing social media, which enables fans to easily and voluntarily spread content [9,14,33]. (c) Active global K-pop fans. Global K-pop fans are familiar with technology, actively enjoy the culture, and freely express their intentions [15,34,35]. (d) K-pop content. K-pop content combines three key qualities: excellent singing ability, choreography, and visuals [13,16,18,36]. The implication is that, when these K-pop success factors are emphasized effectively, more global K-pop fans will be motivated to meet real K-pop stars and watch K-pop performances, which will lead to more fans visiting and traveling in Korea, thereby increasing tourism.

5.2. Research Contributions and Recommendations

This study provides the following theoretical and practical contributions. First, we analyzed the K-pop success factors from the perspectives of production, consumption, and distribution. That is, we applied the theory of the "cultural diamond" used when analyzing cultural phenomena in the sociology of art to support our investigation. To the best of our knowledge, this is the first study to use the cultural diamond model to study the K-pop industry, consisting of four vertices, then derive success factors and link them to sustainability, namely, SNS citizenship behavior and tourist behavioral intention.

Second, we looked at all 17 sustainability categories to identify those that would encompass the K-pop industry's success factors: "Decent Work and Economic Growth," "Responsible Consumption and Production," and "Partnerships to achieve the Goal." To the best of our knowledge, ours is the first study to apply "SNS citizenship behavior" as a parameter and "tourist behavioral intention" as a dependent variable to measure the industry's sustainability.

Third, we were able to demonstrate empirically that, as perceived by global viewers, the K-pop success factors increase SNS citizenship behavior and further lead to tourist behavioral intention. The implication is that necessary measures should be taken for sustainable hallyu tourism marketing, promotion, and product planning in connection with K-pop.

Our recommendations are as follows: (1) to induce consumers to visit or travel to Korea, support should be provided for enthusiastic fans of sustainable K-pop and foreign visitors participating in K-pop concerts should be properly managed; (2) further efforts are needed to build sites that provide K-pop information and integrated tourism information related to K-pop; (3) the planning of K-pop performances in connection with sustainable regional festivals and the development of hallyu tourism products related to K-pop, differentiated by target market, should be expanded; and (4) measures should be explored to promote hallyu tourism in connection with K-pop at a sustainable institutional level.

Fourth, a mediated effect was observed in the path of the K-pop success factors casting, producing/promotion, content→ SNS citizenship behavior → tourist behavioral intention. To sustain this, better management is needed among the entertainment agencies that handle K-pop performances for global K-pop fans. That is, some entertainment agencies that plan K-pop concerts and idol fan meetings have displayed irresponsible behavior with recruited customers and in their operations. This then damages global K-pop fans and erodes trust in the K-pop industry and Korea's national brand and image. This means that institutional measures for the management of entertainment agencies that handle K-pop performances are necessary. Furthermore, the roles and scope of work of these performance entertainment agencies should be defined, and the Fair Trade Commission should provide requirements for establishment approval. There is also a need for legal standards that

clarify interests between sellers and buyers, such as compensation for damages when a performance is cancelled.

Fifth, over the past decade, Korean pop music (K-pop) has left unprecedented traces in the global pop market through the digital proliferation of highly-trained K-pop idols. In addition, English literature on K-pop has steadily increased, and the most recent K-pop phenomenon is focused on the spread of digital idols. [112]. In particular, the changes in the K-pop production environment brought by social media, as mentioned in the introduction, had a great impact. For example, a BTS music video uploaded to YouTube reached more than 1 million views in a single day. [16,18]. Furthermore, as the results of this study show, the fsQCA analysis revealed that social media is a key factor that can have a significant influence on tourism intention. Therefore, entertainment agencies must reduce costs and time when entering foreign markets by more actively utilizing social media through which marketing activities can be easily propagated. Furthermore, global viewers, especially those in their 20 s and 30 s, are familiar with IT and are active consumers. They eagerly embrace IT pop culture, and express their opinions freely. This suggests that entertainment agencies need to create a new IT pop culture, or entertainment culture that incorporates social media, rather than simply leaving consumers to listen to and accept K-pop.

5.3. Research Limitations and Future Directions

While this study provided several theoretical and practical contributions, it has some limitations as well. First, we investigated only certain K-pop success factors (producers, casting, training, producing/promotion, social media, and content) and sustainability. As we looked at only six success factors, more success factors should be investigated in future studies.

Second, we used "SNS citizenship behavior" as a parameter and "tourist behavioral intention" as a dependent variable for sustainability. However, as there are likely more parameters and dependent variables that can be applied for sustainability, more sustainability variables should be analyzed in the future.

Third, the participants of this study were 1247 global viewers from eight countries. As K-pop has become a wider global phenomenon, more global K-pop viewers of other nationalities should be surveyed for specific and generalized investigations. Additionally, for research accuracy, the model developed here could be improved by comparing it with a similar one in another country.

Fourth, based on the data collected, we used two statistical techniques: SEM analysis and fsQCA. However, other statistical techniques may offer differing results.

Author Contributions: The authors contributed equally to this work. All the authors contributed to the conceptualization, formal analysis, investigation, methodology, writing of the original draft, and review and editing. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2019S1A5B5A02051362).

Institutional Review Board Statement: Ethical review and approval were waived for this study, because, although it was a human study, it was observational, and the research design did not involve ethical issues.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data sharing not applicable. The data are not publicly available due to participants' privacy.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Lie, J. What is the K in K-pop? South Korean popular music, the culture industry, and national identity. *Korea Obs.* **2012**, *43*, 339–363. [CrossRef]

2. Yoon, K. Global imagination of K-pop: Pop music fans' lived experiences of cultural hybridity. *Pop. Music Soc.* **2018**, *41*, 373–389. [CrossRef]
3. Necula, A.E. The Hallyu influence. K-POP on foreign lands. *IJIR* **2016**, *3*, 295–301.
4. Lie, J. *K-Pop: Popular Music, Cultural Amnesia, and Economic Innovation in South Korea*; University of California Press: Oakland, CA, USA, 2015; pp. 1–241.
5. Messerlin, P.A.; Shin, W. The K-pop success: How big and why so fast. *Asian J. Soc. Sci.* **2017**, *45*, 409–439. [CrossRef]
6. Fuhr, M. *Globalization and Popular Music in South Korea: Sounding Out K-Pop*; Routledge: New York, NY, USA, 2015; pp. 1–256.
7. Yoon, S.J.; Park, Y.J. Antecedents and consequence of the social network service-based word-of-mouth: With focus on Chinese consumers' experiences of the Korea wave. *J. Int. Trade Commer.* **2016**, *12*, 115–137. [CrossRef]
8. Hoang, H. K-Pop Male Androgyny, Mediated Intimacy, and Vietnamese Fandom. In *Mobile Media and Social Intimacies in Asia*; Springer: Dordrecht, The Netherlands, 2020; pp. 187–203.
9. Jung, S. K-pop, Indonesian fandom, and social media | Jung | Transformative works and cultures. *Transform. Work Cult.* **2011**, *8*, 1. [CrossRef]
10. Otmazgin, N.; Lyan, I. Hallyu across the desert: K-pop fandom in Israel and Palestine. *Cross Curr.* **2014**, *3*, 32–55. [CrossRef]
11. Jung, S.; Shim, D. Social distribution: K-pop fan practices in Indonesia and the 'Gangnam Style' phenomenon. *Int. J. Cult. Stud.* **2014**, *17*, 485–501. [CrossRef]
12. Oh, D.C. Korean wave | K-pop fans react: Hybridity and the white celebrity-fan on YouTube. *Int. J. Commun.* **2017**, *11*, 2270–2287.
13. Oh, I.; Lee, H.J. K-pop in Korea: How the pop music industry is changing a post-developmental society. *Cross Curr.* **2014**, *3*, 72–93. [CrossRef]
14. Jung, E.Y.; Lee, S.; Nornes, A.M. K-pop idols, social media, and the remaking of the Korean wave. *Korean Wave Age Soc. Media* **2015**, *3*, 73–89.
15. Sung, S.Y. K-pop reception and participatory fan culture in Austria. *Cross Curr.* **2014**, *3*, 56–71. [CrossRef]
16. Doré, P.; Pugsley, P.C. Genre conventions in K-pop: BTS's 'Dope'music video. *Continuum* **2019**, *33*, 580–589. [CrossRef]
17. Baek, Y.M. Relationship between cultural distance and cross-cultural music video consumption on YouTube. *Soc. Sci. Comput. Rev.* **2015**, *33*, 730–748. [CrossRef]
18. Kim, Y.Y. Performed intermediality and beyond in the BTS music video 'Idol': K-Pop idol identities in contemporary Hallyu. *EAJPC* **2020**, *6*, 239–255. [CrossRef]
19. Kwak, H.E.; Kim, J.H.; Kim, S.Y.; Jung, J.E.; Choi, H.J. Korean dance performance influences on prospective tourist cultural products consumption and behaviour intention. *J. Psychol. Afr.* **2019**, *29*, 230–236. [CrossRef]
20. Lee, H.W.; Kim, J.H. Brand loyalty and the Bangtan Sonyeondan (BTS) Korean dance: Global viewers' perceptions. *J. Psychol. Afr.* **2006**, *30*, 551–558. [CrossRef]
21. Lee, S.H.; Choi, S.; Kim, H.W. Unveiling the success factors of BTS: A mixed-methods approach. *INTR* **2020**, 1–23. [CrossRef]
22. Aisyah, A. Korean-English language translational action of K-pop social media content: A case study on Bangtan Sonyeondan's (BTS) official twitter. *3L Lang. Linguist. Lit.* **2017**, *23*, 67–80. [CrossRef]
23. Lee, J.H.; Downie, J.S.; Cunningham, S.J. *Challenges in Cross-Cultural/Multilingual Music Information Seeking*; University of London: London, UK; Queen Mary: Long Beach, CA, USA, 2005; pp. 1–7.
24. Lee, J.S. 11 The Korean wave, K-pop fandom, and multilingual microblogging. *Multiling. Youth Pract. Comput. Mediat. Commun.* **2018**, *11*, 205–229. [CrossRef]
25. Kim, J.H.; Kwon, J.H.; Bae, K.H. Impact of K-pop consumption attributes on national image and behavioral intention to visit: Targeting Americans, British, South Africans and Filipinos. *J. Cult. Ind. Stud.* **2018**, *18*, 63–73. [CrossRef]
26. Oh, I.; Park, G.S. The globalization of K-pop: Korea's place in the global music industry. *Korea Obs.* **2013**, *44*, 389–409.
27. Eom, T.; Yu, J.; Han, H. Medical tourism in Korea–recent phenomena, emerging markets, potential threats, and challenge factors: A review. *Asia Pacific J. Tour. Res.* **2019**, *24*, 563–573. [CrossRef]
28. Kim, K.H.; Yu, J.H.; Lee, C.S. A study on product empowerment of medical tourism using conjoint analysis. *Int. Comm. Infor. Rev.* **2014**, *16*, 307–329. [CrossRef]
29. Seo, J.H.; Kim, B. The "Hallyu" phenomenon: Utilizing tourism destination as product placement in K-POP culture. *Tour. Econ.* **2020**, *26*, 719–728. [CrossRef]
30. Alexander, V.D. *Sociology of the Arts: Exploring Fine and Popular Forms*; John Wiley & Sons: Oxford, UK, 2020.
31. Griswold, W. *Cultures and Societies in a Changing World*; Sage Publications: Thousand Oaks, CA, USA, 2012.
32. Shin, S.I.; Kim, L. Organizing K-pop: Emergence and market making of large Korean entertainment houses, 1980–2010. *East. Asia* **2013**, *30*, 255–272. [CrossRef]
33. Jung, S. Youth, social media and transnational cultural distribution: The case of online K-pop circulation. *Mediat. Youth Cult.* **2014**, 114–129. [CrossRef]
34. Marinescu, V.; Balica, E. Korean cultural products in Eastern Europe: A case study of the K-Pop impact in Romania. *Region* **2013**, *2*, 113–135. [CrossRef]
35. Min, W.; Jin, D.Y.; Han, B. Transcultural fandom of the Korean wave in Latin America: Through the lens of cultural intimacy and affinity space. *Media Cult. Soc.* **2019**, *41*, 604–619. [CrossRef]
36. Parc, J.; Messerlin, P.; Moon, H.C. The Secret to the Success of K-Pop: The Benefits of Well-Balanced Copyrights. In *Corporate Espionage, Geopolitics, and Diplomacy Issues in International Business*; IGI Global: Hershey, PA, USA, 2017; pp. 130–148.

37. Kuhlman, T.; Farrington, J. What is sustainability? *Sustainability* **2010**, *2*, 3436–3448. [CrossRef]
38. Scoones, I. Sustainability. *Develop. Pract.* **2007**, *17*, 589–596. [CrossRef]
39. Wilkinson, A.; Hill, M.; Gollan, P. The sustainability debate. *Int. J. Oper. Prod. Manag.* **2001**, *21*, 1492–1502. [CrossRef]
40. Dylan, A. Environmental sustainability, sustainable development, and social work. *Environ. Soc. Work* **2013**, *3*, 62–87.
41. Opp, S.M.; Saunders, K.L. Pillar talk: Local sustainability initiatives and policies in the United States—Finding evidence of the "three E's": Economic development, environmental protection, and social equity. *Urban. Aff. Rev.* **2013**, *49*, 678–717. [CrossRef]
42. Portney, K.E. Local sustainability policies and programs as economic development: Is the new economic development sustainable development? *Cityscape* **2013**, *15*, 45–62.
43. Zhang, K.M.; Wen, Z.G. Review and challenges of policies of environmental protection and sustainable development in China. *J. Environ. Manag.* **2008**, *88*, 1249–1261. [CrossRef] [PubMed]
44. United Nations Organisation. Secretary-General's Remarks to the Press at COP22. Available online: https://www.un.org/sustainabledevelopment/blog/2016/11/secretary-generals-remarks-to-the-press-at-cop22/ (accessed on 28 November 2020).
45. Lee, S.H. Sustainable development goals and human rights-based development cooperation. *Develop. Cooper.* **2017**, *12*, 3–38.
46. Oh, C. Queering spectatorship in K-pop: The androgynous male dancing body and western female fandom. *J. Fandom Stud.* **2015**, *3*, 59–78. [CrossRef]
47. Oh, S.H. Private partnerships and financial mechanisms to achieve sustainable development goals. *Int. Develop. Cooper.* **2015**, *10*, 3–19.
48. Han, S.L.; You, J.W.; Gong, T.S. Effects of customer participation and citizenship behavior on perceived service quality and repurchasing intention: In non-profit university educational service. *Kor. Manag. Rev.* **2004**, *33*, 473–502.
49. Boiral, O.; Talbot, D.; Paillé, P. Leading by example: A model of organizational citizenship behavior for the environment. *Bus. Strateg. Environ.* **2015**, *24*, 532–550. [CrossRef]
50. Bolino, M.C.; Hsiung, H.H.; Harvey, J.; LePine, J.A. "Well, I'm tired of tryin'!" Organizational citizenship behavior and citizenship fatigue. *J. Appl. Psychol.* **2015**, *100*, 56–74. [CrossRef]
51. Klotz, A.C.; Bolino, M.C.; Song, H.; Stornelli, J. Examining the nature, causes, and consequences of profiles of organizational citizenship behavior. *J. Organ. Behav.* **2018**, *39*, 629–647. [CrossRef]
52. Organ, D.W. Organizational citizenship behavior: Recent trends and developments. *Annu. Rev. Organ. Psychol. Organ. Behav.* **2018**, *80*, 295–306. [CrossRef]
53. Robertson, J.L.; Barling, J. Toward a new measure of organizational environmental citizenship behavior. *J. Bus. Res.* **2017**, *75*, 57–66. [CrossRef]
54. Gong, T.; Yi, Y. A review of customer citizenship behaviors in the service context. *Serv. Ind. J.* **2019**, 1–31. [CrossRef]
55. Van Tonder, E.; Saunders, S.G.; Lisita, I.T.; de Beer, L.T. The importance of customer citizenship behaviour in the modern retail environment: Introducing and testing a social exchange model. *J. Retail. Consum. Serv.* **2018**, *45*, 92–102. [CrossRef]
56. Bettencourt, L.A. Customer voluntary performance: Customers as partners in service delivery. *J. Retail.* **1997**, *73*, 383–406. [CrossRef]
57. Kim, J.H.; Seok, B.I.; Lee, K.T.; Yu, J.P. Effects of social responsibility activities of franchise chain hotels on customer value and SNS citizenship behavior. *Korean J. Franch. Manag.* **2017**, *8*, 5–16. [CrossRef]
58. Kim, J.H.; Lee, K.T.; Seok, B.I.; Choi, H.J.; Jung, S.H. Competitive factors of electronic dance music festivals with social networking service (SNS) citizenship behaviour of international tourists. *J. Psychol. Afr.* **2018**, *28*, 116–121. [CrossRef]
59. Laffan, D.A. Positive psychosocial outcomes and fanship in K-pop fans: A social identity theory perspective. *Psychol. Rep.* **2020**, 0033294120961524. [CrossRef] [PubMed]
60. Cha, H.; Kim, S. A study on K-POP strategy: Focused on digital music environment and social media. International Information Institute (Tokyo). *Information* **2014**, *17*, 911–917.
61. Han, B. Korean wave | K-pop in Latin America: Transcultural fandom and digital mediation. *Int. J. Commun.* **2017**, *11*, 2250–2269.
62. Kim, Y.H.; Lee, D.; Han, N.G.; Song, M. Exploring characteristics of video consuming behaviour in different social media using K-pop videos. *J. Inf. Sci.* **2014**, *40*, 806–822. [CrossRef]
63. Malik, Z.; Haidar, S. Online community development through social interaction—K-Pop stan twitter as a community of practice. *Interact. Learn. Environ.* **2020**, 1–19. [CrossRef]
64. Kim, M.S.; Kim, H.M. The effect of online fan community attributes on the loyalty and cooperation of fan community members: The moderating role of connect hours. *Comput. Hum. Behav.* **2017**, *68*, 232–243. [CrossRef]
65. Parc, J.; Kim, S.D. The digital transformation of the Korean music industry and the global emergence of K-pop. *Sustainability* **2020**, *12*, 7790. [CrossRef]
66. Siriyuvasak, U.; Hyunjoon, S. Asianizing K-pop: Production, consumption and identification patterns among Thai youth. *Inter. Asia Cult. Stud.* **2007**, *8*, 109–136. [CrossRef]
67. Dean, D.; Suhartanto, D. The formation of visitor behavioral intention to creative tourism: The role of push–pull motivation. *Asia Pac. J. Tour. Res.* **2019**, *24*, 393–403. [CrossRef]
68. Kim, J.H.; Kim, G.J.; Choi, H.J.; Seok, B.I.; Lee, N.H. Effects of social network services (SNS) subjective norms on SNS addiction. *J. Psychol. Afr.* **2019**, *29*, 582–588. [CrossRef]
69. Muslim, A.; Harun, A.; Ismael, D.; Othman, B. Social media experience, attitude and behavioral intention towards umrah package among generation X and Y. *Manag. Sci. Lett.* **2020**, *10*, 1–12. [CrossRef]

70. Olya, H.G.; Han, H. Antecedents of space traveler behavioral intention. *J. Travel Res.* **2020**, *59*, 528–544. [CrossRef]
71. Chen, X.; Cheng, Z.F.; Kim, G.B. Make it memorable: Tourism experience, fun, recommendation and revisit intentions of Chinese outbound tourists. *Sustainability* **2020**, *12*, 1904. [CrossRef]
72. Chun, S.H.; Nyam-Ochir, A. The effects of fast food restaurant attributes on customer satisfaction, revisit intention, and recommendation using DINESERV scale. *Sustainability* **2020**, *12*, 7435. [CrossRef]
73. Park, D.; Lee, G.; Kim, W.G.; Kim, T.T. Social network analysis as a valuable tool for understanding tourists' multi-attraction travel behavioral intention to revisit and recommend. *Sustainability* **2019**, *11*, 2497. [CrossRef]
74. Dolnicar, S.; Coltman, T.; Sharma, R. Do satisfied tourists really intend to come back? Three concerns with empirical studies of the link between satisfaction and behavioral intention. *J. Travel Res.* **2015**, *54*, 152–178. [CrossRef]
75. Jafarkarimi, H.; Saadatdoost, R.; Sim, A.T.H.; Hee, J.M. Behavioral intention in social networking sites ethical dilemmas: An extended model based on theory of planned behavior. *Comput. Hum. Behav.* **2016**, *62*, 545–561. [CrossRef]
76. Shiau, W.L.; Chau, P.Y. Understanding behavioral intention to use a cloud computing classroom: A multiple model comparison approach. *Inf. Manag.* **2016**, *53*, 355–365. [CrossRef]
77. Shin, Y.H.; Hancer, M. The role of attitude, subjective norm, perceived behavioral control, and moral norm in the intention to purchase local food products. *J. Foodserv. Bus. Res.* **2016**, *19*, 338–351. [CrossRef]
78. Han, J.H. The effects of personality traits on subjective well-being and behavioral intention associated with serious leisure experiences. *JAFEB* **2020**, *7*, 167–176. [CrossRef]
79. Leonnard, S.E.; Comm, M.; Thung, F. The relationship of service quality, word-of-mouth, and repurchase intention in online transportation services. *J. Process. Manag. New Technol.* **2017**, *5*, 30–40. [CrossRef]
80. Tsai, C.T.; Hsu, H.; Chen, C.C. An examination of experiential quality, nostalgia, place attachment and behavioral intentions of hospitality customers. *J. Hospit. Market. Manag.* **2020**, *29*, 869–885. [CrossRef]
81. Jang, S.; Yu, L.; Pearson, T. Chinese travellers to the United States: A comparison of business travel and visiting friends and relatives. *Tour. Geogr.* **2003**, *5*, 87–108. [CrossRef]
82. Chen, C.F.; Chen, F.S. Experience quality, perceived value, satisfaction and behavioral intentions for heritage tourists. *Tour. Manag.* **2010**, *31*, 29–35. [CrossRef]
83. Chen, Y.C.; Shang, R.A.; Li, M.J. The effects of perceived relevance of travel blogs' content on the behavioral intention to visit a tourist destination. *Comput. Hum. Behav.* **2014**, *30*, 787–799. [CrossRef]
84. Chen, C.F.; Tsai, D. How destination image and evaluative factors affect behavioral intentions? *Tour. Manag.* **2007**, *28*, 1115–1122. [CrossRef]
85. Lam, T.; Hsu, C.H. Predicting behavioral intention of choosing a travel destination. *Tour. Manag.* **2006**, *27*, 589–599. [CrossRef]
86. Huang, S.; Hsu, C.H. Effects of travel motivation, past experience, perceived constraint, and attitude on revisit intention. *J. Travel Res.* **2009**, *48*, 29–44. [CrossRef]
87. Lee, S.; Jeon, S.; Kim, D. The impact of tour quality and tourist satisfaction on tourist loyalty: The case of Chinese tourists in Korea. *Tour. Manag.* **2011**, *32*, 1115–1124. [CrossRef]
88. Choi, I.Y.; Choi, H.J.; Lee, J.Y.; Jung, S.H.; An, B.J.; Kim, J.H. Quality of Olympics opening ceremony: Tourism behavioural intention of international spectators. *J. Psychol. Afr.* **2019**, *29*, 126–134. [CrossRef]
89. Meng, H.Y.; Jung, S.H.; Yu, J.P.; Bae, K.H.; An, B.J.; Kim, J.H. Perceived tourist values of the Museum of African Art. *J. Psychol. Afr.* **2018**, *28*, 375–381. [CrossRef]
90. Kim, J.O.; Kim, N.J.; Jeong, C. Effects of the perception of K-pop on destination image and visit intention to Korea: Focusing on Chinese undergraduate students. *J. Tour. Sci.* **2013**, *37*, 77–101.
91. Bok-rae, K. Past, present and future of Hallyu (Korean Wave). *Am. Int. J. Contemp. Res.* **2015**, *5*, 154–160.
92. Cha, H.; Kim, S. A Case Study on Korean Wave: Focused on K-POP Concert by Korean Idol Group in Paris, June 2011. In *International Conference on Multimedia, Computer Graphics, and Broadcasting*; Springer: Berlin/Heidelberg, Germany, 2011; pp. 153–162.
93. Kang, I.W. Study on development plans that lead to innovative growth of cultural industry. *Asia Pac. J. Multimed. Serv. Converg. Art Hum. Sociol.* **2019**, *9*, 337–348.
94. Kim, E.K. Analysis on the musical value and sustainable growth of K-pop. *Global Cult. Rev.* **2015**, *6*, 25–49.
95. Kim, H.S. *A Study on Success Strategies for Global Marketing of K-Pop: Focusing on Experts' In-Depth Interview*; Hanyang University Graduate: Seoul, Korea, 2012.
96. Jun, J.K. *A Study on the Factors of Overseas Spread of K-Pop: With Focus on the Analysis of Producer, Recipient, Media and Content Field. Doctoral Dissertation*; Kookmin University Graduate: Seoul, Korea, 2018.
97. Balaji, M.S. Managing customer citizenship behavior: A relationship perspective. *J. Strateg. Mark.* **2014**, *22*, 222–239. [CrossRef]
98. Di, E.; Huang, C.J.; Chen, I.H.; Yu, T.C. Organisational justice and customer citizenship behaviour of retail industries. *Serv. Ind. J.* **2010**, *30*, 1919–1934. [CrossRef]
99. Hur, W.M.; Kim, H.; Kim, H.K. Does customer engagement in corporate social responsibility initiatives lead to customer citizenship behaviour? The mediating roles of customer-company identification and affective commitment. *Corp. Soc. Responsib. Environ. Manag.* **2018**, *25*, 1258–1269. [CrossRef]
100. Chang, Y. A preliminary study of job performance in entertainment management using DACUM job analysis. *J. Secr. Stud.* **2010**, *19*, 5–32.

101. Kim, M.K. A study on the structure and the characteristic of the relation in the entertainment industry. *Hum. Contents* **2012**, *26*, 73–99.
102. Kim, H.G. Gender/sexuality politics of Korean entertainment industry structured by entertainment management companies. *J. Kor. Women. Stud.* **2014**, *30*, 53–88.
103. An, J.H.; Jeong, C. An exploratory study on the sustainability of Korean wave and successful process of Korean cultural wave contents: A case of PSY's gangnam style. *J. Tour. Sci.* **2014**, *38*, 215–238.
104. Cho, B.C.; Sim, H. Success factor analysis of K-pop and a study on sustainable Korean wave-focus on smart media based on realistic contents. *J. Korea Contents Assoc.* **2013**, *13*, 90–102. [CrossRef]
105. Lee, I.K.; Kim, J.B.; Oh, J.W. A study on the "Korean Drama and Movie Wave" in China and Japan. *J. Kor. Serv. Manag. Soc.* **2007**, *8*, 155–184. [CrossRef]
106. Wen, X.; Cha, H.W. How Korean popular music (K-pop)'s cultural proximity influences oversea audience's evaluation of K-Pop's image and South Korea's national image. *KJCS* **2015**, *59*, 267–300.
107. Han, Y.S.; Kim, J.H. Performing arts and sustainable consumption: Influences of consumer perceived value on ballet performance audience loyalty. *J. Psychol. Afr.* **2021**, *31*, 32–42. [CrossRef]
108. Kim, W.H.; Cho, J.L.; Kim, K.S. The relationships of wine promotion, customer satisfaction, and behavioral intention: The moderating roles of customers' gender and age. *J. Hosp. Tour. Manag.* **2019**, *39*, 212–218. [CrossRef]
109. Kim, J.H.; Jung, S.H.; Ahn, J.C.; Kim, B.S.; Choi, H.J. Social networking sites self-image antecedents of social networking site addiction. *J. Psychol. Afr.* **2020**, *30*, 243–248. [CrossRef]
110. Pappas, I.O.; Woodside, A.G. Fuzzy-set qualitative comparative analysis (fsQCA): Guidelines for research practice in Information Systems and marketing. *Int. J. Inf. Manag.* **2021**, *58*, 102310. [CrossRef]
111. Ragin, C.C. Qualitative Comparative Analysis Using Fuzzy Sets (fsQCA). In *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*; Sage: Thousand Oaks, CA, USA, 2009; pp. 87–121.
112. Shin, H.; Lee, S.A. (Eds.) *Made in Korea: Studies in Popular Music*; Routledge: New York, NY, USA, 2018.

sustainability

MDPI

Article

Business Models 4.0 Using Network Effects: Case Study of the Cyfrowy Polsat Group

Jerzy Niemczyk, Rafał Trzaska, Maciej Wilczyński and Kamil Borowski *

Department of Strategy and Management Methods, Wroclaw University of Economics & Business, 118/120 Komandorska Street, 53-345 Wroclaw, Poland; jerzy.niemczyk@ue.wroc.pl (J.N.); rafal.trzaska@ue.wroc.pl (R.T.); maciej.wilczynski@ue.wroc.pl (M.W.)
* Correspondence: kamil.borowski@ue.wroc.pl

Abstract: The aim of the research, the results of which are presented in the article, is to discover new knowledge allowing for the description and design of business models 4.0 using network effects. In their research, the authors reviewed the literature, carried out desk research and conducted an analysis of publicly available documents of selected companies from the Cyfrowy Polsat Group. The results of the study present the possibility of using the network effect in business models 4.0. The paper develops a framework for business model analysis from the perspective of Industry 4.0. The presented research will allow for an indication of the possibility of using a business model from the perspective of Industry 4.0, based on the theory of the network effect in building the value of network organizations.

Keywords: business model; Industry 4.0; network strategy; strategic management

Citation: Niemczyk, J.; Trzaska, R.; Wilczyński, M.; Borowski, K. Business Models 4.0 Using Network Effects: Case Study of the Cyfrowy Polsat Group. *Sustainability* **2021**, *13*, 11570. https://doi.org/10.3390/su132111570

Academic Editors: Adam Jabłoński and Ioannis Nikolaou

Received: 2 August 2021
Accepted: 12 October 2021
Published: 20 October 2021

1. Introduction

The authors of this publication have been conducting research in the areas of strategies and business models for many years. Their experiences, and a critical review of the literature on the subject, show that the lack of business models dedicated to companies operating in Industry 4.0 is a significant research subject. Business models in new technology sectors are an attractive research object for management theorists and practitioners. This can be seen in the number of scientific papers on business models and in the number of studies related to the impact of Industry 4.0 on management, as well as in the popularity of this issue in business and industry magazines. While so-called business models 4.0, in terms of technology, are constantly enriched with new solutions, in the field of social sciences—including management sciences—business models 4.0 require continuous research [1].

The aim of the article is to discover new knowledge which allows for the description and design of business models from the perspective of Industry 4.0. In particular, the goal is to identify business models 4.0 that use the theory of network effects that are specific to network organizations. It is worth emphasizing that the network effect is integrally related to the basic goals of the organization's development, referring to the search for synergy from combining resources. In the case of the network effect, the benefit of using a good/service increases with the number of users adopting the same or compatible good/service [2]. It is worth emphasizing that the use of the network effect fits into the scope of Industry 4.0 in a special way. Without technology 4.0, it is not possible to achieve all of the advantages of network effects.

The results presented in the article try to indicate the possibility of using a business model from in the perspective of Industry 4.0, based on the theory of the network effect in building the value of network organizations. The analysis will use a case study to illustrate the logic of operation of this type of model in an organization that has been declaring network activities for many years.

The authors were trying to answer the following research questions:

1. Which of the 4.0 technologies build the value of the organization in the business model and how?
2. How does the business model 4.0 increase the possibilities of achieving network effects?
3. How have business models in the communication services sector evolved?
4. How does the media group use business model 4.0 to build its value?
    a. Are there events in the study group from the perspective of events enabling the identification of BM 4.0 operating on the basis of a network effect?
    b. Is it possible to identify the size of the network effect in BM 4.0 in the studied group?
    c. Is there any relationship between changes in the group's business model (from the perspective of the Cyfrowy Polsat Group) and selected stock market indicators?

Empirical research was conducted based on the case study methodology for the Cyfrowy Polsat Group (The subject of the case study is Cyfrowy Polsat S.A.—company listed on the Warsaw Stock Exchange (WSE: CPS)). The selection of this group resulted from the assumption that the capital group operating in the media market and other new technology markets is subject to pressure from technology 4.0 and it already uses network effects in its activities. The Cyfrowy Polast Group also operates in the energy, banking, insurance and real estate sectors. Therefore, the proposed case study of the Cyfrowy Polsat Group will also serve as a study on the possibility of using the network effect in class 4.0 in the description and understanding of the business model. The study will cover the following areas: the phase of diagnosis of the surveyed organization from the perspective of events enabling the identification of the business model under study, the phase of analysis, assuming the study of the network effect in the Cyfrowy Polsat Group's business model, and the phase of assessing and verifying the conclusions obtained through the use of stock exchange indicators. The choice of the Cyfrowy Polsat Group was also dictated by the fact that it is great example of the BM 4.0 model, using the network effect in organizations from the sectors, other than just media services.

In their research, the authors reviewed the literature, carried out desk research, and conducted an analysis of publicly available documents on selected companies of the Cyfrowy Polsat Group.

2. Business Models 4.0

2.1. Business Model 4.0 and Value Building

A Business Model (BM) is a concept that has been the subject of considerable research in management and quality sciences. This research was initiated more widely in the period of domination in the management of the Resource-Based View theory. This was in the 1990s and in the first decade of the 21st century [3]. It was then that the following definition of a business model was created, according to A. Osterwalder and Y. Pigneur: "A business model describes the rationale of how an organization creates, delivers, and captures value" [4]. With this definition, the above-mentioned authors named increasing value as the goal of building a business model. The original value is described from the customer's perspective. Admittedly, in their work "An eBusiness model ontology for modelling eBusiness", A. Osterwalder and Y. Pigneur tried to consider newer trends in business, pointing to: "(1) The products and services a firm offers, representing a substantial value to the customer, and for which he is willing to pay. (2) The infrastructure and the network of partners that are necessary in order to create value and to maintain a good customer relationship. (3) The relationship capital the firm creates and maintains with the customer, in order to satisfy him and to generate sustainable revenues. And last, but not least, (4) the financial aspects" [5]; however, their definition of the business model has remained unchanged and is still the most frequently cited.

The business model in its colloquial, entrepreneurial form is a description of the way a company earns money, while in science it is usually the same as the means of building value [6,7].

A. Jabłoński and M. Jabłoński emphasized several types of business model decomposition and presented almost 40 different definitions of the business models identified in the literature for the period of 1998–2017, together with the presentation of the main term in relation to configuration management [8].

The concept of BM has evolved. In the first phase, the value to which BM was sought was equivalent to gross profit. In turn, in the period of the domination of the Value-Based Management approach, it was already an economic value, understood as an increase in the wealth of business owners measured by the increase in the value of shares/stocks. Now, thanks to the model popularized by A. Osterwalder and Y. Pinquer [4], value is broadly understood as the utility generated in the company for its stakeholders.

Numerous ways of generating value were identified in economics and management, and the concept of economic rent is frequently used in the description of these methods. The most important economic rents indicated in the context of BM include:

- Ricardian rent, i.e., a rent for the right to obtain income from the use of own and scarce resources;
- Rent due to the economies of scale and scope that allows for an increase in the economy of production by increasing the scale of production;
- Chamberlin rent, i.e., rent indicating income from taking a monopolistic position;
- Schumpeterian rent, i.e., rent that provides the right to benefit from innovation, especially from disruptive innovation [9,10].

Aside from the aforementioned types of rent, there are also others [11]. Economic rents used or implied by the Industry 4.0 concept may be of particular interest (Figure 1). Industry 4.0 allows one to achieve, above all, rent due to the economy of scale, with the difference that, unlike classical production processes, this rent in Industry 4.0 can be achieved thanks to a much lower profitability threshold (compare with the Blitzscaling theory [12]). Industry 4.0 is also a provider of network effect, long tail effect and Big Data effect (this is part of the concept widely described in the article "Scalability 4.0 as economic rent in Industry 4.0" [13]). The model, presented in Figure 1, shows the relationship between selected Industry 4.0 technologies, elements of the business model, as discussed by A. Osterwalder and Y. Pigneur (2010), and the methods of value delivery (Value Proposition, Value Creation, Value Delivery, Value Capture, Value Communication, and Value Proposition), as well as economic rents, which make up the Scalability 4.0 concept.

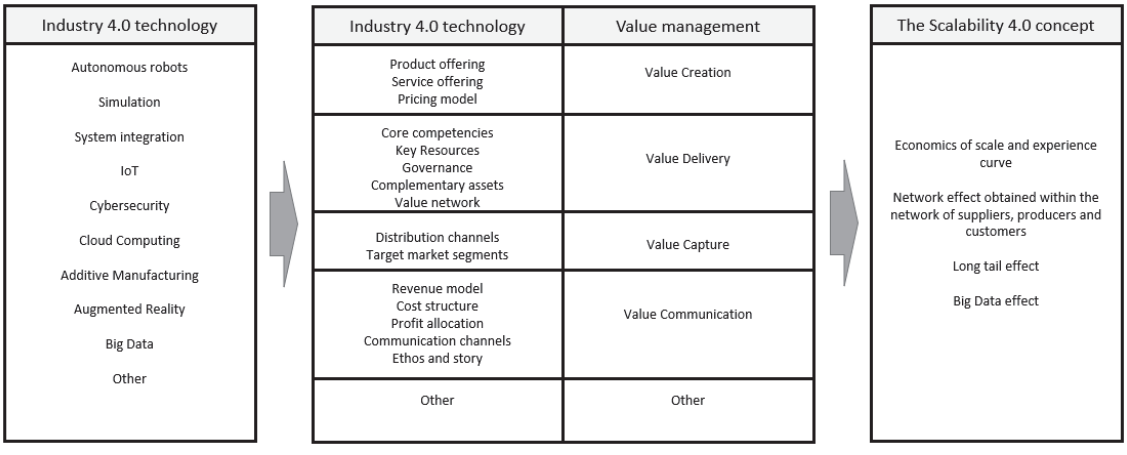

Figure 1. The concept of combining technology, BM elements and value proposition; source: own.

In addition to the methods of building the values indicated in Figure 1, in order to more precisely indicate the features of the business model 4.0, based on Industry 4.0, it is

worth referring to other business models and characteristics that were created only because the 4.0 dimension appeared in economy and management.

The analysis of the Industry 4.0 business model should begin with the definition of revolution 4.0. The research assumed that Industry 4.0 is a set of techniques and technologies identical to the digital transformation of the economy. The most common technologies mentioned here are cybersecurity, simulation, augmented reality, system integration, Internet of Things, additive manufacturing, autonomous robots, Big Data, artificial intelligence, and cloud computing. The above-mentioned technologies are strictly engineering categories. Some authors deepen the concept of Industry 4.0, introducing other tools, issues and concepts that are part of the general domain of the subject, trying firstly to improve our understanding of it and secondly to link it with topics of interest on managerial, engineering and information technology level; predominantly, in relation to resource efficiency, shortening innovation cycles and raising productivity [14]. The literature on the subject includes research showing that Industry 4.0 also affects changes at the levels of economy, management systems, as well as cultural and social changes [15] and others, such as low-cost automation, robotics, 3D printing, smart factory or block chain [16]. Moreover, it is a necessary tool when it comes to maintaining a competitive advantage [17,18]. The abovementioned new technologies introduced by Industry 4.0 have a significant impact on the creation of new and adaptation of existing business models, e.g., Internet of Things [19], Industrial Internet of Things [20], Cyber–Physical Systems (CPS) [21,22], Big Data [23]. M. Dobrowolska and L. Knop claim, that "Business model changes are the expression of companies' hunger for gaining competitive edge and the effectiveness of operations". The Industry 4.0 concept has strengthened changes in business models, especially in relation to the creation of value based on new technologies, options for creating unique resources, key competencies and treating business models as networks of mutually dependent activities and processes [24].

The literature overview conducted by D. Ibarra, J. Ganzarain and J. Igartua-Lopez [25] presents the main design principles of the Industry 4.0, challenges to traditional business models and key challenges to digital transformation in global business. The design principles allow companies to investigate a potential transformation towards Industry 4.0 technologies. One of these principles is "interoperability", which means that machines and people need to be able to communicate through the Internet of Things or "Real-Time Capability" when smart factories need to be able to capture, store and analyze data in real time to make immediate decisions according to new findings. Among the other principles that the authors have included, there are decentralization, virtualization, service-orientation and modularity [26]. The main challenges related to traditional BM refer to networking, customized mass production, low price, local production, fragmentation of the value chain or the decentralization of production. The authors summarized the main prerequisites to digital transformation: appropriate work organization, availability of products, new business models, talented workers, investment in R&D or legal framework.

The Industry 4.0 concept offers opportunities to create new, or redesign, existing business models based on new products and services and ways to serve clients, fulfill their needs, as well as improving efficiency and integration across the entire value chain. Tirabeni emphasizes three main research streams that emerged in their analysis: customer and service centered business models, integrated and networked business models and sustainable business models, naming them as Innovative Business Models [27].

The most important effects of implementing technology 4.0 in business, based on the previously mentioned economic rent, include:

- Reduction in transaction costs for signed contracts; thanks to this, it is possible to widely implement contractual solutions instead of hierarchical solutions;
- Achieving economies of scale on conditions that are previously unattainable, thanks to the longtail rule, the possibilities of Big Data and Network Effect [13];
- Simplification of business processes by resigning from intermediaries thanks to 4.0 technologies;

- Obtaining the effects of the continuous generation of innovation through the use of an open innovation system [28];
- Effects of the "the real-time processing and use of big data for consumer research and marketing, as well as for security purposes, the rapidly growing importance of millennials as a customer group, the sharing economy, and direct digital customer contact from companies without intermediaries" [29];
- Obtaining the effects that are specific to the complexity theory: self-organization, dependency paths, complex adaptive systems, and the selection context specific to the complexity theory [30].

From the Industry 4.0 perspective, the business model must be perceived differently. In the classic canvas model, there was assumed a structural and functional arrangement of nine business model elements. In the cause-and-effect system, these elements were to determine the value proposition, but above all, it was the value proposition that was to influence the shape of these nine elements. In the business model 4.0, the subject of the analysis is: the network of various connection methods, the effect of servicization, methods of generating various value streams (standardization in diversity), methods of generating value based on a uniform communication protocol without transaction costs [31]. It is, therefore, worth considering such changes in the definition of the business model so that they better reflect the impact of Industry 4.0.

2.2. Business Model 4.0 Using Network Effects

Business model 4.0 was defined in the previous part of this article. It has features resulting from the openness of management to 4.0 technologies. To be able to define BM 4.0 additionally using network effects, it is necessary to first adopt a specific definition of this effect.

The network effect has its origins in the development of telephone services at the beginning of the 20th century. It was then popularized by the invention of Ethernet and, for many years, was associated with telecommunication, information and IT infrastructure. The economic theory of the network effect was advanced significantly from 1985 [2]. There is not much research conducted on the network effect as the catalyst for a change in the business models and as a tool to build the competitive advantage. The authors explored this effect in their previous papers [13,32,33].

Network effect is defined as the phenomenon that the benefit of using a good/service increases with the number of users adopting the same or compatible good/service [2]. Ch. P. Lin and A. Bhattacherjee (2008) cite M. L. Katz, C. Shapiro, J.M. Gallaugher and Y.M. Wang "that network effects arise when the utility that consumers derive from the consumption of a product or service depends on the number of other users of the same product or service or the availability of complementary products or services that generate additional value for users of the original product or service" [2,34]. Factors that drive network effects, such as network size and availability of complementary goods or services, are called network externalities [35], and products or services exhibiting such effects are called network goods [36]. There are two types of network externalities: direct and indirect. "Direct network externalities are based on the number of participants in a given network. (. . .) As new participants enter these networks, existing users gain more choice in terms of trading, communicating, or playing games, and thus gain network utility. In contrast, indirect network externalities are ancillary benefits accruing to network participants as a network grows, such as the development of complementary services, standards formation, and price reduction, but not directly from the number of network participants" [36] ("Since MIM (Mobile instant messaging) is essentially a communication technology, network effect should be able to explain the user-perceived values of MIM apps, thus capable of developing hypotheses herein. That is, users can perceive more value from an MIM app if more users adopt the same app, because (1) the user can communicate with more peer users (i.e., the direct network effect), and (2) more value-added features and complementary offerings will be available from the MIM provider or third-party developers (i.e., the

indirect network effect). Therefore, if users perceive more network effect from a certain MIM app, they would perceive more value from that app" [37]). Network externalities are qualities of certain goods and services that make them more valuable to a user as the number of users increases [38].

In this form, BM 4.0 using network effects must be composed in such a way that technologies 4.0 provide it with appropriate feature, specific to Industry 4.0, listed in the second column (Table 1) and ensure that these features simultaneously positively influence the creation of the direct and indirect network effects indicated in the third column (Table 1).

Table 1. The concept of combining technology 4.0, BM 4.0 elements, and BM 4.0 plus the network effect.

Technology 4.0	Features of Business Models 4.0	Business Model 4.0 Using Network Effects
• Cybersecurity; • Simulation; • Augmented reality; • System integration; • Internet of Things; • Additive manufacturing; • Autonomous robots; • Big Data; • Artificial intelligence; • Cloud computing;	• They must link value streams (merge transactions) by eliminating all transaction cost drivers; • They must combine the existing methods of generating value on the basis of service; • They must combine in such a way as to ensure the possibility of generating different streams of values and, at the same time, customizing; • They must combine different methods of generating value based on a uniform communication protocol; • They must generate value across the entire ecosystem; • They enable the achievement of economies of scale at a lower level thanks to 4.0 technologies; • They enable the achievement of the effects of continuous innovation generation through the use of an open innovation system; • They enable the achievement of the effect of the real-time processing type, and the use of big data for consumer research and marketing; • They enable the achievement of SaaS class effects, sharing economy, or ride sharing.	• Direct network effect occurs when a user's benefits result directly from the number of users of a particular product or service [36]. • Indirect network effect occurs when the benefits of using the main product come from the availability of complementary products [36].

Source: own.

The analysis (Table 1) shows that direct effects are possible mainly due to the elimination of transaction costs, the service of the methods of generating value, ensuring the possibility of generating various value streams and customizing, working in the ecosystem, and having a uniform communication protocol. In turn, indirect effects are achieved thanks to the economy of scale, building sharing economy platforms [39], building ride-sharing platforms [40], creating SaaS sales models, achieving real-time processing, and applying the principle of service and the classic principle of operational synergy.

The network effect can also be obtained in the course of the development strategy through mergers and acquisitions. By focusing on making further acquisitions, the company, on the one hand, is constantly growing its customer base. On the other hand, by diversifying its portfolio of services and products, it allows for taking advantage of the so-called cross-selling actions, penetrating the customer base even more. The literature review conducted by Ch. Öberg on the network literature on M&As showed that research either focuses on the M&A parties or refers to M&A effects on business partners and several papers are conceptual, arguing that "M&A effects on business relationships is an unexplored area" [41].

2.3. Evolution of Business Models in the Communication Services Sector

There are four main types of business models in the Communication Services sector. They are the following businesses:

- Subscription: the company sells products without advertising;
- Advertising: the product is delivered for free, but is linked with advertising;
- Mixed: subscription and advertising models operate simultaneously;

- Dual: there are two products—one with fewer ads and better content, and the other with worse content and more ads [42].

The United States can be mentioned as an example of the evolution of classic business models for the Communication Services sector companies, where the revenue streams of traditional Media and Entertainment corporations were based mainly on advertising until the end of the 20th century, additionally focusing on profit and dividends for shareholders (value in the meaning of gross profit). However, this has changed with the development of the ICT industry, especially the Internet. As vividly seen in Table 2. The model switched drastically towards digital. It was then that Internet advertisers, such as Google, AOL, and Yahoo, appeared on the Communication Services market. These companies began to offer their services for free, taking advantage of the low-cost benefits of the Internet as well as technological development, basing their revenues on mass advertisers. It was the beginning of the first revolution on this market. To this day, the Internet is the basic determinant of technology development in this area. Due to the pressure of the Internet, the traditional sectors that rely mainly on open access advertising, in particular the press, radio, and television, have been most affected by the changes. Overall, print newspapers and magazines, alongside with broadcast in radio and televisions ads market share declined by almost threefold within the last 20 years. Their share was taken by constantly growing online media presence [43].

Additional acceleration was caused by the digital revolution and the emergence of new types of Communication Services companies: companies operating as social networks (Facebook or Twitter) and companies that are social and information services (Buzzfeed), which began to take over the advertising market share. The next stage is the emergence of streaming technology and mobile devices. Here, there is also perceptible influence of the increasingly popular revolution 4.0 services, based on the subscription model (Netflix or Spotify). These companies offer services on integrated platforms combining an increasing number of functions. The next stage will most likely be companies providing customized content and advertising services using selected 4.0 technologies outside the Internet (AI, Internet of Things, Augmented Reality, Big Data).

Table 2. Business models in the Communication Services sector on selected examples.

Company Name	The Company's Business Model	Sector	the Year the Company Was Founded
New York Times	Mixed	media/press	1922
NBC	Mixed	media/TV	1926
CBS	Mixed	media/TV	1927
ABC	Mixed	media/TV	1943
HBO	Subscription	media/TV	1972
AOL	Advertising	ICT/internet	1985
Google	Advertising	ICT/internet	1988
Yahoo	Advertising	ICT/internet	1994
Netflix (DVD)	Subscription	ICT/TV	1997
Metro	Advertising	media/press	1999
Pandora	Dual	ICT/radio	2000
Facebook	Advertising	ICT/internet	2004
Huffington Post	Advertising	ICT/internet	2005
YouTube	Advertising	ICT/TV	2005
Spotify	Dual	ICT/radio	2006
Buzzfeed	Advertising	ICT/internet	2006
Netflix (streaming)	Subscription	ICT/TV	2007
YouTube (Premium)	Subscription	ICT/TV	2018

Source: own.

Changes in the BM of companies from the Communication Services sector resulted in pressure from traditional Communication Services companies and their search for new business models, as well as better reaching the consumer with their content or starting more dedicated advertising activities [44]. This led to the development of completely new business models referring to the proposals contained in Section 2.1. This will particularly apply to models using network effects. Therefore, the market in which the Communication Services sector companies operate must consider models referring to service, combining different value streams and value streams based on a uniform communication protocol, to generate value across the entire network of network effects, to innovation, and to other benefits of complexity theory.

3. Research Procedure

The research procedure proposed in this work is based on the classic case study method [45]. The case study is a research method that allows for identifying the tested object, taking into account, e.g., cause and effect events. It is a qualitative research method. Its main goal is to understand the given phenomenon—in this case, to learn about BM 4.0 using network effects. This will provide the basis for generalizing the results of the research on Cyfrowy Polsat Group to the level of general knowledge. This is unique case and company on the polish market. In these cases, where there are no other cases available for replication, the researcher can adopt the single-case design [46,47].

The choice of Cyfrowy Polsat Group for the case study analysis was dictated by the assumption that the group operating on the Communication Services market, which is heavily explored by technology and technology 4.0, probably leverages the network effect in its value-building strategy. Cyfrowy Polsat is a group that is at the forefront of many new business solutions in the Communication Services sector and is a leader in terms of innovation and speed of adapting to new operating conditions. The group is also making strides in the ICT sector. Due to the frequent mergers and acquisitions, scale of operations, and business innovations based on the network effect, the group was selected to help discover ways to describe and design business models in the Industry 4.0 perspective.

The study of this capital group, and more precisely the study of BM 4.0 used by this group, will enable the expansion of knowledge in the field of business models based on the network effect characteristic of companies operating in Industry 4.0. The study will include:

- Diagnosis of the studied group from the perspective of events which enable the identification of BM 4.0 operating on the basis of a network effect (mergers, acquisitions, significant decisions regarding internal development); use of desk research and white interviews;
- Analysis assuming the identification and analysis of the size of the network effect in BM 4.0 in the study group; use of desk research;
- Assessment and verification of the obtained information using an analytical technique based on the study between changes in the group's business model (from the perspective of the Cyfrowy Polsat Group) and selected stock market indicators;

The survey was conducted in the first half of 2020. The following literature databases were used in the study: Scopus, Science Direct, JSTOR and Google Scholar.

4. Results of Own Research of a 4.0 Class Business Model Using Network Effects—Cyfrowy Polsat Group Case Study

Cyfrowy Polsat Group is currently the biggest media/ICT conglomerate in Poland. Established in 1992 as a Polish commercial TV station, it developed between 1999–2003 to create Cyfrowy Polsat—a satellite TV platform. Cyfrowy Polsat offers broadcast satellite subscription television services in Eastern and Central Europe. The company offers a variety of television and radio channels and distributes signal decoders. Since 2013, Cyfrowy Polsat has been listed on the Polish Warsaw Stock Exchange, while the majority of ownership still belongs to its first owner—Zygmunt Solorz-Żak (Zygmunt Solorz-Żak's holding as of 02.01.2021—56.95%). The year 2009 was used as a baseline year for the

analysis due to the substantial growth of the company, and the public availability of the data. Since then, Cyfrowy Polsat Group has also been exceptionally active in the mergers and acquisitions market, growing mostly through programmatic takeovers of companies from media, ICT, and energy/sustainability sectors [48]. This was in line with its strategy of distributing the content on the widest possible scale, using the most modern devices and technologies.

An in-depth analysis of press releases, company notes and commentaries allowed us to identify key reasons for M&A activities, which prove the systematic realization of network effects, and the combination and creation of different value streams and innovations, aligned with the BM 4.0. strategic approach. Among the core business premises of Cyfrowy Polsat's M&A activities are:

- Client base expansion;
- Sales channels expansion;
- Operational and financial synergy;
- Market consolidation;
- Product portfolio diversification;
- New resources acquisition;
- Economies of scale.

Each element was outlined in the Table 3 below, alongside the type of transaction, value, shares acquired and key assets/client base captured.

Table 3. M&A activity of Cyfrowy Polsat S.A. between 2009–2020.

Date of Final Agreement	Target	Transaction Value (mln USD)	Shares Bought (%)	Shares Before Transaction (%)	Business Reason	Client Base/Key Assets Captured
2009	Sferia S.A.	14.79	11	0	Client base expansion, product portfolio diversification (Sferia SA is an Internet provider)	89.9 B2C and 27 thousand B2B clients
2010	mPunkt Polska S.A.	N/A	100	0	Sales channels expansion	Over 200 brick and mortar stores and locations in 150 cities
2011	Telewizja Polsat Sp. z o.o.	1301	100	0	Operational and financial synergy, market consolidation	TV Station, shows, brand
2011	INFO-TV-FM Sp. z o.o.	9.24	61.23	0	Operational and financial synergy, product portfolio diversification	Radio and TV frequency acquisition
2012	Ipla	47.95	100	0	Market consolidation, economics of scale, product portfolio diversification	1.4 million active users
2013	Polskie Media Amer.com S.A.	99	100	0	Operational and financial synergy, market consolidation	Books and newspaper publishing group
2014	Metelem Holding Co. Ltd.	180.91	83.77	0	Operational and financial synergy, market consolidation, economics of scale, client base expansion, product portfolio diversification	8 million new users
2014	Metelem Holding Co. Ltd.	303.95	16.23	0	Operational and financial synergy, market consolidation, economics of scale, client base expansion, product portfolio diversification	8 million new users—transaction completion
2014	Polkomtel Sp. z o.o.	N/A	100	0	Operational and financial synergy, market consolidation, economics of scale, client base expansion, product portfolio diversification	8 million new users—transaction completion
2015	Muzo fm Sp. z o.o.	1.3	100	0	Product portfolio diversification	400 thousand daily listeners, radio frequency
2015	Redefine Sp. z o.o.	N/A	100	0	Market consolidation, sales channels expansion, product portfolio diversification	1.4 million active users—transaction completion
2016	Litenite Ltd.	197.3	100	0	Operational and financial synergy, economics of scale, market consolidation	Acquisition and debt cancellation
2016	Midas S.A.	81.74	27.24	65.99	Operational and financial synergy, economics of scale, market consolidation	LTE frequency acquisition

Table 3. *Cont.*

Date of Final Agreement	Target	Transaction Value (mln USD)	Shares Bought (%)	Shares Before Transaction (%)	Business Reason	Client Base/Key Assets Captured
2016	Midas S.A.	20.53	6.76	93.24	Operational and financial synergy, economics of scale, market consolidation	LTE frequency acquisition—transaction completion
2016	Netshare Sp. z o.o.	N/A	100	0	Operational and financial synergy	LTE frequency acquisition—transaction completion
2017	Eileme 1,2,3,4 AB	N/A	199	0	Operational and financial synergy, sales channels expansion, product portfolio diversification	1.4 million active users—transaction completion
2018	Netia S.A.	195.04	33	0	Client base expansion, product portfolio diversification, operational and financial synergy	1 million client base acquisitions, over 800 of the biggest business clients in Poland
2018	Netia S.A.	N/A	33	0	Client base expansion, product portfolio diversification, market consolidation	1 million client base acquisitions, over 800 of the biggest business clients in Poland—transaction completion
2018	Eleven Sports Network Sp. z o.o.	44.58	50	0	Product portfolio diversification, operational and financial synergy, client base expansion	2 million active paying users and subscribers, licenses
2019	Vindix Sp. z o.o.	N/A	0	0	Operational and financial synergy	77 debt portfolios, worth over PLN 90 million
2019	Asseco Poland S.A.	312.05	21.95	1.05	Operational and financial synergy	ICT software development company and know-how
2020	Alledo Sp. z o.o.	N/A	0	0	Product portfolio diversification, new resources acquisition, operational and financial synergy	Solar panels and LED light producer and know-how; cross/up-sell opportunities
2020	Grupa Interia PL Sp. z o.o.	N/A	100	0	Product portfolio diversification, operational and financial synergy, market consolidation	16 million daily active users
2020	Bcast Inc	1.66	69	0	New resources acquisition, operational and financial synergy, economics of scale	ICT software development company and know-how
2020	Interia.pl	N/A	100	0	Operational and financial synergy, market consolidation, client base expansion, product portfolio diversification	16 million daily active users—transaction completion
2020	Spektrum TV Kozep- Europai Musorkes zito zrt	N/A	50.52	49.48	New resources acquisition, operational and financial synergy, economics of scale, market consolidation	TV Channels and shows

Source: own, based on press releases, company reports.

As seen above, Cyfrowy Polsat Group consecutively expanded its client base, ensuring the acquisition of core assets, enabling horizontal and vertical integration. For instance, the acquisition of the Ipla.tv on-demand streaming platform, previously a satellite-based TV service, moved towards digital to strengthen the market position of Cyfrowy Polsat as an aggregator and content distributor. Another example is the acquisition of Polkomtel or Netia—Telco and broadband providers, allowing Polsat to obtain synergy effects from convergent offerings to their B2C clients, i.e., TV, Internet and phone in one bundle. Those acquisitions significantly expanded its customer base. In 2020, Cyfrowy Polsat Group had around 17 m regular users or clients, of which 25–30% are so-called "multiplay" clients, using more than two products at once [49]. The monetization of acquired client base, supported with 4.0 technologies, enables Cyfrowy Polsat Group's growth, despite the relatively low dynamics of the media industry trajectory. Another example is the acquisition of Vindix, a debt collection company—instead of selling unprofitable clients to other companies, Cyfrowy Polsat Group can manage the liabilities of their clients more easily and efficiently. Until 2020, Cyfrowy Polsat Group had held an established position on Telco, TV and radio market; however, digital media content had not been penetrated. By acquiring Interia, Cyfrowy Polsat integrated vertically, and has every type of media

company in their portfolio. Cyfrowy Polsat Group also moved towards becoming the first integrated media devices company, as they also operate in the utilities and energy sector. Cyfrowy Polsat Group bought Alledo—light and photovoltaic energy producer—and ZE PAK—lignite power plant energy producer. As evidenced above, Cyfrowy Polsat Group's strategy has remained unchanged for the last 10 years. Through mergers and acquisitions, at the beginning it established a large group of customers in the Polish market. Then, it moved into portfolio diversification and offered its clients more and more complex products and services, deriving from the achieved network effect. This was also often communicated by management in the press releases, justifying the acquisitions.

The company board confirms this strategy, especially after the acquisition of Polkomtel (Plus GSM), when KPI reporting has changed. Instead of reporting basic average revenue per user numbers, as most subscription-based companies do, Cyfrowy Polsat Group started to focus on revenue-generating unit saturation, which meant how many active services one client has. Between Q1 2018 and Q3 2020 (last reported period), the RPU grew by 13% to 2.72 points, proving that the strategy of leveraging effects of scale, monetizing the client base, and diversifying product portfolio works [50].

Moreover, when announcing new acquisitions, the Cyfrowy Polsat board communicates the operational and financial synergy externalities, presenting a conscious understanding of its multi-level BM 4.0 strategy. During the acquisition of Netia, a broadband provider, Cyfrowy Polsat published: "the synergy effects of the acquisition for revenue, costs, CAPEX are estimated at 800 million of PLN between 2018 and 2023" [49].

Another example of network rent realization is the acquisition of Interia. From the user perspective, the ads for Polsat TV shows are displayed as pop-up ads on Interia, delivered over the Netia fiber-optic Internet; clients see shows on Polkomtel provided smartphones through Ipla or Cyfrowy Polsat satellite TV, while also receiving an opportunity to install solar panels on their roofs. Average revenue per user of the whole group grows by 5–7% yearly and is one of the key performance indicators reported by the group.

Among M&A, we can also find examples of buying new technology 4.0 businesses. These are i.a. acquisitions of LItenite LTD., Midas S.A., NetShare sp. z o.o., Vindix sp.z o.o., Asseco, Bcast Inc. According to the owners' declarations (reports for shareholders), these acquisitions had an impact on reducing transaction costs (minimizing), accelerating customer service processes, increasing the use of AI in reducing human work and increasing the speed of customization of services and building scalable customer service systems. It is also worth emphasizing that, in the strategies of M&A, Cyfrowy Polsat S.A. tries to take over businesses with mature business models (Ipla, Netia S.A., Polkomtel S.A.) and advanced technology. Among the group's recent acquisitions, there are no insolvent businesses or companies that do not add a certain value in the field of technology.

The analysis, explained in details in Table 4., was carried out independently for years 2015–2019 as this period was the only one fully available due to the change in IFRS 15—Revenue from Contracts with Customers reporting standards. In general, Cyfrowy Polsat manages to retain over 30% EBITDA margins throughout the years, despite their constant decline of 15%. Despite worsening sector profitability, revenue per client increased by 30% from PLN 194.78 to 253.49, while subscription client base remained relatively flat, increasing by only 1%. If we take under the consideration that Cyfrowy Polsat lies in the intersection of ICT/Media business and competes with other TV broadcasters and Telco operators, Cyfrowy Polsat stays strong in benchmark comparisons. The group's biggest private competitor in the TV sector is the TVN Group, which regularly publishes negative bottom-line reports, while Polsat maintains at least 10% profit throughout the years. When it comes to Telco operators, the market is consolidated between four players: T-Mobile, P4, Orange, and Polkomtel (Plus) belonging to Cyfrowy Polsat. According to the Office of Electronic Communications in Poland, the market shares changed due to strong pressure from T-Mobile, and Orange, but Polkomtel managed to retain most of its customers base, while P4 suffered the most. As seen in Table 5. Polkomtel network, belonging to Cyfrowy Polsat, still remains stable telecom market shares, despite strong market competition.

Table 4. Financial and KPI results of Cyfrowy Polsat between Q1 2015 and Q4 2019.

Quarter and Year	Subscription Clients (mln)	Revenue (bn PLN)	Net Profit (mln PLN)	EBIDTA (mln PLN)	EBITDA Margin	Revenue per Client (PLN)
1Q2015	11.957	2.329	170.9	896.6	38.50%	194.78
2Q2015	11.933	2.469	305	977	39.60%	206.91
3Q2015	11.939	2.415	502.5	930	38.50%	202.28
4Q2015	11.934	2.61	186	891	33.80%	218.70
1Q2016	11.936	2.364	179	846	35.80%	198.06
2Q2016	11.971	2.443	231	935	38.30%	204.08
3Q2016	11.822	2.11	270	957	40.10%	178.48
4Q2016	11.679	2.535	342	902	35.60%	217.06
1Q2017	11.382	2.389	271	929	38.90%	209.89
2Q2017	11.381	2.47	282	964	39.00%	217.03
3Q2017	11.464	2.391	235	851	35.60%	208.57
4Q2017	11.498	2.579	157	873	33.90%	224.30
1Q2018	11.52	2.346	292	890	37.90%	203.65
2Q2018	11.611	2.603	231	946	36.10%	224.18
3Q2018	11.723	2.735	227	920	33.60%	233.30
4Q2018	11.712	3.002	66.1	941	31.40%	256.32
1Q2019	11.752	2.792	300	1038	38.20%	237.58
2Q2019	11.913	2.923	269	1076	36.80%	245.36
3Q2019	12.09	2.892	236.5	1021	35.30%	239.21
4Q2019	12.107	3.069	311.9	1062	32.70%	253.49

Source: own elaboration based on company reports, only for fully available years with new IFRS 15 reporting standards.

Table 5. Share of mobile phone operators based on revenue generated in Poland in 2018 and 2020.

Revenue	2018	2020	Change (p.p.)
T-Mobile	21.10%	24.30%	3.20 p.p.
P4	26.10%	20.20%	−5.90 p.p.
Polkomtel	25.10%	24.90%	−0.20 p.p.
Orange	24.50%	28.30%	3.80 p.p.

Accessed on 2 September 2021; Source: Office of Electronic Communication.

Cyfrowy Polsat as a group needs to utilize network-based strategy as the communications sector is already saturated. In 2020, the penetration rate of phones and internet connection consecutively reached 140% and 90% leaving limited opportunity for growth (Office of Electronic Communication). Similarly, the infrastructure costs, mostly due to data consumption and 5G investments, increased by 55%. The Polish IT Chamber projections suggest exponential 5–7× growth, creating stronger cost pressure on providers.

When it comes to prices, we observe a pricing pressure on Polish peers. For instance, a US or Western European citizen pays more for data charges, and rarely enjoys an unlimited data plan, while in Poland this is part of the regular packaging. Annual revenue per user decreased at −24% CAGR between 2015–2020; however, the bundled offerings began to be far more important, and they are the main revenue drivers for both Cyfrowy Polsat and Orange. In fact, these two players changed their reporting to emphasize the importance of bundle sales model, in which one customer receives a multiproduct offering: from fiber, through TV, ending with a telephone plan for a four-person family. As seen in the Figure 2 below, we observe over 5–7× revenue differences between one offering and convergent

ones. This allows for retaining profitability as customer acquisition cost remains similar in any case.

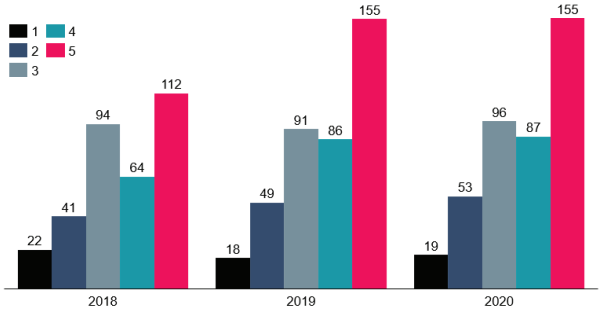

Figure 2. Average monthly revenue per user from bundled telecommunication services (ARPU) in Poland from 2018 to 2020. Source: Office of Electronic Communication.

This proves that network effects were leveraged to fully monetize the customer base, which otherwise would remain stagnant. By acquiring new companies, the Cyfrowy Polsat Group manages to increase its client base, overcoming organic growth obstacles, and realizing synergies of cross/up-sell opportunities within product portfolio.

In 2019, the Cyfrowy Polsat Group bought a minority stake in Asseco Poland. It was a signal to the market, that the Group was looking for solutions to strengthen its IT infrastructure. For the Cyfrowy Polsat, Asseco started to be the main technological partner supporting the development and maintenance of IT systems. The commercialization of 5G networks, artificial intelligence used for customer data analytics 4.0 industry, cyber security or big data are just a few examples of areas where both companies could achieve synergy. On top of that, Asseco is a leading software hub in Poland, being the key technological partner of Cyfrowy Polsat. Despite the purchase of only 21.95% of Asseco shares, it was the second largest investment of Cyfrowy Polsat (USD 312.05 million) which clearly emphasized the strategic importance of this investment. Investment in Asseco was important because of two aspects: creating a technological advantage, and to capture value. Previously, Asseco was key technological partner of the biggest Telco competitor, Orange Polska. According to Rafal Kozlowski, VP of Asseco: "The most important part is to increase level of customer service. The 5G aspects are the next technological challenges, which are currently analyze" [51].

Thanks to its intense M&A activity on the Polish market, the Cyfrowy Polsat Group acquired entities from various areas of activity: broadcasting and production of television, Internet media, telecommunications, pay TV, online video and integrated services. Although they coincide, the key factor for Cyfrowy Polsat Group was the effective and efficient integration of the acquired resources in order to search for the synergy effect that would guarantee the creation of added value, primarily for its shareholders. Cardiam et al. emphasized that resource integration is an embedded process of matching (fitting of available resources and primarily concerns interaction), resourcing (resource creation, integration and resistance removal) and valuing (assessment of value in the social context, the determination of positive or negative outcomes from the enactment of resourcing) [52]. Those concepts have been seen in Cyfrowy Polsat Group's successful strategy: precise assessment of the potential target of the acquisition (Metelem Holding), creation of the new content (Telewizja Polsat), its further distribution through the distribution channels (mPunkt Polska or Ipla), supported by constant resource development (Asseco Poland). The measurable effect of this success is reflected in its the share price.

Since its IPO in 2013, the Cyfrowy Polsat stock price grew from PLN 17 to PLN 29, maintaining healthy profitability, and stable growth rates, outpacing the WIG stock index by 72% within the last ten years, which was presented in the Figure 3. The Beta coefficient of Cyfrowy Polsat S.A. to WiG for the last 10 years is 0.843 according to the financial

data published in the Company's reports. A beta coefficient can measure the volatility of an individual stock compared to the systematic risk of the entire market. A beta value that is less than 1.0 means that the security is theoretically less volatile than the market. Including this stock in a portfolio makes it less risky than the same portfolio without the stock. The outperformance is especially visible from early 2013 when Cyfrowy Polsat started to regularly acquire other companies, realizing its programmatic M&A strategy. The group is also a main vehicle of wealth growth for main owner, Zygmunt Solorz-Żak, who is consecutively the richest Pole, in various rankings.

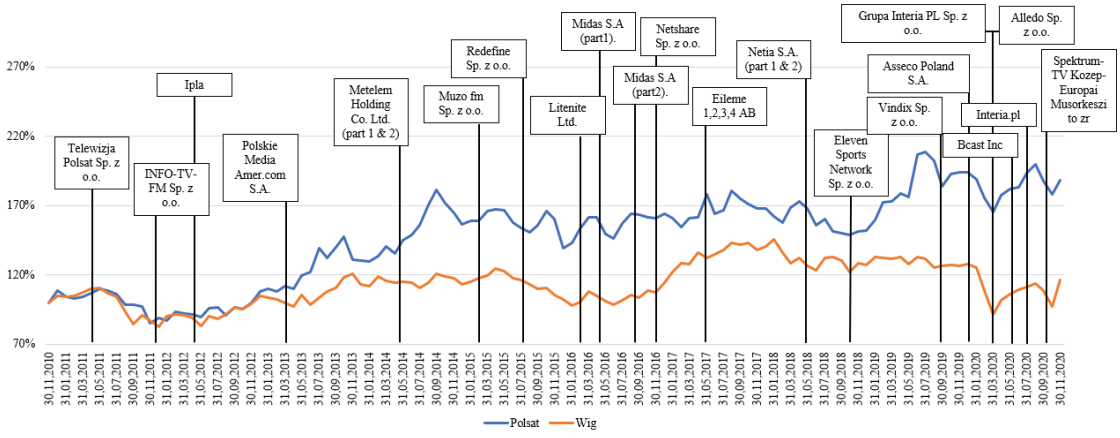

Figure 3. Cyfrowy Polsat stocks performance vs. main Warsaw Stock Index (WIG) vs. M&A activity of Cyfrowy Polsat S.A., between 30.11.2010 and 30.11.2020. The baseline is 100%; Source: own elaboration based on stooq.pl.

5. Conclusions and Discussion of the Results

The aim of the study, the results of which are presented in this article, was to indicate the possibilities of using a business model from the perspective of Industry 4.0 based on the theory of the network effect in building the value of network organizations.

The main objective of the study, the results of which are presented in the article, was to indicate the possibility of using a business model from the perspective of Industry 4.0 based on the theory of the network effect in building the value of network organizations. It is worth emphasizing that the network effect was first used by Jeffrey Rohfls. He investigated the telecommunication sector. The utility that a subscriber derives from a communications service increases as others join the system. He conducted his research in the 1970s. A lot has changed since then. Mainly due to the development of technology, the network effect can also be found in other sectors. However, a completely new impetus was given by the development of Industry 4.0, thanks to which possibilities of creating network effects apply to most sectors [53]. The conducted research allows one to conclude that, especially 4.0 technologies, such as AI, Cloud Computing, big data and IoT have an impact on the shaping of a new business model in the telecommunication sector (the first research question). The new model offers qualitatively different possibilities of achieving the network effect without incurring excessive transaction costs and with new possibilities of building economies of scale. The impact on the reduction, elimination of transaction costs and new possibilities of model scalability are the main features of the method of increasing the possibility of obtaining network effects (second research question). Thanks to business models 4.0, organizations in the telecommunication sector can (as was shown in the case study) move from a classic subscription business model to a model based on the network effect [53]. In the future, the development of this model will be a business model containing the features of the business ecosystem [54] with elements of complexity theory [55]. G. Parker, who in his research proves that "platform ecosystems rely on

economies of scale, data-driven economies of scope, high quality algorithmic systems, and strong network effects that typically promote winner-take-most markets" [56].

The presented case of a media group with its M&A confirms that 4.0 technologies implemented in the business model can change not only quantitatively (the number of customers), but also qualitatively (new monetization schemes—the way of operation).

The results of the study of a class 4.0 business model using network effects presented in the article meet the requirements for the study. It presents the way technology 4.0 influences building the value characteristic of business models and the impact of these categories on the possibility of using direct and indirect network effects. The case report of the Cyfrowy Polsat Group contained in the article helps to facilitate an understanding of the mechanisms of this impact by identifying the key direct effects of the relationship between building value and the increase in the number of customers, the value measured by the size of the markets served. The results of the study carried out in accordance with the case study method can be generalized only to cases with similar properties. This is a fundamental limitation of the case study. Nevertheless, the analyzes and prepared conclusions allow us to confirm the usefulness of researching business models that refer to the concept of the network effect and are technologically supported by innovations from Industry 4.0. The research used the analysis of the IFRS index is characteristic of organizations providing services to clients and groups of clients and measuring the effectiveness of management in this type of activities. Of course, the authors know the limitations of this indicator. Nevertheless, in the situation of the network effect analysis, it is important to include the entire effect of interactions, and the continuous analysis is able to strengthen the credibility of the result obtained. To some extent, the conclusion of the authors of the study is confirmed by comparing the company's results with the general stock market trend. In subsequent studies, it is worth subjecting the rigors of the research method to a wider representation of companies, also in other sectors, and in this way to comprehensively check the usefulness of 4.0 business models based on the concept of the network effect.

The presented case study also allows for the indication of the formation of indirect effects resulting from the use of SaaS services, sharing economy platforms, and ride sharing platforms. Acquisitions of companies increasing the possibilities of servicing IT infrastructure is an opportunity to ensure in the long term an increase in the number of serviced customers at a lower transaction cost [57]. The indicated example can also be treated as a form of organizational synergy analysis [58]. It is also an example of focusing on building an organization focused on meeting the needs of a diverse group of stakeholders [59].

Rebound changes in the Cyfrowy Polsat group "we want to be the leader of the entertainment and telecommunications market in Poland, we want to do so using the best and most modern technologies in order to provide high-quality integrated services, and the overriding goal of our strategy is sustainable, long-term value growth" [60] indicate a consistent strategy of building value based on an increase in the number of customers and an increase in Revenue from Contracts with Customers.

In the communication services sector, the network effect has been the main motive of integration for many years. However, it was not called a network effect, and was often referred to as a strategy of building new markets [61], a strategy of horizontal diversification, strategies of resource diversification [62,63]. This was mainly the case of earlier research. Analyzing very broadly, it was mainly a problem of some kind of diversification. In this way, the building of this type of organization in industry analysis and resource-based management was analyzed. In these approaches to the strategy, the main emphasis was on building the organization's revenues by increasing market shares or increasing the value of the organization as a result of M&A itself. Only the network school in strategic management pointed to other possibilities of building the value of the organization, emphasizing the relational resources of various groups of stakeholders and their impact on building specific feedbacks in the system of supporting income streams.

The next stage, symbolically marked in this article, will be an attempt to interpret network effects as the basis for shaping the ecosystems of an organization [64].

The theory of business models and the development of 4.0 technologies providing the basis for the definition of new 4.0 business models (as presented in the case of Cyfrowy Polsat in the Figure 4), in the opinion of the authors of the article, confirmed by the literature research and case study analysis, will probably be the main factor accelerating the transition to the interpretation of network as the basis for shaping management ecosystems in the spirit of complexity theory.

Changes in the perception of the network effect in management evolve similarly to the already historic outsourcing. Both of these categories first appeared in informatic sciences and only later were adopted by management sciences. Similarly, it has also evolved in the management as the concept of economic platforms [65].

It also emphasized the importance of the value creation from the resource integration in and resource interaction across the Cyfrowy Polsat Group's. The efficient integration of the resources acquired through many of its M&As was crucial to meet shareholder's high expectation. Its strategy clearly represents some of the key concepts of the Resource Interaction Approach, described by Baraldi et al. as channelling the newly acquired services through the same interface, resource combinations across the Group's entities, innovations and technical developments [66].

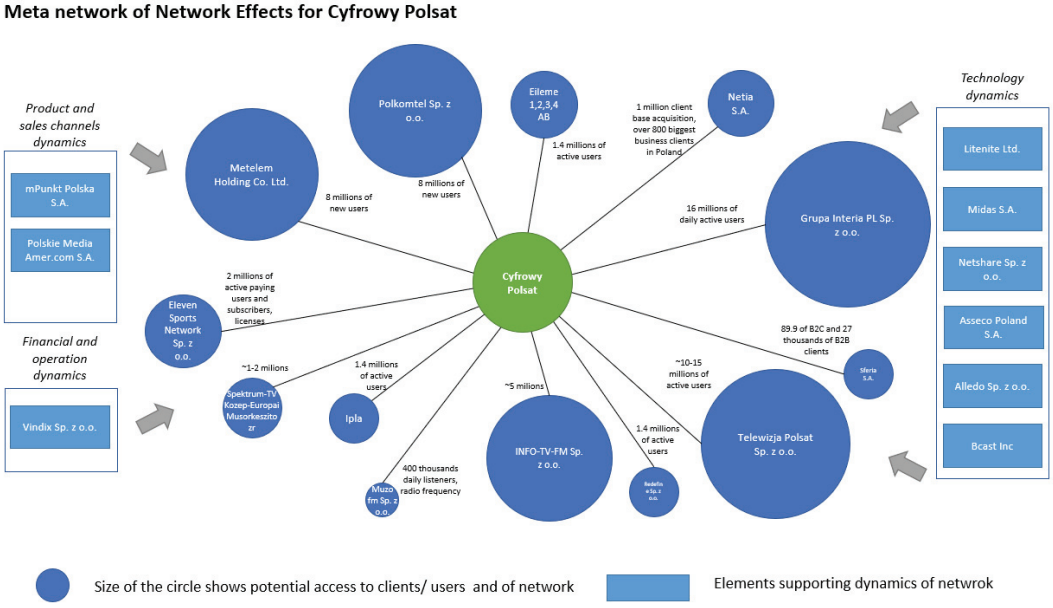

Figure 4. Meta network of network effects for Cyfrowy Polsat; source: own.

It is worth mentioning also that further acquisitions and building network with users and product and services will have impact on network effect. Network effect, in this case, is measured by IFRS 15—Revenue from Contracts with Customers. This metric, according to the authors, may be a good indicator to show the potential advancement of the network effect in a given organization. In this case, if the Contracts with Customers indicator is growing in the proper period, that can mean that the network effect is stronger, and it is more intense. This indicator is most often used in analyses of organizations that build value by adding new customer groups (M&A) and by adding new services or products for existing customer groups (also through M&A).

Of course, the increase in value in the organization may be the result of many factors, dependent and independent of the company. However, the purpose of the study presented

in this article was for those factors that were associated with the expansion of the customer base and the increase in Revenue from Contracts with Customers. The results obtained for the studied group should be treated as reliable, not only because the data were obtained from public documents of the organization and processed in accordance with the logic of this indicator, but also because they are consistent with the strategic goals and strategic motives of the by them M&A.

The presented model does not exhaust all the possibilities of the impact of technology 4.0 on the nature of the business model, nor does it exhaust all possible variants of network business models. However, it is noteworthy that class 4.0 solutions allow for building new and more efficient business models, and often also lead to a change in the general concept of running a business.

As presented within the case study, by leveraging 4.0 business models, including SaaS, sharing economy, and IT infrastructure, alongside with increased volume of clients served, the Cyfrowy Polsat Group realizes a network rent. The company does it mostly through programmatic M&As of selected ICT/media companies, which complement their business model. With that, Cyfrowy Polsat Group monetizes its otherwise-stagnant subscription customers base by adding more connections of products towards customers. Moreover, it does this despite worsening conditions, constantly outperforming the market. It uses a similar integration strategy as a top technology company in the world, including Alphabet (Google), Amazon or Facebook. In this sense, it is an outstanding example of modern BM 4.0 within Central Eastern Europe.

The obtained results can be the basis for changes in the management of organizations. If indeed the transaction costs in the business model 4.0 using network effects can be reduced to zero, then hierarchical organizations so far dominant in management will be ineffective and will lose competition with organizations built on contracts. Then, it will also be possible to fully use the theory of complexity to define the organization's strategy [56].

Until then, managers in organizations can effectively use the concept of including new customer groups and new products for these customers in the organization, counting on the growth of Revenue from Contracts with Customers. The theory of network effects used in the strategies of Google, Facebook, the Netflix group and others has so far proved its advantage over other classic strategies from the concepts of I. Ansoff or M. Porter. However, it differs from the Google, Facebook and Netflix strategy in that it is implemented in a company that deals with media and telecommunications, but also operates in the energy, banking, insurance and real estate sectors. All these sectors operate using the described business model, showing that network effects can also be used cross-sectorally. The closest to this is Alphabet's development. Many other organizations, especially in the service sector, are already consciously moving in this direction.

Author Contributions: The authors contributed equally to this work. J.N., R.T., M.W., K.B. contributed to the conceptualization, formal analysis, investigation, methodology, writing of the original draft, and review and editing. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Publicly available datasets were analyzed in this study. This data can be found here: www.stooq.pl/q/d/?s=cps&c=0&d1=20101130&d2=20201130 (accessed on 20 September 2021) and here: www.stooq.pl/q/d/?s=wig&c=0&d1=20101130&d2=20201130 (accessed on 20 September 2021).

Conflicts of Interest: The authors declare no conflict of interest.

References

1. El Hamdi, S.; Abouabdellah, A.; Oudani, M. Industry 4.0: Fundamentals and Main Challenges. In Proceedings of the 2019 International Colloquium on Logistics and Supply Chain Management (LOGISTIQUA), Paris, France, 12–14 June 2019. [CrossRef]
2. Katz, M.L.; Shapiro, C. Network externalities, competition, and compatibility. *Amer. Econ. Rev.* **1985**, *75*, 424–440.
3. Nielsen, C.; Lund, M. A brief history of the business model concept. In *The Basics of Business Models*; Nielsen, C., Lund, M., Eds.; Ventus: Copenhagen, Denmark, 2014; Volume 1, pp. 22–28.
4. Osterwalder, A.; Pigneur, Y. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*; John Wiley & Sons: Hoboken, NJ, USA, 2010; pp. 1–288.
5. Osterwalder, A.; Pigneur, Y. An eBusiness model ontology for modeling eBusiness. *BLED 2002 Proc.* **2002**, *2*, 75–91.
6. George, G.; Bock, A.J. *Models of Opportunity: How Entrepreneurs Design Firms to Achieve the Unexpected*; Cambridge University Press: Cambridge, UK, 2012.
7. Ovans, A. What is a business model? *Harv. Bus. Rev.* **2015**, *23*, 1–7.
8. Jabłoński, A.; Jabłoński, M. Trust as a Key Factor in Shaping the Social Business Model of Water Supply Companies. *Sustainability* **2019**, *11*, 5805. [CrossRef]
9. Niemczyk, J. *Strategia. Od Planu do Sieci*; Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu: Wrocław, Poland, 2013; pp. 1–133.
10. Dagnino, G. Understanding the Enconomics of Riracdian, Chamberlinian and Schumpeterian Rents. *Int. Rev. Econ. Bus.* **1996**, *43*, 213–235.
11. Lado, A.A.; Boyd, N.G.; Hanlon, S.C. Competition, cooperation, and the search for economic rents: A syncretic model. *Acad. Manag. Rev.* **1997**, *22*, 110–141. [CrossRef]
12. Hoffman, R.; Yeh, C. *Blitzscaling*; Wydawnictwo Onepress: Gliwice, Poland, 2018; pp. 1–320.
13. Niemczyk, J.; Trzaska, R.; Borowski, K.; Karolczak, P. Scalability 4.0 as economic rent in Industry 4.0. *Transform. Bus. Econ.* **2019**, *18*, 824–883.
14. Kagermann, H.; Wahlster, W.; Helbig, J. *Recommendations for Implementing the Strategic Initiative Industry 4.0*; National Academy of Science and Engineering: Berlin, Germany, 2013.
15. Liao, Y.; Deschamps, F.; Loures, E.D.F.R.; Ramos, L.F.P. Past, present and future of Industry 4.0-a systematic literature review and research agenda proposal. *Int. J. Prod. Res.* **2017**, *55*, 3609–3629. [CrossRef]
16. Janik, A.; Ryszko, A. Mapping the field of Industry 4.0 based on bibliometric analysis. In Proceedings of the 32nd International Business Information Management Association Conference (IBIMA)—Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth, Seville, Spain, 15–16 November 2018; pp. 6316–6330.
17. Navickas, V.; Kuznetsova, S.A.; Gruzauskas, V. Cyber–physical systems expression in industry 4.0 context. *Financ. Credit Act. Probl. Theory Pract.* **2017**, *2*, 188–197. [CrossRef]
18. Gerlitz, L. Design management as a domain of smart and sustainable enterprise: Business modelling for innovation and smart growth in Industry 4.0. *Entrep. Sustain. Issues* **2016**, *3*, 244–268. [CrossRef]
19. Majeed, A.A.; Rupasinghe, T.D. Internet of things (IoT) embedded future supply chains for industry 4.0: An assessment from an ERP-based fashion apparel and footwear industry. *Int. J. Supply Chain Manag.* **2017**, *6*, 25–40.
20. Kiel, D.; Arnold, C.; Collisi, M.; Voigt, K.-I. The Impact of the Industrial Internet of Things on Established Business Models. In Proceedings of the 25th International Association for Management of Technology (IAMOT) Conference, Orlando, FL, USA, 15–19 May 2016; pp. 673–695.
21. Baheti, R.; Gill, H. Cyber—physical systems. *Impact Control Technol.* **2011**, *12*, 161–166.
22. Hozdić, E. Smart factory for industry 4.0: A review. *Int. J. Mod. Manuf. Technol.* **2015**, *2*, 2067–3604.
23. Berawi, M.A. Utilizing Big Data in Industry 4.0: Managing Competitive Advantages and Business Ethics. *Int. J. Technol.* **2018**, *9*, 430–433. [CrossRef]
24. Dobrowolska, M.; Knop, L. Fit to Work in the Business Models of the Industry 4.0 Age. *Sustainability* **2020**, *12*, 4854. [CrossRef]
25. Ibarra, D.; Ganzarain, J.; Igartua-Lopez, J.I. Business model innovation through Industry 4.0: A review. *Proc. Manuf.* **2018**, *2*, 4–10. [CrossRef]
26. Carvalho, N.; Chaim, O.; Cazarini, E.; Gerolamo, M. Manufacturing in the fourth industrial revolution: A positive prospect in sustainable manufacturing. *Proc. Manuf.* **2018**, *21*, 671–678. [CrossRef]
27. Tirabeni, L.; De Bernardi, P.; Forliano, C.; Franco, M. How Can Organisations and Business Models Lead to a More Sustainable Society? A Framework from a Systematic Review of the Industry 4.0. *Sustainability* **2019**, *11*, 6363. [CrossRef]
28. Sopińska, A.; Dziurski, P. *Otwarte Innowacje: Perspektywa Współpracy i Zarządzania Wiedzą*; Oficyna Wydawnicza SGH: Warszawa, Poland, 2018; pp. 1–146.
29. Braun, M.; Graf, F. Mergers & Acquisitions at the Intersection of Digital and Global Interaction. Swiss-Chinese Chamber of Commerce. 2019. Available online: https://www.sccc.ch/resources/MA_Digital-Global.pdf (accessed on 10 December 2020).
30. Rokita, J.; Dziubińska, A. *Systemy Złożone w Zarządzaniu*; Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach: Katowice, Poland, 2016; pp. 1–352.
31. Niemczyk, J.; Trzaska, R. Klasyfikacja modeli biznesowych w Industry 4.0. In *Zarządzanie Strategiczne w Dobie Cyfrowej Gospodarki Sieciowej*; Gregorczyk, S.R., Urbanek, G., Eds.; Wydawnictwo Uniwersytetu Łódzkiego: Łódź, Poland, 2020.

32. Niemczyk, J.; Trzaska, R. Network Approach in Industry 4.0: Perspective of Coopetition. In *Contemporary Challenges in Cooperation and Coopetition in the Age of Industry 4.0. Springer Proceedings in Business and Economics*; Zakrzewska-Bielawska, A., Staniec, I., Eds.; Springer: Cham, Switzerland, 2020. [CrossRef]
33. Niemczyk, J.; Trzaska, R.; Trzaska, M. Scalability 4.0 as the main rent in Industry 4.0: The case study of Amazon. *Inf. Ekon. Pr. Nauk. Uniw. Ekon. We Wrocławiu* **2019**, *2*, 69–84.
34. Gallaugher, J.M.; Wang, Y.M. Network effects and the impact of free goods: An analysis of the Web server market. *Int. J. Electron. Commer.* **1999**, *3*, 67–88. [CrossRef]
35. Economides, N. The economics of networks. *Int. J. Ind. Org.* **1996**, *14*, 673–699. [CrossRef]
36. Lin, C.P.; Bhattacherjee, A. Elucidating Individual Intention to Use Interactive Information Technologies: The Role of Network Externalities. *Int. J. Electron. Commer.* **2008**, *13*, 85–108. [CrossRef]
37. Tseng, F.C.; Linh Pham, T.; Cheng, T.C.E.; Teng, C.I. Enhancing customer loyalty to mobile instant messaging: Perspectives of network effect and self-determination theories. *Telem. Inform.* **2018**, *35*, 1133–1143. [CrossRef]
38. Sridhar, V. Network Externalities in Telecom. *Econ. Political Wkly.* **2004**, *39*, 3586.
39. Schwanholz, J.; Leipold, S. Sharing for a circular economy? An analysis of digital sharing platforms' principles and business models. *J. Clean. Prod.* **2020**, *269*, 12227. [CrossRef]
40. Wang, Y.; Winter, S.; Tomko, M. Collaborative activity-based ridesharing. *J. Transp. Geogr.* **2018**, *72*, 131–138. [CrossRef]
41. Öberg, C. The Importance of Customers in Mergers and Acquisitions. Ph.D. Thesis, Linköping Studies in Science and Technology, Linköping, Sweden, 2008. Dissertation No. 1193. Available online: http://www.diva-portal.org/smash/get/diva2:18335/FULLTEXT01.pdfCover (accessed on 20 September 2021).
42. Casadesus-Masanell, R.; Zhu, F. Strategies to Fight Ad-Sponsored Rivals. *Manag. Sci.* **2010**, *56*, 1484–1499. [CrossRef]
43. Nakamura, L.; Samuels, J.; Soloveichik, R. Valuing "Free" Entertainment in GDP: An Experimental Approach; FRB of Philadelphia Working Paper No. 16–24. 2016. Available online: https://ssrn.com/abstract=2833772 (accessed on 20 September 2021).
44. MacNamara, J. Remodelling media: The urgent search for new media business models. *Med. Int. Aust.* **2010**, *137*, 20–35. [CrossRef]
45. Rashid, Y.; Rashid, A.; Warraich, M.A.; Sabir, S.S.; Waseem, A. Case Study Method: A Step-by-Step Guide for Business Researchers. *Int. J. Qual. Methods* **2019**, *18*, 1609406919862424. [CrossRef]
46. Zainal, Z. Case study as a research method. *J. Kemanus.* **2007**, *5*, 1–6.
47. Gerring, J. What is a case study and what is it good for? *Am. Political Sci. Rev.* **2004**, *98*, 341–354. [CrossRef]
48. Borowski, K.; Wilczyński, M. Wpływ fuzji i przejęć na kształtowanie wartości polskich spółek publicznych. In *Perspektywy Rozwoju Modeli Biznesu Przedsiębiorstw-Uwarunkowania Strategiczne*; CeDeWu: Warszawa, Poland, 2019; pp. 241–252.
49. Polsat Potwierdza 800 mln zł z Synergii. Available online: www.bankier.pl/wiadomosc/Cyfrowy-Polsat-potwierdza-800-mln-zl-synergii-z-przejecia-Netii-w-latach-18-23-7648711.html (accessed on 2 January 2021).
50. Wyniki Grupy Cyfrowy Polsat. Available online: www.telepolis.pl/wiadomosci/prawo-finanse-statystyki/wyniki-grupy-cyfrowy-polsat-za-2019-rok (accessed on 2 January 2021).
51. Asseco: Umowy w Niemczech i Projekt dla Cyfrowego Polsatu Celem na 2021. Available online: www.isbtech.pl/2020/11/asseco-umowy-w-niemczech-i-projekt-dla-cyfrowego-polsatu-celem-na-2021 (accessed on 1 September 2021).
52. Caridam, A.; Edvardsson, B.; Colurcio, M. Conceptualizing resource integration as an embedded process: Matching, resourcing and valuing. *Mark. Theory* **2019**, *19*, 65–84. [CrossRef]
53. Rohlfs, J. A theory of interdependent demand for a communications service. *Bell J. Econ. Manag. Sci.* **1974**, *5*, 16–37. [CrossRef]
54. Lee, K.; Ha, N. AI platform to accelerate API economy and ecosystem. In Proceedings of the 2018 International Conference on Information Networking (ICOIN), Chiang Mai, Thailand, 10–12 January 2018; pp. 848–852.
55. Qvortrup, L. Understanding new digital media: Medium theory or complexity theory? *Eur. J. Commun.* **2006**, *21*, 345–356. [CrossRef]
56. Parker, G.; Petropoulos, G.; Van Alstyne, M.W. Platform Mergers and Antitrust, Boston University Questrom School of Business Research Paper No. 376351, 2021, 1–30. Available online: http://dx.doi.org/10.2139/ssrn.3763513 (accessed on 20 September 2021).
57. Williamson, O.E. Transaction cost economics: How it works; where it is headed. *Economist* **1998**, *146*, 23–58. [CrossRef]
58. Assael, H. From silos to synergy: A fifty-year review of cross-media research shows synergy has yet to achieve its full potential. *J. Adv. Res.* **2011**, *51*, 42–58. [CrossRef]
59. Malthouse, E.C.; Buoye, A.; Line, N.; El-Manstrly, D.; Dogru, T.; Kandampully, J. Beyond reciprocal: The role of platforms in diffusing data value across multiple stakeholders. *J. Serv. Manag.* **2019**, *30*, 507–518. [CrossRef]
60. Mission, Vision, Strategy. Available online: www.grupapolsatplus.pl/pl/nas/misja-wizja-strategia (accessed on 2 September 2021).
61. Sun, B.; Xie, J.; Cao, H.H. Product strategy for innovators in markets with network effects. *Mark. Sci.* **2004**, *23*, 243–254. [CrossRef]
62. Ozkan-Canbolat, E. Organizational network effect on diversification strategies. *Strateg. Manag. Q.* **2014**, *2*, 27–48.
63. Hong, A.R. A Review of Diversification Performance of Media Conglomerates. *Int. J. Arts Sci.* **2010**, *3*, 469–486.
64. Niemczyk, J.; Walków, M.; Trzaska, M.; Trzaska, R. Airport Business Ecosystem. *Eur. Res. Stud. J.* **2021**, *24*, 55–72. [CrossRef]

65. Jiang, X. Review on the Evolution of Platform Research from the Perspectives of Management and Economics. In Proceedings of the 2021 International Conference on Economic Development and Business Culture (ICEDBC 2021), Xiamen, China, 18–20 June 2021; pp. 63–70.
66. Baraldi, E.; Gressetvold, E.; Harrison, D. Resource interaction in inter-organizational networks: Foundations, comparison, and a research agenda. *J. Bus. Res.* **2012**, *65*, 266–276. [CrossRef]

sustainability

MDPI

Article

The Digital Transformation of the Korean Music Industry and the Global Emergence of K-Pop

Jimmyn Parc [1] and Shin Dong Kim [2,*]

[1] Paris School of International Affairs (PSIA), Sciences Po Paris, France and Institute of Communication Research, Seoul National University, Seoul 150599, Korea; jimmynparc@gmail.com
[2] Media School, Hallym University, Chuncheon 24252, Korea
* Correspondence: shinkim.sk@gmail.com

Received: 13 August 2020; Accepted: 15 September 2020; Published: 21 September 2020

Abstract: There are a number of voices who blame digitization for having a number of negative effects on the music industry including a decline in album sales, copyright infringement, unfair royalty payments, and competition with foreign multinationals. Yet, the global emergence of Korean pop music or K-pop suggests a different narrative, particularly given that its growth was largely unexpected among industry experts. Understanding the key to its international breakthrough can thus produce meaningful lessons for the music industries of other countries for their own further take-off. This constitutes the focus for this paper. Digitization has influenced various sectors of the Korean music industry such as business, society, and consumers. It has also transformed the management focus of the industry from analog to digital, from offline to online, from albums to songs, from specialization to integration, from domestic providers to international suppliers, from audio sound to visual images, from possessing to accessing, and from limited integration to synergistic network. This signifies that embracing technology advancement can enhance the competitiveness of cultural industries.

Keywords: digitization; digital transformation; K-pop; Korean music industry; Hallyu; Korean wave; cultural industries

In recent years, a number of voices in the music industry have blamed online streaming services like Spotify (Stockholm, Sweden) and YouTube (San Brino, CA, USA) for having a negative effect globally on the music business. In fact, several well-known singers such as Adele, Beyoncé, and Taylor Swift have criticized these streaming platforms as posing a threat to their livelihoods [1,2]. While many have been quick to criticize, few have sought to really understand how technological advancement and digitization have changed culture to this extent; a way of thinking in the industry that has led to few effective approaches being adopted in response to this challenge. However, an alternative path that has proven to be successful exists. Korean pop music or K-pop and its global emergence suggest a narrative on how to fully take advantage of these changes in the music industry (Although the term "industry" generally refers to production and related activities, in this paper it is used to have a broader concept that encompasses production and related activities, as well as consumption).

For this reason, there has been noticeable growing interest in K-pop around the world over the past decade [3–6]. Since its emergence, K-pop has been one of the driving forces behind *Hallyu* or the Korean wave which has translated into the rise of Korean (pop) culture. It covers a diverse range of genres from traditional Korean music to hip hop (rap) and electronic dance music (EDM). Among its many artists, K-pop can be characterized by its "idol" culture with boy and girl bands coupled with its iconic synchronized group dance and mixture of Korean and English lyrics. It is also widely known that K-pop has been extensively diffused by the Internet and its platforms. To provide a sense of its scale, two examples can demonstrate clearly its rising global popularity. The first is the singer PSY's viral hit "Gangnam Style" which came out in 2012 and for several years was the most-watched video of all time

on YouTube. The second is the recent success of the K-pop boyband BTS or Bangtan Boys who won the Billboard Award for Top Social Artist for the third year in a row in 2019, beating well-established singers such as Justin Bieber and Selena Gomez [7]. Furthermore, this band recently achieved its first number 1 on the Billboard Hot 100 with the song "Dynamite".

These landmark achievements stand in stark contrast to the situation that the Korean music industry was faced with in the period before the 1990s. Throughout this time, observers pointed out a wide number of factors that hindered its development, such as the dominance of Japanese music styles, Western influences, government censorship, international pressure to open its market, plagiarism, piracy, and negative domestic market conditions (refer to Parc and Kawashima [8] and Parc, Messerlin, and Moon [9]). In particular, Korea was for a long time regarded as existing outside of the "core countries" in the cultural sector. This would then suggest that the emergence of K-pop in the global market needs to be understood better in terms of the key factors behind its international popularity and their implications that can be useful for other music industries (Some consider this as a result of the Korean music industry's continuous efforts since the 1970s to achieve international popularity, particularly in Japan. In this regard, there were a few scattered cases of artists making a breakthrough: Lee Sung-Ae in the late 1970s, Cho Yong-Pil from the late 1970s to the early 1980s, and Gye Eun-Sook in the 1980s and 1990s. However, they are very different from today's popularity in terms of geographical coverage and the level of impact. It should be noted that other countries, such as Japan and a number of European countries, have also undertaken similar efforts toward the US market. Hence, simply mentioning sporadic moments of going abroad is not enough to explain the international popularity of K-pop).

So far, most analyses on K-pop have drawn upon insufficient explanations such as hybridity and cultural proximity, which are elaborated further in the literature review, or have highlighted aspects that have little meaning elsewhere such as cultural uniqueness or superiority (refer to Otmazgin [10]). Moving away from such approaches that often lack true logic, candidate factors should be carefully analyzed by distinguishing changes that have happened ex ante or ex post for the international emergence of K-pop. Among many explanations, internet-related factors such as the influence of social networking services (SNS) hold some weight but are not specific to Korea.

In order to better understand the emergence of K-pop, an analysis on changes in the Korean music industry should be considered. Thus, this paper links digital technology to the music industry and focuses on identifying the key elements that have fostered the digital transformation of the Korean music industry, which has resulted in the global emergence of K-pop. To support such an approach, a comprehensive and systematic analytical tool based upon Michael Porter's diamond model is utilized. We first review critically the literature that has examined the factors behind K-pop's international coverage. Following this, Porter's diamond model and its logic in this situation is applied. We then analyze the reciprocity between technological advancement and the Korean music industry, coupled with its impact on digital transformation of the industry. Next, we discuss how evolution became generalized along with guidelines for cultural policies in an era of digitization. The paper concludes with a summary of implications to be drawn from the analysis and suggests areas for further study.

1. Critical Literature Review

While K-pop has been around for some time (in this case, when K-pop began is debatable. Some view it as emerging after the Korean War, thus in the 1950s when American songs had a significant influence on Korean music [9,11]. Others argue that the beginning of K-pop was with Seo Taiji and Boys, a boy band that debuted in 1992 (see Oh and Lee [12] and Howard [13]). However, these different views do not change the analysis and findings of this paper), its international popularity only became more visible in the 2000s. Given these recent developments, an analysis of K-pop's growing international popularity would be stronger if it were focused on more timely variables. In looking at the existing studies on this topic, they can be categorized into five elements that reflect their approach: (1) cultural proximity, (2) hybridity, (3) state cultural policies, (4) fandom, and (5) SNS.

Cultural proximity. Kim and Ryoo [14] and Sung [15] have noted that Korean cultural products are mostly consumed in East and Southeast Asia. In earlier times, it seemed that the export of Korean products enjoyed more popularity in countries that share Confucian values. This has led many scholars then to argue that the spread of Korean popular music and other texts depends upon cultural proximity. However, Lie [16] has pointed out that Korean cultural goods have also enjoyed widespread popularity in Europe, North America, Latin America, and the Middle East. Further insights in this regard can be provided by the number of views on YouTube as a barometer to measure the diversity of its popularity; this platform provides a wide range of music regardless of it being old or new and it is the most popular online streaming site in the world [17].

Jung and Song [18] present the number of views on YouTube by region based on data from 2011, a year before the viral spread of "Gangnam Style". The fact that a large portion of views are concentrated in Asia would seem initially to support the cultural proximity argument (see Column [a] of Table 1). Although the absolute number is meaningful, the analysis can be different if we consider the number of views per person and also per youngster of each country as they are more likely to be the consumers of K-pop; in other words, data for Columns [d] and [e] are more important than those of Column [a] for a fair comparison. Such an approach is used due to great contrasts among population sizes and demographics around the world which on its own does not accurately reflect the real popularity of K-pop. This new approach used here thus reveals a different picture.

Table 1. A new interpretation of the number of YouTube views for K-pop (2011).

Regions	No. of Views [a] (2011, Unit: 1000)	Populations [b] (2011, Unit: 1000)		No. of Views/Person	
		Total	Age Group (15–29 y.o.)	Total	Age Group (15–29 y.o.)
	[a]	[b]	[c]	[d] = [a]/[b]	[e] = [a]/[c]
Asia 1 (excl. China and Korea)	1,507,325	2,828,906	763,191	0.53	1.98
Japan	423,684	128,499	20,095	3.30	21.08
Asia 2 ([Asia 1]–Japan)	1,083,641	2,700,407	743,096	0.40	1.46
North America	289,271	346,251	72,501	0.84	3.99
Europe	173,862	737,851	144,163	0.24	1.21
South America	119,079	597,995	158,510	0.20	0.75
Oceania	30,820	37,498	8625	0.82	3.57
Africa	9631	1,066,410	295,584	0.01	0.03

Notes: 1. On the number of views, the original source does not clarify if the Caribbean region is included in the category of "South America". Therefore, in contrast to the original format, the population of the Caribbean region is integrated into South America; 2. Data on China are not included in the Asia category due to unavailability of YouTube in the country; 3. The number of views in Korea and the Korean population are excluded. Data sources: a. Jung and Song [18]; b. United Nations [19].

First, compared to those in "Asia 1" and "Asia 2" (China and Korea are excluded; YouTube is not available in China while Korea is where K-pop originates from), people in North America and Oceania are actually the consumers who viewed K-pop videos the most when the number of views per capita is taken into account (see Column [d]). It is noteworthy that these data are from the period before the success of Psy and BTS and that Japan has been the main target for K-pop bands. Second, this becomes even more evident when focusing on the age group of 15–29 who are considered to be the main consumers of K-pop. When Japan is excluded, youths in North America and Oceania consume more K-pop than the same age group in Asia, again when the number of views per capita is considered (see Column [e]). In order to better understand this perspective, it is also necessary to point out the fact that Korean entertainment companies promoted K-pop more in Asia, notably in Japan, during its

early days. Furthermore, Psy and BTS have gained more popularity in North America than elsewhere. All of these explanations suggest that the cultural proximity argument cannot fully explain how K-pop came to enjoy significant popularity at the global level.

Some may argue that the above analysis does not consider the influence of the Korean diaspora. However, this point is irrelevant when taking into account the ratio of diaspora which we have calculated additionally (see Table 2). In this respect, using data for 2011 from the Ministry of Foreign Affairs of the Republic of Korea [20], the ratio of Korean diaspora in each region's population appears to be around 0 percent. Among these regions, North America has the highest diaspora population which is 0.666 percent of the total population, while Oceania, Europe, Asia (excluding China, Japan, and Korea), South America, and Africa all reach close to 0 percent.

Table 2. Presence of Korean diaspora (2011).

Regions	Total Population [a] (2011, Unit: 1000)	Total No. of Korean Diaspora [b]	Ratio of Korean Diaspora
Asia 1 (excl. China and Korea)	2,828,906	1,205,479	0.043%
Japan	128,499	913,097	0.711%
Asia 2 ([Asian 1]−Japan)	2,700,407	292,382	0.011%
North America	346,251	2,307,082	0.666%
Europe	737,851	656,707	0.089%
South America	597,995	112,980	0.019%
Oceania	37,498	161,038	0.429%
Africa	1,066,410	11,072	0.001%

Notes: 1. The regional distinction is adopted from Table 1; 2. Data for age groups of Korean diaspora are unavailable. Data sources: a. United Nations [19]; b. Ministry of Foreign Affairs of the Republic of Korea [20].

Hybridity. The hybridity between Korean and Western cultures is an element often referred to in many existing studies on K-pop's popularity [21–24]. There are various types of hybridity to consider here, but for this paper we will consider music style and lyrics as they are the most commonly referred to in existing studies. In the first case, musical hybridity is interpreted as foreign music genres and styles that have been mixed with traditional Korean pop music [23]. Indeed, much of this influence came during the 1990s when hip hop, reggae, and Euro dance became popular in the Korean music scene. Second, lyrical hybridity is often understood in terms of the lyrical content being a mixture of English and Korean [24,25]. While these two types of hybridity have enriched the K-pop music scene, a broader understanding of this issue is necessary in order to accurately assess its impact on K-pop and its global popularity.

It is important to recognize that many types of music have been popular in other countries before they reached Korea. For example, reggae was already popular in the Philippines, Thailand, and Japan during the 1980s. Hip hop became mainstream throughout the 1980s and 1990s in the United States, Europe, Africa, and Asia. Euro dance became globally popular from the mid-1990s [26]. Therefore, the hybridity of these music styles with traditional local music should not be considered as K-pop-specific but has been part of a global trend.

Hybridity in regard to the lyrics cannot by themselves explain the popularity of K-pop. English words frequently featured in the lyrics of songs from Hong Kong and Japan long before they showed up in Korea [22,27]. This shows that hybridity of lyrics is by no means specifically characteristic to K-pop. While this may have helped K-pop to reach a competitive level with other prevailing music in the global market, it is still hard to argue that this hybridization *per se* makes K-pop internationally more popular than others that are also hybridized.

State cultural policy. Hong [28], Jin [21], and Kwon and Kim [29] have sought to highlight the importance of the Korean government's cultural policy in the rise of K-pop. Here they have noted how performers have benefited from official financial support to hold concerts and festivals. Such government support, though, only began in the late 2000s when K-pop was already showing signs of international popularity [9,30]. Crucially, however, this was directed toward promoting the "national brand" of Korea by exploiting K-pop's popularity rather than intending to foster its growth [12,31,32]. This argument is supported by an official statement from a government official who stated that the "Korean wave including K-pop has been gaining a lot of international attention and it is culturally beneficial to the national interests, so the state provides full support" [33].

Fandom. Several studies have identified the zealous fandom of K-pop as a factor in its international popularity [24,25,34]. Fans of K-pop often open websites for various online activities to support their favorite bands. They routinely play newly released songs of their supporting band on various music sites. Some even externalize by posting billboards in public spaces to express support for their favorite bands or organize crowdfunding projects. The importance of K-pop fandom and its activities to support their favorite bands and create a sense of community should not be overlooked, although a focus on fandom perhaps raises the question: how did they come to know about K-pop, how were they able to access the music? Above all, why were they interested in K-pop in the first place? In this respect, why are the fandom activities for K-pop significantly more visible than those for bands from other countries?

SNS. In addressing such questions, Jin [21], Jung [35], and Jung and Shim [36] have all emphasized the importance of digitization coupled with technological development and social media. The power of SNS has undeniably helped K-pop to spread more effectively at a low cost. Indeed, digitization seems to offer the most likely explanation for why the Korean music industry has enjoyed progress and prosperity by considering the correlation between K-pop's emergence and the early introduction of the Internet.

Despite its persuasive view, this approach requires further analysis as well given that the Internet is now the basic infrastructure for many countries around the world. As such, it would be very easy for any international entertainment company to utilize the Internet and SNS to promote their work. Furthermore, the availability of the Internet is not limited to K-pop fans, but also to the fandom of other singers and bands from around the world. In other words, if they wish, they can pursue similar supporting activities for their favorite bands and singers. We can see here that this factor has an insufficient explanatory power and requires rather an in-depth analysis of why K-pop and the Korean music industry have more actively engaged in SNS when compared with their counterparts around the world. As such, a more comprehensive approach is needed to understand how business, society, and consumers have reacted to new information and communication technologies in return.

It is here that we wish to emphasize the structure of the music industry. Regardless of digitization, the music industry inevitably encompasses four main segments: production, distribution, performance, and consumption. By considering this structure, it is easy to understand that the role of the Internet and SNS analyzed in previous studies is superficially related to either distribution or consumption. Therefore, this paper will comprehensively cover all of these four segments in depth, which will help to broaden the understanding of K-pop's international popularity.

2. Theoretical Background and Methodology

In order to cover the four main segments of the music industry, an effective tool is required that can deal with them systematically and comprehensively. In this regard, Porter's [37] diamond model provides one of the best tools for such analysis. Based on the concept of competitive advantages, Porter states that competitiveness relies on four interrelated components: (1) *factor conditions*, (2) *demand conditions*, (3) *related and supporting industries*, and (4) *firm strategy, structure, and rivalry*. Factor conditions include a country's position in areas of production, such as the presence of skilled labor or other necessary factors to compete in a given industry; demand conditions involve the size and sophistication

of home demand for the industry's product or service; related and supporting industries include the presence or absence of domestic suppliers and an internationally competitive related industry; and firm strategy, structure, and rivalry entail the conditions that govern how companies are created, organized, and managed, as well as the nature and intensity of domestic rivalry [37] (p. 71). Based upon this model, he argues that nations are more likely to succeed in industries or industry segments for which these four components are most favorable.

This can further explain how competitive advantages can be created, enhanced, and sustained. In particular, it is crucial to pay attention to the point that competitive advantages can be created in a given environment and disadvantages can even be transformed into advantages [37,38]. In his study, Porter argues that companies or industries achieve competitive advantage through acts of innovation, either in new technologies and new ways of doing things, or in pursuing existing ideas that have never been vigorously pursued [37] (p. 45). As a result, strategies (or industry and business activities) can develop to fit both industry dynamics and changing environments.

This diamond approach has been utilized to analyze cultural industries, including *Hallyu* generally [39,40], Korean dramas and films [41], K-pop [9], and comparison between J-pop and K-pop [8]. Therefore, concerning the structure of the music industry, this tool is extensive enough to cover production, distribution, performance, and consumption which covers comprehensively the industry and is adequate enough to be applied to an analysis of the Korean music industry.

While this paper adopts the diamond approach and the attribute of each component, we have renamed its four components as follows to allow for greater clarity while still retaining the model: *producers* (*factor conditions*); *consumers* (*demand conditions*); *distributors* (*related and supporting industries*); and *business context* (*firm strategy, structure, and rivalry*). The analysis described in this paper begins with *distributors* and ends by dealing with *business context*, as technological advancement brought about changes in distribution first ahead of other segments and later these changes have affected the business context.

As part of the analysis that explains the digital transformation of the Korean music industry, the narrative employed in this paper is not necessarily in chronological order, but is instead more focused on cause and effect; some changes appeared much earlier yet still have an impact. Moreover, the analysis in this paper is based on qualitative assessments on industrial dynamics and are backed up by existing studies. In particular, sources from media outlets are often utilized as they cover the most recent events related to digitization in the Korean music industry that cannot be found in current academic papers.

As yet, there are few studies that have systematically conducted in-depth research on the digitization of the Korean music industry given its recent nature. This has led to analysis on K-pop being conducted without linking the evidence to one another in a logical fashion. The novelty then of this article is the way in which it seeks the causality that can systematically and comprehensively explain the digital transformation of the Korean music industry when facing digitization.

3. Digital Transformation of the Korean Music Industry

This section examines the digital transformation of the Korean music industry responding to the changes of business, society, and consumers in the face of digital technological advancement. As the introduction of the Internet and its "routinization" through smart devices have brought about drastic changes [8], the process and responsiveness have materialized in different ways. As such, it would be more effective to cover these two events separately; they are thus categorized as "introduction" (Digitization 1.0) and "routinization" (Digitization 2.0) of the Internet.

3.1. Digitization 1.0: Introduction of the Internet

3.1.1. Distributors: From Analog to Digital

As the emergence of new recording technologies made it easier to copy the latest music in Korea, piracy became more prevalent throughout the 1980s and 1990s. The common practice though was not to copy an entire album but rather a pirated album would contain a playlist of the most popular songs. Known as *kilboard* (an amalgamation of the Korean word for street *kil* and the US entertainment brand Billboard), these compilation albums were widely sold by illegal vendors on the streets of Korea. Despite the fact that this was considered as bad practice by the Korean government who periodically sought to crack down on these vendors, *kilboard* albums were very popular as they featured all the best songs of the time and the price was generally three to five times cheaper than buying an album in a shop. In particular, they became popular among the young generation who were the main consumer of music despite having no principal income sources. This arguably made the *kilboard* vendors effective music distributors while promoting the idea that songs are easily accessible cultural products without having to pay much money.

In the early 1990s, PC-based communication network services were dominant before the Internet became widespread in Korea. Personal digital devices were also introduced during this period, such as MiniDisc players and later MP3 players. Online communities regularly featured personal advertisements from those seeking to exchange music with other users, which increased bonds among consumers of a specific band or singer. With loose regulation of intellectual property rights (IPRs) and ubiquitous piracy, tech-savvy youngsters increasingly extracted songs from CDs and exchanged them with their peers.

In witnessing these changes, the Korean music business began to shift from the analog format toward "digital music" albums. The first effort in this case was initiated in 1998 by Cho PD, a little-known Korean rapper, who established his own record label Stardom (Seoul, Korea). He wrote and composed his first online album *In Stardom* which was uploaded and distributed through an online network in 1998. Featuring eight rap songs as MP3 files, this online album became rapidly popular nationwide. Soon thereafter he released an offline version of *In Stardom* in January 1999. Although this work featured eight new songs alongside the original ones from his previous online album, and was classified by censors as offensive material, it achieved nationwide sales of 500,000 albums and was considered to be one of the most successful cases at that time in Korea. Through these processes, the Korean music industry understood the great potential of this new type of distribution which led to more digital albums being released. Today, many Korean bands release their albums simultaneously as both on- and offline platforms. This transition from analog to digital has facilitated the wider and more effective diffusion of K-pop in the era of digitization when compared with export of physical albums.

3.1.2. Producers: From Offline to Online

Led by groundbreaking groups such as Hyun Jin-young and Wawa and Seo Taiji and Boys, the Korean music industry underwent a significant change in terms of music style moving from ballads to rap music in the early 1990s (Hyun Jin-young was trained under Lee Soo-man who was the founder of SM Entertainment). In other words, the direction of the musical influence was unilateral, from international to domestic. Witnessing the shift from offline to online markets, Korean businesses anticipated not only an increase in domestic market size, but also an expansion of market scope. In other words, a bilateral shift. This trend became a reality following the sudden success of the Korean dance music duo Clon who enjoyed widespread popularity in Taiwan during the late 1990s. Thus, the music style transformations during this period accelerated further to meet the changing domestic and international tastes.

Under these circumstances, entertainment companies began to hire bilingual musicians to sing and rap in English, which helped to penetrate foreign markets as well as to appeal to international fans. In this context, the largest entertainment company in Korea, SM Entertainment (Seoul, Korea,

hereafter SME), formed the girl group S.E.S. in November 1997 whose members could speak English and Japanese. Initially, Korean companies focused on the Japanese market but soon expanded to recruit Korean American singers in the late 1990s, and other performers from China and Thailand as the years passed. This strategy has also been adopted by late-comers such as YG Entertainment (Seoul, Korea, hereafter YGE) and JYP Entertainment (Seoul, Korea, hereafter JYPE).

As the market has functions bilaterally between domestic and international through on- and offline platforms, it is not just the consumption market that has expanded, but also the way music is produced. In this regard, Korean companies and their bands and singers collaborate with international musicians in order to enlarge their fandom internationally as well as to widen their music genres. For example, American musicians such as Flo Rida and Diplo collaborated with Korean musicians such as BoA and G-Dragon in the late 2000s. This trend continued to be strengthened throughout the 2010s as the Nordic pop group Bracelet collaborated with the Korean boy band B.A.P while John Legend released a duet with Wendy from Red Velvet. In particular, BTS has been one of the leaders in such collaboration. This group has teamed up with a range of well-known American musicians, such as The Chainsmokers, Desiigner, Halsey, Lauv, Nicki Minaj, Steve Aoki, and Warren G. This endeavor has helped K-pop to further diversify its genres and to introduce itself to the local fandom of well-established collaborators. Hence, these efforts have contributed toward expanding K-pop's influence and market through both on- and offline platforms. All in all, this has helped to increase its international popularity.

3.1.3. Consumer: From Album to Song

The rapid digitization of the music industry changed consumer purchasing behavior across the world. Instead of buying a CD album, consumers in the 2000s began to purchase (or download) only the popular songs from online music platforms or stores [42]. In other words, instead of buying an album that has only one or two appealing songs while the others are less so, consumers collect only those songs that they enjoy more. In fact, this selective behavior appeared in Korea much earlier than other countries as Korean youngsters extracted songs in MP3 format from CDs and traded them online. For consumers, this process divorced songs from their albums and changed the way in which they engaged with music. Rather than simply criticize this behavior, Korean music producers instead began to reconsider their own production strategies in response. The approach they adopted in this sense was to increasingly focus their efforts on producing just a few standout tracks rather than utilizing all their resources to create multiple tracks for an album.

Because they were now concentrated on producing just a few tracks, such a limited number of songs had to be of the highest quality. To achieve an internationally competitive standard, Korea's entertainment companies began to forge new contacts with leading foreign composers from the late 1990s. For example, several songs performed by S.E.S. were in fact composed by Japanese and Finnish song writers or were even an official cover version. For example, their widely popular song "Dreams Come True" (1998) was actually a cover of "Like a Fool" by the Finnish girl group Nylon Beat. With this successful formula, these entertainment companies went on to establish a tight network with foreign song writers, notably those from Scandinavia. SM leads the way in such efforts and has a collaborative network with 864 international songwriters as of June 2020 [43]. This endeavor helped them to enhance their musical quality and has allowed K-pop to be competitive in the global market. Part of this effort has been externalized as international collaboration which explained the precedent section.

Another interesting point in this regard can be found with the Japanese music industry. Since the mid-1980s, its artists have been releasing what is known as "single albums", a format which contains only one or two songs as part of efforts to increase sales. This single-album strategy was adopted in Korea. Later when combined with the Internet, it resulted in Korean companies producing the more profitable "digital single albums"; the first of this kind being released by the Korean singer Seven in 2004. This strategy has been further advanced with mini albums and compilation albums; a retro-trend that happened in the past but armed with digitization and the Internet. One notable example is BTS.

This band has released a number of single, mini, regular, repackaged (or compilation), and special albums by putting several title songs at the heart of these albums (The classification for a "single album" has not been clearly defined. However, in general, a single album has 1–4 main songs, a mini album has around 5 songs, and regular albums have approximately 10 songs. Repackaged albums add a few new songs to the original album, whereas special albums refer to albums of limited editions and ones that are made for a special purpose, often including gifts such as concert tickets). In contrast with past practices, fans today purchase albums in order to support their favorite singers and groups rather than to enjoy them as a musical experience [44]. All of these efforts contribute to a larger consumption of more appealing songs than before.

3.1.4. Business Context: From Specialization to Integration

The distribution of albums is closely related to their sales, which is a conventional source of revenue. When distribution does not effectively function due to negative factors like when piracy was widespread in Korea, other parties will seek to overcome this malfunctioning segment through alternative means as seen with the production side. Under these circumstances, the role of music sources such as radio and TV has become that of new distribution outlets as they help to increase the commercial reputation of singers and bands.

In particular, as the music market size increased significantly, the efficiency in producing in quantity and distributing music effectively has become an even more crucial factor. Several pioneers such as Lee Soo-man recognized that there would be a promising future for entertainment companies in Korea and therefore began to train up many aspirants with great potential to specific requirements instead of going through the lengthy and somewhat unpredictable process of talent scouting (It is also known that Lee Soo-man benchmarked the success of Johnny & Associates (Tokyo, Japan), one of the largest Japanese entertainment conglomerates in the Japanese music industry). In other words, these entertainment companies integrated various functions from production and distribution to training and management. Given that these online networks have functioned as effective distribution channels and outlets, they have not only anchored the position of entertainment companies in the Korean music industry but have also helped K-pop to spread abroad.

As domestic and international fans are able to easily enjoy music and music videos online, they are then keen to embrace stimulating experiences such as on-site performances. Since Korean idol groups have focused on both music and dance, this fact has made their concerts more of a spectacle [45,46]. It is important to note that such live shows cannot be so easily copied or found online and they have been identified by music companies as a key source for revenues in the face of declining offline music sales. In seizing this opportunity, companies are increasingly looking to incorporate a section that deals with on-site performance. A good example in this case is the merger of SME with the event organizer Dream Maker (Seoul, Korea) in 2005 which reflects the substantial profitability of holding concerts. Such vertical integration has become a more prevalent characteristic in the Korean music industry and has contributed to vibrant dynamics.

3.2. Digitization 2.0: Routinization of the Internet

3.2.1. Distributors: From Domestic Providers to International Suppliers

As piracy was prevalent in Korea, local streaming service providers had to be careful about increasing the subscription fees and the price of songs that they were offering. If they were to charge too much then the younger generation of consumers who are the majority would simply switch back to illegal downloads [47,48]. In contrast, if their appropriate level of contracted royalty does not meet the expectation of the musicians and their managing companies, these service providers would have difficulties to secure a pool of K-pop songs. This complex situation places the Korean service providers in a delicate situation. Furthermore, as the routinization of the Internet became greater and the power of SNS and YouTube increased, Korean streaming service providers were concerned about

the entry of foreign service providers such as Amazon (Seattle, WA, USA), iTunes (Cupertino, CA, USA), and Spotify. However, Korean entertainment companies had a different view toward these players as they had already experienced the effective and wide distribution networks of international platforms such as Facebook (Menlo Park, CA, USA) and YouTube.

Although these international streaming service providers have shown keen interest in the Korean market, they face several "invisible barriers," which led them to initially hold back their entry. First, the younger generation of consumers prefer to listen to K-pop rather than foreign songs; for this, Korean service providers have comparative advantages [47,48]. Second, subscription fees in Korea are much lower than other countries. The result is that several local providers such as Melon (Seoul, Korea) and Genie (Seoul, Korea) have enjoyed a cost advantage which has forced international service providers to carefully consider how they will enter the Korean market.

Despite this unique environment with the aforementioned disadvantages, foreign service providers have more incentive to secure a pool of K-pop songs due to its growing global popularity and demand around the world. This makes them willing to purchase K-pop at a higher price which creates more revenue for the musicians and entertainment companies than what local platforms and service providers pay them [47]. Many of these Korean entertainment companies recognized this as an opportunity to distribute K-pop abroad more easily and effectively because they are confident about the dissemination power of these international service providers.

3.2.2. Producers: From Audio Sound to Visual Images

Visual images have long played an important role in pop music as technological advancement has progressed. There are many examples of famous television appearances from Elvis Presley's dance moves to Michael Jackson's glittering costumes; the first case was broadcast in black-and-white television whereas the latter was in color. The appearance of dedicated music channels such as MTV (New York, NY, USA) pushed further the integration of audio sounds and visual images as music videos sought to be more appealing by featuring a storyline within their contents. The screens of smart devices have become another supplementary outlet for music videos as the Internet became routinized in the late 2000s.

In this environment where visual images play a significant role, Korean entertainment companies have focused on enhancing the choreography of their bands such as group dance. This has helped them to satisfy the visual appetite of consumers [8]. Obviously, many do not understand this aspect, but often rashly criticize the thick make-up among singers and disdain the well-organized group dances of these idol groups as "manufactured" art, while they are often considered to be the symbol of K-pop itself. In sum, with advances in audio/visual technology, the trend in the music industry has changed from "music to listen to" to "music to listen to and watch," a process which Korean entertainment companies have actively adapted to.

Recently, the integration of audio sounds and video images has been further developed in a more sophisticated way. In a similar way to the Marvel Cinematic Universe, often known as MCU, Big Hit Entertainment launched the BTS Universe or BU in 2015 to promote its band. In other words, a series of storylines continues not only in a single song, but also across several songs and albums. Consequently, BTS has inserted many subplots and Easter eggs into their songs and music videos as a subtle way to draw in the audience more. Among the many examples, this can be seen with the songs "Save Me" (2016) and "Fake Love" (2018) which were released two years apart from each other but feature a connection. The title of "Save Me" appears written on a wall in the "Fake Love" music video at the 4:51 time mark. If this image is reversed as shown in Figure 1, it spells out "I'm Fine". This created much speculation among BTS fans. Some guessed that it was a sign telling its fans that the group is fine despite online attacks from BTS haters or some played out difficulties in the BU storyline, while others took it as a hint of a new song which will be released in the near future. As predicted, the song "I'm Fine" was released in August 2018 and it is treated as an extension of "Save Me" as it begins with the seven members of the boyband standing in the same position as when "Save Me" ends.

These endeavors have made K-pop more interesting and appealing than their counterpart around the world.

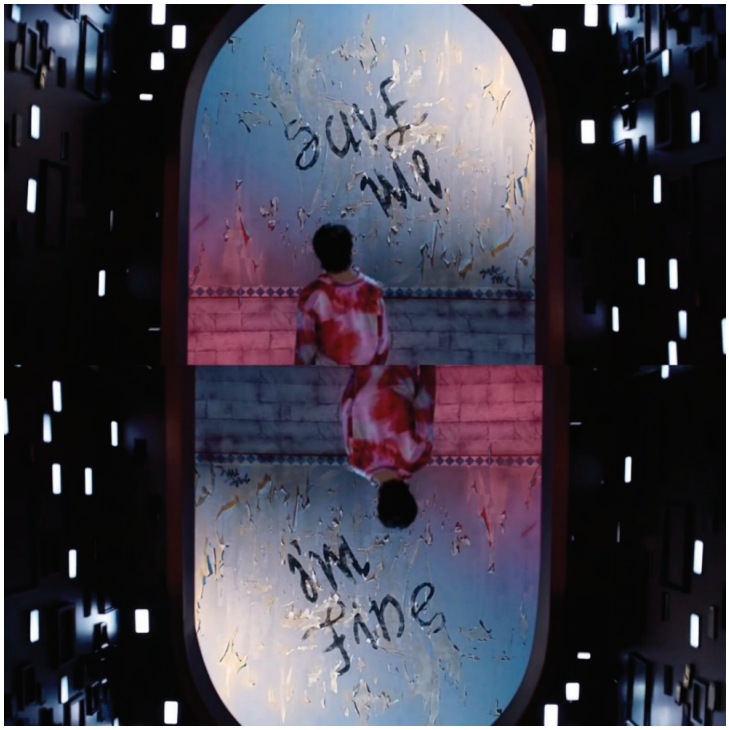

Figure 1. The images of "Save Me" and "I'm fine". Image source: BTS's "Fake Love" music video (4:51), [49].

3.2.3. Consumers: From Possess to Access

As technological advancement changed the music industry from analog to digital, consumers collected music files instead of physical albums. Given the limitations brought on by computer hard drives, consumers began to increasingly turn to virtual storage services such as Webhard (Seoul, Korea) and Soribada (Seoul, Korea) in the early 2000s. This allowed users to download and exchange music as well as to save it in their virtual folders.

Although these services were popular among younger generations, the emergence of smart devices shifted the focus among consumers further. During this time, they underwent a dramatic transformation from "possessing music" on virtual storage platforms or MP3 players to "accessing music" via software or music streaming through smart devices [11]. Although IFPI [50] and IPSOS and IFPI [42] have all described this as a recent global trend, streaming services actually appeared earlier in Korea than other countries. For example, the online music streaming service Melon was launched in 2004, several years before Spotify appeared on the scene [51].

Facing these changes, Korean entertainment companies understood from the beginning the importance of SNS and internet platforms as effective tools for disseminating music under "loose" copyright practice in Korea. For example, they were among the first to establish official YouTube channels in order to promote newly released songs more effectively. Hence, a large number of (new and old) K-pop songs have become available online. As online diffusion through these internet platforms is wider and faster than sales of physical albums, international fans have been able to easily access K-pop through various sources on the Internet [9]. Furthermore, this has become a way in which Korean

entertainment companies have learned about the preferences of fans around the world, thus it leads them to produce more internationally appealing music. As a result, the consumption and size of K-pop have significantly increased domestically and internationally.

3.2.4. Business Context: From Limited Interaction to Synergistic Networks

Korean companies have recognized the way in which the function of music has transformed from end products to promotional products in the era of digitization, this can be a starting point for other (un)related business, such as fashion, restaurants, movies, and advertising as well as on-site performances. This integrated diversification is also a way to establish stronger business portfolios that can help secure more stable revenue sources while spreading the possible risks that it may cause. For this, Korean entertainment companies established subsidiaries that specialized in specific sectors. For instance, SME has Esteem (Seoul, Korea, for fashion), SM Culture & Contents Co., Ltd. (Seoul, Korea, for dramas and variety shows), SM Food and Beverage Co., Ltd. (Seoul, Korea), and SM Town Travel (Seoul, Korea). In the same vein, YGE has Moonshot (Seoul, Korea, for cosmetics), YG Sports (Seoul, Korea, as golf agency), and YG STUDIOPLEX (Seoul, Korea, for drama production). Finally, for their part, JYPE has JYP Foods Inc. (New York, NY, USA), JYP Pictures Co., Ltd. (Seoul, Korea), and JYP Publishing Co., Ltd. (Seoul, Korea).

Such a diversification in business operations has pushed these entertainment companies to target stars who have differentiated talents that fit these varying sectors more efficiently. To meet the new market demands, these companies have placed more effort and investment into fostering promising groups and singers by utilizing revenues gained from previously successful acts within the same company [5,52]. For example, with the profits earned by successful singers and groups such as BoA and Girls' Generation, SME was able to invest in future talent. In the same way, entertainment companies have invested in diversified business by using revenues from various cash cow sectors. This is similar to the *chaebols* or conglomerates that emerged in Korea as a way to interact with both related and seemingly unrelated sectors, known as "chaebolization". As time goes by, these businesses have shown a patchy performance and have had to be restructured in order to possess more efficient and synergetic networks.

These Korean entertainment companies have also sought to expand more aggressively abroad in order to broaden their geographical scope of business activities. Thus, they have established overseas joint ventures and/or subsidiaries in countries such as China, Japan, and the United States. In this way, BoA from SME and Wonder Girls from JYPE branched out into the US music industry and achieved a degree of recognition. By contrast, PSY and his agency YGE worked with Scooter Braun and his Schoolboy Records (Santa Monica, CA, USA) in order to make the song "Gangnam Style" become a viral hit. Since then, Korean entertainment companies have collaborated more with local companies or agencies when needed, instead of establishing or working with local subsidiaries. In going through these synergetic networks, Korean entertainment companies have become more internationally competitive.

4. Discussion

This paper has shown how digitization has brought about an impact upon almost all segments of the music industry. Such a transformation has also changed the conventional process of music production, distribution, performance, and even consumption. Given these new dynamics, the prosperity of a country's music industry depends on how each segment in the industry chain responds to such transformations while enhancing more effectively the core functions of each segment; good quality of music in large quantity, efficient and wider distribution, and mass but sophisticated consumption. In this regard, the Korean music industry can be an interesting case example to explore.

There were two phases in terms of digital transformation. The first one is with the introduction of the Internet and the latter is with its routinization. Based on the previous analysis, the first phase is captioned as "Series A", whereas the latter is labeled as "Series B" in Table 3. The Korean music

industry has responded more actively to digitization by embracing these changes and has now taken advantage of it. Looking at Table 3, it provides a summary of the whole digital transformation of the Korean music industry systematically and comprehensively. Although a sequence of events can be found in Table 3, it is noteworthy that all these developments have occurred pretty well much simultaneously and within a relatively short period of time.

Table 3. Digital transformation in the Korean music industry.

		Changes	Responsiveness of the Korean Music Industry
Distributors	Hardware (A-1)	Analog ⇒ Digital	• Distribution of MP3 files via the Internet (early 2000s) • Digital album (1998)
	Software (B-1)	Domestic providers ⇒ International suppliers	• International streaming service providers (2010s) • Easier access to the global market (2015)
Producers	Basic (A-2)	Offline ⇒ Online	• Globalization of idol groups (late 2000s) • International collaboration (late 2000s)
	Advanced (B-2)	Audio sound ⇒ Visual images	• Make-up and choreography; group dance (early 2000s) • Synergetic use of audio sounds and visual images (2010s)
Consumers	Size (A-3)	Album (bundle of songs) ⇒ Song (a piece of music)	• Enhanced musicality (early 2000) • Digital single album and its extension (2010s)
	Quality (B-3)	Possessing ⇒ Accessing	• Virtual storage, e.g., p2p (2000) • Internet platforms (early 2000s)
Business context	Structure (A-4)	Specialization ⇒ Integration	• Establishment of entertainment companies (late 1990s) • Verticalization and M&As (2000s)
	Synergy (B-4)	Limited interaction ⇒ Synergetic network	• Music as promotional tool, on-site performance (2000s) • "Chaebolization" (early 2010s)

There are two key ways in which Table 3 provides a useful overview: (1) it summarizes critical factors systematically and comprehensively in a way that provides a better understanding of the transformation of the music industry when confronting digitization; (2) practitioners and policy makers can use this table to see where hindrances exist and how to overcome them by analyzing the case of the Korean music industry.

Some advocates for creative industries argue that culture should be protected and conserved, a point which ignores the fact that it can further evolve through changes like technological advancement. Moreover, they often emphasize the importance of state aid for the industry as it is closely linked to national culture and identity. While this paper does not deny the need for this kind of support, the case of the Korean music industry highlights different lessons, and this should be taken into account when policy makers establish cultural policies. To sum up, the Korean music industry has evolved by overcoming its disadvantages and enhancing existing advantages while understanding and embracing comprehensively the changes brought on by digitization and technological advancement. This all makes their entrepreneurship more dynamic and business activities more innovative which can produce an outstanding performance.

5. Conclusions

When the Korean music industry began to boom in the early 1990s, many observers expressed concerns about the future of the industry as it faced an environment that had been "devastated" by digitization. At the time, the industry was confronted by a multitude of challenges including the loose practice of IPRs, rampant piracy through the Internet, and the lifting of the ban on Japanese cultural products. Some even argued that there would be no future for the Korean music industry. However, despite the fact that these issues have not been entirely solved, the Korean music industry was able to survive and flourish further in the global market. In seeking to explain this success against the odds, many scholars have pointed out Korea-specific factors which are not available in other countries nor can be found easily in other countries while being new in Korea.

Such arguments may explain how K-pop was able to reach a similar level with the pop music from other countries, but still cannot fully explain why it has become more distinguishable and popular than its counterparts. In this regard, a rigorous analysis on the evolution of the Korean music industry has very important lessons. It will help to identify the factors that can be applied in countries that wish to develop their music industry.

Instead of sticking to traditional structures and practices, the Korean music industry understood the transformation that came with digitization such as from analog to digital, from offline to online, from albums to songs, from specialization to integration, from domestic providers to international suppliers, from audio sound to visual images, from possessing to accessing, and from limited interaction to synergetic network. More importantly, the Korean music industry has embraced these changes by adjusting their activities. This adaptation process has significantly enhanced the viability of K-pop in the global market during this era of digitization.

There are two meaningful implications from the analysis of the Korean music industry presented in this paper. First, the transformation due to digitization should be comprehensively understood instead of merely focusing on a few sectors. By understanding these aspects more systematically, meaningful implications can be drawn for other countries. Second, in understanding these transformations, the Korean music industry did not wrestle with digitization but rather embraced it. As a result, K-pop fans all over the world were able to easily access the music produced, and Korean entertainment companies and their idol groups would then try to meet the needs of their international fan base.

Since the analysis in this paper focuses on comprehensiveness to understand the increasing international popularity of K-pop, the transformation of business, society, and consumers in the Korean music industry when faced with digitization is clearly introduced and systematically scrutinized. Therefore, each element would be of interest for further studies, especially given the fact that digitization and technological advancement can be found all over the world. Furthermore, it can be interesting to assess the current competitiveness level of the Korean music industry after it has embraced digitization vis-à-vis its international counterparts. Addressing these topics can help enhance the rigor of the related studies in order to help society achieve true cultural diversity and competitiveness.

Author Contributions: J.P. designed this research and contributed to writing/revising the main parts of this article. S.D.K. commented on and revised this article. All authors have read and agreed to the published version of the manuscript.

Funding: Jimmyn Parc's work was supported by the Laboratory Program for Korean Studies through the Ministry of Education of the Republic of Korea and the Korean Studies Promotion Service of the Academy of Korean Studies (AKS-2015-LAB-2250003); Shin Dong Kim's work and the article processing charges (APC) for this paper were supported by the National Research Foundation of Korea (NRF-2015S1A5B4A01037022).

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Sisario, B. Adele is Said to Reject Streaming for '25'. *The New York Times*. Available online: https://www.nytimes.com/2015/11/20/business/media/adele-music-album-25.html (accessed on 13 May 2020).
2. Sweney, M. Shaken it Off! Taylor Swift Ends Spotify Spat. *The Guardian*. Available online: https://www.theguardian.com/music/2017/jun/09/shaken-it-off-taylor-swift-ends-spotify-spat (accessed on 5 June 2020).
3. Han, B. Korean wave: K-pop in Latin America: Transcultural fandom and digital mediation. *Int. J. Commun.* **2017**, *11*, 2250–2269.
4. Hjorth, L. Being real in the mobile reel: A case study on convergent mobile media as domesticated new media in Seoul, South Korea. *Converg. Int. J. Res. New Media Technol.* **2008**, *14*, 91–104. [CrossRef]
5. Oh, I.; Park, G.S. From B2C to B2B: Seeing Korean pop music in the age of new social media. *Korea Obs.* **2012**, *43*, 365–397.
6. Otmazgin, N.; Lyan, I. Hallyu across the desert: K-pop fandom in Israel and Palestine. *Cross-Curr. East Asian Hist. Cult. Rev.* **2014**, *3*, 32–55. [CrossRef]
7. Billboard Social 50 Artists. Available online: https://www.billboard.com/charts/year-end/2019/social-50-artists (accessed on 14 July 2020).

8. Parc, J.; Kawashima, N. Wrestling with or embracing digitization in the music industry: The contrasting business strategies of J-pop and K-pop. *Krit. Kultura* **2018**, *30*, 23–48.
9. Parc, J.; Messerlin, P.A.; Moon, H.-C. The secret to the success of K-pop: The benefits of well-balanced copyrights. In *Corporate Espionage, Geopolitics, and Diplomacy Issues in International Business*; Christiansen, B., Kasarci, F., Eds.; IGI Global: Hershey, PA, USA, 2016; pp. 130–148.
10. Otmazgin, N. A Tail that wags the dog? Cultural industry and cultural policy in Japan and South Korea. *J. Comp. Policy Anal. Res. Pr.* **2011**, *13*, 307–325. [CrossRef]
11. Parc, J. Between technological advancement and protectionism: The bumpy evolution from MP3 players to smartphones in Korea. *Krit. Kultura* **2019**, *32*, 6–31.
12. Oh, I.; Lee, H.-J. K-pop in Korea: How the pop music industry is changing a post-developmental society. *Cross-Currents East Asian Hist. Cult. Rev.* **2014**, *3*, 72–93. [CrossRef]
13. Howard, K. Mapping K-pop past and present: Shifting the modes of exchange. In *The Political Economy of Business Ethics in East. Asia: A Historical and Comparative Perspective*; Chandos Publishing: Cambridge, MA, USA; Kidlington, UK, 2017; pp. 95–111.
14. Kim, E.M.; Ryoo, J. South Korean culture goes global: K-pop and the Korean wave. *Korean Soc. Sci. J.* **2007**, *34*, 117–152.
15. Sung, S.-Y. Constructing a new image. Hallyu in Taiwan. *Eur. J. East Asian Stud.* **2010**, *9*, 25–45. [CrossRef]
16. Lie, J. What is the K in K-pop? South Korean popular music, the culture industry, and national identity. *Korea Obs* **2012**, *43*, 339–363.
17. Jung, J. Emerging social distribution: The case of K-pop circulation in the global pop market. In *Made in Korea: Studies in Popular Music*; Shin, H., Jung, S., Eds.; Routledge: New York, NY, USA, 2017; pp. 61–72.
18. Jung, K.H.; Song, J.H. 2.3 Billion Views from 235 Countries on K-pop Music Videos on YouTube, Korea JoongAng Daily. Available online: https://news.joins.com/article/7034831 (accessed on 15 May 2020).
19. United Nations. World Population Prospects. Available online: https://esa.un.org/unpd/wpp/Download/Standard/Population (accessed on 8 September 2020).
20. Ministry of Foreign Affairs of the Republic of Korea (MOFA). *The Current State of Korea Diaspora 2015*; MOFA: Seoul, Korea, 2016.
21. Jin, D.Y. *New Korean Wave: Transnational Cultural Power in the Age of Social Media*; University of Illinois Press: Chicago, IL, USA; Springfield, MO, USA, 2016.
22. Lee, J.S. Linguistic hybridization in K-pop: Discourse of self-assertion and resistance. *World Engl.* **2004**, *23*, 429–450. [CrossRef]
23. Shim, D. Hybridity and the rise of Korean popular culture in Asia. *Media, Cult. Soc.* **2006**, *28*, 25–44. [CrossRef]
24. Yoon, K. Global imagination of K-pop: Pop music fans' lived experiences of cultural hybridity. *Popul. Music. Soc.* **2018**, *41*, 373–389. [CrossRef]
25. Jin, D.Y.; Ryoo, W. Critical interpretation of hybrid K-pop: The global-local paradigm of English mixing in lyrics. *Pop. Music Soc.* **2014**, *37*, 113–131. [CrossRef]
26. Bennett, A. *Cultures of Popular Music*; Open University Press: Berkshire, UK, 2001.
27. Moody, A. English in Japanese popular culture and J-Pop music. *World Engl.* **2006**, *25*, 209–222. [CrossRef]
28. Hong, E. *The Birth of Korean Cool: How One Nation Is Conquering the World Through Pop Culture*; Picador: New York, NY, USA, 2014.
29. Kwon, S.-H.; Kim, J. The cultural industry policies of the Korean government and the Korean wave. *Int. J. Cult. Policy* **2014**, *20*, 422–439. [CrossRef]
30. Chae, J.Y. *Study on Policy Alternatives for the Development of New Korean Waves*; Korea Culture & Tourism Institute: Seoul, Korea, 2011.
31. Choi, D.Y.; Kim, P.S. Promoting a policy initiative for nation branding: The case of South Korea. *J. Comp. Asian Dev.* **2014**, *13*, 346–368. [CrossRef]
32. Parc, J. The effects of protection in cultural industries: The case of the Korean film policies. *Int. J. Cult. Policy.* **2017**, *23*, 618–633. [CrossRef]
33. Kelly, E. The South Korean government actually has a department dedicated to K-pop. *Metro*. Available online: https://metro.co.uk/2018/01/19/south-korean-government-actually-department-dedicated-k-pop-7242799 (accessed on 31 January 2020).

34. Min, W.; Jin, D.Y.; Han, B. Transcultural fandom of the Korean wave in Latin America: Through the lens of cultural intimacy and affinity space. *Media Cult. Soc.* **2019**, *41*, 604–619. [CrossRef]
35. Jung, E.Y. New wave formations: K-pop idols, social media, and the remaking of the Korean wave. In *Hallyu 2.0: The Korean Wave in the Age of Social Media*; Lee, S., Nornes, A.M., Eds.; University of Michigan Press: Ann Arbor, MI, USA, 2015; pp. 73–89.
36. Jung, S.; Shim, D. Social distribution: K-pop fan practices in Indonesia and the 'Gangnam Style' phenomenon. *Int. J. Cult. Stud.* **2014**, *17*, 485–501. [CrossRef]
37. Porter, M.E. *The Competitive Advantage of Nations*; The Free Press: New York, NY, USA, 1990.
38. Moon, H.-C. *The Strategy for Korea's Economic Success*; Oxford University Press: New York, NY, USA, 2016.
39. Ko, J.M. A study on competitiveness of Korean wave contents. *Cult. Ind. Res.* **2005**, *5*, 5–18.
40. Lee, J.W.; Lee, K.B. Global competitiveness of Korean cultural content: A case of drama industry. *Korean Manag. Rev.* **2007**, *36*, 1419–1447.
41. Parc, J.; Moon, H.-C. Korean dramas and films: Key factors for their international competitiveness. *Asian J. Soc. Sci.* **2013**, *41*, 126–149. [CrossRef]
42. Ipsos Connect (IPSOS); International Federation of the Phonographic Industry (IFPI). *Music Consumer Insight Report*; IPSOS and IFPI: London, UK, 2016.
43. SM Entertainment. Available online: http://www.smentertainment.com (accessed on 25 May 2020).
44. Resnikoff, P. BTS Is Charging $22 for a CD that Their Fans Can't Even Play, Digital Music News. Available online: https://www.digitalmusicnews.com/2017/08/29/bts-cd-love-release-22/ (accessed on 25 March 2020).
45. Fuhr, M. *Globalization and Popular Music in South. Korea: Sounding out K-Pop*; Routledge: New York, NY, USA, 2016.
46. Mamiya, F. J-Pop ga ajia wo seisu ho (How J-pop could conquer the Asian market). *Voice* **2011**, 162–167. Available online: https://www.japanpolicyforum.jp/culture/pt20111202181601.html (accessed on 5 June 2020).
47. Cho, Y. Will Apple Music be Successful? Available online: http://www.sedaily.com/News/NewsView/NewsPrint?Nid=1KZ1J5B95M (accessed on 15 June 2020).
48. Kang, D.C. Apple Music Arrives with 30 Million songs. *The Chosun Ilbo*. Available online: http://biz.chosun.com/site/data/html_dir/2016/08/06/2016080600038.html (accessed on 7 June 2020).
49. Big Hit Entertainment, Fake Love. Available online: https://www.youtube.com/watch?v=7C2z4GqqS5E (accessed on 14 July 2020).
50. International Federation of the Phonographic Industry (IFPI). *IFPI Digital Music Report 2015: Charting the Path to Sustainable Growth*; IFPI: London, UK, 2015.
51. Parc, J. The divergent paths of digital music service providers: A comparative case study of Melon and Spotify. *Orient. Stud.* **2019**, *159*, 51–66.
52. Hong, E. Why it Was so easy for Korea to Overtake Japan in the Pop Culture Wars, Quartz. Available online: https://qz.com/21468 (accessed on 24 April 2020).

sustainability

MDPI

Article

Influence of Social Media Usage on the Green Product Innovation of Manufacturing Firms through Environmental Collaboration

Norhuda Salim, Mohd Nizam Ab Rahman *, Dzuraidah Abd Wahab and Ariff Azly Muhamed

Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Bangi 43600, Malaysia; norhuda.ukm@gmail.com (N.S.); dzuraidah@ukm.edu.my (D.A.W.); ariff.ukm@gmail.com (A.A.M.)
* Correspondence: mnizam@ukm.edu.my

Received: 3 August 2020; Accepted: 15 October 2020; Published: 20 October 2020

Abstract: Firms are finding it increasingly important to leverage social media to facilitate knowledge access, get valuable feedback, and improve innovations to cater for emerging markets. However, using social media without integrating other key factors does not seem to add value to innovation efforts. Therefore, this study investigates the potential of social media usage (SMU) in enhancing green product innovation (GPI) and how two types of environmental collaboration may affect that relationship, which is a subject that has been under-explored. First, the literature on the expansion of the use of social media in enhancing GPI was reviewed to develop the theoretical framework and hypotheses. Then, data collected from 211 manufacturing firms were analysed using structural equation modelling to examine the proposed relationship. The results revealed that SMU does not directly influence GPI. Rather, internal environmental collaboration (IEC) and environmental collaboration with suppliers (ECS) fully mediate the relationship between SMU and GPI. The results further disclosed a positive relationship between IEC and ECS, where both types of environmental collaboration seem to be key factors in improving GPI. Hence, this study highlights the importance of knowledge sharing through environmental collaborations for the generation of ideas to improve products in order to remain competitive in the market.

Keywords: social media usage; green product innovation; environmental collaboration; environmental knowledge

1. Introduction

The need to support green growth and adhere to environmental regulations is increasingly compelling manufacturing firms to be more proactive in finding new information that can assist in improving their green practices and developing green products. As such, firms increasingly appreciate and seek to take effective advantage of the benefits of social media because it can be the best platform through which to disseminate information [1,2] and exchange information to gain new insights and additional knowledge [3]. Social media—which is defined here as encompassing social networking sites, microblogs, image and video-sharing applications, and collaborative websites—is increasingly attracting research interest globally because of its powerful and widespread impact on social interaction [4].

Previous studies on social media usage (SMU) and green product development have tended to focus more on the behaviour of consumers, rather than on the green performance of firms. For instance, several studies have found that SMU fosters pro-environmental action among consumers [5,6] and increases green consumerism or green purchases in various contexts [7]. However, at the firm level, the studies on the influence of SMU on the green performance of firms are very limited; thus far they have only considered green supply chain management [8,9] and the sustainable performance of

firms [10] in a very broad context. Moreover, it has been argued that the effects of social media on green practices are complex and, as yet, they are not well understood [8,11]. Therefore, given this current lack of understanding, it is not surprising that many firms, including green firms, are incapable of leveraging the benefits of social media and are unable to identify the significant factors associated with the effective use of this form of media [4,12]. Yet, clearly, green firms need to be more active in utilizing social media because they need to remain economically competitive while producing sustainable products and promoting a greener image to their customers and communities [13,14]. Therefore, there is a need to further investigate how social media can contribute to green business practices, especially in respect of the GPI of manufacturing firms because it seems that, thus far, this relationship has not been explored [15]. Such research is important because social media provides a wealth of up-to-date information on green issues that firms need to capture in order to innovate and compete effectively in a dynamic market. While an increasing number of recent studies have linked social media with the implementation of innovation [3,16–20], such investigations have not yet addressed the issue of green innovation. In this regard, in a review of existing studies, Bhimani et al. [21] concluded that the influence of SMU on innovation needs to be investigated through a more robust multidisciplinary lens, which would require further research to be undertaken on potential mediators or indirect effects, and furthermore, such research would also need to consider the various stages, organizational resources, and competences in the relationship.

According to the knowledge-based view, converting raw input from various sources into useful information to develop competitive strategies may bring real benefits to a business [22]. Therefore, it can be postulated that, through the use of social media, firms can gain value by cooperating with various parties that can contribute to the innovation effort [16,23]. In the context of green product development, the environmental collaborations practised by a firm have the potential to translate the benefits of social media into green practices more generally. In this regard, a recent study shows that environmental collaboration mediates the effect of social capital and capacity building on environmental performance [24]. In addition, it has been proven that internal environmental collaboration (IEC) mediates the relationship between advanced manufacturing technologies and green innovation [25], while environmental collaboration with suppliers (ECS) improves the financial performance of firms when practising green initiatives [26]. These findings underline the importance of environmental collaboration in improving green practices especially in the area of innovation, where these practices are concerned with reducing environmental impact and also making cost savings. On the other hand, studies have also shown that ECS does not help to improve the sustainability of the manufacturing process [27] and does not assist in eco-innovation [28]. However, those findings relate specifically to the food and beverage and the hospitality industries that may differ from the manufacturing industry in terms of operational processes and strategic focus because, according to Segarra-Oña et al. [29], manufacturing firms are more oriented towards the environment than service firms. Given the mixed findings across industries, further studies are needed in order to further enrich the literature in this area and to expand on previous research.

In light of the above, this study aims to address three key issues. Firstly, we attempt to clarify the relationship between the SMU and GPI of manufacturing firms. Secondly, we try to determine whether IEC and ECS mediate the relationship between SMU and GPI in manufacturing firms. Thirdly, we seek to ascertain whether IEC helps to improve ECS in manufacturing firms. Hence, this study contributes to the literature by expanding knowledge on the potential of SMU in improving green product development.

Previous studies have shown that SMU has an influence on green performance even in limited contexts, but its effects on GPI have not been explored in depth. Moreover, the SMU indicators used in this study are tailored to suit the context of environmental activities and green products. This approach is in line with previous studies that have adapted SMU indicators to focus on other research areas, such as marketing, customer relations [12], general use [30], recycling activities [15], and innovation [31]. Finally, by adopting the resource-based view (RBV) and relational view and by

using structural equation modelling (SEM) analysis, this study proposes a more comprehensive model in which IEC (internally driven) and ECS (external source) are linked together with SMU in order to examine the relationship between SMU and GPI. Thus, the results of the SEM analysis provide strategic managers with a better understanding of the direct and indirect relationships between SMU and GPI to enable them to prioritize more effectively the application of the key factors that govern these relationships.

The remainder of this paper is organized as follows: Section 2 presents the literature review and the hypotheses development; Section 3 explains the methodology used; Section 4 presents the results; Section 5 discusses the results; and lastly, Section 6 outlines the conclusion and implications of the study.

2. Literature Review

2.1. Social Media and Knowledge

Social media connects organizations, customers, stakeholders, and communities and empowers its users to communicate and collaborate using internal and external knowledge sources [19]. Social media platforms enable users to exchange and share information to gain new insights and additional knowledge [3]. According to the RBV perspective, manufacturing firms need to develop their capabilities in searching for current and valuable knowledge to achieve good performance in GPI in order to remain competitive in the market. In this regard, past studies have shown that having the capability to utilize the knowledge obtained from SMU may accelerate the innovation and the competitiveness of firms [3,18]. Various forms of knowledge can be obtained through feedback and two-way interactions with customers, users, and stakeholders, and such knowledge allows firms to identify preferences and expectations about upcoming new products [19]. Furthermore, SMU offers better methods of business collaboration because it enables the creation of collaborative knowledge and inspires effective knowledge sharing between firms that can lead to the generation of more competitive ideas [32], which, in line with relational theory, helps to improve firm performance. In the green context, environmental collaboration, which is specifically intended to exploit environmental knowledge to develop new ideas, is believed to foster GPI activities. Thus, this study draws on both the RBV and the relational theory perspective to develop a hypothesis model that explains the relation between SMU and GPI as well as the influence of IEC and ECS.

2.2. SMU and GPI

Green product innovation involves improving products by using eco-friendly designs that are aimed at reducing pollution, conserving resources, and minimizing environmental impacts [33]. Well-planned GPI can improve the environmental management performance of firms, help to reduce their environmental costs, and open up new market opportunities to increase competitive advantage [34]. Recent studies have shown that innovation capabilities can be enhanced through SMU because it can basically change the way firms communicate [19]. Social media is a powerful platform that allows users to tap into rich information, which in turn impacts their knowledge development, decision making, and organizational performance [35]. In this regard, Corral et al. [17] found that, in firms that practice modern human resource management, SMU has a direct effect on firm innovativeness. While this finding is not related to the green context, it is nevertheless plausible that SMU can also increase the GPI performance of firms.

The relationship between SMU and GPI can be expressed through the adoption of the RBV, which states that firms that have the ability to efficiently exploit and utilize resources in ways that are valuable, rare, inimitable, and non-substitutable can achieve sustainable competitive advantage [36]. In this respect, Mothe and Nguyen-Thi [37] argued that firms that actively engage in the pursuit of new knowledge and ideas from various sources will increase their chances of success. In terms of knowledge sources, social media is a valuable resource that continues to expand and a growing number of green

firms are actively sharing information about the environment online because more firms are looking for information on green products and environmental practices [7]. Furthermore, Carlson et al. [23] claimed that consumers are increasingly open to participating voluntarily in providing feedback or ideas for product improvement through social media. They are also willing to share green information through social media sites such as Facebook, Twitter, etc., and to disseminate positive feedback on the health and environmental benefits of green products [38]. Therefore, in light of the above, it seems that SMU has the potential to be an important agent for the broader sharing of environmental or green information and could therefore greatly influence GPI. Based on this argument, the following hypothesis is proposed:

Hypothesis (H1). *There is a positive and significant relationship between SMU and GPI.*

2.3. The Mediating Roles of IEC

Although SMU is believed to spur GPI, the underlying mechanisms that drive the implementation of GPI itself have not been examined in detail. To fill this gap, this study intends to determine whether IEC acts as one of the mediators in the relationship between SMU and GPI. Internal environmental collaboration can be defined as the direct involvement of different divisions within an organization in jointly planning and developing environmental management strategies to enhance the organization's core competencies in utilizing knowledge for environmental innovation [25]. In this regard, the integration of other functions such as marketing, research and development, and production could lead to successful inter-functional collaboration [14]. The extensive environmental collaboration among employees including experts, analysts, and decision makers can be considered as a unique organizational capability from the perspective of RBV [39], and can be expected to translate SMU into better GPI performance. Currently, there are many social sites that promote high-quality green news and information by top green bloggers and social media contributors. However, employees need to be more proficient in sharing, screening, and extracting information because the poor handling of such information could create conflicts within the organization [40]. Thus, a presence of a high level of IEC would allow employees to find new ideas related to the environment from social media and further assimilate this new knowledge by structuring and integrating it into the existing knowledge base to enhance innovation [41]. In this regard, Rózewski et al. [42] pointed out that an efficient knowledge flow within the community of practice is vital because it can encourage the community members to be more proactive. Moreover, Fernando and Wah [43] argued that green innovation requires good communication and collaboration among cross-functional team members who are skilled in green practices such as reducing waste, conducting product life-cycle analyses, and gauging the compliance status of operations to improve manufacturing processes and product specifications. In addition, social media is accessible to many individuals in an organization and therefore connecting them to information derived from social media by giving them access to a common database that links various functional departments would be very helpful for sharing technical information, policies, and establishing common environmental goals [25].

In addition, GPI requires new knowledge and up-to-date information on how to improve product features that meet market needs and, at the same time, comply with various relevant policies [44]. Furthermore, GPI also requires the implementation of effective cost control measures [45]. Hence, knowledge needs to be integrated quickly and supported by efficient decision making [46]. Yet, making the right decisions that meet the triple bottom line of sustainability (i.e., its environmental, economic, and social aspects) is challenging because the trade-off between environmental and economic objectives requires deep knowledge [47]. Thus, IEC needs to be present in a firm because it supports the digestion of knowledge, which enables the exposure of the knowledge garnered from various sources and the reaching of more comprehensive and appropriate decisions. Moreover, IEC, as manifested in a green team, is mainly responsible for synergizing environmental communications to make knowledge flow more focused, dynamic and fast, and it also allows the better transfer of critical technical knowledge

across multiple functions to ensure that a firm continues to be environmentally innovative [48]. Therefore, IEC is expected to promote the benefits of SMU in expediting GPI, as postulated in the following hypotheses:

Hypothesis (H2). *IEC mediates the relationship between SMU and GPI.*

Hypothesis (H2a). *There is a positive and significant relationship between SMU and IEC.*

Hypothesis (H2b). *There is a positive and significant relationship between IEC and GPI.*

2.4. The Mediating Roles of ECS

Environmental collaboration with suppliers is also considered to be an underlying factor that supports SMU in improving GPI. In this study, ECS encompasses sustainability accountability in supply chain relationships, including the leveraging of resources and the exploitation of knowledge opportunities with partners to induce environmental sustainability [27]. The appositeness of ECS in the context of this study is derived from relational theory [49], which views organizational relationships between firms as a key source of competitive advantage. A number of previous studies have integrated relational theory into models for supply chain collaboration in the green context and have addressed the relational value that is formed through the joint contributions of allied partners. For example, it has been found that such collaboration can result in reducing the consumption of raw materials, volume of disposed waste, use of toxic materials, and toxic emissions in product development and production [50]; in minimizing unnecessary packaging and increasing the use of recycled materials in operational processes [51]; in offering fresh ideas, methods, or technologies to manufacturers for developing products, and in building overall compliance with environmental regulations [52,53].

Moreover, ECS is believed to maximize the influence of SMU on GPI because ECS generates initiatives that drive firms to seek environmental knowledge through social media with a greater focus on the environmental goals they want to achieve. In this regard, Cao and Yu [40] pointed out that SMU needs to be strategically managed and well-directed because its improper or ineffective usage can negatively affect firm performance. Furthermore, ECS inspires firms to expand their business network and to adopt new technology to attract more opportunities to increase revenue while reducing supply risks [54]. Meanwhile, ECS can also enhance a firm's GPI because it provides access to new knowledge, enables learning, and facilitates the sharing of information on future market trends and new technologies to generate cutting-edge ideas that lead to innovation [55]. Moreover, Ardito et al. [56] argued that suppliers represent the most beneficial source of knowledge for enhancing innovation activities as compared to customers and competitors. This view is supported by a study that showed that collaboration with green suppliers enables the efficient use of their resources and the exploitation of knowledge opportunities to enhance environmental activities and drive cost savings [57], which are important for successful implementation of GPI. However, as mentioned earlier, some studies related to the food and beverage and the hospitality industries have found that ECS is not likely to assist firms to implement sustainable process and eco-innovation [27,28], which can affect the implementation of GPI. Therefore, it is important to further examine the role of ECS in fostering SMU to enhance the implementation of GPI in manufacturing firms by testing the following hypotheses:

Hypothesis (H3). *ECS mediates the relationship between SMU and GPI.*

Hypothesis (H3a). *There is a positive and significant relationship between SMU and ECS.*

Hypothesis (H3b). *There is a positive and significant relationship between ECS and GPI.*

2.5. The Relation between IEC and ECS

Internal and external knowledge sharing must be prioritized because both have a great influence on a firm's success [58]. Demeter et al. [59] asserted that knowledge generated in an internal network should be combined with the expertise of external supply chain partners. By adopting this two-pronged knowledge-gathering and sharing strategy, more superior environmental knowledge would be generated, and would in turn motivate firms to adopt more proactive environmental strategies [60]. Furthermore, the integration of the tacit knowledge possessed by green suppliers has been shown to lead to the promotion of continuous innovation in the design of eco-friendly products [61,62]. This viewpoint is in agreement with Melander [45], who pointed out that firms that already have good internal knowledge management tend to share environmental knowledge outside the firm, particularly with competent suppliers that have environmental expertise, in order to reap the benefits of new environmental knowledge. It seems that firms with higher levels of knowledge sharing can connect internal and external collaboration in an effective way [59]. However, studies on the relationship between these two forms of collaboration in the green context remain scarce. Therefore, this study measures the influence of IEC on ECS by proposing a fourth and final hypothesis:

Hypothesis (H4). *There is a positive and significant relationship between IEC and ECS.*

Figure 1 depicts the hypothesis model developed for this study.

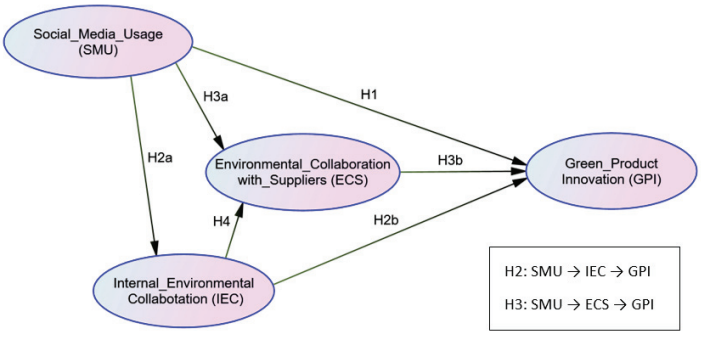

Figure 1. Hypothesis model.

3. Methodology

3.1. Data Collection and Sampling

This study involved manufacturing firms registered with the Malaysia External Trade Development Corporation (MATRADE 2018). The firms represent all subsectors in the manufacturing industry and many of them export their products to countries around the world. The firms listed in the Malaysia Exporters Directory, which is a database compiled by MATRADE (http://www.matrade.gov.my), are committed to continuously improving their products and processes to comply with international standards including sustainability requirements. Hence this target group is believed to meet the needs of the survey conducted for this study. Seven hundred of the firms listed on the database were randomly sampled for this study. The middle- or upper-level managers of the selected firms were contacted via an email that directed them to the online questionnaire survey developed for this study. The email included a cover letter explaining the purpose of the survey and the assurance that the utmost level of confidentiality would be maintained. Data collection took place between December 2019 and June 2020. To increase the response rate, follow-up telephone calls were made two weeks after sending the email. At the end of the data collection process, 226 surveys were returned, representing a response rate of 32.3%. After removing the invalid questionnaires, 211 useable questionnaires remained in the sample. This number was deemed sufficient for executing the analysis of the four constructs employed in the model [63]. To ensure the quality of the research findings, the possibility of the existence of common method bias was investigated using Harman's single-factor test. The results indicated that the first factor captured only 36.194% of the variance, which implied that common method bias was not a significant problem in this study.

3.2. Measure

Initially, the constructs used in this study were represented by 26 items that were adopted and adapted from previous research. The survey items were designed so that they could be answered by the respondents using a seven-point Likert scale [64] ranging from 1 = "strongly disagree" to 7 = "strongly agree". To ensure that the validity of the instrument for the field study, exploratory factor analysis (EFA) was conducted on each construct [65]. The Bartlett's test result showed a significance level of 0.000, which denoted that the constructs were well-correlated [66]. The Kaiser–Meyer–Olkin scores were above 0.8 (ranging between 0.833 and 0.871), which indicated that the data set was appropriate for the analysis [67]. Meanwhile, the total amount of the variance described by the items was found to be sufficient because it exceeded the minimum requirement of 60% [65–67] (ranging between 60.26% and 66.07%). The construct reliability was tested by using the Cronbach's alpha coefficient. The four constructs all exceeded the 0.7 threshold (ranging between 0.857 and 0.894) and therefore possessed acceptable reliability [66]. In addition, EFA was performed to identify whether any items had a weak factor loading of below 0.6. As a result, two items were removed from the model. Hence, 24 out of the 26 items were used in the confirmatory factor analysis (CFA) analysis (refer to Table 1 in Section 4).

3.3. Model

This study employed SEM for the data analysis, which was done using IBM-SPSS-AMOS software. This approach was adopted because SEM is the most efficient method for validating latent constructs and for analysing the causal paths among constructs simultaneously in a model [63]. Most importantly, it can be employed to test the hypotheses and mediators in a model [67].

Table 1. Factor Loadings of Measurement Items.

Item	Factor Loading
Social media usage [68,69]	
SMU1: Use social media to gather information about environmental issues/green products from customers/suppliers/governments	0.755
SMU2: Use social media to collect information about competitor activities in innovating green products	0.742
SMU3: Upload information about environmental issues/green products online to discuss it with others	0.711
SMU4: Interact with more people when discussing a complicated theme regarding the environment	0.717
SMU5: Frequently participate in online discussions to create new knowledge on environmental activities/green products	0.703
SMU6: Voluntarily participate in professional online discussions related to environmental activities/green products	0.581 (deleted)
Internal environmental collaboration [25,70]	
IEC1: Achieve environmental goals together	0.792
IEC2: Mutual understanding of responsibility in overseeing environmental performance	0.772
IEC3: Collaborate to reduce environmental impact	0.811
IEC4: Plan together to anticipate and solve problems related to the environment	0.788
IEC5: Make a joint decision on how to minimize the environmental impact of the product	0.775
Environmental collaboration with suppliers [71]	
ECS1: Work with suppliers to attain environmental objectives	0.801
ECS2: Provide suppliers with green design specifications for purchased items	0.778
ECS3: Cooperate with suppliers to develop new resource reduction strategies	0.784
ECS4: Collaborate with suppliers to improve waste reduction initiatives	0.764
ECS5: Cooperate with suppliers to achieve a cleaner production process	0.734
ECS6: Collaborate with suppliers to acquire materials/parts that support environmental goals	0.760
Green product innovation [33,72]	
GPI1: Choose materials that produce the least amount of pollution	0.803
GPI2: Choose materials that consume the least amount of energy/resources	0.763
GPI3: Modify product designs to substitute traditional materials with recycled ones	0.750
GPI4: Consider whether products are easy to recycle, reuse, and decompose	0.731
GPI5: Improve environmentally friendly packaging for products	0.630
GPI6: New product sales revenue	0.681
GPI7: Customer satisfaction	0.689

4. Result

4.1. Demogaphic Profile

Figure 2 provides the demographic profile of the respondents who provided valid responses. From the figure, it can be seen that 70% of the respondents were assistant managers, assistant directors or above. Furthermore, 77% of the respondents had worked for their company for more than 10 years. Employees in senior roles are more knowledgeable about their organization's strategic orientation [73] and are thus more likely to have a clear understanding of the organizational utilization of social media in retrieving environmental knowledge. Moreover, when respondents have extensive working experience, it enables them to provide quality feedback. Furthermore, the majority of the respondents (68%) represented the electrical and electronics industry, the chemical industry, and the mechanical and equipment industry, all of which are key subsectors that drive the growth of the manufacturing sector in Malaysia. Hence it can be inferred that good-quality, pertinent data were obtained for the analysis.

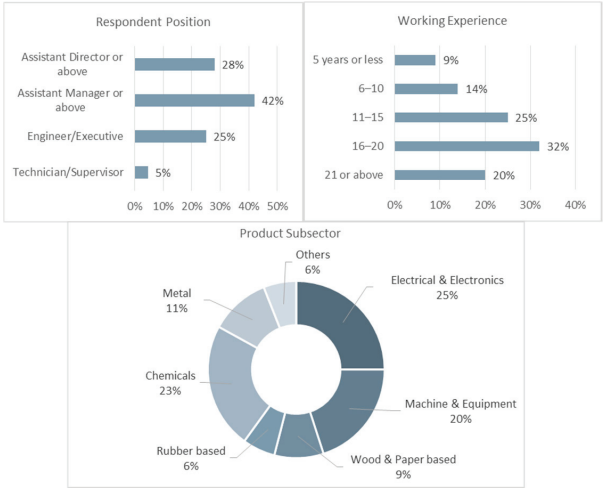

Figure 2. Demographic profile.

4.2. Measurement Model

The relationships between the four constructs and the 24 measurement items formed the measurement model for this study. Confirmatory factor analysis was carried out to assess the measurement model for unidimensionality and to examine the validity and reliability of the latent constructs. As shown in Table 1, all the factor loadings were greater than the minimum threshold of 0.6 [74,75], except for SMU6, which had a value of 0.581. Therefore, this item was deleted, thus allowing unidimensionality to be achieved. Accordingly, construct validity, convergent validity, and discriminant validity were then tested to examine the significance of the measurements items. The initial results for construct validity showed unacceptable values for the goodness-of-fit index (GFI), comparative fit index (CFI) and Tucker–Lewis index (TLI). As regards the modification indices (MI) measurement, a high MI value (>15.0) indicates that the respective items are redundant, which thus affects the discriminant validity of the model [75–77]. Upon examination, two covariance values, i.e., those between ECS4 and ECS5 and between GPI4 and GPI5, which were 21.23 and 19.78, respectively, had caused the poor fit of the model. Consequently, for this particular case, both pairs were set as 'free parameter estimates', which eventually resulted in improving the fitness indices and achieving acceptable values. The fitness indices for the final measurement model are presented in Table 2.

Table 2. Fitness Indices of the Measurement Model.

Category	Index	Initial Index Value	Final Index Value	Level of Acceptance
Absolute fit	RMSEA	0.075	0.067	<0.08
	GFI	0.853	0.907	>0.9
Incremental fit	CFI	0.894	0.920	>0.9
	TLI	0.882	0.921	>0.9
Parsimonious fit	Chisq/df	1.670	1.688	<3

Note: RMSEA = Root Mean Square Error of Approximation; GFI = goodness of fit index; CFI = comparative fit index; TLI = Tucker–Lewis index; Chisq/df = parsimony index.

In this study, as shown in Table 3, all the average variance extracted (AVE) values surpassed the threshold of 0.5 [78,79], which indicated that all the items were significantly loaded onto their construct. In addition, the composite reliability (CR) values exceeded the basic threshold level of 0.70 [78], which denoted that the constructs were reliable and had internal consistency. Furthermore, as also shown in Table 3, the diagonal value representing the square root of the AVE for each construct was higher than the inter-construct correlation values in the rows and columns. This proved that all four constructs possessed discriminant validity. Furthermore, all the construct correlations were below 0.85 [79], which indicated that there were no multicollinearity problems in the study model.

Table 3. Reliability and Validity of the Measurement Model.

	CR	AVE	GPI	SMU	IEC	ECS
GPI	0.884	0.523	**0.723** [a]			
SMU	0.848	0.527	0.514 [b]	**0.726**		
IEC	0.891	0.621	0.667	0.532	**0.788**	
ECS	0.888	0.569	0.550	0.475	0.512	**0.755**

Note: [a] square root of AVE; [b] inter-construct correlation.

4.3. Structural Equation Modelling and Hypothesis Testing

4.3.1. Standardized Path Coefficients

Structural equation modelling was performed to test the proposed hypotheses. Figure 3 presents the standardized path coefficients of the generated model. In the model, the coefficient of determination (R^2) value for GPI was 0.52, which indicated that the combined contribution of ECS, IEC, and SMU in estimating GPI was 52%, a value that was deemed sufficient for this type of model [67].

4.3.2. Hypothesis Testing

The results of hypothesis testing are presented in Table 4, from which it can be seen that the statistical results support H2a, H2b, H3a, H3b, and H4, but surprisingly reject H1.

The supposition in hypothesis H1 that SMU would have a significant positive relationship with GPI is not supported. Although the direct link between SMU and GPI shows a positive result, it is insignificant ($\beta = 0.198$, $p > 0.1$). As regards hypothesis H2a, the result indicates that SMU has a positive and significant relationship with IEC ($\beta = 0.649$, $p < 0.001$), hence, hypothesis H2a is supported. Accordingly, the results also support hypothesis H2b, where IEC exerts a significant positive relationship with GPI ($\beta = 0.482$, $p < 0.001$).

The results also reveal that SMU has a positive and significant relationship with ECS ($\beta = 0.324$, $p < 0.01$), thus hypothesis H3a is supported. Consequently, hypothesis H3b is also supported, where ECS has a significant positive relationship with GPI ($\beta = 0.267$, $p < 0.01$). As regards the relation between internal and external collaborations, the result supports hypothesis H4, as it indicates that there is a significant positive relationship between IEC and ECS ($\beta = 0.340$, $p < 0.001$).

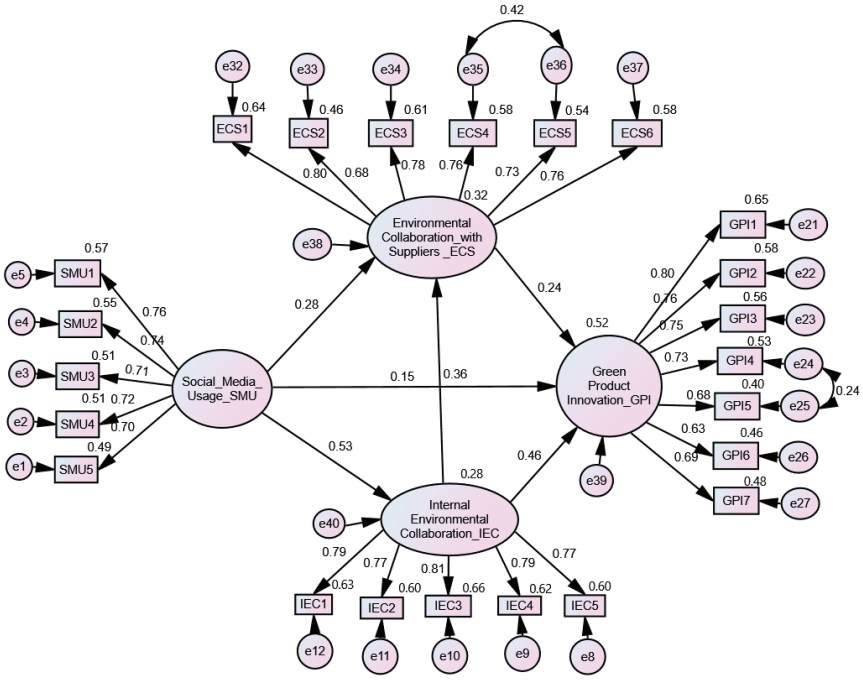

Figure 3. Standardized path coefficients.

Table 4. Results of Regression Path Analysis and Hypothesis Testing.

Hypothesis		β	SE	CR	*p*-Value	Result
H1	SMU → GPI	0.198	0.118	1.671	0.105	Not Significant
H2a	SMU → IEC	0.649	0.122	5.312	***	Significant
H2b	IEC → GPI	0.482	0.104	4.634	***	Significant
H3a	SMU → ECS	0.324	0.120	2.699	0.007	Significant
H3b	ECS → GPI	0.267	0.100	2.667	0.008	Significant
H4	IEC → ECS	0.340	0.097	3.511	***	Significant

Note: *** = $p < 0.001$.

4.4. Mediation Analysis

The analysis found that the direct relationship between SMU on GPI is not significant, whereas the indirect relationship (refer to Figure 3) that involves the link between SMU → IEC and IEC → GPI is significant with a coefficient value of 0.244 (0.53*0.46). This indicates that IEC acts as a full mediator in the relationship between SMU and GP and thus hypothesis H2 is supported. The result is similar for the link between SMU → ECS and ECS → GPI, which is significant with a value of 0.067 (0.28*0.24), and which implies that ECS also acts a full mediator, and thus leads to the acceptance of hypothesis H3. This finding clearly indicates that without strategic environmental collaboration, the use of social media alone will not help a firm to achieve GPI.

5. Discussion

The finding in this study that SMU does not directly influence GPI is contrary to the findings of some previous studies. Some studies found a direct relationship between SMU and innovation performance [17,20]. This lack of agreement between current and previous findings may largely be due to the nature of social media itself as it can be measured in many different ways [4] depending on the interest or context of the research. For example, certain studies have measured the extent to which individuals communicate through social media and benefit from such communication specifically [80], while other studies have investigated the effects of social media users' actions more broadly [81] or have directly examined the use of social networking sites such as Facebook, LinkedIn, Twitter, etc. [82]. Furthermore, in past studies, the indicators used for innovation have represented conventional innovation in general. Therefore, the different intentions of the studies and/or the variation in the indicators used may have affected the survey responses and subsequently influenced the research findings.

However, it seems from the results that IEC acts as a bridge that connects SMU with GPI. This finding highlights the importance of exchanging information related to core work through in-house corporate communication channels [82,83] and accelerating firm activities by creating more efficient cross-functional teams [3]. Basically, IEC is closely related to the concept of organizational integration which is crucial for effective environmental management [84] and this advantage encourages SMU to accelerate the sharing of new technologies and enable the effective transfer of knowledge across various departments to bring about more innovation [85,86]. In addition, firms that are implementing a dynamic environmental management strategy should always endeavour to obtain the most up-to-date information and share that information so that they can be more responsive to environmental issues [87]. However, in order to ensure that information from online sources is truly suitable for adoption, the information must first be evaluated and discussed with the firm's internal influencers before it can be exploited to achieve strategic goals [1]. Therefore, the presence of IEC is required to ensure that discussions and that decision making are optimal so as to improve GPI. Hence, the finding of this study supports the results reported by Kong et al. [25], who showed that IEC fosters green innovation.

As regards the role of ECS in connecting SMU with GPI, a previous study stated that ECS does not help in increasing the green activity of firms. However, in contrast, the finding of the current study indicates that ECS plays a critical role in connecting SMU to GPI. As stated by Benitez et al. [83] and Cheng et al. [30], leveraging SMU could improve the coordination between a firm and its supply chain, thereby further enhancing supplier involvement in the firm's product development activities. In an environmental context that is ever more challenging, it is becoming increasingly important for firms to cultivate resources and capabilities with network partners [87,88]. In this regard, SMU empowers employees to engage in collaborative knowledge creation [89] and, most importantly, to connect with suppliers that are well-versed in green technology. Thus, by engaging with suppliers, new environmentally friendly materials and new designs [45] could be developed at a more competitive price, and subsequently increase GPI.

Hence, overall, the findings of this study reveal that the use of social media alone does not lead to GPI. Rather, it is important to integrate environmental collaboration (IEC and ECS) into the green innovation strategies of manufacturing firms in order to meet the demands of a dynamic environment.

6. Conclusions

The findings of this study enrich the existing body of work on social media and its utilization and effects in the workplace from both a theoretical and practical perspective. The evolution of social media has caused it to become an important tool in managing dynamic knowledge to strengthen the GPI performance of firms. However, there is a scarcity of research on the strategies that can be employed to strengthen GPI through the use of social media. Therefore, this study sought to address this gap by investigating the extent to which the adoption and use of social media affects GPI

performance by using some indicators for SMU that were tailored to the environmental activities and green product development of manufacturing firms. Furthermore, most of the past studies in this field have focused on general collaboration. In contrast, this study, which drew on the resource-based and relational perspectives, investigated whether two types of environmental collaboration (IEC and ECS) act as catalysts of the relationship between SMU and GPI. The resultant findings extend the existing knowledge in this field and shed further light on the important role of IEC and ECS in generating more competitive new ideas. More specifically, this study found that IEC positively influences ECS and, notably, that both IEC and ECS fully mediate the relationship between SMU and GPI.

This study also has practical implications for strategic managers as the results will help them to realign their firms' capabilities in response to environmental changes by focusing on ensuring the efficient and effective sharing of environmental knowledge within their organization. The findings show that there is a critical need to improve communication skills and enhance cross-functional collaboration among multiple divisions by sharing and endeavoring to achieve the same green mission in order to generate more creative new ideas. In addition, top management must seize the opportunity to collaborate with the right suppliers, because suppliers that are more knowledgeable and experienced in environmental management and green product development can contribute more tacit knowledge to bring about good quality innovations. Furthermore, the decision makers in firms need to provide guidance to staff on SMU by setting environmental goals and creating a favourable corporate culture so that the knowledge that is discussed and shared by employees via social media is more focused on the end goal, thus allowing for the most advantageous environmental collaborations to be established.

In closing, it should be mentioned that this study has some limitations that should be taken into account when considering the findings. Firstly, this study examined the use of social media in improving GPI in the context of environmental collaboration, which is a relatively new area of research. Hence, the indicators that were used for the constructs could be interchangeable depending on the research intent. Therefore, future studies may wish to attempt to establish a consistent set of indicators in order to achieve a more robust measurement model. They may also wish to expand the potential of SMU by examining the effects of SMU on other aspects such as corporate publicity, public relations, corporate social responsibility, and marketing communications. Secondly, this study restricted the concept of external environmental collaboration to the relationship between the firm and its suppliers, thus ignoring the interactions of the firm with its customers and other stakeholders. Therefore, future studies may wish to consider including these interactions in any further investigations.

Author Contributions: The individual contributions of the authors are as follows: Conceptualization: N.S. and M.N.A.R.; Data curation: N.S.; Formal analysis: N.S. and A.A.M.; Investigation: N.S. and M.N.A.R.; Methodology: N.S. and D.A.W.; Resources: M.N.A.R.; Software: N.S.; Supervision: M.N.A.R. and D.A.W.; Validation: N.S. and A.A.M.; Writing of original draft: N.S. and A.A.M.; Review and editing to produce final draft: M.N.A.R. and D.A.W. All authors have read and agreed to the published version of the manuscript.

Funding: This research was supported by Universiti Kebangsaan Malaysia under Grant FRGS/1/2018/TK08/UKM/02/1.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

References

1. Crammond, R.; Omeihe, K.O.; Murray, A.; Ledger, K. Managing knowledge through social media modelling an entrepreneurial approach for Scottish SMEs and beyond. *Balt. J. Manag.* **2018**, *13*, 303–328. [CrossRef]
2. Kane, G.C. The evolutionary implications of social media for organizational knowledge management. *Inf. Organ.* **2017**, *27*, 37–46. [CrossRef]
3. Muninger, M.; Hammedi, W.; Mahr, D. The value of social media for innovation: A capability perspective. *J. Bus. Res.* **2019**, *95*, 116–127. [CrossRef]
4. Ahmed, Y.A.; Ahmad, M.N.; Ahmad, N.; Zakaria, N.H. Social media for knowledge-sharing: A systematic literature review. *Telemat. Inf.* **2019**, *37*, 72–112. [CrossRef]

5. Ballew, M.T.; Omoto, A.M.; Winter, P.L. Using Web 2.0 and Social Media Technologies to Foster Proenvironmental Action. *Sustainability* **2015**, *7*, 10620–10648. [CrossRef]
6. Hynes, N.; Wilson, J. I do it, but don't tell anyone! Personal values, personal and social norms: Can social media play a role in changing pro-environmental behaviours? *Technol. Forecast. Soc. Chang.* **2016**, *111*, 349–359. [CrossRef]
7. Zhang, N.A.N.; Skoric, M.M. Media Use and Environmental Engagement: Examining Differential Gains from News Media and Social Media. *Int. J. Commun.* **2018**, *12*, 380–403.
8. Nasrollahi, M. The Impact of Firm's Social Media Applications on Green Supply Chain Management. *Int. J. Supply Chain Manag.* **2018**, *7*, 16–24.
9. Tseng, M.L.; Lim, M.K.; Wu, K.J.; Peng, W.W. Improving sustainable supply chain capabilities using social media in a decision-making model. *J. Clean. Prod.* **2019**, *227*, 700–711. [CrossRef]
10. Abbas, J.; Mahmood, S.; Ali, H.; Ali Raza, M.; Ali, G.; Aman, J.; Bano, S.; Nurunnabi, M. The Effects of Corporate Social Responsibility Practices and Environmental Factors through a Moderating Role of Social Media Marketing on Sustainable Performance of Firms' Operating in Multan, Pakistan. *Sustainability* **2019**, *11*, 3434. [CrossRef]
11. Huang, H. Media use, environmental beliefs, self-efficacy and pro-environmental behavior. *J. Bus. Res.* **2015**, *69*, 2206–2212. [CrossRef]
12. Tajudeen, F.P.; Jaafar, N.I.; Ainin, S. Information & Management Understanding the impact of social media usage among organizations. *Inf. Manag.* **2017**, *55*, 308–321.
13. Abdullah, I.; Wan Mahmood, W.H.; Md Fauadi, H.F.; Ab Rahman, M.N.; Mohamed, S.B. Sustainable manufacturing practices in Malaysian palm oil mills: Priority and current performance. *J. Manuf. Technol. Manag.* **2017**, *28*, 278–298. [CrossRef]
14. De Medeiros, J.F.; Ribeiro, J.L.D.; Cortimiglia, M.N. Success factors for environmentally sustainable product innovation: A systematic literature review. *J. Clean. Prod.* **2014**, *65*, 76–86. [CrossRef]
15. Sujata, M.; Khor, K.S.; Ramayah, T.; Teoh, A.P. The role of social media on recycling behaviour. *Sustain. Prod. Consum.* **2019**, *20*, 365–374. [CrossRef]
16. Martín-Rojas, R.; García-Morales, V.J.; Garrido-Moreno, A.; Salmador-Sánchez, M.P. Social Media Use and the Challenge of Complexity: Evidence from the Technology Sector. *J. Bus. Res.* **2020**, 1–19. [CrossRef]
17. Corral, G.; Zubielqui, D.; Fryges, H.; Jones, J. Social media, open innovation & HRM: Implications for performance. *Technol. Forecast. Soc. Chang.* **2017**, *144*, 334–347.
18. Garcia-Morales, V.J.; Martín-Rojas, R.; Lardón-López, M.E. Influence of social media technologies on organizational performance through knowledge and innovation. *Balt. J. Manag.* **2018**, *13*, 345–367. [CrossRef]
19. Mention, A.; Barlatier, P.; Josserand, E. Using social media to leverage and develop dynamic capabilities for innovation. *Technol. Forecast. Soc. Chang.* **2019**, *144*, 242–250. [CrossRef]
20. Papa, A.; Santoro, G.; Tirabeni, L.; Monge, F. Social media as tool for facilitating knowledge creation and innovation in small and medium enterprises. *Balt. J. Manag.* **2018**, *13*, 329–344. [CrossRef]
21. Bhimani, H.; Mention, A.; Barlatier, P. Social media and innovation: A systematic literature review and future research directions. *Technol. Forecast. Soc. Chang.* **2018**, *144*, 251–269. [CrossRef]
22. Duan, L.; Xu, L. Da Business intelligence for enterprise systems: A survey. *IEEE Trans. Ind. Inform.* **2012**, *8*, 679–687. [CrossRef]
23. Carlson, J.; Rahman, M.; Voola, R.; Vries, N. De Customer engagement behaviours in social media: Capturing innovation opportunities. *J. Serv. Mark.* **2018**, *32*, 83–94. [CrossRef]
24. Gölgeci, I.; Gligor, D.M.; Tatoglu, E.; Ayaz, O. A relational view of environmental performance: What role do environmental collaboration and cross-functional alignment play? *J. Bus. Res.* **2019**, *96*, 35–46. [CrossRef]
25. Kong, T.; Feng, T.; Ye, C. Advanced manufacturing technologies and green innovation: The role of internal environmental collaboration. *Sustainability* **2016**, *8*, 1056. [CrossRef]
26. Solakivi, T.; Laari, S.; Töyli, J.; Ojala, L. Firm performance and environmental collaboration in manufacturing. *Int. J. Bus. Syst. Res.* **2017**, *11*, 365–392. [CrossRef]
27. Grekova, K.; Calantone, R.J.; Bremmers, H.J.; Trienekens, J.H.; Omta, S.W.F. How environmental collaboration with suppliers and customers influences firm performance: Evidence from Dutch food and beverage processors. *J. Clean. Prod.* **2016**, *112*, 1861–1871. [CrossRef]
28. Aboelmaged, M. Direct and indirect effects of eco-innovation, environmental orientation and supplier collaboration on hotel performance: An empirical study. *J. Clean. Prod.* **2018**, *184*, 537–549. [CrossRef]

29. Segarra-Oña, M.; Peiró-Signes, Á.; Mondéjar-Jiménez, J. Twisting the twist: How manufacturing & knowledge-intensive firms excel over manufacturing & operational and all service sectors in their eco-innovative orientation. *J. Clean. Prod.* **2016**, *138*, 19–27.
30. Cheng, C.C.J.; Krumwiede, D.; Krumwiede, D. Enhancing the performance of supplier involvement in new product development: The enabling roles of social media and firm capabilities. *Supply Chain Manag.* **2018**, *23*, 171–187. [CrossRef]
31. Du, S.; Yalcinkaya, G.; Bstieler, L. Sustainability, Social Media Driven Open Innovation, and New Product Development Performance*. *J. Prod. Innov. Manag.* **2016**, *33*, 55–71. [CrossRef]
32. Hitchen, E.L.; Nylund, P.A.; Ferràs, X.; Mussons, S.; Hitchen, E.L.; Nylund, P.A.; Ferra, X. Social media: Open innovation in SMEs finds new support. *J. Bus. Strategy* **2017**, *38*, 21–29. [CrossRef]
33. Chen, Y.S.; Lai, S.B.; Wen, C.T. The influence of green innovation performance on corporate advantage in Taiwan. *J. Bus. Ethics* **2006**, *67*, 331–339. [CrossRef]
34. Chen, Y.S. The driver of green innovation and green image—Green core competence. *J. Bus. Ethics* **2008**, *81*, 531–543. [CrossRef]
35. Basit, A.; Hassan, Z. The Impact of Social Media Usage on Employee and Organization Performance: A Study on Social Media Tools Used by an IT Multinational in Malaysia. *J. Mark. Consum. Behav. Emerg. Mark.* **2018**, *1*, 48–65.
36. Barney, J. Firm Resources and Sustained Competitive Advantage. *J. Manag.* **1991**, *17*, 99–120. [CrossRef]
37. Mothe, C.; Nguyen-Thi, U.T. Persistent openness and environmental innovation: An empirical analysis of French manufacturing firms. *J. Clean. Prod.* **2017**, *162*, 59–69. [CrossRef]
38. Lu, Q.S.; Miller, R. How Social Media Communications Combine with Customer Loyalty Management to Boost Green Retail Sales. *J. Interact. Mark.* **2019**, *46*, 87–100. [CrossRef]
39. Hart, S.L. A Natural-Resource-Based View of the Firm. *Acad. Manag. Rev.* **1995**, *20*, 986–1014. [CrossRef]
40. Cao, X.; Yu, L. Exploring the influence of excessive social media use at work: A three-dimension usage perspective. *Int. J. Inf. Manag.* **2019**, *46*, 83–92. [CrossRef]
41. Huang, F.; Rice, J. Openness in Product and Process Innovation. *Int. J. Innov. Manag.* **2012**, *16*, 1250020. [CrossRef]
42. Rózewski, P.; Jankowski, J.; Bródka, P.; Michalski, R. Knowledge workers' collaborative learning behavior modeling in an organizational social network. *Comput. Hum. Behav.* **2015**, *51*, 1248–1260. [CrossRef]
43. Fernando, Y.; Wah, W.X. The impact of eco-innovation drivers on environmental performance: Empirical results from the green technology sector in Malaysia. *Sustain. Prod. Consum.* **2017**, *12*, 27–43. [CrossRef]
44. Stucki, T.; Woerter, M.; Arvanitis, S.; Peneder, M.; Rammer, C. How different policy instruments affect green product innovation: A differentiated perspective. *Energy Policy* **2018**, *114*, 245–261. [CrossRef]
45. Melander, L. Customer and Supplier Collaboration in Green Product Innovation: External and Internal Capabilities. *Bus. Strateg. Environ.* **2018**, *27*, 677–693. [CrossRef]
46. Taylor, B.; De Loë, R.C. Conceptualizations of local knowledge in collaborative environmental governance. *Geoforum* **2012**, *43*, 1207–1217. [CrossRef]
47. Suhariyanto, T.T.; Wahab, D.A.; Ab Rahman, M.N. Product design evaluation using life cycle assessment and design for assembly: A case study of a water leakage alarm. *Sustainability* **2018**, *10*, 2821. [CrossRef]
48. Ogbeibu, S.; Emelifeonwu, J.; Senadjki, A.; Gaskin, J.; Kaivo-oja, J. Technological turbulence and greening of team creativity, product innovation, and human resource management: Implications for sustainability. *J. Clean. Prod.* **2020**, *244*, 118703. [CrossRef]
49. Dyer, J.H.; Singh, H. Relational View. *Acad. Manag. Rev.* **1998**, *23*, 660–679. [CrossRef]
50. Sarkis, J. A boundaries and flows perspective of green supply chain management. *Supply Chain Manag.* **2012**, *17*, 202–216. [CrossRef]
51. Ageron, B.; Gunasekaran, A.; Spalanzani, A. Sustainable supply management: An empirical study. *Int. J. Prod. Econ.* **2012**, *140*, 168–182. [CrossRef]
52. Seman, N.A.A.; Govindan, K.; Mardani, A.; Zakuan, N.; Saman, M.Z.M.; Hooker, R.E.; Ozkul, S. The mediating effect of green innovation on the relationship between green supply chain management and environmental performance. *J. Clean. Prod.* **2019**, *229*, 115–127. [CrossRef]
53. Zailani, S.; Govindan, K.; Iranmanesh, M.; Shaharudin, M.R.; Sia Chong, Y. Green innovation adoption in automotive supply chain: The Malaysian case. *J. Clean. Prod.* **2015**, *108*, 1115–1122. [CrossRef]
54. Mustaffa, N.F.; Hishamuddin, H.; Mat Ropi, N.; Saibani, N.; Ab Rahman, M.N. Assessing Supply Chain Risk Management Practices in Manufacturing Industries in Malaysia. *J. Kejuruter.* **2018**, *1*, 17–22.

55. Liao, S.H.; Hu, D.C.; Ding, L.W. Assessing the influence of supply chain collaboration value innovation, supply chain capability and competitive advantage in Taiwan's networking communication industry. *Int. J. Prod. Econ.* **2017**, *191*, 143–153. [CrossRef]
56. Ardito, L.; Messeni, A.; Dezi, L.; Castellano, S. The influence of inbound open innovation on ambidexterity performance: Does it pay to source knowledge from supply chain stakeholders? *J. Bus. Res.* **2018**. [CrossRef]
57. Dai, J.; Cantor, D.E.; Montabon, F.L. Examining corporate environmental proactivity and operational performance: A strategy-structure-capabilities-performance perspective within a green context. *Int. J. Prod. Econ.* **2017**, *193*, 272–280. [CrossRef]
58. Mehdikhani, R.; Valmohammadi, C. Strategic collaboration and sustainable supply chain management: The mediating role of internal and external knowledge sharing. *J. Enterp. Inf. Manag.* **2019**, *32*, 778–806. [CrossRef]
59. Demeter, K.; Szász, L.; Rácz, B. The impact of subsidiaries ' internal and external integration on operational performance. *Intern. J. Prod. Econ.* **2016**, *182*, 73–85. [CrossRef]
60. Ong, T.S.; Lee, A.S.; Teh, B.H.; Magsi, H.B. Environmental Innovation, Environmental Performance and Financial Performance: Evidence from Malaysian Environmental Proactive Firms. *Sustainability* **2019**, *11*, 3494. [CrossRef]
61. Reficco, E.; Gutiérrez, R.; Jaén, M.H.; Auletta, N. Collaboration mechanisms for sustainable innovation. *J. Clean. Prod.* **2018**, *203*, 1170–1186. [CrossRef]
62. Eslami, M.H.; Lakemond, N.; Brusoni, S. The dynamics of knowledge integration in collaborative product development: Evidence from the capital goods industry. *Ind. Mark. Manag.* **2018**, *75*, 146–159. [CrossRef]
63. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis: A Global Perspective*, 7th ed.; Pearson Education, Inc.: Upper Saddle River, NJ, USA, 2010.
64. Likert, R. A Technique for the Measurement of Attitudes Archives of Psychology. *Arch. Psychol.* **1932**, *140*, 1–55.
65. Yong, A.G.; Pearce, S. A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutor. Quant. Methods Psychol.* **2013**, *9*, 79–94. [CrossRef]
66. Nunnally, J.; Bernstein, I.H. *Psychometric Theory*, 3rd ed.; Vaicunas, J., Belser, J.R., Eds.; McGraw-Hill, Inc.: New York, NY, USA, 1994.
67. Awang, Z. *SEM Made Simple: A Guide to Learning Structural Equation Modeling*; MPWS Rich Publication: Bandar Baru Bangi, Malaysia, 2015.
68. Kwahk, K.; Park, D. Computers in Human Behavior The effects of network sharing on knowledge-sharing activities and job performance in enterprise social media environments. *Comput. Hum. Behav.* **2016**, *55*, 826–839. [CrossRef]
69. Sigala, M.; Chalkiti, K. Knowledge management, social media and employee creativity. *Int. J. Hosp. Manag.* **2015**, *45*, 44–58. [CrossRef]
70. Vachon, S.; Klassen, R.D. Environmental management and manufacturing performance: The role of collaboration in the supply chain. *Int. J. Prod. Econ.* **2008**, *111*, 299–315. [CrossRef]
71. Vachon, S.; Klassen, R.D. Extending green practices across the supply chain integration. *Int. J. Oper. Prod. Manag.* **2006**, *26*, 795–821. [CrossRef]
72. Huang, Y.-C.; Yang, M.-L.; Wong, Y.-J. The effect of internal factors and family influence on firms' adoption of green product innovation. *Manag. Res. Rev.* **2016**, *39*, 1167–1198. [CrossRef]
73. Campbell, D.T. The Informant in Quantitative Research. *Am. J. Sociol.* **1955**, *60*, 339–342. [CrossRef]
74. Hooper, D.; Coughlan, J.; Mullen, M. Structural Equation Modelling: Guidelines for Determining Model Fit Structural equation modelling: Guidelines for determining model fit. *J. Bus. Res. Methods* **2008**, *6*, 53–60.
75. Hair, J.F.; Gabriel, M.; Patel, V. AMOS Covariance-Based Structural Equation Modeling (CB-SEM): Guidelines on its Application as a Marketing Research Tool. *Rev. Bras. Mark.* **2014**, *13*, 44–55.
76. Hair, J.F.; Black, W.C.; Babiin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Prentice Hall: Upper Saddle River, NJ, USA, 2009.
77. Byrne, B.M. Structural Equation Modeling with AMOS, EQS, and LISREL: Comparative Approaches to Testing for the Factorial Validity of a Measuring Instrument. *Int. J. Test.* **2001**, *1*, 55–86. [CrossRef]
78. Henseler, J.; Ringle, C.M.; Sarstedt, M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. Acad. Mark. Sci.* **2014**, *43*, 115–135. [CrossRef]
79. Fornell, C.; Larcker, D.F. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *J. Mark. Res.* **1981**, *18*, 39–50. [CrossRef]

80. Lam, H.K.S.; Yeung, A.C.L.; Cheng, T.C.E. The impact of firms' social media initiatives on operational efficiency and innovativeness. *J. Oper. Manag.* **2016**, *47–48*, 28–43. [CrossRef]
81. Raman, R.; Menon, P. Using social media for innovation-market segmentation of family firms. *Int. J. Innov. Sci.* **2018**. [CrossRef]
82. Braojos, J.; Benitez, J.; Llorens, J. How do social commerce-IT capabilities influence firm performance? Theory and empirical evidence. *Inf. Manag.* **2018**, *56*, 155–171. [CrossRef]
83. Benitez, J.; Castillo, A.; Llorens, J.; Braojos, J. IT-enabled knowledge ambidexterity and innovation performance in small U.S. firms: The moderator role of social media capability. *Inf. Manag.* **2017**, *55*, 131–143. [CrossRef]
84. Salim, N.; Ab Rahman, M.N.; Abd Wahab, D. A systematic literature review of internal capabilities for enhancing eco-innovation performance of manufacturing firms. *J. Clean. Prod.* **2019**, *209*, 1445–1460. [CrossRef]
85. Zhang, G.; Tang, C. How could firm's internal R&D collaboration bring more innovation? *Technol. Forecast. Soc. Chang.* **2017**, *125*, 299–308.
86. Rahman, M.N.A.; Doroodian, M.; Kamarulzaman, Y.; Muhamad, N. Designing and validating a model for measuring sustainability of overall innovation capability of small and medium-sized enterprises. *Sustainabilityy* **2015**, *7*, 537–562. [CrossRef]
87. Martinez-Martinez, A.; Cegarra-Navarro, J.G.; Garcia-Perez, A.; Wensley, A. Knowledge agents as drivers of environmental sustainability and business performance in the hospitality sector. *Tour. Manag.* **2019**, *70*, 381–389. [CrossRef]
88. Wan Mahmood, W.H.; Ab Rahman, M.N.; Md Deros, B.; Jusoff, K.; Saptari, A.; Ebrahim, Z.; Mohamed Sultan, A.A.; Abu Bakar, M.H.; Subramonian, S.; Jano, Z. Manufacturing performance in green supply chain management. *World Appl. Sci. J.* **2013**, *21*, 76–84.
89. Mohd Suki, N. Consumer environmental concern and green product purchase in Malaysia: Structural effects of consumption values. *J. Clean. Prod.* **2016**, *132*, 204–214. [CrossRef]

sustainability

MDPI

Article

Digitalisation of Creative Industries Fostered by Collaborative Governance: Public Innovation Labs in Gipuzkoa

Alfonso Unceta [1], Xabier Barandiaran [2] and Asier Lakidain [3,*]

[1] Department of Sociology, University of the Basque Country, 48940 Leioa, Spain; alfonso.unceta@ehu.eus
[2] Faculty of Social and Human Sciences, University of Deusto, 20012 San Sebastian, Spain; xabier.barandiaran@deusto.es
[3] Sinnergiak Social Innovation Centre, University of the Basque Country, 20018 San Sebastian, Spain
* Correspondence: alakidain@sinnergiak.org; Tel.: +34-943-01-87-49

Abstract: This article analyses the promotion of digitalisation in the creative economy through collaborative governance in the province of Gipuzkoa (Basque Country, Spain). In order to understand this initiative, two public innovation labs located in San Sebastian that influence audiovisual production in Basque and digital gastronomy, respectively, are used as case studies: 2deo–Basque Language Audiovisual Lab and LABe–Digital Gastronomy Lab. Based on sectoral contexts of fragmentation, public and private efforts to consolidate synergies and accelerate processes for the coordination of value chains, attraction of talent, experimentation, and innovation. The analysis has relied on qualitative methodologies, consisting of interviews with key actors and desk research. The results show the implications of a sub-regional collaborative governance model as a means to contribute to a regional Smart Specialisation Strategy. Although the initiative faces a consolidation process, public innovation labs in Gipuzkoa foster sectoral articulation and digitalisation in gastronomy and audiovisual production in the Basque language. Additionally, the acceleration of innovation and the involvement of quadruple helix agents in management tasks have been explored.

Keywords: creative economy; digitalisation; public innovation lab; digital gastronomy; collaborative governance

Citation: Unceta, A.; Barandiaran, X.; Lakidain, A. Digitalisation of Creative Industries Fostered by Collaborative Governance: Public Innovation Labs in Gipuzkoa. *Sustainability* **2021**, *13*, 2568. https://doi.org/10.3390/su13052568

Academic Editor: Adam Jabłoński

Received: 15 January 2021
Accepted: 23 February 2021
Published: 27 February 2021

1. Introduction

This article delves into publicly headed innovation labs for Cultural and Creative Industries (CCI) in Gipuzkoa, Basque Country. As part of a collaborative governance model, the innovation labs seek to help to articulate a regional Smart Specialisation Strategy (S3) based on the strengthening of sectoral entrepreneurial activity. The main contribution of this experience is the exemplification of a structured and agreed involvement of multiple actors, who adopt differentiated and complementary roles, thus enabling effective governance.

CCI is a hard-to-define concept. There are different definitions that vary depending on the perspective of the person addressing the topic. The definition by the UNCTAD [1] (p. 8) is widely acknowledged due to its broadness and adaptability, as it understands that CCI are "the cycles of creation, production and distribution of goods and services that use creativity and intellectual capital as primary inputs; constitute a set of knowledge-based activities, focused on but not limited to arts, potentially generating revenues from trade and intellectual property rights; comprise tangible products and intangible intellectual or artistic services with creative content, economic value and market objectives." What distinguishes the CCI is the use value given to the symbolic, which is rooted in cultural and creative sources.

However, delimiting the types of economic activity that belong to the CCI requires more precision. The Basque Observatory of Culture identifies 14 creative and cultural sectors active in the Basque Country, among which gastronomy and audiovisual and multimedia creation can be found [2]. These have been perceived by the Gipuzkoa Provincial

Council as economic areas of strategic importance. By means of a collaborative governance model implemented in Gipuzkoa, the provincial government has led the creation of two innovation labs with the aim of strengthening audiovisual creation in the Basque language and digital gastronomy at a sub-regional level.

The Province of Gipuzkoa is located in the Basque Autonomous Community (Basque Country), next to the northern Spanish border with France. The Basque Autonomous Community has 2,219,777 inhabitants and is divided into three Historical Territories or Provinces: Biscay (1,159,046 inhabitants), Alava (333,852 inhabitants), and Gipuzkoa (726,879 inhabitants). The Capital city of this Autonomous Community is Vitoria-Gasteiz, located in Alava. The Province of Gipuzkoa represents 33% of the Basque Country's population. It covers a surface area of 1980 km^2, the smallest province in Spain. It comprises 11 districts and 89 municipalities, and San Sebastian is the capital city of the province. San Sebastian hosts 26% of the province's population. The main languages are Spanish and Basque.

Cultural and creative industries have grown in relevance over the last two decades as notable contributors to overall socio-economic development and well-being. Such a reputation has been propelled by the emphasis that scholars, policy makers, and entrepreneurial agents have placed on creativity [3,4]. Indeed, the interplay between a wide set of agents and elements [5] can help comprise an entrepreneurial ecosystem [6,7] in which cultural entrepreneurs and creativity play a major role [8] (p. 65) generating innovation outcomes and overall welfare consequences [9]. For the purpose of this article, entrepreneurial ecosystems will be defined following the basic definition provided by Miller and Acs [10] (p. 79), which states that an entrepreneurial ecosystem and its outputs relies on a variety of voluntary relationships among independent agents with some form of agreed-upon and acceptable governance.

Nonetheless, it was political leadership which first centred the attention on CCI as a policy matter. The set of policies that the UK Government's Department of Culture, Media and Sport (DCMS) introduced in the late 1990s reframed the production of cultural goods and services as "creative industries", thus understanding them as a "legitimate object of policy" [11]. In the previous decade, a generally deteriorating industrial sector led to national development agendas centred around the notion of business-friendliness and local skills [11–13]. Soon the focus of local public investments started to move from industrial settings to urban areas, which had to be adjusted with new concepts in mind. Emerging industries were promoted, tourism most prominently, and it was deemed that cultural venues and events would create "urban attractiveness", thus re-generating income and employment [14,15].

Similar processes took place in other European countries following the steps of Britain [16]. A general framework can be found in the UNCTAD [17] which established a basic perspective that paved the way for other countries to include the CCI in their development plans. Even though actions aimed at enhancing the creative economy have been globally fragmentary, the term CCI has been adopted by multiple international public institutions [18,19]

One of the main sources of this duality in the policy landscape is the strong influence that the spatial perspective of CCI acquired shortly after the DCMS presented its development scheme. According to Chapain and Comunian [20], a report produced in the year 2000 by the DCMS titled "Creative Industries–The Regional Dimension" stressed the importance of locally-oriented policies and greatly contributed to shift the focus from national governments to regional institutions. In this specific case the Regional Development Agencies were in charge of the application of CCI-oriented government policy, since it was conceived as a key sector in order to make cities and regions competitive within the globalised knowledge economy [21,22].

CCI are significantly context-dependent. Different regions around Europe have envisioned different CCI strategies due to specificities in their structural attributes that can unlock or expand paths for economic growth. These variations are clearly noticeable in

regions part of the European Union, where subtle spatial differences have led to distinctive CCI strategies [23–26].

1.1. Regional CCI Policies as Smart Specialisation Strategy

Although there is not a consensus on its theoretical and spatial dimensions, the concept of 'region' has been widely used as an operative term in the literature [27]. With public innovation strategies in mind, Cooke defines it as "a meso-level political unit set between the national or federal and local levels of government that might have some cultural or historical homogeneity, but which at least has some statutory powers to intervene and support economic development, particularly innovation" [28] (p. 953). Such a view contributes to conceptually tie a region to its policy implementation and competencies. As a realm of social action, a conceptual understanding of 'region' entails repercussions for public policies. For instance, the institutional configuration, political agency, and economic activities are influenced within the boundaries of the regional territory. Nowadays, this can be noted through Smart Specialisation Strategies.

In the European context, CCI policy variations across regions have been largely subjected to regional specialisation strategies. Regional Research and Innovation Strategies for Smart Specialisation are an essential part of the European Union's (EU) Cohesion Policy and they will likely continue to be at the forefront of the EU's priorities, as the programming for the 2021–2027 period suggests [29]. S3 is a policy concept to support regional prioritisation in innovative sectors, fields or technologies through the entrepreneurial discovery process and it is based on a bottom-up approach to reveal what a region does best in terms of its endowments [30]. It seeks to promote and coordinate place-based development through non-neutral, vertical policies, which have a common legal and institutional framework [31,32]. Under this model, each region is responsible for the identification of its own strengths and the amplification of positive surrounding conditions. As Foray puts it, "The main goal of a smart specialisation policy is to concentrate resources on the development of those activities that are likely to effectively transform the existing economic structures through R&D and innovation" [33] (p. 4). Thus, smart specialisation strategies are formed by exploratory synergies between four basic kinds of actors, namely businesses and entrepreneurs, civil society, governments, and universities, who form the so-called "quadruple helix") of smart specialisation [34,35]. However, Foray also notes that "in most cases, a smart specialisation process is embedded in the existing productive structures that are local but whose transformation requires new resources, new technologies and new competences" [36] (p. 25), which implies that S3 strategies are not to be mistaken with undertaking a complete overhaul of local production contexts, but rather strengthening pre-existing qualities.

1.2. The Basque Smart Specialisation Strategy

From 2014 onward, member regions of the EU must have a smart specialisation strategy in place since the European Commission established S3 as a prerequisite for access to the European Regional Development Fund [37]. In line with the new mandate, the regional government of the Autonomous Community of the Basque Country (Spain) undertook a S3 formulation that was heavily based on its prior efforts to restructure the business and innovation system [38]. Cultural and creative industries have a salient role in it as an "opportunity niche". Other European regions have granted strategic importance to CCI within a broader S3 programme as well. For instance, Central Finland, Emilia-Romagna, Wallonia, Western Greece, or Slovakia, which are part of the CREADIS3 project. Matching the then-spreading trend in CCI policy perspective that originated in the UK, in the early 2000s the Basque Government initiated a process to intervene more purposefully in the creative industries sector in the region. First, the Basque Council for Culture was created, which represented a preliminary move towards governance; then, the Basque Culture Plan (2002–2009) was introduced and, thirdly, the Basque Observatory of Culture was created back in 2006. These steps were intended as an assertion of the Basque regional

leadership on CCI policy and highlighted its potential in the economic field. This approach was aligned with broader policymaking contexts such as the EU, in which 'creativity' was advocated for invigorating the CCI business activity as stressed by the Directorate-General for Culture, Youth and Education of the European Commission during the 2000s [39]. Thus, creativity was understood as an asset and the way was paved for commercially oriented policies at European level [40].

It should be noted that the Basque smart specialisation plan also entails acting on two other dimensions, namely, the reform of the Science, Technology and Innovation (STI) governance system, in order to open the polity to market-related agents and universities on the one hand, and the restructuring of the Basque Science, Technology and Innovation Network "to ensure a better alignment between design and delivery" on the other [41] (p. 1549). As noted by the OECD [38], thorough multi-level coordination structures have to be maintained in order to meet such goals. This suggests that the Basque S3 does not only seek to simply comply with EU's requirements, but it also aims to be robust and sustainable.

1.3. Gipuzkoa's Innovation Labs

In Gipuzkoa, at sub-regional level, cultural and creative industries are inextricably tied to a public collaborative governance programme. Since 2016, the Gipuzkoa Provincial Council has fostered a flagship initiative known as 'Building the Future' (*Etorkizuna Eraikiz* in the Basque language). The initiative is described as a comprehensive public collaborative governance model open to all societal agents in the sub-region as a means to enable participation and cooperation for the strategic design of the public agenda [42]. In practice, public–private experimentation is the driving force of the initiative and it is oriented towards answering the challenges of the economic, social, and political future [43]. As a government initiative, Building the Future has three main objectives [44]:

- Generate loci for listening, deliberating, and occasionally, but not necessarily, decision making. These forums are based on horizontal relationships, where the government interacts and cooperates with the network of agents that comprise civil society, namely institutions, businesses, NGOs, universities, associations, etc.
- Collectively identify the upcoming challenges in the Territory of Gipuzkoa. This is mostly achieved by designing methods to tackle future challenges, trying experimental solutions in real-life environments together with different networks of agents. Obtained results are later applied to public policies by the Gipuzkoa Provincial Council.
- Create specific structures to strengthen and ensure the sustainability of the open and collaborative governance processes. Such structures' primary functions are supporting the management, ensuring funding, disseminating the results of deliberation, and looking after the proper implementation of governance processes.

'Building the Future' is an initiative that proposes a new way of doing politics [45–47] which is founded on different levels of Governance action, from systemic to individual [48–51]. To this end, it designs new forms of political action emancipated from its institutional logics to influence the public agenda [52,53]. The design relies on the principles of interactive governance [54] and creates strategies and structures that generate the conditions for governance [55]. In particular, it deepens the connection between different actors [56,57] that aim to "realize or implement a public policy, manage a public program or operationalize a set of assets" [58] (p. 543).

The open and collaborative governance model designed and implemented by the Gipuzkoa Provincial Council includes, among other actions [44], what are known as Reference Centres. These are physical centres distributed across the territory of Gipuzkoa [59], thus context-based venues located in environments with adequate resources to meet the strategic priorities defined by the Basque Government, which include knowledge and innovation communities (KICs) [60]. Each of these operate as specialised hubs of open innovation [61,62] oriented towards enhancing subjects with strong potential in Gipuzkoa, which, as mentioned above, are designated as strategic priorities and opportunity niches. The reasoning for the existence of the reference centres is twofold: on the one hand,

they contribute to the local implementation of specialisation strategies (vertical axis of action [63]); on the other hand, they are nexuses for the structuring and articulation of the actors and processes involved in each priority area (horizontal axis of action). Impacting the horizontal axis is achieved by helping the strengthening of a territorial value chain under a holistic view, one that starts with primary suppliers and extends to market results. Normatively, this process is instrumental for supporting the S3 regional policy.

Reference centres operate under the "entrepreneurial discovery process" approach. The term entrepreneurial discovery process (EDP) refers to the systematic discovery and pursuit of emergent research, development, and innovation investment priorities by agents, typically within a socio-economic system territorially bounded [64], i.e., a region. The EDP requires fostering bottom-up approaches, even if they coexist with corresponding top-down actions [65]. Generally, the role of governments is to create enabling conditions for entrepreneurial discoveries to take place. Moreover, Szerb et al. [66] note that numerous S3 strategies tend to lack private sector and civil society engagement, creating an endeavour void that undermines the outputs of entrepreneurial discovery processes. Hence, governments tend to dominate in the early stages of specialisation strategies.

An accurate way to conceptualise reference centres in Gipuzkoa is to frame them as publicly led 'innovation labs' [67,68], provided that they rely on active participation to generate innovation outputs that add to the overarching public benefit. However, Gipuzkoan reference centres are not to be mistaken with living labs in the public sector, their recent surge in the literature notwithstanding [69]; reference centres foster various industries thanks to public involvement and assistance. Cultural and creative industries are among those industries, since they are one of the four opportunity niches identified in the regional S3. Along with entrepreneurship, innovation is an important vector for the competitiveness of regions [70] and the creative industries have been proven to contribute towards this [71]. Additionally, as Miles and Green noted [72], creative industries specifically produce innovation in areas that have traditionally remained 'hidden' for researchers and practitioners, namely, user interface, cultural product, cultural concept, and delivery. Together with technological and process innovation, these industries possess above average capabilities for positive spillovers to other economical fields, such as tourism, public services, or healthcare [73,74].

The Gipuzkoan CCI-dedicated reference centres are named '2deo–Basque Language Audiovisual Lab' (2deo) and 'LABe–Digital Gastronomy Lab' (LABe), presented in Table 1.

Table 1. Core attributes of 2deo and LABe.

	2deo–Basque Language Audiovisual Lab	**LABe–Digital Gastronomy Lab**
CCI field	Audiovisual content in Basque	Digital gastronomy
Objective	To promote audiovisual production in the Basque language	To reflect, co-create, and innovate in digital gastronomy
Challenges	Scarce, unknown, and poorly considered offer Sector with scarce cutting-edge technological capacity	Deficiencies in the sector's digitalisation Potential to improve cohesion in the value chain
Date of creation	May 2019	July 2019
Main recipients	SMEs in the sector Basque youth and citizens	SMEs in the sector Basque citizens

Source: Author's elaboration.

Therefore, it should be highlighted that, on the one hand, 2deo–Basque Language Audiovisual Lab is a space dedicated to promoting audiovisual production and that on the other, LABe–Digital Gastronomy Lab is dedicated to promoting digital gastronomy. In addition to helping to coordinate the above-mentioned sectors, these innovation labs are way to offer innovation infrastructures to actors that face difficulties in accessing them. Since its

preliminary design, the involvement of quadruple helix agents has been put into practice (see Table 2), in such a way that the point of view of the sector's agents is notably present. Conceptually, the quadruple helix includes social and cultural organizations reflecting the importance of "culture", "values", and "lifestyles", and in general, the dynamics with civil society to signify that the relations between university, industry, and government are contextual and generate innovation systems that are different depending on their institutional, social, and cultural contexts [34].

Table 2. Quadruple helix agents involved.

Collaborating Agents	2deo–Basque Language Audiovisual Lab	LABe–Digital Gastronomy Lab
Government	Gipuzkoa Provincial Council	Gipuzkoa Provincial Council
Scientific Research	University of the Basque Country University of Mondragón	Basque Culinary Center
Business	SMEs in the audiovisual sector San Sebastian International Film Festival EiTB (Basque Autonomous Community's public broadcast service)	SMEs in the gastronomy sector ACEDE Cluster (Basque cluster of businesses producing home appliances and components.)
Society	Tabakalera, International Centre for Contemporary Culture	Tabakalera, International Centre for Contemporary Culture

Source: Author's elaboration.

Hence, both centres are located in Tabakalera, the international centre for contemporary culture in San Sebastian (capital city of the province of Gipuzkoa), which can be understood as a "cultural brownfield" [75] of institutional leadership. The location of public innovation labs in this centre is an indication of the importance attached to them by the sub-regional policy action system.

1.4. Basque CCI Ecosystem

The Basque milieu of cultural and creative industries has been described as an "archipelago of heterogenous entities" [76] (p. 12). Such wording is a synthesis of a complex reality, in which agents are far from comprising a cluster and have diverse needs, sizes, and scope.

A quick overview of the CCI sector in 2016 shows a total of 15,437 companies based in the Basque Country, which accounted for 10% of the total number of companies across all economic sectors [77]. These companies generated nearly 1784 million euros in 2015, approximately 2.61% of Basque GDP [76,78]. In terms of employment, the CCI sector accounted only for 5.3% of total jobs [77]. Comparatively, on average, creative economy companies are substantially smaller in terms of number of employees than the rest of the business spectrum: roughly 94,3% of these companies had fewer than 10 employees, mainly relying on self-employment, since 83.3% had between 0 and 2 [79]. By contrast, a group of 96 prominent cultural and creative companies, i.e., 0.62% of cultural and creative companies in 2016, generated an estimated 55% of the value created by the industry and employed 15.9% of the overall workforce [76,77].

These observations about the Basque cultural and creative industry ecosystem are consistent with a general depiction of CCI made by Pratt [80], who states that cultural and creative industries differ from other economic fields by virtue of the "missing middle", that is, the lack of sufficient medium-size entities in the sectoral landscape. Moreover, given the high self-employment rate in CCI, companies tend to have a short lifespan, which translates into greater emphasis on skilled workers, rather than on firms, on one hand, and a weak sectoral structure, on the other. This is exacerbated by the project-based work dynamics credited to CCI, since projects represent an often-temporary alliance of professionals and resources. Other overviews of labour in CCI [81] have underlined that

weak sectoral structures have negative consequences for employment quality, which in turn is closely related to social inequalities within the industry.

Material conditions make CCI a prominent sector for entrepreneurship, as creators tend to shift enterprises frequently. Nevertheless, theorists like Swedberg [82] have analysed the notion of 'cultural entrepreneurship' introduced by Schumpeter, who is often credited as the early manifestation of modern growth entrepreneurs and natural ecological systems conceptualisations [83]. Extending the general understanding, Baumol [84] turned the attention towards institutional arrangements, which highly influence the degree of productivity derived from entrepreneurship. Entrepreneurial ecosystems are framed with 'productive entrepreneurship' as their core outcome, ultimately producing aggregate welfare benefits [6,7].

In order to enhance productive entrepreneurship, governments, and public institutions that engage in the entrepreneurial ecosystem approach primarily play the role of "feeders" of regional entrepreneurial networks, instead of "leaders" [6] (p. 8). Essentially, under this approach, governments create the necessary preconditions for entrepreneurial discovery processes to take place. In order to specify the different governance functions that public action can serve, Rampersad [85] (p. 1124) delineates four modes of network governance:

- Framing: establishing an identity for the ecosystem and developing a working coordinating mechanism.
- Activating: the process of identifying participants for and structuring the network.
- Mobilising: building commitment among actors.
- Synthesising: creating conditions for productive interaction while preventing, minimising, and removing obstacles to cooperation.

However, the elements that interact within an ecosystem are diverse and constitute complex intersections, as Stam and van de Ven [5] show, and precise policy implications are yet to be explored [86]

2. Research Design and Methods

This article is formulated as a case study conducted in the Province of Gipuzkoa, Spain. The methodology employed follows the "empirical triangulation" approach [87], combining empirical qualitative methods, i.e., semi-structured interviews, and desk research. Empirical triangulation enables internal validity assessment during the research process, as analysing exogenously produced documents helps to delimit the extent and significance of semi-structured interviews. This is especially impactful in studies where "elite interviews" are conducted [88,89]. Furthermore, case studies on public administration research make extensive use of diversified sources in order to acquire contextual understanding, and the research here described is aligned with that praxis [90,91]. The methodological design has been made with the goal of maximising the explanatory potential of the agents involved in the activity and governance of 2deo–Basque Language Audiovisual Lab and LABe–Digital Gastronomy Lab.

On the one hand, desk research efforts have taken two types of directions. First, three themes in the literature have been examined in depth: Cultural and Creative Industries as policy matters, Smart Specialisation Strategies, and Collaborative Governance. These fields constitute the core of the study and contribute to frame the case. Secondly, an analysis of information from grey literature and secondary sources was undertaken. Such sources can be classified as "management-related" and "knowledge-related".

Management-related sources are those produced by governments and public administrations responsible for CCI policy design and implementation. In this case, the European Commission, the Basque Government, and the Gipuzkoa Provincial Council. It should be noted that the Spanish Government, concerning the national level, is not part of the analysis, inasmuch as the Basque Government holds full legislative powers in economic planning. Studies in other European regional contexts may have to take account of the national level.

Knowledge-related sources derive from various institutions monitoring the CCI landscape in the Basque Country and Gipuzkoa. The materials have been produced by researchers from Mondragon University and the University of the Basque Country, the Basque Statistical Institute, Creadis3 European Interreg Project, independent research institutes and, finally, LABe's and 2deo's management. Some institutions produce information periodically, such as the Basque Statistical Institute, while others have produced data on a one-off or circumstantial basis, such as the Creadis3 project [77]. The nature of the data obtained is multidisciplinary and mixed, i.e., both quantitative and qualitative.

Lastly, four semi-structured "elite interviews" were conducted in autumn of 2020. After receiving due consent, they were carried out with people responsible for different levels of action within the context of both reference centres. These interviews, described in Table 3, were designed with the aim of collecting information from distinct, but clearly complementary origins. A representative from the Gipuzkoa Provincial Council was deemed relevant, as it is the leading public institution of the Building the Future governance model. Secondly, the General Manager of Tabakalera is in position to provide a comprehensive view of the audiovisual production sector in Gipuzkoa since different organisations are located in their facilities. Thirdly, the BCC Innovation Manager can present a global overview of innovation in gastronomy, while LABe's Innovation and Product Development Lead is in a position to provide insights from their activity.

Table 3. Conducted interviews.

Affiliation	Position
Economic Promotion Department, Gipuzkoa Provincial Council	Managing Director of Strategic Projects
Basque Culinary Center, Mondragon University	BCC Innovation Manager
LABe–Digital Gastronomy Lab	Innovation and Product Development Lead
Tabakalera	General Manager

Source: Author's elaboration.

To that end, a standardised set of questions was employed in each interview, with small variances according to each interviewees' domain. Moreover, these interviews allowed to gather information about five main themes regarding the narratives about the reference centres and their environment:

- The status of 2deo's and LABe's operations, respectively.
- 2deo and LABe's main achievements.
- The narrative about the entrepreneurial landscape around both 2deo and LABe.
- The role of digitalisation in both 2deo and LABe.
- The impact of Building the Future on the performance of 2deo and LABe.

After conducting them, the resulting body of oral texts were analysed. In order to guide the thematic analysis, a preliminary exploration of noun-driven cooccurrences was completed using TexMiner, an open-source software for text scrutiny. Then, the cooccurrences were contrasted with the five themes mentioned above. This exercise contributed to identify the themes and frames used by the interviewees. Finally, a qualitative analysis of the corpus was conducted by the researchers, producing results shown in the following section.

3. Results

The results obtained, as shown in this section, contribute to the exemplification of practices and knowledge in two general aspects:

- On the governance capabilities of local governments by promoting processes of change and modernisation, in this case, in the creative and digital sphere. Specifically, by promoting more flexible structures, decentralised actions, and developing valuable tools for the management of public policies.
- On the display of concrete examples in which diverse action networks are built, allow a multidimensional approach to problems, and try to articulate multiple disciplines and knowledge in the design and development of different actions.

This contribution is presented in the following sections, which differentiate between 2deo-Basque language Audiovisual Lab and LABe-Digital Gastronomy Lab.

3.1. 2deo–Basque Language Audiovisual Lab

2deo can be described as a public innovation lab whose mission is to foster the production and consumption of audiovisual content in the Basque language, promoting experimentation in contents, formats, and production. It was launched in May 2019, but the reflection process that led to its creation goes back earlier.

The creation of 2deo was preceded by a collaborative diagnosis process articulated in Gipuzkoa Lab, Building the Future's space for joint experimentation. It involved the participation of the Gipuzkoa Provincial Council, the University of Mondragon, the University of the Basque Country, societal agents as part of a contrast group, agents from the regional audiovisual production sector and specific international collaborations. The focus on the production of audiovisual content in Basque arose from the identification of structural weaknesses and threats in audiovisual consumption by young people in Gipuzkoa. The ad hoc study, 'Basque-speaking teenagers in Gipuzkoa: Consumption and creation of audiovisual content' [92] shows that the offerings of content in the Basque language are scarce, unknown to younger audiences, and perceived as unattractive.

As the diagnosis is shared by the agents involved, 2deo's principal goals are:

- To promote the Basque language, particularly among young people.
- To foster the creation of content and formats adapted to new consumption habits.
- To create a referential space for new talent, trends, and products.
- To promote the internationalisation of the sector.

This innovation lab's activity is supported by a series of agents that belong to the quadruple helix. In addition to the stakeholders that have participated in the prior reflection process, also cooperating with 2deo's current activity are EiTB, the University of the Basque Country, the Basque Observatory of Culture, the San Sebastian International Film Festival, and Basque-speaking teenagers, among others. These actors form alliances and joint projects through 2deo's "professionalisation programming", which is comprised by three lines of work:

- 'Applika +', a research project on audiovisual consumption among young university students aged 18 to 22 and product testing among young people aged 14 to 18, in collaboration with the University of the Basque Country, the Basque Observatory of Culture, and EiTB [93].
- '2deo. Zinemaldi & Technology', meetings that address digital transformation in the audiovisual field, including an international start-up competition aimed at promoting innovative business projects based on audiovisuals and digitalisation, in collaboration with the San Sebastian International Film Festival, Tecnalia Research & Innovation Foundation, the Basque Government and Petronor.
- Participation in the working group on innovation in audiovisual content aimed at young people created by EiTB.

Meanwhile, one of the interviewees notes that companies in the Basque audiovisual sector suffer from "precariousness and difficulties in obtaining funding, very few risks are taken with new formats [. . .] and they have a poor presence in international markets." For another interviewee, 2deo represents a partial response to these problems: "I think the centre's target audience reflects the sector that the centre works in, [. . .] an atomised

ecosystem where we have very small producers: individuals, creatives, people linked to culture and creation." As an alternative, one of the respondents suggests that "if this were accompanied by a competitive taxing policy strategy, Gipuzkoa and especially its capital, San Sebastian, could become a reference point for international productions, which would entail an obvious opportunity for improvement of the audiovisual sector."

The 2deo laboratory has 550 square metres of facilities, divided into collaboration and production areas, spaces for editing and post-production and finally, a work area for the centre's coordinators. The profile of the creatives who use 2deo's resources tends to be, according to one interviewee, "mainly film school students. [. . .] Many students from the Elías Querejeta Film School (public film school of Gipuzkoa) go to the facilities to edit work they are creating at the school". The function that Tabakalera fulfils of acting as a physical link is central in Gipuzkoa's audiovisual context, as in addition to 2deo, it also houses the headquarters of the Elías Querejeta Film School and the San Sebastian International Film Festival.

However, the prototypes that are created in 2deo's ecosystem have a notably more professionalised focus. As one of the interviewees explains, "a small company, a cooperative company, two associations and four participants who present the project in their name" carried out audiovisual experiments in 2020. Since the centre opened, 31 audiovisual prototypes have been promoted and 12 of them have been presented at festivals.

In its role as an experimentation and digitalisation hub, 2deo promotes a digital focus of the audiovisual prototypes that are presented. One of its managers observes that "in 2deo's DNA itself, as regards digitalisation, as regards new production methods, new products are very closely linked to digitalisation already." On the one hand, this aspect is directly related to providing cutting-edge technology to users of the centre to test creative ideas, and on the other, to conceptualising productions as attractive products on online distribution platforms of both television and films.

The impact of Covid-19 has caused a significant slowdown of activity. In the words of one of its managers: "I think that in this respect, 2020 has caused us quite a lot of hurt in the sense that, as it is such a strange year, many initiatives that were already planned and approved for 2020 have either had to cancel or be rescheduled over time."

According to the interviewees, the Building the Future collaborative governance model that 2deo is embedded in is key to understand its operation. "Building the Future has led to the creation of these centres and the Department, the Directorate of Strategic Projects that interacts with these reference centres [. . .] has strongly internalised that way of working in co-governance, in collaboration. They have experienced it as something that is innate." 2deo's activity is eminently experimental, as it adopts the 'Design Thinking' methodology [94] in prototyping processes. Moreover, the main criteria for the selection of projects are their "experimental and innovative potential." This working methodology is supported by an annual management plan that is re-evaluated by all the agents participating in the centre's management. On the other hand, the innovation lab itself understands that its outputs help to promote the audiovisual sector and that to this end, it must disseminate the results of its work in the social sphere.

3.2. LABe–Digital Gastronomy Lab

The Digital Gastronomy Lab LABe is a public innovation centre for the development of experimental technologies and methodologies in the field of digital gastronomy. It opened officially in July 2019 and is thus the second public innovation lab created in Gipuzkoa after 2deo–Basque Language Audiovisual Lab. Just like the latter, its creation is fostered by the sub-regional public administration which, during an initial phase of reflection on the territory's qualities, points out that the gastronomy sector is strong and that it contributes significantly to the regional S3.

The emergence of LABe is also closely linked to the strategy of the Basque Culinary Center to consolidate the Basque Country's cuisine and gastronomy sector at the forefront globally. Guipuzkoa is a territory with a consolidated value chain in the field of gastronomy.

Within it, there are internationally strong companies in the gastronomy and restaurant sector, but in addition, it has a cluster dedicated to industrial cuisine products, innovation technology centres, and living labs. LABe, as a space for accelerating digitalisation and innovation, exists within a larger framework of sectoral cooperation. Likewise, the regional smart specialisation strategy supports the creation of LABe thanks to the consideration of Creative Industries as an opportunity niche, where gastronomy can be found [95]. The 'Basque Industry 4.0' and 'Gastronomy and Nutrition 2020' regional plans provide strategic foundations for the creation of the centre [96].

Therefore, the objectives of LABe–Digital Gastronomy Lab are the following:

- To promote talent and the acceleration of start-ups.
- To identify the main technologies, business models and international-level solutions (scouting tasks) and attract them to Guipuzkoa.
- To generate innovation and learning spaces with the multiple agents of the quadruple helix involved.
- To generate spaces of cooperation within the gastronomy value chain.

The vision underlying the creation of LABe was explained by one of our interviewees: "at both the Guipuzkoa Provincial Council and the Basque Culinary Center we understood that we had to consolidate that position of leadership we already have. We enjoy widespread recognition at international level. What happens is that it is true that maybe innovation in the sector, in this case, and I am going to the last part of the value chain, restaurants, was very focused on culinary innovation. On the plate, the guest's experience. (. . .) And we thought that in order to continue being referential, we also had to lead that aspect of incorporating technology". As a result, public–private collaboration has led to a physical space of 1400 m^2 in which open experimentation and the implementation of digital work processes is possible. Nevertheless, one of the interviewees notes that the consolidation of LABe "has to stem from working together and interacting with other agents beyond the digital gastronomic space itself."

The sectoral agents that interact at LABe have a variety of features, as companies that are established in the sector, emerging companies, and graduate students from the BCC converge in the centre. Communication with gastronomy businesses is acknowledged as an important vector to identify needs. However, the experimentation process to cover these needs is open and mainly bottom-up: "BCC Innovation intervenes, but a start-up or a company that wants to lead on that issue can intervene; other technology centres that may be slightly more technological than us and which complement us. Somehow this ecosystem is formed based on the identification of an opportunity that can be done by us or it may be because a company or a start-up brings it. The trigger, so to speak, can be several agents, but the philosophy is one of co-creating, yes." Additionally, as a complement to entrepreneurial efforts, LABe's prospective team scouts for emerging technologies at an international level.

From a technological perspective, LABe fulfils a testing function. On one side, it operates as a testing environment for some of the Basque Culinary Centre's research outputs, namely, those oriented towards the digital economy. However, one of the respondents highlights that LABe, understood as a "technological centre", has to compete "at an international level in gastronomy, but with other technology centres, because we understand that the league of centres, from our perspective, which may not be shared, is a different league from that of the universities, and we wanted to be there." On the other hand, start-ups can use LABe to try new devices and techniques that require rare tools or expertise.

In order to support experimental actions, there is a multidisciplinary team of professionals, as one of the interviewees stresses: "I think that the profiles of the people who work there, the fact that they are multidisciplinary, is extremely important. Jose, for example, is a chef, but he is a bit of an odd chef because he is much closer to entrepreneurship, to the promotion of new businesses, to technology than a traditional chef. [. . .] But we also have those chefs who are working on culinary innovation, we also have people who know about sensory issues."

The work areas that are focused on the most by the gastronomy innovation lab are the so-called front-office, i.e., activities comprehensible to customers, and the back-office, activities focused on the general management of businesses. The intensification of the digitalisation of both areas is related to the holistic vision of the project. Since its creation, at LABe, 26 test and validation experiments have been performed, 77 start-ups, 43 companies or innovation centres have joined the ecosystem, 5 technological products have been developed, and finally, close to 17,000 customers have passed through its restaurant [97].

One of the main challenges that LABe faces is the coordination of all the strata of the sub-regional gastronomy sector, as pointed out by one of the interviewees. "What LABe seeks is to provide stimulus knowing that the levels are different because, of course, within the field of restaurants or gastronomy we have the cutting-edge chefs and then we have the catering venue itself, the local, neighbourhood venue, so in the knowledge that there are very different levels each of us are going to, so to speak, contribute to digitalisation, of course each at their own rate and at their own pace." As with 2deo, Covid-19 has slowed down efforts to expand the centre's action, as much of its activity went online during 2020. In this context, the knowledge transfer to the public has been carried out through practical demonstrations, direct communication with other restaurants, and social media.

The collaborative governance that makes possible and supports LABe–Digital Gastronomy Lab is, again, perceived by the interviewees as essential for the centre's activity: "I think that this spirit is embedded [. . .], because by definition, by default, its starting point is an open concept as we say. So very likely, as we said, without the institution's backing it wouldn't have been possible, to start with." Work is structured through an annual management plan which is contrasted with the activity carried out at the end of said period: "We set ourselves indicators on a scorecard like any other initiative or any other business project might do, and we contrast it with the Gipuzkoa Provincial Council department itself."

4. Discussion

2deo–Basque Language Audiovisual Lab and LABe–Digital Gastronomy Lab are two public innovation labs that are part of a sub-regional collaborative governance programme. The similarities between both reference centres lie in their open nature, as their activity is based on the collaboration of multiple institutional, university, business, and social agents, and promote innovation as a tool to streamline and structure two creative sectors that are markedly fragmented. In fact, it should not be forgotten that audiovisual production in the Basque language and gastronomy are niches of opportunity for the Basque Country's smart specialisation strategy and that, as a result, they are economic spheres with contrasted potential.

Both experiences are part of a regional Smart Specialisation Strategy, which understands that collective knowledge and learning [98] are localised and regional in nature [99]. Smart Specialisation Strategies are closely related to the notion of 'proximity', which asserts the situated character of knowledge through the role played by physical, cognitive, and cultural proximity [100,101]. What is relevant about the regional dimension is that it allows the development of endogenous competences that depend, to a large extent, on the three factors that we are going to discuss below:

- The roles of the different actors in the system.
- The characteristics of entrepreneurial ecosystems.
- The identification and control of the risks involved in the process.

4.1. Roles

4.1.1. Policy Makers and the Institutional Role

The institutional role regulates the relationship between different social actors. Such actors structure their practices differently from one region to another, which creates different types of environments [23,102]. Hence, in order to enhance the role of these reference centres, it is understood that it is necessary for institutions to promote their activity and

learn from the processes they generate [103]. The Gipuzkoa Provincial Council has made efforts towards creating adequate conditions for effective governance [55] to take place. Previous specific governance experiences in Gipuzkoa have not been capable of navigating political and multi-level complexities and, as a result, CCI-promoting policies have suffered delays or drawbacks [104]. Thus, following Kooiman [105], Building the Future provides instruments and actions that have translated into reference centres, that is, LABe, 2deo, and others. Furthermore, Building the Future adheres to a notion of governance based on multiple interactions and joint collaboration, as proposed by Torfing et al. [54].

The saliency of the Gipuzkoa Provincial Council in the articulation of audiovisual production and digital gastronomy sectors can be viewed as the assumption of a feeding role, while entrepreneurs act as innovation and transmission agents [6,9]. Despite its relative importance within the collaborative efforts, government action on both sectors fulfils two distinctive roles. On the one hand, considering the status of audiovisual production at sub-regional level, 2deo seeks to activate creators' digital capabilities and potential. On the other hand, LABe aims to mobilise the gastronomic sector in order to embed digitalisation into emergent and established businesses [85,97,106].

In terms of ongoing and expected learning, the political materialisation of these public initiatives has contributed to enrich 'regional learning' and 'policy learning', having an impact on the understanding of organisational change, social learning, and politics as potential and effective vehicles for territorial development [107].

Perhaps the key learning lies in the choice of mechanisms that are conducive to the increasing participation of diverse actors, which in turn places high demands on the level of governance. In short, it refers to learning to choose appropriate governance mechanisms and systems in relation to the policy formulations and objectives pursued [108,109].

4.1.2. The Role of Researchers

Researchers have the fundamental mission of promoting collective learning networks, which enable the creation, preservation, and expansion of the knowledge base necessary to carry out innovation activities [110,111]. The aim is to set the orientation of the contribution of universities towards local communities, overcoming the restricted conception of academic performance and research production [112].

This means building bridges between specialised knowledge and social agents as a whole, promoting interaction with the environment and providing solutions to social demands and problems [113]. Every innovation lab in Gipuzkoa is supported by at least one university within the Province, who contribute to explore selected areas of work and produce knowledge. The University of Mondragon and the Public University of the Basque Country have been identified in this study.

The practical experience of these interactions should produce lessons in terms of the positioning of universities and researchers in relation to the knowledge economy of the 21st century. Thus, universities are increasingly linked to the practical challenges of society identified by governments and public institutions [114].

4.1.3. The Role of Practitioners

The role of practitioners is fundamentally concerned with promoting the development of communities that share ideas, information, and knowledge through collaborative working mechanisms [115], in which the communicative processes that foster partnerships between agents become vital [116]. In this case, sharing means that agents develop a practice in common and jointly create a particular learning path, which is why the production, communication, and transfer of knowledge is always "situated", i.e., it is strongly influenced by the social context in which the practice takes place [117,118].

Alternatively, collaborations with various kinds of agents need to be intensified and consolidated, as some respondents have noted above. Both reference centres are in the early stages of their operations and the prevalence of the sub-regional government has been greater than an ideal scheme would indicate. This development, however, has been

examined in the Smart Specialisation literature. S3, as a vertical policy implementation, requires a strong presence of government action initially [31,32]. In order to increase the involvement of other actors, enhancements to the regional entrepreneurial ecosystem have been suggested [66]. In this vein, 2deo and LABe follow a congruent line of work.

From a learning perspective, the creation of an expansive learning context [119] must promote the transmission and distribution of knowledge in order to produce an increase in value for individuals, organisations, and the territory as a whole. Collective learning processes depend to a large extent on the absorptive capacity of a territory or region. The absorptive capacity is a relational concept that defines the capacity of organizations to interpret, assimilate, transform, and exploit external knowledge on the basis of accumulated internal knowledge [120]. Reference centres in Gipuzkoa dedicated to open innovation contribute to bridge the gap between the learning potential within the Basque Country and the actual absorptive capacity of its social capital.

4.2. Entrepreneurial Ecosystem

Sussan and Acs [121] (p. 58) propose that entrepreneurial ecosystems have as a main result the sustainability itself of the entrepreneurial process. This is because entrepreneurial ecosystems are complex and fragile systems, where "many elements interact to produce systems performance, thus, the system method needs to allow the constituent elements to interact." Thus, the basic function of 2deo and LABe is to promote interaction between the "constituent elements" of their respective sectors, while providing a safety net for innovative and emerging initiatives. Moreover, this is supported by the policy recommendations of the European Creative Industries Alliance, who suggests fostering cross-sectional collaboration as a means to stimulate innovation and growth [122].

The Province of Gipuzkoa, as part of the Autonomous Community of the Basque Country, has been rated above the European average in entrepreneurial ecosystems indexes [123]. However, the results obtained in this study suggest that the entrepreneurial capacities of audiovisual production and digital gastronomy need to be distinctively examined within a broader economy. Accordingly, LABe emerges in an already active entrepreneurial environment, although lacking in connectivity. Audiovisual production in Basque language, on the other side, requires support from different angles in order to be active and autonomous.

The use of open innovation and design thinking methods at 2deo and LABe, which are applied non-linearly, encourages the promoted projects to adopt adaptability as a latent feature, [94]. At the same time, the technological environment in which creatives, small start-ups or digitally innovative companies act is ever-changing. This becomes more pressing when considering the challenge of the scalability of their projects. In fact, the Basque Country's CCI state that they find huge difficulties in obtaining funding, but at the same time, few difficulties in making use of the technology they have available [124]. According to Nambisan [125] (p. 1034), this behaviour is more adequate for changing contexts, as "[overall] entrepreneurial success may no longer be reflected by the enactment of a predefined opportunity or the execution of a predefined value proposition. Instead, entrepreneurial actions would need to be oriented toward facilitating a continuously evolving value proposition."

Therefore, from a general perspective, it seems apparent that the institutional framework has a considerable influence on entrepreneurial activity; in particular, on the conditions of possibility so that this entrepreneurship can take place and be sustainable over time. Taking other public programmes for the development of innovation as inspiration, it can be said that the most important task of institutions is coalition building, while the search for new alternatives is an exploratory task and corresponds to the economic and knowledge production sectors [126]. In this sense, Building the Future aims to enable the collective formulation of initiatives in order to build a joint public agenda for Gipuzkoa, which requires robust governance strategies and networks [127]. 2deo and LABe innovation labs are key components of this endeavour.

4.3. Risks

Given that innovation labs in Gipuzkoa are framed within the Building the Future collaborative governance model, their operations face various risks that must be taken into account. Such risks can be divided into two main categories: organisational risks and dynamic risks.

Firstly, organisational risks derive from an excessive dependence on the Gipuzkoa Provincial Council. Since their creation, both innovation labs have been led by the sub-regional government with the aim of stimulating entrepreneurial contexts within the territory. This configuration is still far from achieving better forms of distributed leadership. It is understood that leadership must be shared so that the operations of the innovation labs produce innovative outcomes based on the EDP. Moreover, shared and collaborative leadership would help to consolidate innovation labs and make their operations more independent. Sustained dependence on the Gipuzkoa Provincial Council could potentially hinder the consolidation of the innovation labs and the emergence of an active entrepreneurial ecosystem.

Secondly, dynamic risks are those relative to the specific activities carried out in 2deo and LABe. As reflected in the results section, 2deo and LABe's innovation and project acceleration processes are clearly defined and applied accordingly: public calls for proposals, active listening, technology scouting, connection between agents, etc. However, the participation of multiple actors does not necessarily translate into collective comprehension of the innovation labs. In other words, if entrepreneurial agents and society do not gradually take ownership of the reference centres, the collaborative nature of the initiative could be at risk. In this regard, the main contribution of the innovation labs is not their existence, but the outcomes of their work. Their success relies on their production. Therefore, there must be a sensible transfer of knowledge and results in order to make them feasible for sectoral agents.

Due to the Covid-19 pandemic, both reference centres have reduced their production, but they have also adopted different actions directing them towards digital media and thus have avoided completely halting their work. As a whole, the Basque Creative and Cultural sector has adopted similar tactics as a result of Covid-19, as shown by the Basque Observatory of Culture [128]: faced with a 71% reduction in activity compared to 2019, 26% of companies have adapted their work digitally, and 10% of companies have adopted innovation strategies to transform their activity in the new context. These alterations are consistent with the broader European CCI landscape, where there has been an increase of digital cultural and creative activities, even though not strong enough to compensate for the lack of physical exhibition and distribution options [129].

5. Conclusions

This article has analysed the activity of two public innovation labs created under 'Building the Future', the governance model of the Gipuzkoa Provincial Council (Basque Country, Spain) [44], which influence two key sectors of the sub-regional creative economy, i.e., audiovisual production in the Basque language and digital gastronomy. In general terms, these public innovation labs have four fundamental goals: to promote digitalisation in their sectors, to foster innovation, to enable and accelerate the growth of start-ups, and in a cross-cutting manner, to contribute towards sectoral coordination through collaborative governance.

Cultural and creative industries are opportunity niches of the smart specialisation strategy of the Basque Autonomous Community and, as part of it, the Gipuzkoa Provincial Council has promoted the creation of two innovation labs: '2deo–Basque Language Audiovisual Lab' and 'LABe–Digital Gastronomy Lab'. Both labs are located in San Sebastian, the province's capital. The International Centre for Contemporary Culture, Tabakalera, houses the headquarters of both centres, as the regional members of the quadruple helix understood that it is a public space that is highly adequate for the convergence and articulation of sectoral agents.

The contributions of this study consist of two main lines of work: firstly, a display of a governance model enabling mechanisms for collaboration and, secondly, the operations of two public innovation labs fostering digitalisation.

These innovation labs represent an intermediate outcome of a set of transformation processes fostered by a public governance model: Building the Future. As such, this paper presents a working example of versatile, decentralised, and co-dependency structures that have the potential to activate and connect dynamic economic sectors [54,105]. Although the role of thesub-regional government is currently dominant, a stronger entrepreneurial ecosystem could be able to garner space and significance. Hence, the raison d'être of both centres cannot be understood exclusively in dichotomous terms, i.e., as corrective interventions or positive stimuli. On the one hand, 2deo was created after the University of the Basque Country carried out a diagnostic study, but it is also understood as an opportunity for innovation by institutions and sectoral agents. On the other, LABe emerged in a sector with strong roots in Gipuzkoa, where it is difficult to access innovative technologies and which would benefit from increased interactions in the value chain. This translates into the combination of bottom-up processes (entrepreneurial action) with top-down strategies (public action) which are implemented through deliberation and collaboration.

The practice and analysis of this governance model concerns policy makers, practitioners, and researchers alike, as they interact in multiple collaborative contexts. For policy makers, the operation of innovation labs under Building the Future exemplifies the plausibility of adopting public collaborative strategies in order to adapt to socio-economic changes. Practitioners find a representation of their work as connectors and communicators of openly generated knowledge, which requires solid absorptive capacity in the CCI sector. As contributing agents, researchers and universities are involved by bringing specialised knowledge closer to the needs of the social environment around innovation labs.

In terms of impact, 2deo and LABe have facilitated the creation of multiple projects and have coordinated the work of a large number of professionals, emerging talents, and researchers, but management stresses that both innovation labs are undergoing consolidation processes. As young centres, it remains to be analysed how they can offer support beyond early business prototypes and help in scale-up cases. 2deo specifically operates within a sector that faces important difficulties in terms of business sustainability. LABe's environment, while diverse, is better established and capable of actively bringing forward digitalisation initiatives for testing and development.

Nevertheless, innovation labs face several risks that compromise their consolidation and growth in the medium term. These risks are based, on the one hand, on the lack of shared leadership and excessive dependence on public actors and, on the other hand, on the stagnation of knowledge transfer to entrepreneurial and innovative actors.

The arrival of the Covid-19 pandemic reduced the amount of work achievable during 2020, meaning that successive measurements of the actual impact of both centres should be carried out starting in 2021. This could shed a brighter light on the evolution of CCI in Gipuzkoa, which are part of the greater European productive context [129]. Focusing on governance structures and managerial views, this study did not intend to provide detailed accounts of the innovation methodologies or specific work dynamics that are employed in the innovation labs of Gipuzkoa. Moreover, the findings of this case study should be cautiously interpreted in relation to other spatial and institutional arrangements. As previously discussed, CCI and entrepreneurial ecosystems are notably context-dependent, especially in regions where CCI are part of the S3 in place.

Author Contributions: Conceptualisation, A.U. and X.B.; Methodology, X.B. and A.L.; Formal analysis, A.U., X.B., A.L.; Writing A.U.; X.B.; A.L.; Review and editing, A.U. and A.L. All authors approved the final version. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. UNCTAD. *Creative Economy Report*; United Nations Conference on Trade and Developmente: Geneva, Switzerland, 2010.
2. Observatory of Basque Culture. *Conceptual Delineation and Definition of CCI Sectors in the Basque Country*; Basque Government: Vitoria, Spain, 2018.
3. Loots, E.; van Witteloostuijn, A. The growth puzzle in the creative industries or why creatives and their industries are a special case. *Revue de l'Entrepreneuriat* **2018**, *17*, 39–58. [CrossRef]
4. Lazzeretti, L.; Capone, F.; Innocenti, N. *The Evolution of 'Creative Economy' Research*; Working Paper N. 1/2016; Università Degli Studi di Firenze: Firenze, Italy, 2016.
5. Stam, E.; van de Ven, A. Entrepreneurial ecosystem elements. *Small Bus. Econ.* **2019**. [CrossRef]
6. Stam, E.; Spigel, B. *Entrepreneurial Ecosystems*; Working Paper N. 16-13; Utrecht School of Economics: Utrecht, The Netherlands, 2016.
7. Acs, Z.J.; Stam, E.; Audretsch, D.; O'Connor, A. The lineages of the entrepreneurial ecosystem approach. *Small Bus. Econ.* **2017**, *49*, 1–10. [CrossRef]
8. Schumpeter, J.A. The theory of economic development. In *Joseph Alois Schumpeter*; Backhaus, J., Ed.; Kluwer: Boston, MA, USA, 2003; pp. 61–116.
9. Acs, Z.J.; Estrin, S.; Mickiewicz, T.; Szerb, L. Entrepreneurship, institutional economics, and economic growth: An ecosystem perspective. *Small Bus. Econ.* **2018**, *51*, 501–514. [CrossRef]
10. Miller, D.J.; Acs, Z.J. The campus as entrepreneurial ecosystem: The University of Chicago. *Small Bus. Econ.* **2017**, *49*, 75–95. [CrossRef]
11. O'Connor, J. *The Cultural and Creative Industries: A Literature Review*, 2nd ed.; Creativity, Culture and Education: Newcastle Upon Tyne, UK, 2010.
12. Tödtling, F. *The Uneven Landscape of Innovation Poles, Local Embeddedness and Global Networks*; IIR-Discussion Papers; WU Vienna University of Economics and Business: Vienna, Austria, 1992; Available online: https://epub.wu.ac.at/id/eprint/6164 (accessed on 26 February 2021).
13. Valler, D. Strategy and Partnership in Local Economic Development: A Case Study in Local Economic Strategy Making. *Rev. Policy Res.* **1991**, *10*, 109–116. [CrossRef]
14. Law, C.M. Urban Tourism and its Contribution to Economic Regeneration. *Urban Stud.* **1991**, *29*, 599–618. [CrossRef]
15. Pratt, A.C. Creative cities: Tensions within and between social, cultural and economic development: A critical reading of the UK experience. *City Cult. Soc.* **2010**, *1*, 13–20. [CrossRef]
16. Gratton, C.; Richards, G. The Economic Context of Cultural Tourism. In *Cultural Tourism in Europe*; Richards, G., Ed.; ATLAS: Arnhem, The Netherlands, 2005; pp. 55–66.
17. UNCTAD. *Creative Economy Report*; United Nations Conference on Trade and Development: Geneva, Switzerland, 2008.
18. Flew, T.; Cunningham, S. Creative Industries after the first decade of debate. *Inf. Soc.* **2010**, *26*, 113–123. [CrossRef]
19. Prince, R. Globalizing the Creative Industries Concept: Travelling Policy and Transnational Policy Communities. *J. Arts Manag. Law Soc.* **2010**, *40*, 119–139. [CrossRef]
20. Chapain, C.; Comunian, R. Enabling and Inhibiting the Creative Economy: The Role of the Local and Regional Dimensions in England. *Reg. Stud.* **2010**, *44*, 717–734. [CrossRef]
21. Jayne, M. Creative Industries: The Regional Dimension? *Environ. Plan. C Gov. Policy* **2005**, *23*, 537–556. [CrossRef]
22. Schlesinger, P. Expertise, the academy and the governance of cultural policy. *Media Cult. Soc.* **2013**, *35*, 27–35. [CrossRef]
23. Andres, L.; Chapain, C. The Integration of Cultural and Creative Industries into Local and Regional Development Strategies in Birmingham and Marseille: Towards an Inclusive and Collaborative Governance? *Reg. Stud.* **2013**, *47*, 161–182. [CrossRef]
24. Power, D. Culture, creativity and experience in Nordic and Scandinavian cultural policy. *Int. J. Cult. Policy* **2009**, *15*, 445–460. [CrossRef]
25. Boix, R.; Hervás-Oliver, J.L.; De Miguel-Molina, B. Micro-geographies of creative industries clusters in Europe: From hot spots to assemblages. *Reg. Sci.* **2015**, *94*, 753–772. [CrossRef]
26. Boix, R.; Lazzeretti, L.; Capone, F.; de Popris, L.; Sánchez, D. The geography of creative industries in Europe: Comparing France, Great Britain, Italy and Spain. In Proceedings of the ERSA Congress, Jönköping, Sweden, 19–23 August 2010.
27. Cooke, P.; Memedovic, O. *Strategies for Regional Innovation Systems: Learning Transfer and Applications*; United Nations Industrial Development Organization: Vienna, Austria, 2003.
28. Cooke, P. Regional Innovation Systems, Clusters, and the Knowledge Economy. *Ind. Corp. Chang.* **2001**, *10*, 945–974. [CrossRef]
29. European Commission. EU Budget: Regional Development and Cohesion Policy beyond 2020. Press Release. Available online: https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_18_3885/IP_18_3885_EN.pdf (accessed on 14 November 2020).
30. McCann, P.; Ortega-Argilés, R. Smart Specialization, Regional Growth and Applications to European Union Cohesion Policy. *Reg. Stud.* **2015**, *49*, 1291–1302. [CrossRef]

31. McCann, P.; Ortega-Argilés, R. Smart specialisation: Insights from the EU experience and implications for other economies. *J. Reg. Res.* **2016**, *36*, 279–293.
32. Asheim, B.T. Smart specialisation, innovation policy and regional innovation systems: What about new path development in less innovative regions? *Innov. Eur. J. Soc. Sci. Res.* **2019**, *32*, 8–25. [CrossRef]
33. Foray, D. *Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy*; Routledge: Abingdon, UK, 2015.
34. Castro-Spila, J.; Unceta, A.; Luna, Á. The double helix of organizations: Social Performance and Social Innovation. In Proceedings of the R&D Management Conference, University of Cambridge, Cambridge, UK, 3–6 July 2016.
35. Carayannis, E.; Grigoroudis, E. Quadruple Innovation Helix and Smart Specialization: Knowledge Production and National Competitiveness. *Foresight STI Gov.* **2016**, *10*, 31–42. [CrossRef]
36. Foray, D. Should we let the genie out of the bottle? On the new industrial policy agenda and the example of smart specialisation. In *Uscire Dalla Crisi: Città, Comunità, Specializzazioni Intelligenti*, 1st ed.; Antonietti, R., Corò, G., Gambarotto, F., Eds.; FrancoAngeli: Milan, Italy, 2015; pp. 25–30.
37. European Commission. *National/Regional Innovation Strategies for Smart Specialisation (RIS3)*; Cohesion Policy 2014–2020; Factsheet; European Commission: Brussels, Belgium, 2014. [CrossRef]
38. OECD. *OECD Reviews of Regional Innovation: Basque Country, Spain*, 1st ed.; OECD Publishing: Paris, France, 2011; pp. 41–51.
39. Littoz-Monnet, A. Agenda-Setting Dynamics at the EU Level: The Case of the EU Cultural Policy. *J. Eur. Integr.* **2012**, *34*, 505–522. [CrossRef]
40. Galloway, S.; Dunlop, S. A Critique of Definitions of the Cultural and Creative Industries in Public Policy. *Int. J. Cult. Policy* **2007**, *13*, 17–31. [CrossRef]
41. Morgan, K. Collective entrepreneurship: The Basque model of innovation. *Eur. Plan. Stud.* **2016**, *24*, 1544–1560. [CrossRef]
42. Ansell, C.; Gash, A. Collaborative Platforms as a Governance Strategy. *J. Public Adm. Res. Theory* **2017**, *28*, 16–32. [CrossRef]
43. Barandiaran, X.; Restrepo, N.; Luna, Á. Collaborative governance in tourism: Lessons from Etorkizuna Eraikiz in the Basque Country, Spain. *Tour. Rev.* **2019**, *74*, 902–914. [CrossRef]
44. Model–Etorkizuna Eraikiz. Available online: https://www.gipuzkoa.eus/en/web/etorkizunaeraikiz/model (accessed on 2 December 2020).
45. Fung, A. Putting the Public Back into Governance: The Challenges of Citizen Participation and Its Future. *Public Adm. Rev.* **2015**, *74*, 513–522. [CrossRef]
46. Nichols Clark, T.; Hoffman-Martinot, V. (Eds.) *The New Political Culture*; Routledge: New York, NY, USA, 1998.
47. Canel, M.J.; Luoma-aho, V. *Public Sector Communication. Closing Gaps between Citizens and Organizations*; Wiley-Blackwell: Boston, MA, USA, 2018.
48. Levi-Faur, D. (Ed.) *The Oxford Handbook of Governance*; Oxford University Press: Oxford, UK, 2014.
49. Torfing, J. *Collaborative Innovation in the Public Sector*; Georgetown University Press: Washington, DC, USA, 2016.
50. European Commission. *Promoting Good Governance*; European Social Fund: Luxembourg, 2014.
51. Peters, G. Governance as Political Theory. In *The Oxford Handbook of Governance*; Levi-Faur, D., Ed.; Oxford University Press: Oxford, UK, 2014; pp. 19–32.
52. Beck, U.; Giddens, A.; Lash, S. *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order*; Stanford University Press: Stanford, CA, USA, 1994.
53. Fung, A.; Wright, E. Deepening Democracy: Innovations in Empowered Participatory Democracy. *Politics Soc.* **2001**, *29*, 5–41. [CrossRef]
54. Torfing, J.; Peters, G.; Pierre, J.; Sorensen, E. *Interactive Governance: Advancing a New Paradigm*; Oxford University Press: Oxford, UK, 2012.
55. Jessop, B. Governance and Metagovernance: On reflexivity, Requisite Variety and Requisite Irony. In *Governance as Social and Political Communication*; Bang, H., Ed.; Manchester University Press: Manchester, UK, 2002; pp. 101–116.
56. Ansell, C. The Networked Polity: Regional Development in Western Europe. *Governance* **2000**, *13*, 279–291. [CrossRef]
57. Klijn, E.H.; Koppenjan, J. *Governance Networks in the Public Sector*; Routledge: Abingdon, UK, 2016.
58. Ansell, C.; Gash, A. Collaborative Governance in Theory and Practice. *J. Public Adm. Res. Theory Pract.* **2007**, *8*, 543–571. [CrossRef]
59. González-Bereziartua, M. Urban efflorescences of the global and the local: An analysis of the territory of Gipuzkoa (Spain). In Proceedings of the 24th ISUF International Conference, Valencia, Spain, 27–29 September 2017. [CrossRef]
60. Özbolat, N.K.; Haegeman, K.; Sereti, K. *European Institute of Innovation and Technology (EIT) Knowledge and Innovation Communities (KICs): Collaboration in a RIS3 Context*; Publications Office of the European Union: Luxembourg, 2019. [CrossRef]
61. Leminen, S.; Westerlund, M.; Nyström, A.G. Living Labs as Open-Innovation Networks. *Technol. Innov. Manag. Rev.* **2012**, *2*, 6–11. [CrossRef]
62. Chesbrough, H. *Open Innovation: The New Imperative from Creating and Profiting from Technology*; Harvard Business School Press: Boston, MA, USA, 2006.
63. Fromhold-Eisebith, M. Bridging Scales in Innovation Policies: How to Link Regional, National and International Innovation Systems. *Eur. Plan. Stud.* **2007**, *15*, 217–233. [CrossRef]
64. Perianez-Forte, I.; Marinelli, E.; Foray, D. The Entrepreneurial Discovery Process (EDP) cycle: From priority selection to strategy implementation. In *Implementing Smart Specialisation: A Handbook*; Gianelle, C., Kyriakou, D., Cohen, C., Przeor, M., Eds.; European Commission: Brussels, Belgium, 2016; pp. 14–35.

65. Rodríguez-Pose, A.; Wilkie, C. *Institutions and the Entrepreneurial Discovery Process for Smart Specialization*; Papers in Evolutionary Economic Geography N. 15.23; Utrecht University: Utrecht, The Netherlands, 2015.
66. Szerb, L.; Ortega-Argilés, R.; Acs, Z.J.; Komlósi, É. Optimizing entrepreneurial development processes for smart specialization in the European Union. *Pap. Reg. Sci.* **2020**, *99*, 1413–1457. [CrossRef]
67. Keyson, D.V.; Morrison, G.M.; Baedeker, C.; Liedtke, C. Living Labs to Accelerate Innovation. In *Living Labs: Design and Assessment of Sustainable Living*; Keyson, D.V., Guerra-Santin, O., Lockton, D., Eds.; Springer: Cham, Switzerland, 2017; pp. 55–62.
68. Gascó, M. Living labs: Implementing open innovation in the public sector. *Gov. Inf. Q.* **2016**, *34*, 90–98. [CrossRef]
69. Tõnurist, P.; Kattel, R.; Lember, V. Innovation labs in the public sector: What they are and what they do? *Public Manag. Rev.* **2017**, *19*, 1455–1479. [CrossRef]
70. Huggins, R.; Thompson, P. Entrepreneurship, innovation and regional growth: A network theory. *Small Bus. Econ.* **2015**, *45*, 103–128. [CrossRef]
71. Müller, K.; Rammer, C.; Trüby, J. The role of creative industries in industrial innovation. *Innovation* **2009**, *11*, 148–168. [CrossRef]
72. Miles, I.; Green, L. *Hidden Innovation in the Creative Industries*; NESTA: London, UK, 2008.
73. Bakhshi, H.; McVittie, E. Creative supply-chain linkages and innovation: Do the creative industries stimulate business innovation in the wider economy? *Innov. Organ. Manag.* **2009**, *11*, 169–189. [CrossRef]
74. Edwards-Schachter, M. The nature and variety of innovation. *Int. J. Innov. Stud.* **2018**, *2*, 65–79. [CrossRef]
75. Andres, L.; Grésillon, B. Cultural brownfields in European cities: A new mainstream object for cultural and urban policies. *Int. J. Cult. Policy* **2013**, *19*, 40–62. [CrossRef]
76. Barandiaran, X.; Peña, S.; Unceta, A. The Archipelago of Cultural and Creative Industries: A Case Study of the Basque Country. *Economies* **2019**, *8*, 21. [CrossRef]
77. Urdangarin, J.; Aparicio, M.; Bordenave, S.; De Epalza, C.; Goitia, S.; Kanalaetxabarria, F.; Larrabeiti, A.; Redondo, I. *Creadis3: Report on Territorial Diagnosis. Basque Country*; Basque Government: Vitoria, Spain, 2018.
78. EUSTAT. Gross Domestic Product (GDP) of the Basque Country. *Basque Statistics Institute.* Available online: https://en.eustat.eus/banku/id_3426/indexLista.html (accessed on 23 November 2020).
79. Observatory of Basque Culture. *Analysis of Businesses, Jobs and Labour Market of the Cultural Milieu in the Autonomous Community of the Basque Country*; Basque Government: Vitoria, Spain, 2016.
80. Pratt, A.C. The cultural and creative industries: Organisational and spatial challenges to their governance. *Die Erde* **2013**, *143*, 317–334.
81. Ruth Eikhof, D.; Warhurst, C. The promised land? Why social inequalities are systemic in the creative industries. *Empl. Relat.* **2013**, *35*, 495–508. [CrossRef]
82. Swedberg, R. The cultural entrepreneur and the creative industries: Beginning in Vienna. *J. Cult. Econ.* **2006**, *30*, 243–261. [CrossRef]
83. Colombo, M.G.; Dagnino, G.B.; Lehmann, E.E.; Salmador, M.P. The governance of entrepreneurial ecosystems. *Small Bus. Econ.* **2017**, *52*, 419–428. [CrossRef]
84. Baumol, W.J. Entrepreneurship: Productive, Unproductive, and Destructive. *J. Political Econ.* **1990**, *98*, 893–921. [CrossRef]
85. Rampersad, G. Entrepreneurial Ecosystems: A Governance Perspective. *J. Res. Bus. Econ. Manag.* **2016**, *7*, 1122–1134.
86. Audretsch, D.; Colombelli, A.; Grilli, L.; Minola, T.; Rasmussen, E. Innovative start-ups and policy initiatives. *Res. Policy* **2020**, *49*, 104027. [CrossRef]
87. Patil, S.K.; Kant, R. Methodological literature review of knowledge management research. *Tékhne* **2014**, *12*, 3–14. [CrossRef]
88. Natow, R.S. The use of triangulation in qualitative studies employing elite interviews. *Qual. Res.* **2020**, *20*, 160–173. [CrossRef]
89. Tight, M. *Understanding Case Study Research*; SAGE Publications: London, UK, 2017.
90. Brower, R.S.; Abolafia, M.Y.; Carr, J.B. On improving qualitative methods in public administration research. *Adm. Soc.* **2000**, *32*, 363–397. [CrossRef]
91. Van Thiel, S. *Research Methods in Public Administration and Public Management*; Routledge: Abingdon, UK, 2014.
92. Fernández, A.; Lazkano, I.; Eguskiza, L.; Larrauri, I.; Zunzunegui, S.; Zumalde, I. *Basque-Speaking Teenagers in Gipuzkoa: Consumption and Creation of Audiovisual Content*; University of the Basque Country: Leioa, Spain, 2017.
93. Mimenza-Castillo, L. (Ed.) *Yearbook of Basque Language Media, 2019*; Behategia: Andoain, Spain, 2019.
94. Brenner, W.; Uebernickel, F.; Abrell, T. Design Thinking as Mindset, Process, and Toolbox. In *Design Thinking for Innovation*, 1st ed.; Brenner, W., Uebernickel, F., Eds.; Springer: Cham, Switzerland, 2016; pp. 3–21.
95. Building the Future. *Digital Gastronomy: Strategic Plan Proposal*; Gipuzkoa Provincial Council: San Sebastian, Spain, 2018.
96. Basque Government. *Gastronomy and Nutrition Strategic Plan 2020*; Basque Government: Vitoria, Spain, 2019.
97. BCC Innovation. *LABe–Digital Gastronomy Lab Presentation Dossier*; Basque Culinary Center: San Sebastian, Spain, 2020.
98. Lawson, C.; Lorenz, E. Collective Learning, Tacit Knowledge and Regional Innovative Capacity. *Reg. Stud.* **1999**, *33*, 305–317. [CrossRef]
99. Maskell, P.; Malmberg, A. Localised learning and industrial competitiveness. *Camb. J. Econ.* **1999**, *23*, 167–185. [CrossRef]
100. Boschma, R. Proximity and Innovation: A Critical Assessment. *Reg. Stud.* **2005**, *39*, 61–74. [CrossRef]
101. Kirat, T.; Lung, Y. Innovation and Proximity: Territories as Loci of Collective Learning Processes. *Eur. Urban Reg. Stud.* **1999**, *6*, 27–38. [CrossRef]

102. Cooke, P.; Gomez-Uranga, M.; Etxebarria, G. Regional innovation systems: Institutional and organisational dimensions. *Res. Policy* **1997**, *26*, 475–491. [CrossRef]
103. Benz, A.; Fürst, D. Policy Learning in Regional Networks. *Eur. Urban Reg. Stud.* **2002**, *9*, 21–35. [CrossRef]
104. Fox, T.; Rampton, J. *ExPost Evaluation of the 2016 European Capitals of Culture*; European Commission: Luxembourg, 2017.
105. Kooiman, J. Social-Political Governance. *Public Manag. Rev.* **1999**, *1*, 67–92. [CrossRef]
106. Arantzabal, I.; Pavon, A.; Agirre, O.; Arana, G. *2deo–Basque Language Audiovisual Lab*; Gipuzkoa Provincial Council: San Sebastian, Spain, 2018.
107. Karlsen, J.; Larrea, M. The contribution of action research to policy learning. *Int. J. Action Res.* **2014**, *10*, 129–155. [CrossRef]
108. Borrás, S.; Edquist, C. The choice of innovation policy instruments. *Technol. Forecast. Soc. Chang.* **2013**, *80*, 1513–1522. [CrossRef]
109. Edler, J.; Fagerberg, J. Innovation policy: What, why, and how. *Oxf. Rev. Econ. Policy* **2017**, *33*, 2–23. [CrossRef]
110. Asheim, B.T.; Coenen, L. Knowledge bases and regional innovation systems: Comparing Nordic clusters. *Res. Policy* **2005**, *34*, 1173–1190. [CrossRef]
111. McAllister, I. *Working with Neighbors: University Partnerships for International Development*; Association of Universities and Colleges of Canada: Ottawa, ON, Canada, 1996.
112. Etzkowitz, H.; Leydesdorff, L. *Universities in the Global Economie: A Triple Hélix of University, Industry and Government Relations*; Cassell Academic: London, UK, 1997.
113. Mott, A. *University Education for Community Change: A Vital Strategy for Progress on Poverty, Race and Community Building*; Community Learning Project: Washington, DC, USA, 2005.
114. Sterling, S. Higher Education, Sustainability, and the Role of Systemic Learning. In *Higher Education and the Challenge of Sustainability*; Corcoran, P.B., Wals, A.E.J., Eds.; Springer: Dordrecht, The Netherlands, 2004.
115. Wenger, E.; McDermott, R.; Snyder, W. *Cultivating Communities of Practice: A Guide to Managing Knowledge*; Harvard Business School Press: Brighton, MA, USA, 2007.
116. Hansen, M.; Nohria, N.; Tierney, T. What's Your Strategy for Managing Knowledge? *Harv. Bus. Rev.* **1999**, *77*, 106–116. [PubMed]
117. Bresnen, M.; Edelman, L.; Newell, S.; Scarbrough, H.; Swan, J. Social practices and the management of knowledge in project environments. *Int. J. Proj. Manag.* **2003**, *21*, 157–166. [CrossRef]
118. Wenger, E. Communities of practice: Learning as a social system. *Syst. Think.* **1998**, *9*, 2–10. [CrossRef]
119. Engeström, Y. Expansive Learning at Work: Toward an activity theoretical reconceptualization. *J. Educ. Work* **2001**, *14*, 133–156. [CrossRef]
120. Cohen, W.M.; Levinthal, D.A. Absorptive Capacity: A New Perspective on Learning and Innovation. *Adm. Science Q.* **1990**, *35*, 128–152. [CrossRef]
121. Sussan, F.; Acs, Z.J. The Digital Entrepreneurial Ecosystem. *Small Bus. Econ.* **2017**, *49*, 55–73. [CrossRef]
122. Dörflinger, A.; Bachinger, K.; Enichlmair, C.; Fischl, I.; Gavac, K.; Hausemer, P.; Oberholzner, T.; Spaghetti, V. *Boosting the Competitiveness of Cultural and Creative Industries for Growth and Jobs*; European Commission: Luxemburg, 2016. [CrossRef]
123. Leendertse, J.; Schrijvers, M.; Stam, E. *Measure Twice, Cut Once: Entrepreneurial Ecosystem Metrics*; Working Paper N. 20-01/2020; Utrecht University School of Economics: Utrecht, The Netherlands, 2020.
124. Sinnergiak Social Innovation. *Cultural Industries in the Basque Country: Present and Future*; Sinnergiak Social Innovation: San Sebastian, Spain, 2014.
125. Nambisan, S. Digital Entrepreneurship: Toward a Digital Technology Perspective of Entrepreneurship. *Entrep. Theory Pract.* **2017**, *41*, 1029–1055. [CrossRef]
126. Alasoini, T. Nordic Working Life Development Programs and the Tricky Problem of Scaling-up. *Nord. J. Work. Life Stud.* **2018**, *8*, 71–91. [CrossRef]
127. Ansell, C.; Sørensen, E.; Torfing, J. The COVID-19 pandemic as a game changer for public administration and leadership? The need for robust governance responses to turbulent problems. *Public Manag. Rev.* **2020**, 1–12. [CrossRef]
128. Observatory of Basque Culture. *Monitoring the Impact of Covid-19 in the Basque Cultural Sector*; Basque Government: Vitoria, Spain, 2020.
129. EY Consulting. *Rebuilding Europe: The Cultural and Creative Economy before and after the COVID-19 Crisis*; GESAC: Brussels, Belgium, 2021.

sustainability

MDPI

Article

A Fuzzy-Based Application for Marketing 4.0 Brand Perception in the COVID-19 Process

Ozge Yasar [1] and Tulay Korkusuz Polat [2,*]

[1] Institute of Natural Sciences, Sakarya University, Sakarya 54050, Turkey
[2] Industrial Engineering Department, Sakarya University, Sakarya 54050, Turkey
* Correspondence: korkusuz@sakarya.edu.tr

Abstract: One main point distinguishing Marketing 4.0 from other marketing approaches is the "customer". Marketing 4.0 focuses on "act" and "advocacy" within the 5A (aware, appeal, ask, act, and advocate) customer path. In Marketing 4.0, advocacy is as important as the purchase of customers. In order to have good competitive power in the digital world, and to follow and guide their digital customers, brands need to determine their marketing strategies by considering the 5A customer path, in which there may be touchpoints where brands can intervene. During the COVID-19 pandemic, there was a significant decrease in the incomes of consumers due to the closure of businesses and/or personnel dismissals. With this decrease in income, consumer purchasing habits have changed. For this reason, many companies have started studies to explore how to increase customer loyalty. This study aimed to understand how the marketing process and brand loyalty of a company operating in the cleaning products category were affected before and during the pandemic and to identify weak touchpoints in the customer path by developing a 5A customer path model based on fuzzy logic. The study also aimed to monitor customer purchasing and brand advocacy rates during the pandemic and detect the problematic touchpoints on the 5A customer path. The main contribution of this study to practitioners and brand strategy managers is that it brings a different dimension to the field of Marketing 4.0 applications with a fuzzy logic approach. In this study, a rule-based fuzzy logic application was used for the first time to identify the deficiencies in the 5A customer path. With the fuzzy logic approach, an artificial intelligence technology, failure points on the 5A customer path can be known in advance, and brand managers will be able to determine appropriate strategies to increase the advocacy of their brands and take precautions where necessary. Brand managers can periodically collect customer data and use fuzzy logic to identify and eliminate 5A customer path disruptions.

Keywords: COVID-19; rule-based fuzzy logic; 5A customer path; Marketing 4.0

Citation: Yasar, O.; Korkusuz Polat, T. A Fuzzy-Based Application for Marketing 4.0 Brand Perception in the COVID-19 Process. *Sustainability* **2022**, *14*, 16407. https://doi.org/10.3390/su142416407

Academic Editor: Adam Jabłoński

Received: 6 October 2022
Accepted: 2 December 2022
Published: 8 December 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

1. Introduction

The effects of developing technology in recent years have touched every aspect of life. Technology provides convenience in every area, from health, education, and tourism to industry, business, and social life. New concepts emerging with new technologies create innovations for both manufacturers and consumers. With the adoption of the Industry 4.0 concept, the effect of digitalization has been seen in many applications, such as smart factories [1,2], lean manufacturing [3,4], airport systems [5], and flexible production systems [6]. Review sources such as Fuartes et al. [7], Baran and Korkusuz Polat [8], and Contini and Peruzzini [9] can be consulted for more detailed information on Industry 4.0. In the face of the evolving world market, the desires and needs of human beings also change. These changes provide the formation of new markets, new products, and new sectors. Manufacturers who follow innovations and technology have a say in these new products/markets/sectors and increase their profitability. However, manufacturers who cannot follow innovations and technology and cannot respond to consumer needs will

fail [10,11]. Today, consumers are interested in the product; they want to access whatever they want in terms of time, location, quantity, and quality. This situation increases the market competition in all sectors [12]. Increasing market competition leads to changes in companies' sales and marketing strategies. Firms that switch from traditional to digital marketing do not hesitate to increase their marketing budgets [13].

Along with digital transformation, there have been changes in management strategies and forms. Digital transformation is very effective in marketing communication. With the transformation, the importance of the customer and brand value increases. study by Hughes and Vafeas [14] followed a methodology using qualitative and quantitative questionnaire data. It was revealed among the study's findings that the relationship between the customer and the brand is proportional to how much the customer meets the needs and wishes of the brand. Although consumption increases in the digitalized world, market competition increases as product diversity increases. Marketing activities should be open to changes and diverse, as marketing is a dynamic structure. For this reason, companies want to increase their chances of competing in the market by integrating the concept of Marketing 4.0 into their strategies, which has been called the transition from traditional to digital in recent years. Marketing 4.0 is a marketing evolution that aims to make the customer part of the brand and addresses digital and traditional marketing methods together, caring only on behalf of the non-profit brand and about its identity and using online and offline systems together to complete the customer's path from brand awareness to customer advocacy [15,16]. Marketing 4.0 adheres to the Internet when digitizing economic activities and creates new marketing strategies that improve the brand–customer relationship [16].

Many studies on digital marketing can be found in the literature. Hwang and Kim [17] conducted a Marketing 4.0 study investigating the 5A customer path of food tourists of generations X and Y in Korea. In the study, it was shown that although generation Y has more social interactions than generation X, both consumer groups use social media quite frequently. In addition, it was shown that the effect of brand advocacy on social media is relatively high in the action phase. Székely et al. [18] observed low productivity during the distribution of industrial semi-finished products in Southeast Europe. Therefore, to increase efficiency in their work, they conducted 500 h of observation and two rounds of questionnaires in four countries in Southeast Europe; the 5A customer path constituted the industrial customer path. Dash et al. [19] demonstrated that brand quality and stance impact customer satisfaction and affect customer purchases according to a Marketing 4.0 study on 508 first-time real estate buyers. Aoki et al. [20] drew attention to two questions in the customer purchase journey with their study: What touchpoints increase the brand experience? Moreover, what is the impact of brand experiences on customer contribution? In the study, they investigated the customer experiences and the contribution of customers of the brand Nike in Japan. The researchers stated that brand experience can increase customer contribution according to their results, and that non-monetary contribution is a defining feature of the brand experience. It has been observed that when brand experiences are improved, brand advocacy can also be increased. Duncan's [21] study stated that the most effective touchpoints are "customer-created touchpoints".

Artificial intelligence studies have gained momentum in recent years and are used to make activities more efficient, effective, reliable, etc. [22]. With the digitalization of marketing studies, artificial intelligence technologies are frequently used in marketing applications as in other business subjects. Mustak et al. [23] revealed ten major research points in their study examining artificial intelligence applications in marketing. These include understanding the customer correctly [24], industrial studies of artificial intelligence [25,26], and insights based on customer conversations in electronic environments [27,28] to improve market performance, to utilize artificial intelligence applications for brand management, to increase and improve customer loyalty [29], to use artificial intelligence to improve new side applications and customer services [30], and to implement artificial intelligence and strategic marketing together [31]. The fuzzy logic approach is an artificial intelligence

technology frequently used in many business problems where uncertain knowledge needs to be processed. Janarthanan et al. [32] created a fuzzy system with 23 rules using temperature and precipitation parameters to calculate wind speed. Mijović et al. [33] used fuzzy logic to determine airline market shares in long-haul flights. In their study, Yıldız and Kişoğlu [34] made the most appropriate upper body estimation application with a rule-based fuzzy logic approach in the women's clothing sector. A model with two inputs and one output parameter was created for the application, and a rule base consisting of 25 rules was prepared. Sarmah et al. [35] used rule-based fuzzy logic to evaluate the quality of a hydroelectric power plant environmental impact assessment report. Soylu and Carman [36] used fuzzy logic in the automatic slip control systems they developed for agricultural tractors. In the study, they aimed to automatically change the working depth of the equipment by measuring the amount of slippage that occurs during tillage activities. Iancu [37] developed a model to diagnose heart disease using a rule-based fuzzy logic application. In the study, 44 rules were created for the model, which consisted of eleven input variables and one output variable with the Mamdani fuzzy logic approach. Arslankaya and Celik [38] used the fuzzy logic approach for heart attack prediction in their study, creating 576 rules. Another area where fuzzy logic has been applied is COVID-19, which emerged unexpectedly in 2020 and affected the whole world. One of these studies is the fuzzy logic programming and adaptability design study of medical products for anti-epidemic normalization by Fu and Liang [39]. The study proposes a design method with the fuzzy logic approach for medical products. Meanwhile, Kokoç et al. [40] developed a fuzzy inference system to choose a marketing strategy in their study.

With the fuzzy logic approach, productivity increases with the opportunity to make more detailed and different analyses in marketing activities. Li and Li [41] developed a decision-making model to support international marketing planning. The researchers used multiple software tools, simulation, and the fuzzy logic approach in the model in an integrated manner. Lin et al. [42] used the fuzzy logic approach to develop a decision-making model that accurately analyzes human thoughts during market research and reveals the partial mediation of time. Social media usage rates, which are increasing daily, have reached levels that attract the attention of companies. Companies now carry out customer relations and management through social media networks. Howells and Ertugan [43] used the fuzzy logic approach to analyze sensitivity in social media data. The study also mentioned that fuzzy logic applications are used in customer comment analysis and effective marketing campaigns.

When the studies in the literature were examined, no application was found in which the fuzzy logic approach was used in the Marketing 4.0 concept. Thus, fuzzy rules were used for the first time here to measure the weaknesses in the touchpoints of the 5A customer path, which is one of the foundations of Marketing 4.0. In this study, a 5A customer path model based on fuzzy logic was created to understand how the marketing process, brand loyalty, and advocacy were affected before and after the pandemic in the cleaning products category. When the sales data for the first six months of 2020 for e-commerce, the most significant digital marketing source, were examined, an increase was seen compared to 2019 [44]. The increase is thought to be due to COVID-19, and mainly due to the increase in supermarket shopping from home [45]. The COVID-19 era has caused the primary needs of consumers to change. Cleaning and hygiene products have become a priority need for customers. Most customers who want to be protected from the disease have turned to e-commerce sites to avoid contact and for ease of access. The reason for choosing cleaning and hygiene products as an application example in this study is that the importance of these products for consumers has increased considerably with the pandemic. The application was made for a local brand providing tissue paper, paper towels, napkins, toilet paper, and hygiene products. Marketing 4.0 was used to assess the brand's sales before and during the pandemic, and a new model using rule-based fuzzy logic was proposed to measure weaknesses in the touchpoints of the 5A customer path. As a result of the implementation of the model, the changes in the purchasing and customer advocacy rates of the brand before

and during the pandemic as well as the insufficient points for awareness, attractiveness, curiosity, action, and advocacy in this process were determined, and solutions were offered for these points. The study consisted of five parts. In Section 2, the Marketing 4.0 and fuzzy logic approaches are explained. The developed rule-based fuzzy logic-supported 5A customer path model is explained in Section 3. In Section 4, the findings obtained from the study are evaluated. Finally, Section 5 contains the conclusions, strategies, and recommendations on how to work in the future.

2. Methodology

PAR (purchase action ratio) and BAR (brand advocacy ratio) values related to brand advocacy and the 5A customer path emphasized by Marketing 4.0 and the fuzzy logic approach were used in the application. The PAR and BAR values of the brand were calculated according to the data obtained from questionnaires given to the brand customers, who are the subject of the application. At the same time, weaknesses in the touchpoints of the 5A customer path were identified with the rule-based fuzzy logic approach.

2.1. Marketing 4.0

Traditional marketing is essential for raising brand awareness and attracting customers, and the customer is the first stage of the company relationship [46]. Recently, customer preferences have shifted from market-leading brands to lesser-known private ones. The increase in Internet usage and the development of technology have changed market competition because they positively affect the elimination of shopping restrictions (time, place, access, payment methods, etc.). Today, customers have become more valuable and powerful when market competition is high. Companies try to connect customers with the brands they create while making them valuable. Thus, they also create brand value. With the increase in brand value, their purchasing awareness increases. As customers gain purchasing awareness, they continue researching the product they will buy by looking at their user experiences, reviews, prices, and campaigns and even going to the physical store [47]. This situation has led businesses to use digital marketing strategies. The most important step of digital marketing is to increase purchasing and advocacy based on brand loyalty [48]. To adapt to digitalized marketing, marketing activities in companies have also started to digitalize [49]. As customers prefer brands they can reach anywhere and anytime, companies often combine offline marketing with online marketing [50].

Marketing 4.0 integrates online and offline systems between companies and customers, makes the brand transparent, and is a marketing approach that increases customer engagement [51,52]. Marketing 4.0 has changed over time, similar to Industry 4.0, reaching its current form following the latest updates after Marketing 1.0 (product-oriented), Marketing 2.0 (consumer-oriented), and Marketing 3.0 (human-oriented) [53,54]. In addition to human-oriented Marketing 3.0, Marketing 4.0 has been developed by detailing customer decision-making regarding brand advocacy. Marketing 4.0 consists of brand identity, brand image, brand integrity, and brand interaction [19]. With the new dimension of brand interaction, companies take their value from the brand to the customer and raise their customers' awareness about the impact of value-based actions. It is not enough for a brand for a customer to complete a purchase. The customer must be satisfied with the purchase, product, procurement, packaging, etc., and must repeatedly come to the point of purchase [55]. Providing brand advocacy is one of the most important goals of Marketing 4.0. To maintain their competitiveness, businesses have to measure brand advocacy and identify weak points in the touchpoints of the 5A customer path to increase brand advocacy.

5A Customer Path

The customer becomes a brand advocate by establishing an emotional bond with the brand with the positive experiences he or she has gained from the brand. Companies aim to achieve 100% satisfaction with the customer experience by increasing channels

to constantly communicate with the customer [56]. While this increases the interaction between the customer and the company, it also increases the BAR value by enabling the customer to be a brand advocate at the touchpoints on the 5A customer path [31]. Defining the 5A customer path correctly is essential when determining strategies to win, retain, and maintain customers. The 5A concept, also known as the new customer path, is a marketing approach that considers the customer's behavior towards the brand in the following steps: aware, appeal, ask, act, and advocate [57,58]. The touchpoint is defined as customers' interaction on the 5A route with the brand or other customers related to the brand on online and offline channels [59]. For successful omnichannel marketing, marketing experts should correctly examine the touchpoints on the 5A customer path and reach the customer at critical touchpoints to satisfy the customer [60].

Brand managers conduct research to determine their position in the market. Some consider the profit margin, while others consider customer loyalty. Increasing customer loyalty also increases the rate of recommendation of the brand by customers. To increase this rate, companies also calculate the rate of recommendation and purchase by customers aware of their brands. The PAR and BAR are used in these calculations. The PAR shown in Equation (1) is the calculation of brand awareness in the purchasing process. The BAR shown in Equation (2) transforms customers' aware of the brand into "loyal brand advocates" [48].

$$Purchase\ Action\ Ratio(PAR): \frac{Purchase\ Action}{Spontaneous\ Awareness}\ , \quad (1)$$

$$Brand\ Advocacy\ Ratio\ (BAR): \frac{Spontaneous\ Advocacy}{Spontaneous\ Awareness}\ , \quad (2)$$

The PAR and BAR show how companies' brand awareness efforts will receive feedback on investments. In the next step, companies that see the PAR and BAR and the level of awareness leading to purchasing and advocacy either revise their advertising and marketing strategies or introduce new strategies. The failure of a company to translate brand awareness into purchasing or advocacy indicates that the customer is experiencing a disconnect between steps in the 5A concept [57,58]. They can, however, observe where work and advertisements are missing in the process; identifying and solving the problems can provide the desired efficiency level in the PAR and BAR [48]. In the purchasing process, brand awareness does not turn into a buying action due to reasons such as the possibility that the customer knows the brand but does not find the brand's product attractive and does not wonder about the brand, the customer struggles to access the product, or the customer is not satisfied with the customer service they received when asking for information. During the advocacy process, the customer who has made a purchase is asked to defend the brand. If the customer is unsatisfied with the brand experience, they will not advocate it. This situation shows low emotional intimacy between the customer and the brand [48].

Different industry archetype models have emerged because customers' industry expectations are different in terms of the customer touchpoints during marketing: aware, appeal, ask, act, and advocate. These models are the Doorknob, Goldfish, Trumpet, Funnel, and Bow Tie models [17]. The "Doorknob" model is the most common. The model's feature is that customers with a low level of curiosity have a high tendency to repurchase the same brand. The second largest model after the Doorknob model is the "Goldfish" model. The feature that distinguishes the latter from the former is the high level of customer curiosity. The sales process of the product or service is long-term, and customers who fit this model conduct extensive research and evaluation and are influenced by the brand conversations around them while purchasing the product. The "Trumpet" model is where customers with the lowest purchasing tendency stand in the 5A customer path due to high product prices. However, even those who cannot buy the product due to its high price but are exposed to brand conversations with the influence of the environment constitute a customer profile that recommends and researches the product. The "Funnel" model is the only one in which

customers plan their purchasing decisions well and go through every stage from brand awareness to brand advocacy. Customers who fit this model research the information they have gained from brand conversations and decide to buy the product when they come to the results they like. However, the customer must be satisfied with the product and brand [17,61].

The first four industry archetype models have strengths and weaknesses in the points located on the 5A customer path. The "Bow Tie" model, the last sector archetype model, eliminates the weaknesses of the other four models and includes the strengths of all four models. The brand awareness value is equal to the brand advocacy value, and the BAR value of the mentioned brand has the best performance of one point in the ideal Bow Tie model. Since the model's brand attractiveness and liability are the same, everyone who has attraction to the brand buys the brand. In this case, while the level of curiosity enables the customer to buy the brand, it also prevents unnecessary research on the brand. Figure 1 shows the "Bow Tie" model compared with the other four models.

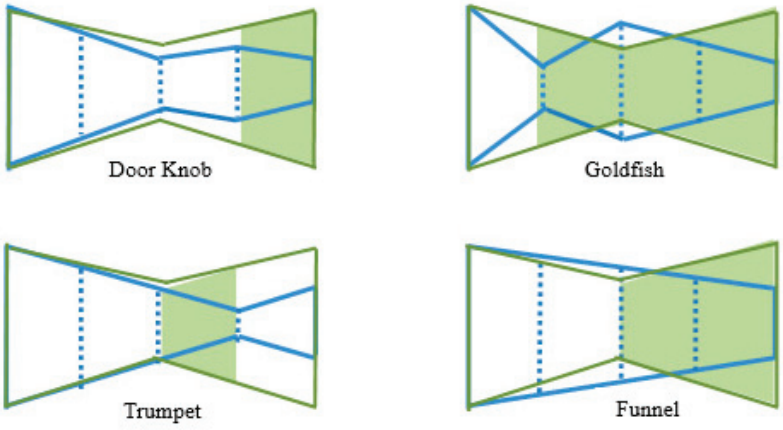

Figure 1. Improving a company's success with industry archetypes [48].

2.2. Fuzzy Logic Approach

Various systems have been produced to facilitate human life in the past years, and today, these systems are developing more with global standards. Along with technology, the fuzzy logic approach developed under artificial intelligence systems is one of them. The fuzzy logic approach is used in these systems because it is challenging to apply classical logic in systems where mathematical modeling is complex, there is no model, or there are many variable members [62,63]. The fuzzy logic approach systematically arranges the collected data under specific rules, considering user experiences. In fuzzy logic applications, linguistic variables that vary according to everyone instead of absolute actual variables create fuzzy data and cause fuzzy results [64]. Results from the rule-based fuzzy logic approach, different from mathematical models, are obtained according to the users' rules, considering the users' experience [65].

Fuzzy logic is an artificial intelligence technology that does not work on exact values but rather operates on fuzzy values. Generally, a membership function is assigned to fuzzy sets, where linguistic variables create flexibility [66]. A fuzzy set is a collection of objects with continuity, in which the membership function of the objects is characterized by changes in the range of 0–1 [62]. Fuzzy logic is a method that creates a decision-making mechanism with symbolic expressions by using subjective data instead of numerical data without a specific mathematical model and produces efficient and acceptable results [67–73]. Within the framework of the fuzzy approach, it is necessary to consider problems more clearly and consider all possibilities. To solve such problems, rules can be created. Fuzzy rules are the

linguistic expression of control rules that reflect the experience and knowledge of experts. The process of the rule-based fuzzy logic approach is summarized in Figure 2 [74].

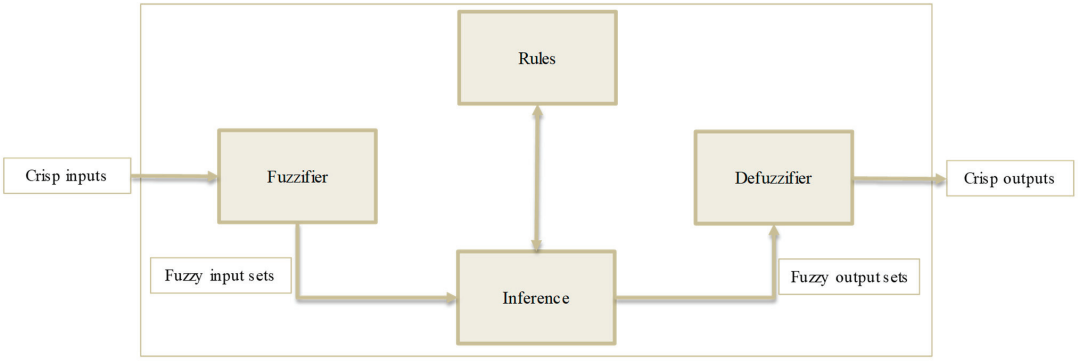

Figure 2. Rule-based fuzzy logic system.

Fuzzifier: The fuzzifier converts variables into symbolic values and linguistic qualifiers with the help of determining membership functions. In fuzzy logic systems, different membership functions can be used in different structures that shape sets and show the boundaries of linguistic expressions on the graph. Triangle, trapezoidal, bell curve, Gaussian, and sigmoid functions are the most widely used membership functions [75–78]. In this study, after using several different types of membership functions, the triangular membership function was considered to give the most relevant results and had a single value of "1". When the linguistic variables of each input are evaluated, the linguistic variable corresponds to the value "1" for customers to buy the product "never".

Setting the Rule: Rules are created to convert linguistic input variables to output variables. In rule-based fuzzy logic approaches, rules are prepared using "If–Then" statements as well as "and" and "or" [79,80]. In Equations (3) and (4), examples of "and" and "or" rules are shown. According to the established rules, "and" gives minimum or maximum results. The number of rules may change depending on the number of input variables and fuzzy sets. Rules should be created to cover all possibilities in problem-solving, and all established rules should be added to the fuzzy inference system [81,82].

$$\text{If } X_1 \text{ is } A \text{ and } Y_1 \text{ is } B, \text{ then } Z_1 \text{ is } C \quad , \tag{3}$$

$$\text{If } X_2 \text{ is } D, \text{ or } Y_2 \text{ is } E, \text{ then } Z_2 \text{ is } E \quad , \tag{4}$$

Determination of Fuzzy Inference System: Based on the linguistic variables, different fuzzy inference systems such as Mamdani systems, Sugeno or Takagi–Sugeno–Kang (TSK) models, and Tsukamoto models can be used [83,84]. The Mamdani fuzzy inference system (MFIS) method is used in this study. The MFIS method gives fuzzy values that reveal the value of the variables in net values [83,85–88]. Moreover, it is an intuitive and widely used system suitable for a user-friendly interface [89]. The MFIS is used to study uncertain parameters such as nonlinear attribute parameters [90].

Defuzzifier: A fuzzy result is obtained by making fuzzy calculations, but crisp (non-fuzzy) results are needed to complete the problem [91]. Thus, the result obtained by performing calculations based on fuzzy rules should be clarified. Clarification can be performed as shown in Equation (5) [92].

$$(x)\begin{cases} a \le x < b & \rightarrow \frac{(x-a)}{(b-a)} \\ b \le x \le c & \rightarrow \frac{(c-x)}{(c-b)} \\ x < a \text{ or } x > c & \rightarrow 0 \end{cases} \quad , \tag{5}$$

Various programs have been developed for fuzzy logic approaches, which have many applications, to give correct and quick computer environments. One of them is the MATLAB program, in which fuzzy logic applications can be made by creating and editing a system via the Fuzzy Logic Toolbox (FLT). In this study, the fuzzy logic application was made with the support of the MATLAB program.

3. Proposed Model

The new coronavirus disease which first appeared in Wuhan, China, in December 2019 was named COVID-19 [93,94]. Before the first case was seen in Turkey on 11 March 2020, various precautions were taken by following the cases and developments in the rest of the world. After April 2020, curfews/restrictions were imposed, sometimes covering only metropolitan cities and sometimes the whole country. With the suggestion of health officials, the obligations of mask–distance–hygiene started to be implemented in the country as per the state policy. During the whole pandemic process, especially in March-April 2020, while the sales of products such as surgical masks, cologne, hand disinfectants, and hygiene/cleaning products peaked, there were cases where the products were out of stock. Consumers' preferences in their products (significantly increasing the demand for hygiene products) and their purchasing habits have changed with the pandemic. Therefore, it has been necessary for businesses to make changes in their marketing strategies to adapt to these new habits in customers. This study provides data on how a brand operating in the cleaning products industry acts at the points on the 5A customer path where it can communicate with customers and how this has changed with the pandemic, and whether this has been affected by the COVID-19 pandemic will be analyzed. Since these data are linguistic and contain uncertainty, the fuzzy logic approach, which processes uncertain knowledge, was used while evaluating them. Unlike the 5A customer path studies in the literature, the present evaluations of the touchpoints on the 5A customer path were made using the fuzzy logic approach for the first time. The rule-based fuzzy logic approach wasused to identify weaknesses at touchpoints in the 5A customer path. The rule base consists of 3137 rules, which is quite large compared to fuzzy logic applications in the literature. The summary flowchart of the application is shown in Figure 3.

According to the developed model, in the first stage of the application, a questionnaire was conducted to collect data on customer behavior and attitudes in a local area where the brand operates. Moreover, a customer portfolio was created by analyzing the data obtained from the questionnaires. In the second stage, the PAR and BAR values of the brand (using Equations (1) and (2)) were calculated according to the results obtained from the analysis. In the last stage of the application, the weak touchpoints for the brand's 5A customer path were determined by the rule-based fuzzy logic application, simultaneously with the calculation of the PAR and BAR values.

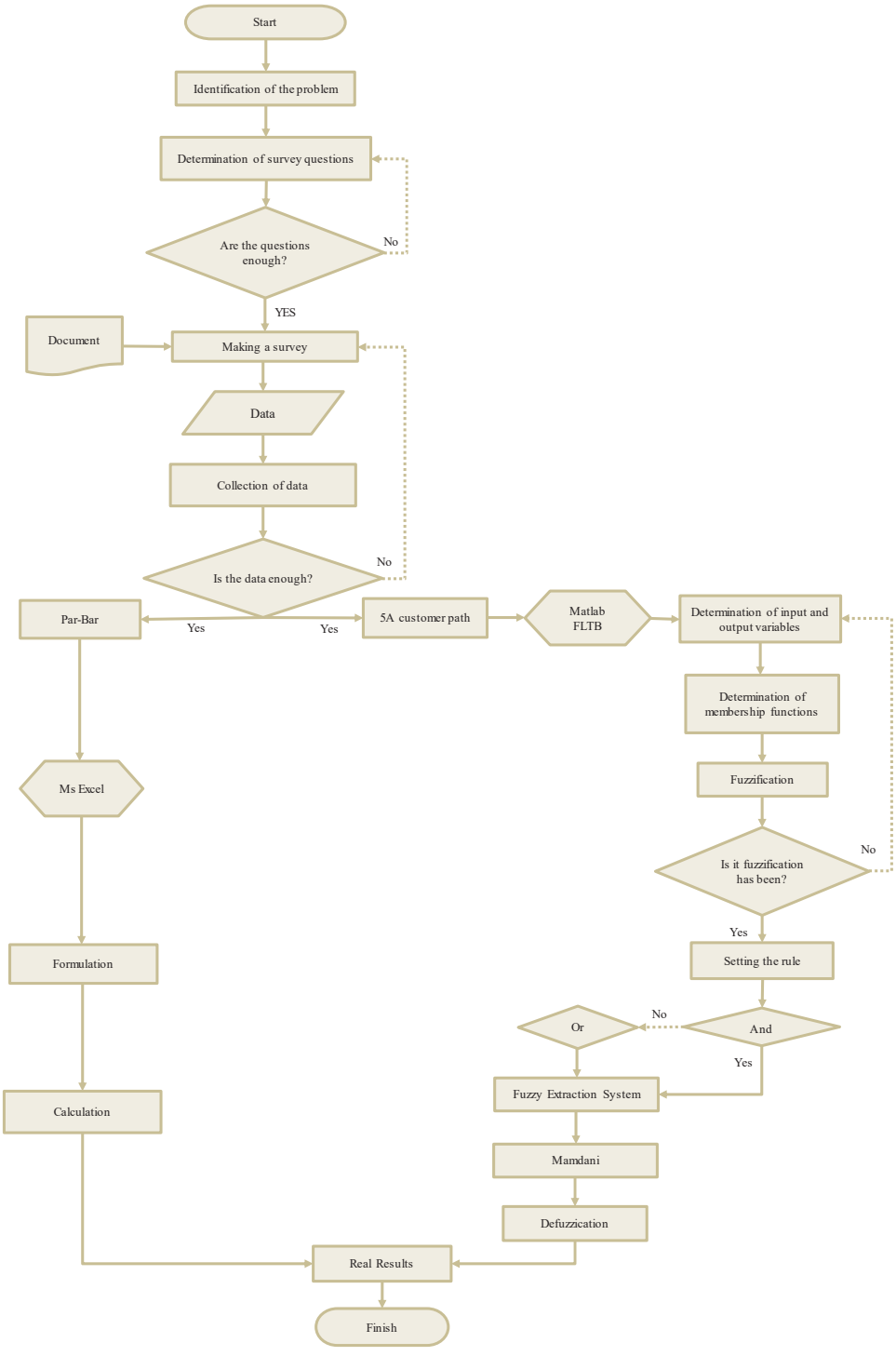

Figure 3. Application flowchart.

4. Results and Discussion

4.1. Obtaining and Evaluating Data

The study created a ten-question questionnaire to monitor customers' behavior, which was applied to 300 people (196 online and 104 face-to-face). The research sample consists of 300 people of different gender, ages, and education levels residing in Yalova and selected by the convenience sampling method. The research data were obtained by a questionnaire form developed by the researchers. While some participants could be questioned face-to-face in this process, about two-thirds of the participants completed the questionnaire online due to the pandemic conditions. While conducting the questionnaire, all participants were informed about the purpose of the questionnaire, and informed consent was obtained. The questionnaire, prepared in the Google forms environment, consisted of four parts (the questionnaire form is shown in Appendix A). The scope of the research was stated in the first part of the questionnaire to inform the customer filling out the questionnaire. Then, the second part obtained the customer's personal information to understand the customer portfolio closely. Name, age, sex, education level, and monthly income range were the data collected in this section. The third part of the questionnaire examined the customer's brand usage before the COVID-19 pandemic. The five questions created by taking the touchpoints on the 5A customer path into consideration addressed the brand awareness, curiosity, attraction, purchasing, and action touchpoints from the customer's perspective. With this part of the questionnaire, it can be observed how customers saw the brand before the COVID-19 pandemic, and if they did not choose the brand, why they did not choose it. The questions in the fourth part assessed the customer's attitude towards the brand during the COVID-19 pandemic and the customer path followed in this process. The large sample size will ensure that the results are close to the actual values during the questionnaire application.

A customer portfolio was created with the participation of 300 people living in the region where the brand's company is located (60% of the participants were female, and 40% were male). The age, education, and income levels of the participants are shown in Figure 4.

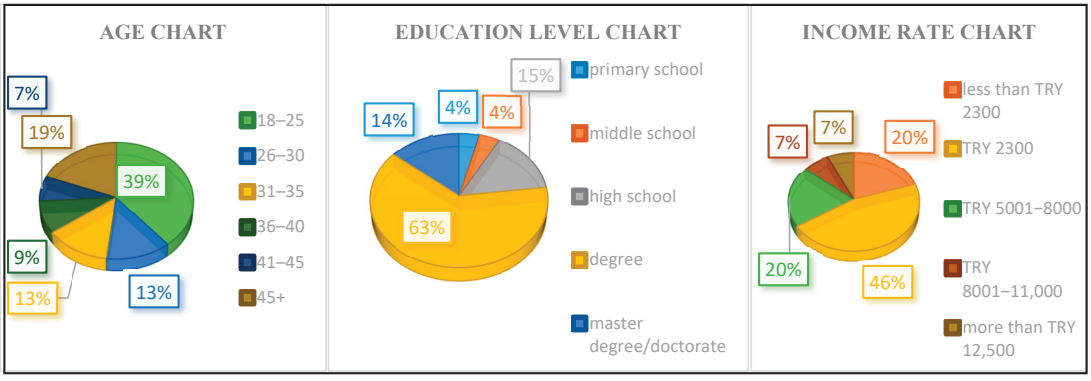

Figure 4. Data chart.

While some of the data collected by the questionnaire consist of demographic data, the rest consist of customer responses to be used in the third phase of the application, the fuzzy logic application. The graphs drawn according to the data obtained from the questionnaire results are shown in Figures 5 and 6. With the pandemic, purchasing rates in the questionnaire results were expected to decrease due to the decrease in purchasing power, the choice of substitute products in cases where access to the product was complex, and the decrease in shopping due to curfews. Figure 5 shows the purchasing and brand advocacy rates before and during the pandemic according to age and gender. Highlights in

the chart are that the number of purchases increased in the 31–35 age range, the advocacy rate for the 36–40 age range remained the same, and the advocacy rate for the 41–45 age group increased during the pandemic. The purchasing rate of female customers decreased by 24%, and the advocacy rate decreased by 16%. The most crucial result observed in male clients is that their advocacy rates remained constant.

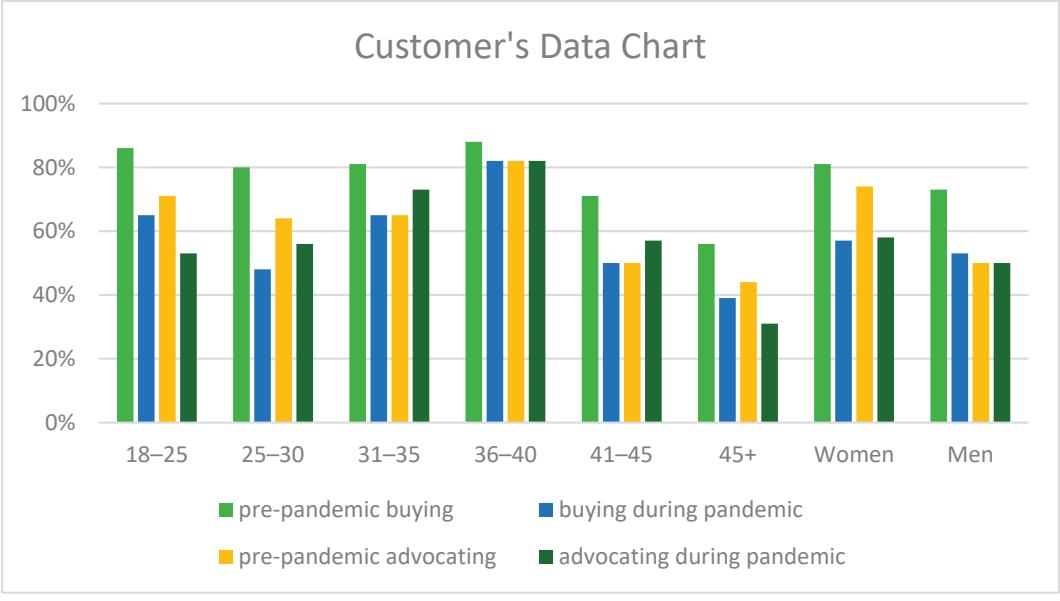

Figure 5. Customers' data chart (age and gender).

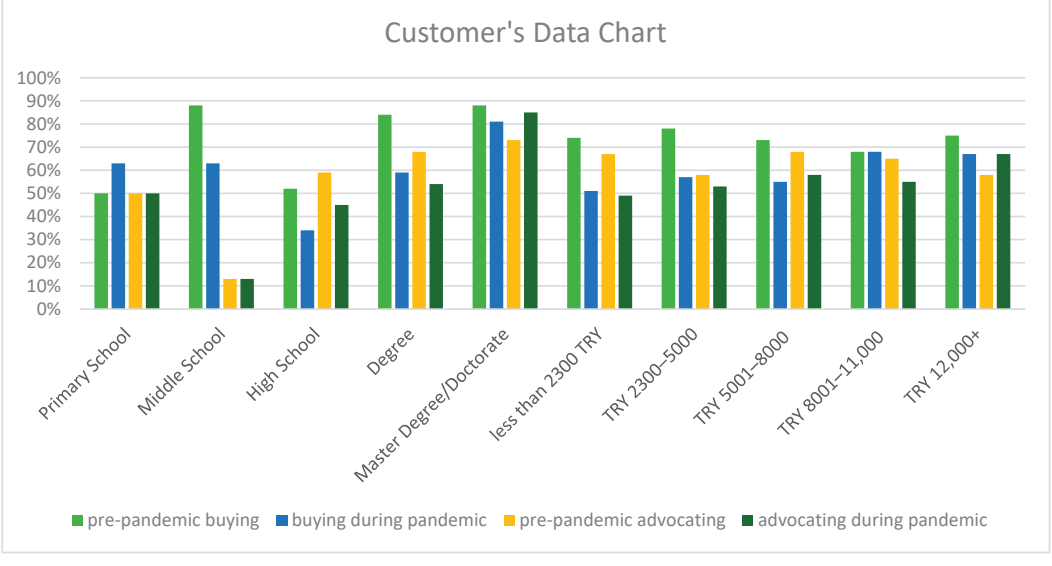

Figure 6. Customers' data chart (education level and income rate).

Figure 6 shows the purchasing and brand advocacy rates before and during the pandemic process according to the education and income level categories. Highlights in the chart are that the advocacy rate remained the same. Furthermore, the purchasing rate of those with a primary school education level remained the same, the advocacy rate remained the same for those educated to secondary school level, and the advocacy rate in customers with master's and doctorate degrees increased. There was no change in the purchasing rate for customers with an income level of TRY 8001–11,000, and the advocacy rate in customers earning above TRY 12,500 showed an increase of 9% (exchange rate for the questionnaire period: EUR 1 = TRY 10.46).

4.2. Calculation of PAR and BAR Values

In line with the data obtained from the questionnaire, the answers given by each customer were evaluated. The brand's status before and during the pandemic was examined in terms of PAR and BAR values, which are essential in marketing. The PAR and BAR values of the brand were calculated with Equations (1) and (2), respectively, (due to the many data in the questionnaire, the Excel program was used for calculations to obtain accurate results). Since some of the questionnaire answers contained linguistic variables, the answers were transformed into mathematical values when performing Excel calculations (for example, 5 for always, 4 for usually, 3 for sometimes, 2 for rarely, and 1 for never). The PAR and BAR values obtained are shown in Table 1.

Table 1. PAR and BAR variables.

	Pre-Pandemic	**During Pandemic**
PAR	0.96	0.79
BAR	0.78	0.71

The PAR value before the pandemic was 0.96. This shows that customers bought from the brand even if they did not find it attractive. Since the brand is well known in the sector and is known to be high-quality, it is not surprising to observe that every customer had purchased from it at least once according to the questionnaire. The BAR value of the same brand in the same period was 0.78. This shows that the brand lacks emotional bonding with the customer, as specified in the "Goldfish" model. As to the "reasons for not choosing the brand", for one of the questions evaluating the pre-pandemic period, customers gave answers such as the fact that the brand is more expensive than rival companies, they experienced problems in accessing the product, and the product is a general need. During the pandemic, the PAR value was calculated as 0.79 and the BAR value as 0.71. The decrease in PAR was more significant during the pandemic because even the customers who cannot buy a product can be the brand's defenders, which is reflected in the BAR value. According to the questionnaire results, customers' reasons not to buy and defend the brand before the pandemic were also valid during the pandemic. Based on the calculations, the industry archetype of the brand during the pandemic was determined to follow the "Doorknob" model. This shows that the brand's attractiveness and purchasing touchpoints that had problems before the pandemic were improved with the studies carried out, but the defect in the advocacy point continued. During the pandemic, the world's economic problems and the depletion of product stocks caused customers to move away from the brands they always bought; instead, they preferred the first brand they could reach, thus reducing brand purchase and advocacy rates.

4.3. 5A Customer Path Determination

In the third part of the application, the 5A customer path touchpoints of the brand considered weak were determined. The rule-based fuzzy logic approach was used to make this determination. In the model created by using five inputs (aware, appeal, ask, act, and advocate) and one output (5A customer path) variable, linguistic variables expressing five different situations for each of the input variables (i.e., always, usually, sometimes,

rarely, and never) were defined, and 3137 rules containing all possibilities were determined. Rule-based fuzzy logic applications created with many linguistic variables and rules are not typical in the literature. This study differs from other studies because it has many rules and is the first fuzzy logic application in this field. This study used the Fuzzy Logic Toolbox (FLT) of the MATLAB program, the preferred software of fuzzy logic applications. First, the answers to the 5A customer path questions obtained through the questionnaire were added to the FLT database. For fuzzy logic application, triangular membership function, the MFIS, "and" conjunctions for rule generation, and a value range of 0–5 were determined. In Figure 7, the interface prepared in the FLT is shown.

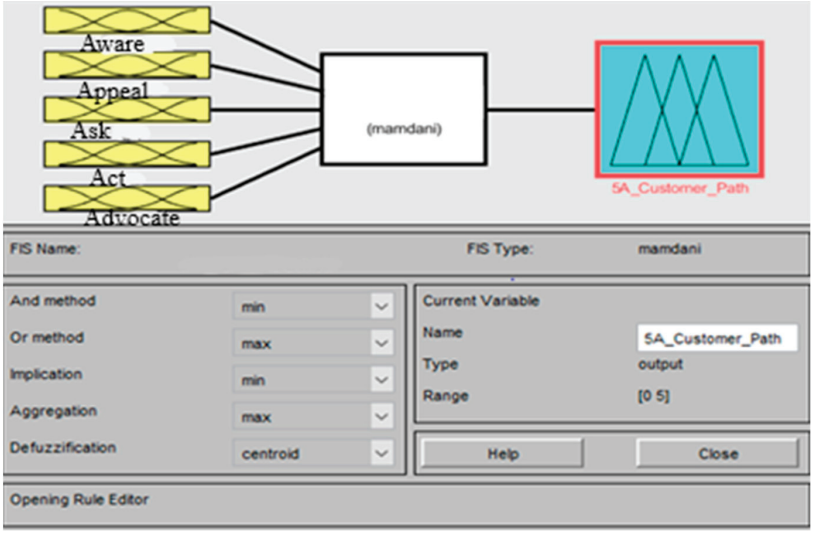

Figure 7. FLT interface.

Table 2 shows the fuzzy numbers corresponding to the linguistic variables. Since the triangle membership function was used in the application, there are three variables for each linguistic variable.

Table 2. Linguistic variables converted to fuzzy numbers.

Linguistic Variables	Fuzzy Numbers
Never	(0 0.5 1)
Rarely	(1 1.5 2)
Sometimes	(2 2.5 3)
Usually	(3 3.5 4)
Always	(4 4.5 5)

Figure 8 shows the linguistic variables with the five value ranges we determined when we looked at the awareness input. These variables are never, rarely, sometimes, usually, and always—i.e., the possible answers to our questions in our questionnaire. Our triangular membership function was determined as "trimf" for our awareness input. The input parameter values were determined after a few trials so that each linguistic variable corresponds to its range.

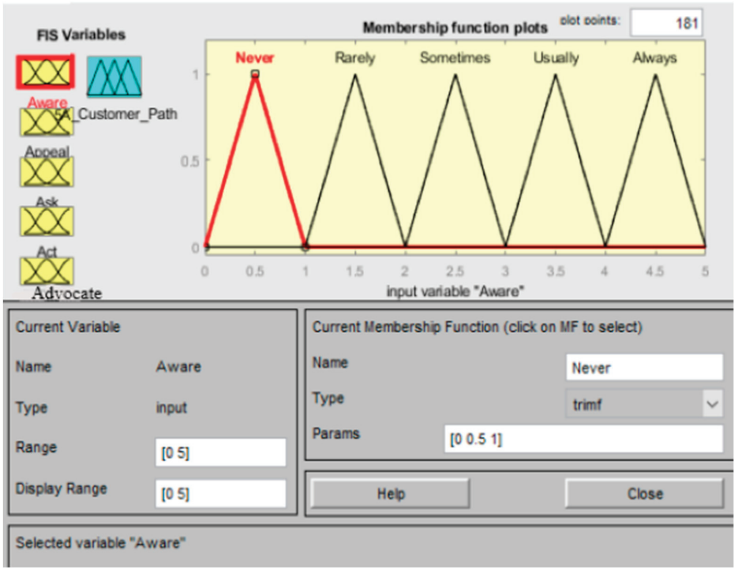

Figure 8. Linguistic variables.

After the awareness input value, the attractiveness, curiosity, purchasing, and advocacy input values were added. As with the awareness entry, the value ranges for the other four inputs were between 0 and 5. The outcome of the problem is shown in Figure 9. The 5A concept was added to our program as a customer path. The output values ranged from 0 to 5, as with the input values. The membership function of the output was determined as the triangular membership function "trimf", the membership function in the input. The output parameters consisted of the 5A customer path touchpoints. According to the study results, the weak point of the brand among these parameters could be determined, and the most suitable parameters for awareness, attractiveness, curiosity, purchasing, and advocacy were determined.

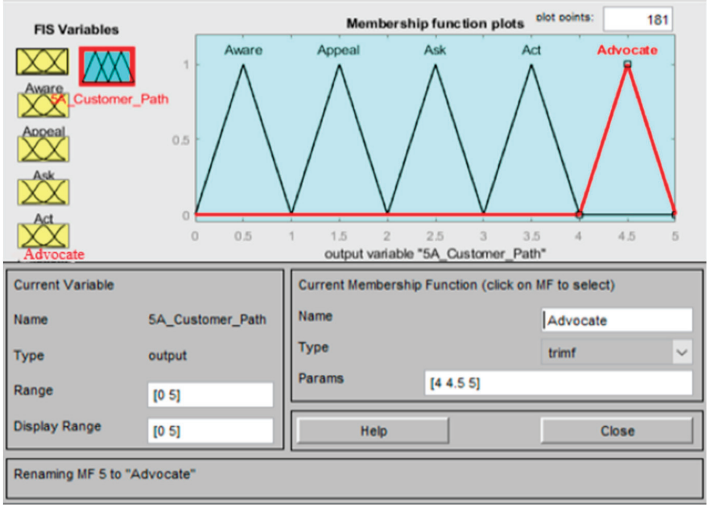

Figure 9. The 5A output variable.

The rule preparation process aimed to find the weak point of the brand to create the "Bow Tie" model. The rules were created using the "If–Then" rule structure with the "and" connector. In this study, 3137 rules were created using the FLT system. For example, the following rule was created: If (Awareness is Always) and (Charming is Always) and (Curiosity is Always) and (Action is Usually) and (Advocacy is Sometimes), then (5A_Customer_Path is advocacy). For this rule, it is understood that, although the action touchpoint is tolerable, the advocacy touchpoint must be worked on first to resemble the "Bow Tie" model.

If the model obtained with the customer data already followed the "Bow Tie" model, "note" was selected, as this implies no need to work on the brand's touchpoints, and the outputs would be shown not to reflect that result. This rule can be interpreted as the linguistic equivalent of the awareness, attractiveness, curiosity, action, and advocacy inputs not always acting to serve the customer. For example: If (Awareness is Always) and (Charm is Always) and (Curiosity is Always) and (Action is Always) and (Advocacy is Always), then (5A_Customer_Path is not action).

After creating 3137 rules, the rule viewer was used for the roadmap showing the fuzzy inference process of the problem. When input values are entered in the rule viewer, the outputs of those values are shown following the determined rules. Figure 10 shows a section of the rule base. Each column represents one of the input or output variables. The yellow shapes in the columns show the inputs' membership function, and the blue shapes represent the outputs. Each line represents a rule.

Figure 10. Rule viewer.

5. Conclusions

To have good competitiveness in the digital world, businesses need to determine marketing strategies by considering the 5A customer path and directing their digital customers. There may be touchpoints on the 5A customer path where brands can intervene. In this study, the data obtained from the customer questionnaire were analyzed, and the brand's sector archetype and PAR and BAR values were determined before and during the pandemic. The values before and during the pandemic were compared. In the third stage of the application, with the fuzzy logic-based 5A customer path model proposed within the scope of the study, weak points in the 5A customer path of the brand were found for customer profiles.

According to the analysis of the results obtained, since the brand is a well-known local brand with plenty of advertisements, awareness among customers was high both before and during the pandemic.

While evaluating the pre-pandemic situation in the questionnaire, it was found that customers do not prefer the brand due to the brand being more expensive than other competing companies, problems experienced in accessing the product, and because the product is a simple need. The industry archetype, essential in evaluating the 5A customer path, was determined to be the "Goldfish" for the brand before the pandemic. The "Goldfish" model is the most challenging archetype model for marketing professionals during conversion to the "Bow Tie" model. In the "Goldfish" model, sales and brand advocacy rates are low, and the level of curiosity is well above what it should be. Improvement efforts should bring customer curiosity to the optimum point with the right strategies and lead the customer to buy and become a brand advocate. According to the results, the "Goldfish" model found before the pandemic shows that the brand lacks an emotional connection with its customers. This shows that the brand has problems at the purchasing and advocacy touchpoints, especially in attractiveness. In order to approach the "Bow Tie" model, which is one of the goals of Marketing 4.0, the brand needs to increase both its attractiveness and emotional ties with customers in the post-pandemic era.

When the pandemic was evaluated in the questionnaire, the industry archetype belonging to the brand was determined to be the "Doorknob". This shows that the attractiveness and purchasing touchpoints where the brand experienced disruption before the pandemic were improved with the studies carried out, while disruption continued at the point of advocacy. The "Doorknob" model also shows that competing brands are high, and the customers prefer more affordable competitor brands. The brand should increase customers' emotional affinity to transform the "Doorknob" model into a "Bow Tie" model. For this, customer engagement programs can be developed, and brand affinity levels can be increased.

During the pandemic, the economic problems experienced in the world caused product stocks to run out and customers to stay away from the brands they always buy, instead preferring the first brand they can access. This situation also reduced brand purchase and advocacy rates. The questionnaire study proves this (while the PAR value was 0.96 before the pandemic, it became 0.79 during the pandemic; the BAR value was 0.78 before and 0.71 during the pandemic). The decrease in the PAR value is more remarkable than that in the BAR value. Even customers who cannot buy a product can advocate for that brand, and this situation is reflected in the BAR value, which shows that the reasons for not buying and defending the brand before the pandemic continued in the same way during the pandemic.

The study's main objective was to investigate how brand loyalty and advocacy were affected by the pandemic and to develop a rule-based fuzzy logic-based 5A customer path model to identify weak touchpoints in the customer path. Since the data used in the research were obtained from the residents of Yalova, they have limited generalizability for the relevant brand in the whole country. In addition, the difficulty of reaching people due to the pandemic limited the research. While some participants could be questioned face-to-face, about two-thirds of the participants had to complete the questionnaire online due to the pandemic conditions. It would be helpful to consider the generalizability of the study by addressing this situation. The research can, however, be applied to larger datasets from different regions in future studies. Similar studies with people living in other regions may provide valuable contributions to a better evaluation of the results obtained from this research. In addition, the 5A customer path model, which was prepared using the rule-based fuzzy logic approach in this study, can be developed by using hybrid methods, such as neuro-fuzzy techniques, in future studies.

Author Contributions: Conceptualization, O.Y.; methodology, O.Y. and T.K.P.; validation, O.Y. and T.K.P.; formal analysis, O.Y. and T.K.P.; investigation, O.Y.; resources, O.Y. and T.K.P.; data curation, O.Y.; writing–original draft preparation, O.Y.; writing–review and editing, T.K.P.; visualization, O.Y. and T.K.P.; supervision, T.K.P.; project administration, T.K.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

MARKETING 4.0—QUESTIONNAIRE

PART 1

The COVID-19 disease, which emerged in Wuhan, China, in December 2019, has been affecting the whole world for about one year. However, innovations and changes have emerged in every aspect of our lives. We will examine the effects of these changes in our questionnaire study in the field of marketing.

PART 2

NAME:

AGE:

- 18–28
- 26–30
- 31–35
- 36–40
- 41–45
- Over 45 years old

GENDER:

- Woman
- Man

EDUCATION LEVEL:

- Primary school graduate
- Middle school graduate
- High school graduate
- Vocational School or Graduate Degree (or student)
- Master's Degree/Doctorate's Degree (or student)

MONTHLY INCOME LEVEL:

- Less than TRY 2300
- TRY 2300–3000
- TRY 3001–4000
- TRY 4001–5000
- TRY 5001–6500
- TRY 6501–8000
- TRY 8001–9500
- TRY 9501–11,000
- TRY 11,001–12,500
- More than TRY 12,500

PART 3

1. I knew the products of the "SELPAK" brand before COVID-19

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

2. Before COVID-19, there were works (advertising, sponsorship, social assistance, etc.) of the brand "SELPAK" that caught my attention

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

3. Before COVID-19, I was doing price research and quality research when buying the products of the brand "SELPAK".

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

4. I was buying the "SELPAK" brand before COVID-19

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

5. Before COVID-19, I would recommend the brand "SELPAK" to my friends

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

PART 4

6. I know the products of the "SELPAK" brand during the COVID-19 process

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

7. I do price research and quality research while buying the "SELPAK" brand during the COVID-19 process

- 1 (never)
- 2 (rarely)
- 3 (sometimes)
- 4 (usually)
- 5 (always)

8. I buy the brand "SELPAK" during the COVID-19 process

- 1 (never)
- 2 (rarely)
- 3 (sometimes)

- 4 (usually)
- 5 (always)

9. I would recommend the "SELPAK" brand to my friends during the COVID-19 process
   - 1 (never)
   - 2 (rarely)
   - 3 (sometimes)
   - 4 (usually)
   - 5 (always)
10. During the COVID-19 process, there are works (advertising, sponsorship, social assistance, etc.) of the brand "SELPAK" that caught my attention
    - 1 (never)
    - 2 (rarely)
    - 3 (sometimes)
    - 4 (usually)
    - 5 (always)

https://docs.google.com/forms/d/1_SBkwYfS5k6Tkszh_b2yravb-8RwQX6k7D9MXjlt-XM/edit?ts=62c56796 (accessed on 31 July 2022).

References

1. Wang, S.; Wan, J.; Zhang, D.; Li, D.; Zhang, C. Towards smart factory for industry 4.0: Self-organized multi-agent system with big data-based feedback and coordination. *Comput. Netw.* **2016**, *101*, 158–168. [CrossRef]
2. Büchi, G.; Cugno, M.; Castagnoli, R. Smart factory performance and Industry 4.0. *Technol. Forecast. Soc. Chang.* **2020**, *150*, 119790. [CrossRef]
3. Cagnetti, C.; Gallo, T.; Silvestri, C.; Ruggieri, A. Lean production and Industry 4.0: Strategy/management or technique/implementation? A systematic literature reviews. International Conference on Industry 4.0 and Smart Manufacturing. *Procedia Comput. Sci.* **2021**, *180*, 404–413. [CrossRef]
4. Langlotz, P.; Aurich, J.A. Causal and temporal relationships within the combination of Lean Production Systems and Industry 4.0. *Procedia CIRP* **2021**, *96*, 236–241. [CrossRef]
5. Memika, T.; Korkusuz Polat, T. Internet of things supported airport boarding system and evaluation with fuzzy. *Intell. Autom. Soft Comput.* **2023**, *35*, 2687–2702. [CrossRef]
6. Enrique, D.V.; Druczkoski, J.C.M.; Lima, T.M.; Charrua-Santos, F. Advantages and difficulties of implementing Industry 4.0 technologies for labor flexibility. *Procedia Comput. Sci.* **2021**, *181*, 347–352. [CrossRef]
7. Fuertes, G.; Zamorano, J.; Alfaro, M.; Vargas, M.; Sabattin, J.; Duran, C.; Ternero, R.; Rivera, R. Opportunities of the Technological Trends Linked to Industry 4.0 for Achieve Sustainable Manufacturing Objectives. *Sustainability* **2022**, *14*, 11118. [CrossRef]
8. Baran, E.; Korkusuz Polat, T. Classification of Industry 4.0 for Total Quality Management: A Review. *Sustainability* **2022**, *14*, 3329. [CrossRef]
9. Contini, G.; Peruzzini, M. Sustainability and Industry 4.0: Definition of a Set of Key Performance Indicators for Manufacturing Companies. *Sustainability* **2022**, *14*, 11004. [CrossRef]
10. Patel, P.C.; Feng, C.; Guedes, M.J. Marketing capability and new venture survival: The role of marketing myopia. *Ind. Mark. Manag.* **2021**, *93*, 307–326. [CrossRef]
11. Tang, T.; Zhang, S.; Peng, J. The value of marketing innovation: Market-driven versus market-driving. *J. Bus. Res.* **2021**, *126*, 88–98. [CrossRef]
12. Babar, M.; Habib, A. Product market competition in accounting, finance, and corporate governance: A review of the literature. *Int. Rev. Financ. Anal.* **2021**, *73*, 101607. [CrossRef]
13. Erdmann, A.; Ponzoa, J.M. Digital inbound marketing: Measuring the economic performance of grocery e-commerce in Europe and the USA. *Technol. Forecast. Soc. Chang.* **2021**, *162*, 120373. [CrossRef] [PubMed]
14. Hughes, T.; Vafeas, M. Marketing Agency/Client Service-For-Service Provision in an Age of Digital Transformation. *J. Bus.-Bus. Mark.* **2019**, *26*, 265–280. [CrossRef]
15. Gregor, B. Evolution and modern concepts of marketing. *Studia Pol. Akad. Nauk Kom. Przestrz. Zagospod. Kraj.* **2002**, *112*, 9–36.
16. Rahayu, A.U.; Kautsar, A. Marketing 4.0: A Digital Transformation in Pharmaceutical Industry to Reach Customer Brand Experience. *J. Univ. Padjadjaran* **2018**, *16*, 80–85. [CrossRef]
17. Hwang, J.; Kim, J.Y. Food tourists' connectivity through the 5A journey and advocacy: Comparison between generations Y and X. *Asia Pac. J. Tour. Res.* **2020**, *25*, 27–38. [CrossRef]
18. Székely, S.; Csata, Z.; Cioca, L.I.; Benedek, A. Industrial Marketing 4.0—Upgrading the Industrial Costumers' Path to the Digital Economy. *Pol. J. Manag. Stud.* **2020**, *22*, 535–548. [CrossRef]

19. Dash, G.; Kiefer, K.; Paul, J. Marketing-to-Millennials: Marketing 4.0, customer satisfaction and purchase intention. *J. Bus. Res.* **2021**, *122*, 608–620. [CrossRef]
20. Aoki, K.; Obeng, E.; Borders, A.L.; Lester, D.H. Can brand experience increase customer contribution: How to create effective sustainable touchpoints with customers? *J. Glob. Sch. Mark. Sci.* **2019**, *29*, 51–62. [CrossRef]
21. Duncan, T. *Principles of Advertising & IMC*, 2nd ed.; McGraw-Hill Companies: Chicago, IL, USA, 2005.
22. Syam, N.; Sharma, A. Waiting for sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice. *Ind. Mark. Manag.* **2018**, *69*, 135–146. [CrossRef]
23. Mustak, M.; Salminen, J.; Plé, L.; Wirtz, J. Artificial intelligence in marketing: Topic modeling, scientometric analysis, and research agenda. *J. Bus. Res.* **2020**, *123*, 389–404. [CrossRef]
24. Kitchens, B.; Dobolyi, D.; Li, J.; Abbasi, A. Advanced customer analytics: Strategic value through integration of relationship-oriented Big Data. *J. Manag. Inf. Syst.* **2018**, *35*, 540–574. [CrossRef]
25. Dekimpe, M.G. Retailing and retailing research in the age of big data analysis. *Int. J. Res. Mark.* **2020**, *37*, 3–14. [CrossRef]
26. Dzyabura, D.; Hauser, J.R. Recommending products when consumers learn their preferences weights. *Mark. Sci.* **2019**, *38*, 365–541. [CrossRef]
27. Jahn, B.; Kunz, W. How to transform consumers into fans of your brand. *J. Serv. Manag.* **2012**, *23*, 344–361. [CrossRef]
28. Pantano, E.; Pizzi, G. Forecasting artificial intelligence on online customer assistance: Evidence from chatbot patent analysis. *J. Retail. Consum. Serv.* **2020**, *55*, 102096. [CrossRef]
29. Tjepkema, L. What Is Artificial Intelligence (AI) Marketing? A Complete Guide. Emarsys. 2016, pp. 53–55. Available online: https://emarsys.com/learn/blog/artificial-intelligence-marketing-solutions/ (accessed on 31 May 2021).
30. Wirth, N. Hello marketing, what can artificial intelligence help you with. *Int. J. Mark. Res.* **2018**, *60*, 435–438. [CrossRef]
31. Verma, S.; Sharma, R.; Deb, S.; Maitra, D. Artificial intelligence in marketing: Systematic review and future research direction. *Int. J. Inf. Manag. Data Insights* **2021**, *1*, 100002. [CrossRef]
32. Janarthanan, R.; Balamurali, R.; Annapoorani, A.; Vimala, V. Prediction of rainfall using Fuzzy Logic. *Mater. Today Proc.* **2021**, *37*, 959–963. [CrossRef]
33. Mijović, N.; Kalić, M.; Kuljanin, J. Tuning the Fuzzy Logic system by two meta-heuristics: Case study of airline market share on long-haul routes. *Transp. Res. Procedia* **2021**, *52*, 453–460. [CrossRef]
34. Yıldız, S.; Kişoğlu, S. Bulanık Mantık Yaklaşımı ile Hazır Giyimde Beden Numarası Eşleştirme. *E-J. New World Sci. Acad.* **2011**, *6*, 2C0031.
35. Sarmah, P.; Nema, A.K.; Sarmah, R. An approach to determine the quality of EIA reports of hydropower plants using analytic network process and Fuzzy Logic toolbox. *Environ. Impact Assess. Rev.* **2020**, *85*, 106462. [CrossRef]
36. Soylu, S.; Carman, K. Fuzzy Logic based automatic slip control system for agricultural tractors. *J. Terramechanics* **2021**, *95*, 25–32. [CrossRef]
37. Iancu, I. Heart disease diagnosis based on mediative Fuzzy Logic. *Artif. Intell. Med.* **2018**, *89*, 51–60. [CrossRef]
38. Arslankaya, S.; Celik, T.M. Prediction of Heart Attack Using Fuzzy Logic Method and Determination of Factors Affecting Heart Attacks. *Int. J. Comput. Exp. Sci. Eng. (IJCESEN)* **2021**, *7*, 1–8. [CrossRef]
39. Fu, Y.L.; Liang, K.C. Fuzzy Logic programming and adaptable design of medical products for the COVID-19 anti-epidemic normalization. *Comput. Methods Programs Biomed.* **2020**, *197*, 105762. [CrossRef]
40. Kokoc, M.; Ersoz, S.; Aktepe, A. A Fuzzy Inference System Proposal for Selecting Marketing Strategy. *Int. J. East. Anatolia Sci. Eng. Des.* **2020**, *2*, 1–21.
41. Li, S.; Li, J.Z. Agents International: Integration of multiple agents, simulation, knowledge bases and Fuzzy Logic for international marketing decision making. *Expert Syst. Appl.* **2010**, *37*, 2580–2587. [CrossRef]
42. Lin, H.C.; Wang, C.S.; Chen, J.C.; Wu, B. New statistical analysis in marketing research with fuzzy data. *J. Bus. Res.* **2016**, *69*, 2176–2181. [CrossRef]
43. Howells, K.; Ertugan, A. Applying Fuzzy Logic for sentiment analysis of social media network data in marketing. In Proceedings of the 9th International Conference on Theory and Application of Soft Computing, Computing with Words and Perception, ICSCCW 2017, Budapest, Hungary, 24–25 August 2017.
44. ETBIS. 2020. Available online: https://eticaret.gov.tr/istatistikler (accessed on 21 March 2021).
45. Erdogan, G.M. E-Commerce and Digital Advertising Investments in the COVID-19 Period. *Selcuk Commun. Mag.* **2020**, *13*, 1296–1318.
46. Wang, H.; Ko, E.; Woodside, A.; Yu, J. SNS marketing activities as a sustainable competitive advantage and traditional market equity. *J. Bus. Res.* **2021**, *130*, 378–383. [CrossRef]
47. Tarabasz, A. The reevaluation of communication in customer approach—Towards Marketing 4.0. *Int. J. Contemp. Manag.* **2013**, *12*, 124–134.
48. Kotler, P.; Kartajaya, H.; Setiawan, I. *Marketing 4.0 Moving from Traditional to Digital*; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2017.
49. Isilar, H.B. Evaluation of Digital Marketing Applications in Airline Industry. *J. Aviat. Space Stud.* **2021**, *1*, 42–63.
50. Swoboda, B.; Winters, A. Effects of the most useful online-offline and online-offline channel integration services for consumers. *Decis. Support Syst.* **2021**, *145*, 113522. [CrossRef]

51. Gau, W.B. A Reflection on Marketing 4.0 From the Perspective of Senior Citizen's Communities of Practice. *SAGE Open* **2019**, *9*, 21582440198. [CrossRef]
52. Martínez-Ruiz, M.P.; Gómez-Suárez, M.; Jiménez-Zarco, A.I.; Izquierdo-Yusta, A. Editorial: Toward Consumer 4.0 Insight and Opportunities Under the Marketing 4.0 Scenario. *Front. Pyscol.* **2021**, *11*, 611114. [CrossRef]
53. Wereda, W.; Woźniak, J. Building Relationships with Customer 4.0 in the Era of Marketing 4.0: The Case Study of Innovative Enterprises in Poland. *Soc. Sci.* **2019**, *8*, 177. [CrossRef]
54. Varey, R.J.; McKie, D. Staging consciousness: Marketing 3.0, post-consumerism and future pathways. *J. Cust. Behav.* **2010**, *9*, 321–334. [CrossRef]
55. Wu, L.; Liu, H. Tracing fake-news footprints: Characterizing social media messages by how they propagate. In Proceedings of the Eleventh ACM International Conference on Web Search and Data Mining, Marina Del Rey, CA, USA, 5–9 February 2018; pp. 637–645.
56. Andreini, D.; Pedeliento, G.; Zarantonello, L.; Solerio, C. A renaissance of brand experience: Advancing the concept through a multi-perspective analysis. *J. Bus. Res.* **2018**, *91*, 123–133. [CrossRef]
57. Tampi, E.N.H.; Pamungkas, I.N.A. Analysis Customer Path 5A Pada Sponsor Film AADC 2 Sebagai Program Entertainment Branding. *ProTVF* **2018**, *2*, 69–86. [CrossRef]
58. Softscotch. New Customer Paths. 2021. Available online: https://www.softscotch.com/new-customer-path (accessed on 5 February 2021).
59. Mawarni, D.M.; Pamungkas, I.N.A. Analysis of Customer Path 5A on Instagram Tcash. *E-Proceeding Manag.* **2019**, *6*, 1402–1411.
60. Brakus, J.J.; Schmitt, B.H.; Zarantonello, L. Brand experience: What is it? How is it measured? Does it affect loyalty? *J. Mark.* **2009**, *73*, 52–68. [CrossRef]
61. Ertekin, D. Marketing Sectors and Archetypes. 2018. Available online: https://medium.com/@AmpersandBlog/pazarlama-sekt%C3%B6r%C3%BC-ve-arketipleri-8b18eff2b5ce (accessed on 5 August 2021).
62. Zadeh, L.A. Fuzzy Sets. *Inf. Control* **1965**, *8*, 338–353. [CrossRef]
63. Zimmerman, H.J. *Fuzzy Set Theory and Its Applications*; Kluwer Ac. Publishing: New York, NY, USA, 1990; 400p.
64. Homaifar, A.; McCormick, E. Simultaneous design of membership functions and rule sets for fuzzy controllers using genetic algorithms. *IEEE Trans. Fuzzy Syst.* **1995**, *3*, 129–139. [CrossRef]
65. Keskenler, M.F.; Keskenler, E.F. Historical Development of Fuzzy Logic. *Takvim-I Vekayi* **2017**, *5*, 1–10.
66. Ozkan, E.; Iphar, M.; Konuk, A. Fuzzy Logic Approach in Resource Classification. *Int. J. Min. Reclam. Environ.* **2017**, *33*, 183–205. [CrossRef]
67. Basligil, H. The fuzzy analytic hierarchy process for software selection problems. *J. Eng. Nat. Sci.* **2005**, *3*, 24–33.
68. Rodriguez, K.L.F.; Romero, F.T. Desarrollo de un sistema logico difuso para el control de la locomocion bipeda de un robot humanoide NAO. *Res. Comput. Sci.* **2016**, *113*, 181–194. [CrossRef]
69. Shanthi, L.; Bogale, B.; Ali, M. Survey on Fuzzy Logic and subjective performance evaluation of supply chain management. *Int. J. Sci. Res. Comput. Sci. Eng. Inf. Technol.* **2018**, *3*, 636–642.
70. Korkusuz Polat, T. Risk Priority with Fuzzy Logic: Application of A Textile Factory. *Sak. Univ. J. Sci.* **2019**, *23*, 203–212. [CrossRef]
71. Aktepe, A.; Ersoz, S.; Turker, A.K.; Barisci, N.; Dalgic, A. An inventory classification approach combining expert systems, clustering, and fuzzy logic with the ABC method, and an application. *S. Afr. J. Ind. Eng.* **2018**, *29*, 49–62. [CrossRef]
72. Turksen, I.B.; Zarandi, M.H.F. *Practical Applications of Fuzzy Technologies in Production Planning and Programming-Fuzzy and Clear Approaches*; Zimmermann, H.J., Ed.; Kluwer Academic: Norwell, MA, USA, 1999; pp. 479–529.
73. Ross, T. *Fuzzy Logic with Engineering Applications*; John Wiley & Sons: West Sussex, UK, 1995.
74. Mohsin, K.M.; Mokhtar, A.A.; Tse, P.W. A fuzzy logic method: Predicting corrosion under insulation of piping systems with modelling of CUI 3D surfaces. *Int. J. Press. Vessel. Pip.* **2019**, *175*, 103929. [CrossRef]
75. Jain, A.; Sharma, A. Membership Function Equation Methods For Fuzzy Logic Systems. A Comprehensive Review. *J. Crit. Rev.* **2020**, *7*, 8717–8733. Available online: https://www.bibliomed.org/mnsfulltext/197/197-1601130290.pdf?1626105764 (accessed on 1 May 2021).
76. Lee, C.F.; Tzeng, G.H.; Wang, S.Y. A Fuzzy Set Approach for Generalized CRR Model: An Empirical Analysis of S&P 500 Index Options. *Rev. Quant. Financ. Account.* **2005**, *25*, 255–275.
77. Mavani, N.R.; Yuh, L.C.; Hashim, H.; Rahman, N.A.; Ali, J.M. Fuzzy Mamdani based user-friendly interface for food preservatives determination. *Food Bioprod. Process.* **2021**, *126*, 282–292. [CrossRef]
78. Voskoglou, M. Use of the Triangular Fuzzy Numbers for Student Assessment. *Am. J. Appl. Math. Stat.* **2015**, *3*, 1–9. Available online: https://arxiv.org/ftp/arxiv/papers/1507/1507.03257.pdf (accessed on 1 May 2021).
79. Arji, G.; Ahmadi, H.; Nilashi, M.; Rashid, T.A.; Ahmed, O.H.; Aljojo, N.; Zainol, A. Fuzzy Logic approach for infectious disease diagnosis: A methodical evaluation, literature and classification. *Biocybern. Biomed. Eng.* **2019**, *39*, 937–955. [CrossRef]
80. Tanak Coşkun, G.; Yılmaz Yalçıner, A. Determining the best price with linear performance pricing and checking with fuzzy logic. *Comput. Ind. Eng.* **2021**, *154*, 107150. [CrossRef]
81. Ahmadi, M.H.E.; Royaee, S.J.; Tayyebi, S.; Boozarjomehry, R.B. A new insight into implementing Mamdani fuzzy inference system for dynamic process modeling: Application on flash separator fuzzy dynamic modeling. *Eng. Appl. Artif. Intell.* **2020**, *90*, 103485. [CrossRef]

82. Nilashi, M.; Ibrahim, O.; Ahmadi, H.; Shahmoradi, L. A knowledge-based system for breast cancer classification using Fuzzy Logic method. *Telemat. Inform.* **2017**, *34*, 133–144. [CrossRef]
83. Danish, E.; Onder, M. Application of Fuzzy Logic for Predicting of Mine Fire in Underground Coal Mine. *Saf. Health Work.* **2020**, *11*, 322–334. [CrossRef] [PubMed]
84. Beigzadeh, R.; Eiamsa-ard, S. Fuzzy Logic to thermal and friction characteristics of turbulent air-flow over diamond-shaped turbulators. *Int. Commun. Heat Mass Transf.* **2021**, *120*, 105001. [CrossRef]
85. Adriaenssens, V.; Baets, B.D.; Goethals, P.L.M.; Pauw, N.D. Fuzzy rule-based models for decision support in ecosystem management. *Sci. Total Environ.* **2004**, *319*, 1–12. [CrossRef]
86. Anooj, P.K. Clinical decision support system: Risk level prediction of heart disease using weighted fuzzy rules. *J. King Saud Univ. Comput. Inf. Sci.* **2012**, *24*, 127–140. [CrossRef]
87. Kaur, A.; Kaur, A. Comparison of mamdani-type and sugeno-type fuzzy inference systems for air conditioning system. *Int. J. Soft Comput. Eng.* **2012**, *2*, 323–325.
88. Paul, A.K.; Shill, P.C.; Rabin, M.R.I.; Murase, K. Adaptive weighted fuzzy rule-based system for the risk level assessment of heart disease. *Appl. Intell.* **2018**, *48*, 1739–1756. [CrossRef]
89. Dhimish, M.; Holmes, V.; Mehrdadi, B.; Dales, M. Comparing Mamdani Sugeno Fuzzy Logic and RBF ANN network for PV fault detection. *Renew. Energy* **2018**, *117*, 257–274. [CrossRef]
90. Mazhar, S.; Ditta, A.; Bulgariu, L.; Ahmad, I.; Ahmed, M.; Nadiri, A.A. Sequential treatment of paper and pulp industrial wastewater: Prediction of water quality parameters by Mamdani Fuzzy Logic model and phytotoxicity assessment. *Chemosphere* **2019**, *227*, 256–268. [CrossRef]
91. Szczepaniak, P.S. Fuzzy and Genetic Approach to Diagnosis of Power Transformers. *IFAC Proc. Vol.* **2000**, *33*, 417–422. [CrossRef]
92. Soto-Zarazúa, G.M.; Rico-García, E.; Ocampo, R.; Guevara-González, R.G.; Herrera-Ruiz, G. Fuzzy-logic-based feeder system for intensive tilapia production (oreochromis niloticus). *Aquac. Int.* **2010**, *18*, 379–391. [CrossRef]
93. Liu, Y.; Gayle, A.A.; Smith, A.W.; Rocklöv, J. The reproductive number of COVID-19 is higher compared to SARS coronavirus. *J. Travel Med.* **2020**, *27*, taaa021. [CrossRef] [PubMed]
94. Zhu, N.; Zhang, D.; Wang, W.; Li, X.; Yang, B.; Song, J. A Novel Coronavirus from Patients with Pneumonia in China. *N. Engl. J Med.* **2020**, *382*, 727–733. [CrossRef] [PubMed]

sustainability

MDPI

Review

A Bibliometric Analysis of Enterprise Social Media in Digital Economy: Research Hotspots and Trends

Wen Zhang [1], Yuting Yang [1] and Huigang Liang [2,*]

[1] College of Business, Xi'an University of Finance and Economics, Xi'an 710100, China; zhangwen0917@163.com (W.Z.); yangyuting202307@163.com (Y.Y.)
[2] Fogelman College of Business & Economics, University of Memphis, Memphis, TN 38152, USA
* Correspondence: hliang1@memphis.edu

Abstract: With the rise of the digital economy, new business models have expedited the progress of corporate digital transformation. The mobile internet era has made enterprise social media a popular tool for employee communication. Summarizing the development and trends of enterprise social media research is beneficial for identifying future research topics. This paper analyzes the literature from the Web of Science core collection database and employs CiteSpace software to develop a scientific knowledge map, providing a visual analysis of the literature on enterprise social media in the context of the digital economy. The paper presents the research hotspots and evolutionary paths of enterprise social media, thereby clarifying the future development trends in this field. The study reveals that there is a relatively limited amount of literature on this topic, and collaboration among authors is not strong. Most research is conducted by higher education institutions in China and the United States. The research hotspots revolve around the theme of enterprise social media, covering topics such as knowledge sharing, communication, and performance. The research themes have undergone a transition from singularity to diversity. Finally, this paper proposes future research prospects in three areas: the human–computer collaborative model against the backdrop of artificial intelligence, user privacy disclosure and protection, and the impact of enterprise social media usage on the mental and physical health of employees. These prospects aim to provide valuable insights for subsequent research endeavors.

Keywords: enterprise social media; enterprise management; CiteSpace; knowledge map

Citation: Zhang, W.; Yang, Y.; Liang, H. A Bibliometric Analysis of Enterprise Social Media in Digital Economy: Research Hotspots and Trends. *Sustainability* **2023**, *15*, 12545. https://doi.org/10.3390/su151612545

Academic Editor: Su-Yol Lee

Received: 7 July 2023
Revised: 15 August 2023
Accepted: 16 August 2023
Published: 18 August 2023

1. Introduction

With the vigorous rise of the digital economy and sharing economy, profound changes have occurred in the organizational structure, labor force composition, labor relations, and employment patterns of enterprises [1]. The digital economy relies on digital information as its primary resource, utilizes internet platforms as the main information carrier, is driven by digital technology innovation, and manifests itself in various new modes of economic activities [2]. The digital economy plays a pivotal role in driving high-quality economic development through two mechanisms: the augmentation of human capital and the facilitation of green technology innovation. This renders it a crucial engine of global economic transformation [3]. The development of data technology contributes to the transformation of traditional industries and the growth of digital industries [1], reducing the cost of green technology innovation for enterprises [4] and directly creating economic value [5]. The advent of the digital economy, catalyzed by the continuous innovation and development of digital technology, has ushered in novel economic paradigms. This phenomenon has precipitated shifts in social production methods, increasing production efficiency, and consequently bringing about significant transformations for sustained development and the interactions of enterprises [6,7]. In effect, it propels enterprises to continuously progress and develop, promoting digital transformation and upgrading [8].

Under the influence of the country's "dual carbon" goals, energy conservation and carbon reduction, which target the industrial internet and digital transformation, the relationship between the digital economy and low carbon emissions has drawn widespread attention [9]. The digital transformation has brought new solutions for companies to reduce carbon emissions. Concurrently, the shift toward low-carbon and green transformation is reshaping corporate behavior, and the transformation must aim for environmental sustainability [10]. Technology stands as a crucial prerequisite for digital transformation [11], and key information technologies represented by the fifth-generation mobile communication technology have paved the way for enterprise digitalization [12]. Digital technologies can enhance labor productivity in industries and improve the efficiency of business decision-making processes, effectively reducing energy consumption in traditional sectors [13]. Digital technologies and solutions, including artificial intelligence, big data, cloud computing, and blockchain, are gradually becoming suitable for various industries. This progressive integration is leading to substantial enhancements in industrial labor productivity, enterprise management, and the effectiveness of decision-making efficiency [14], thus reducing industrial energy consumption [15]. The digital economy prioritizes industrial structure upgrading, achieving an intelligent and digital transformation of the economic system [16]. This objective is pursued through the advancement of digital technologies, the establishment of digital platforms, and the implementation of digital solutions aimed at optimizing energy structures and resource efficiency, thereby achieving synergy among the digital economy, the low-carbon economy, and environmental benefits [2].

In the era of the diversified information age driven by the digital economy and the internet, social media has rapidly integrated into the public perspective, changing traditional lifestyles and work patterns [17]. Social media has become a crucial channel for online and offline communication for businesses, enhancing the efficiency of internal information dissemination and facilitating communication between management and frontline employees [18]. From the use of communication tools to the development of various social networking platforms, enterprise social media provides users with abundant information and convenient channels for communication, promoting the development of users' social network relationships. Consequently, social media has quickly become an indispensable part of people's daily lives and work [19]. Corporations are harnessing the potential of enterprise social media to facilitate workplace communication, coordination, and collaboration [20], which culminates in heightened managerial efficiency and sustainable business development [21].

Enterprise social media refers to the use of social networks by organizations to achieve work-related collaboration and establish online communities [22]. Leonardi [23] comprehensively summarizes enterprise social media as web-based platforms that allow workers to: (1) communicate messages with specific coworkers or broadcast messages to everyone in the organization; (2) explicitly indicate or implicitly reveal particular coworkers as communication partners; (3) post, edit, and sort text and files linked to themselves or others; and (4) view the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time of their choosing. Sun et al. [24] conducted a comprehensive literature review to capture the dark side of enterprise social media abuse from a conflict perspective. They also explored the potential of enterprise social media platforms from a knowledge management perspective [25]. Wu et al. [26] employed a meta-analysis approach to examine the relationship between ESM usage and work performance. They analyzed the current state of research on enterprise social media, tracked its development, and revealed new trends and challenges in the field of enterprise social media research. Enterprises adopt and deploy enterprise social media platforms within their organizations to enhance employees' work performance by facilitating internal communication, knowledge sharing, and collaboration [27].

These papers provide guidance for later scholars studying enterprise social media. However, they also have some limitations. Firstly, most of these reviews mainly explore the positive impacts of enterprise social media on employees and companies in the context

of Web 2.0 and the mobile internet era, while neglecting the adverse effects. Secondly, they overlook whether the use of enterprise social media in the context of digital economy development plays a facilitating or inhibiting role in corporate digital transformation, as well as how to avoid the generation of adverse factors and better promote digital transformation and the long-term sustainability of companies. Therefore, this article focuses on the development of the contemporary digital economy and the low-carbon environmental background. Through bibliometric analysis, it aims to address four issues related to enterprise social media: first, what can we discover from the perspective of literature analysis? Second, what hotspots and research trends can be obtained using knowledge graphs? Third, how does existing research on enterprise social media influence corporate digital transformation in the context of the digital economy? Fourth, what guidance do existing studies provide for future research directions?

The rest of this article is organized as follows: Section 2 introduces the research method and data sources. Section 3 utilizes a visual knowledge graph of enterprise social media literature to analyze current research hotspots and trends. Section 4 discusses the significance of this research and future research directions. Section 5 summarizes the conclusions, limitations, and prospects of this study.

2. Research Methods and Data Sources

2.1. Research Methods

A scientific knowledge graph refers to the representation of the process and relationships of research development in the form of graphs. It utilizes data mining, information processing, knowledge metrics, and graphical visualization to present a field of scientific research [28]. CiteSpace is an information visualization and analysis software developed by Chaomei Chen, which can be used to examine co-citation networks based on a large amount of bibliometric data [29].

CiteSpace has significant reference value for interdisciplinary studies, enabling researchers to efficiently understand specific research areas, their associations, and emerging areas of interest. For example, Qiu [30] used CiteSpace to trace the development origins of social media, revealing a cutting-edge topics and knowledge graph on social media research. Ran et al. [31] conducted a bibliometric analysis using the information visualization software CiteSpace to display the knowledge structure and hotspots in social media research in the form of a knowledge graph. Li et al. [32] utilized the visualization tool CiteSpace for bibliometric research and analysis, quantifying and visualizing the landscape and evolution of enterprise social media studies. All these studies indicate that using CiteSpace software can intuitively present the trends and research focuses on each stage of a research stream.

Therefore, this paper will adopt a bibliometric analysis method using CiteSpace 6.1.R6 software to investigate the core content of enterprise social media from the perspectives of journals, core authors, institutions, the co-occurrence of keywords, the clustering of hot words, and emerging terms. The study aims to map the current status, hotspots, and frontiers of research and further explore the development trends and future research directions of enterprise social media in the context of the digital economy.

2.2. Data Sources

Due to the inclusion of literature from various disciplines, such as engineering, social sciences, medicine, management, and philosophy, the Web of Science Core Collection database was selected as the source of data for this study [33]. The theme of this study is enterprise social media. Through various trials, it was found that the most comprehensive articles were retrieved using the search term TS = ("enterprise social media" OR "firm social media" OR "company social media" OR "corporation social media" OR "organizational social media"). The literature was limited to English language articles, and the search was conducted on 20 June 2023. Finally, a total of 288 relevant articles were selected, covering the period from 2008 to 2023. The research roadmap of this article is shown in Figure 1.

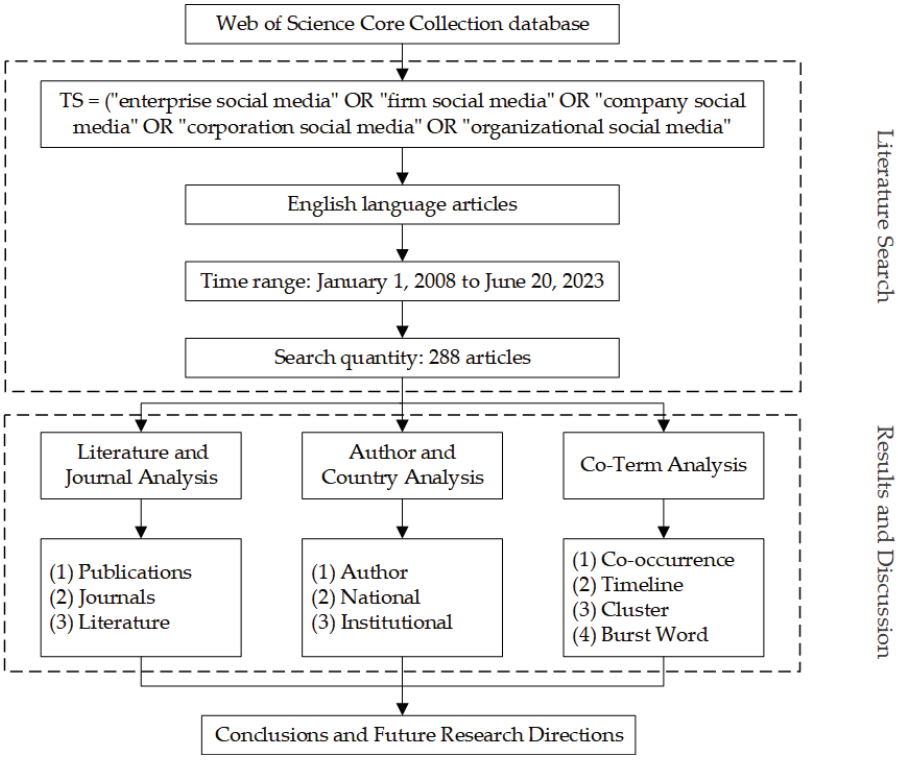

Figure 1. Research roadmap.

3. Results of the Analysis

3.1. Journal Analysis

3.1.1. Overview of Publications

From the perspective of the publication volume of enterprise social media research literature, it can be observed that with the application and development of enterprise social media in recent years, the related literature has also shown an increasing trend. Based on Figure 2, the research can be divided into three stages: the initial stage of research, the stage of slow development, and the stage of rapid growth, according to the publication volume. Before 2013, there were relatively few publications, indicating the nascent stage of enterprise social media research during that period. From 2013 to 2017, with the development of popular technologies such as the internet and big data, scholars gradually paid attention to research on enterprise social media, leading to a slow growth in the number of papers on the subject. Commencing from 2018, the number of publications grew rapidly, indicating a higher level of attention from scholars due to the increasing number of enterprise social media users. At the same time, a search on Web of Science reveals that there are still relatively few research achievements in the field of enterprise social media literature, indicating that there is still significant room for scholars to continue in-depth research.

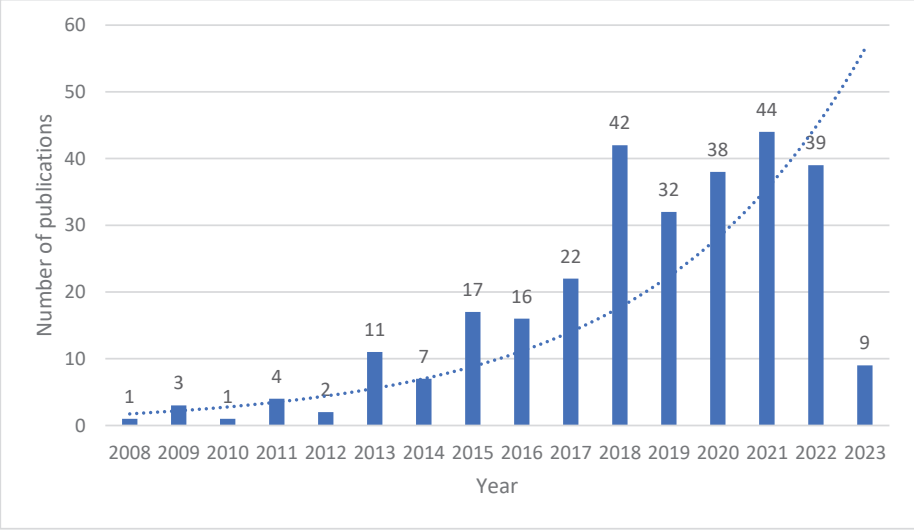

Figure 2. Annual publication volume of enterprise social media research. Note: The statistical data are as of 20 June 2023.

3.1.2. Analysis of Publishing Journals

Journals are platforms for showcasing research areas and achievements [34]. Table 1 summarizes the journals with more than five publications, revealing that most articles on enterprise social media are published in internationally renowned journals, indicating that enterprise social media is a popular research topic in recent years. The top three journals in terms of publication volume are *Internet Research*, *Information Technology People*, and the *International Journal of Information Management*. Among them, *Internet Research* has the highest number of publications, surpassing ten, and constitutes the largest proportion. Other journals publishing research on enterprise social media have fewer publications but remain important publishing platforms.

Table 1. Major journals for enterprise social media research.

No.	Journals	Publications	Proportion
1	Internet Research	14	4.86%
2	Information Technology People	9	3.13%
3	International Journal of Information Management	9	3.13%
4	Journal of Enterprise Information Management	9	3.13%
5	Sustainability	9	3.13%
6	Frontiers in Psychology	7	2.43%
7	Journal of Knowledge Management	7	2.43%
8	Computers in Human Behavior	6	2.08%
9	Journal of Business Research	6	2.08%
10	Journal of Computer Mediated Communication	6	2.08%
11	Journal of Organizational Computing and Electronic Commerce	6	2.08%

3.1.3. Analysis of High-Frequency Co-Cited References

Highly cited literature refers to documents that have been cited frequently, reflecting the quality of research, innovation in a specific field, and substantial attention and recognition from scholars [35]. It aids researchers in understanding the hot topics and key milestones in their respective fields [36]. Table 2 presents the top ten most cited documents, with citation indices exceeding 100.

Table 2. High-Frequency Co-Cited References in Enterprise Social Media Research.

No.	Title	Journals	Year	Authors	Citation Frequency
1	Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organizations	Journal of Computer Mediated Communication	2013	Leonardi, PM; Huysman, M; Steinfield, C [23]	541
2	The effects of network sharing on knowledge-sharing activities and job performance in enterprise social media environments	Computers in Human Behavior	2016	Kwahk, KY; Park, DH [37]	185
3	What factors influence knowledge sharing in organizations? A social dilemma perspective of social media communication	Journal of Knowledge Management	2016	Razmerita, L; Kirchner, K; Nielsen, P [38]	183
4	Knowledge sharing motivational factors of using an intra-organizational social media platform	Journal of Knowledge Management	2012	Vuori, V; Okkonen, J [39]	134
5	The impact of firms' social media initiatives on operational efficiency and innovativeness	Journal of Operations Management	2016	Lam, HKS; Yeung, ACL; Cheng, TCE [40]	124
6	Improving the agility of employees through enterprise social media: The mediating role of psychological conditions	International Journal of Information Management	2018	Cai, Z; Huang, Q; Liu, HF; Wang, XY [41]	118
7	Location, Motivation, and Social Capitalization via Enterprise Social Networking	Journal of Computer—Mediated Communication	2013	Fulk, J; Yuan, YC [42]	113
8	Why men and women continue to use social networking sites: The role of gender differences	Journal of Strategic Information Systems	2017	Krasnova, H; Veltri, NF; Eling, N; Buxmann, P [43]	112
9	The Role of Marketer-Generated Content in Customer Engagement Marketing	Journal of Marketing	2019	Meire, M; Hewett, K; Ballings, M; Kumar, V; Van den Poel, D [44]	111
10	An affordance perspective of enterprise social media and organizational socialization	Journal of Strategic Information Systems	2018	Leidner, DE; Gonzalez, E; Koch, H [45]	108

Among them, the most cited article is by Leonardi et al. [23], which comprehensively explores enterprise social media from various aspects, such as its definition, history, and prospects. This work has been widely accepted, adopted, and referenced by scholars. The second most cited paper is by Kwahk et al. [37], investigating the impact of third-generation young individuals' orientation toward knowledge-sharing activities and individual work performance in the context of enterprise social media. It concludes that knowledge self-efficacy, social interaction, and mutual norms positively influence third-party inclinations and knowledge-sharing activities on social media, which further affect individual work performance. The third most cited paper is by Razmerita et al. [38], studying the factors that drive or hinder employees' engagement in enterprise social media. Their research identifies important drivers for knowledge sharing, including willingness to help, monetary rewards, management support, management encouragement, and recognition for knowledge-sharing behaviors. On the other hand, barriers to knowledge sharing include behavior changes, lack of trust, and time constraints. This study contributes to understanding the factors influencing the success or failure of enterprise social media.

Several other papers also investigate the impact of enterprise social media on organizational efficiency [40], employee psychology [41], organizational socialization [45], and other aspects. Thus, enterprise social media is a crucial medium for organizations and employees, influencing the long-term development of enterprises, and these highly cited papers provide guidance for future researchers, offering theoretical and practical significance for sustainable organizational development.

3.2. Author and Country Analysis

3.2.1. Author Analysis

The author collaboration network graph can reflect the influence of authors in specific research domains and the closeness of their collaboration network [46]. In this section, core author analysis is conducted using the author collaboration network graph. The size of the nodes in the graph represents the number of published articles, while the lines between nodes represent collaborative relationships between authors. The density of the

lines is positively correlated with the strength of collaboration. Figure 3 illustrates the formed author collaboration graph, which consists of 313 nodes and 298 connections, with a network density of 0.0061. Among them, the nodes representing Sun, Pitafi, and Luqman are relatively large, indicating that these authors have produced more research results on enterprise social media. Additionally, these nodes have different colors from the inside to the outside, indicating their sustained interest and achievements in this topic. The connections between nodes in the graph are relatively sparse, and some nodes are isolated and dispersed, suggesting that there is only limited collaboration between certain authors. Overall, the level of collaboration is not strong; there has not been a widespread trend of collaboration among the authors.

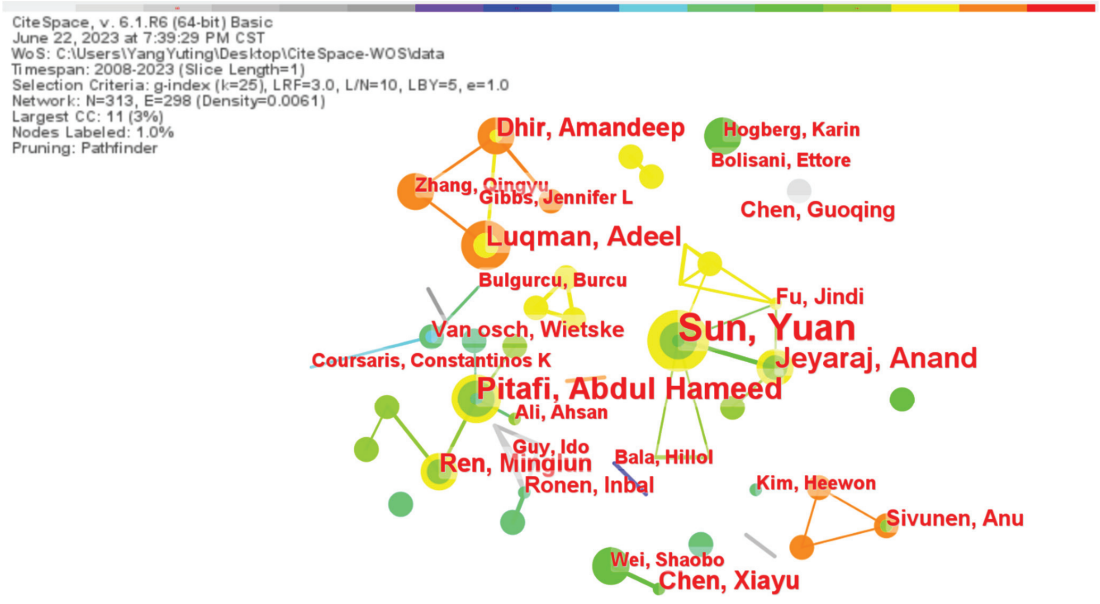

Figure 3. Author network map.

3.2.2. National and Institutional Analysis

Analyzing the degree of cooperation among different countries, institutions, and scholars is crucial from the perspective of national and research organizations [47]. This enables a deeper interpretation of the research advancements of enterprise social media within diverse cultural contexts. The national collaboration network is built upon the foundation of collaborative efforts cited in the literature. Collaboration is considered to exist when authors from two different countries contribute to the same article [48]. The visualization graph in Figure 4 encompasses a total of 284 nodes and 503 edges. Each node represents a country or institution, and the edges between nodes represent collaboration among countries or institutions. The circular color legend radiating from the center corresponds to publication years, ranging from gray to teal and finally to red, representing early research to recent years' studies, respectively. Furthermore, the color of the center of the circles represents the earliest year of publication, while the thickness of the color scale corresponds to the number of publications in the respective year. The circle centers of the United States and Germany are depicted in deep purple, indicating that these countries initiated research on enterprise social media at an earlier stage. The distribution of average annual publications in the United States is evenly spread, indicating sustained research output in this field. The circle center of China is blue-purple, suggesting

a comparatively later start in research. However, the color progression primarily shifts from blue-purple to red, implying recent research output in the past few years.

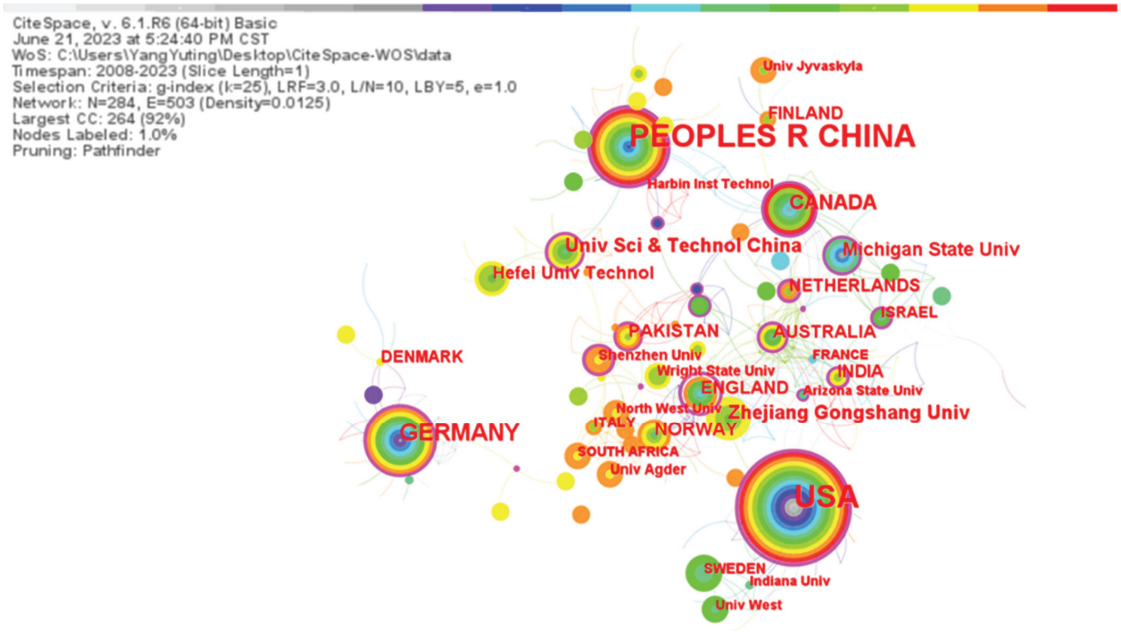

Figure 4. National and institutional cooperative network map.

According to the results of the national collaboration network in CiteSpace, the top ten countries in terms of publication volume were identified. As shown in Table 3, in terms of quantity, China has the highest number of publications in Web of Science, with a current publication count of 100 articles. The following countries include the United States (96 articles), Germany (27 articles), and others. The United Kingdom has the highest centrality (0.85), followed by the United States (0.52), China (0.43), Canada (0.37), and other countries. While China has a much higher publication volume than the United Kingdom, its centrality is relatively lower. Therefore, future research should focus on strengthening international cooperation and communication to promote the development of enterprise social media research.

Table 3. Total number of national papers issued.

Serial	Countries	Publications	Centrality	Serial	Countries	Publications	Centrality
1	China	100	0.43	6	England	12	0.85
2	USA	96	0.52	7	Australia	12	0.24
3	Germany	27	0.36	8	Pakistan	12	0.12
4	Canada	17	0.37	9	India	9	0.29
5	Norway	13	0.10	10	Finland	9	0.04

According to the results of the institution collaboration network in CiteSpace, the top ten research institutions in terms of publication volume were identified. As shown in Table 4, the research institutions with higher publication volumes are mainly concentrated in Chinese and American universities. These include China's Zhejiang Gongshang University (15 articles), the University of Science and Technology of China (14 articles), and Hefei University of Technology (10 articles), as well as the United States' Michigan State University (13 articles) and Wright State University (6 articles), etc. While the initial

research on enterprise social media emerged from the United States, China's rapid construction and development of 5G technology and base stations, as well as the widespread and portable nature of social media mobile terminals, have provided greater advantages. The innovation of Chinese social media has brought great value. With the increase in the duration, frequency, and number of social media users, as well as the high attention from the government and the market, Chinese scholars are particularly concerned about the field of social media and have invested in in-depth research, resulting in excellent research achievements on the platform. Agder University College from Norway and the University of Jyväskylä from Finland also show interest in researching enterprise social media.

Table 4. Number of publications by research institutions.

Serial	Research Institutes	Publications	Centrality
1	Zhejiang Gongshang University, Hangzhou, China	15	0.03
2	University of Science and Technology of China, Hefei, China	14	0.24
3	Michigan State University, East Lansing, MI, USA	13	0.38
4	Hefei University of Technology, Hefei, China	10	0.03
5	Agder University College, Arendal, Grimstad and Kristiansand, Norway	6	0.00
6	Wright State University, Dayton, OH, USA	6	0.00
7	Shenzhen University, Shenzhen, China	6	0.21
8	Arizona State University, Phoenix, AZ, USA	5	0.15
9	Northwest University, Xi'an, China	5	0.01
10	University of Jyväskylä, Jyväskylä, Finland	5	0.00

3.3. Co-Term Analysis

3.3.1. Keyword Co-Occurrence Analysis

Co-occurrence analysis of keywords can reveal the popular research topics and general research trends in a particular field over the years [31]. The larger the node, the higher the frequency of occurrence of the keyword, which reflects the stronger research enthusiasm of scholars in the relevant field. The more connections between nodes, the stronger the co-occurrence relationship among them [49]. By importing the literature into CiteSpace with a time range from 2008 to 2023, employing a "1-year" time slice and selecting "keyword" as the node type, along with selecting the Pathfinder and Pruning sliced networks and Pruning the merged network trimming method, a keyword co-occurrence network was constructed, consisting of 352 nodes and 738 edges. The network density was calculated to be 0.0119, indicating a relatively dense and interconnected structure of research themes. Figure 5, dentered around enterprise social media, expands into several important key themes, including social media, communication, work performance, knowledge sharing, and more. The dense and intertwined connections among the nodes illustrate the strong association between research topics in the literature. Among them, keywords such as social media, behavior, influence, and performance exhibit larger node sizes, indicating a greater emphasis from researchers on the impact of enterprise social media, as well as aspects related to organizational management and performance.

Summary of high-frequency keywords and centrality statistics (Table 5) based on keyword co-occurrence graph. From the analysis of keyword frequencies in the field of enterprise social media research, we determined that the term "enterprise social media" has appeared 133 times, significantly surpassing other keywords. It holds the largest node and represents the core of the entire research field. Other prominent themes include social media, work, influence, and communication. The advancement of internet technology has provided convenient services to humans in various ways, speeds, and scales. These services enable users to effectively conduct work on online platforms and foster the prosperity of businesses [50]. Currently, internet technology has evolved from Web 2.0 to Web 3.0, where artificial intelligence facilitates bidirectional connections between humans and the internet [51]. Technologies such as big data and AI automatically capture user needs and provide high-quality services [7]. The user base of social media platforms

has experienced explosive growth, and users' reliance on social media has progressively increased. According to a report by the McKinsey Global Institute, it is estimated that by 2030, approximately 70% of businesses will adopt at least one form of AI technology. A report by market intelligence company Tractica suggests that AI may flourish in industries such as consumer goods, automotive, financial services, telecommunications, and retail. By 2025, the global annual revenue of the AI software market is projected to reach USD 126 billion.

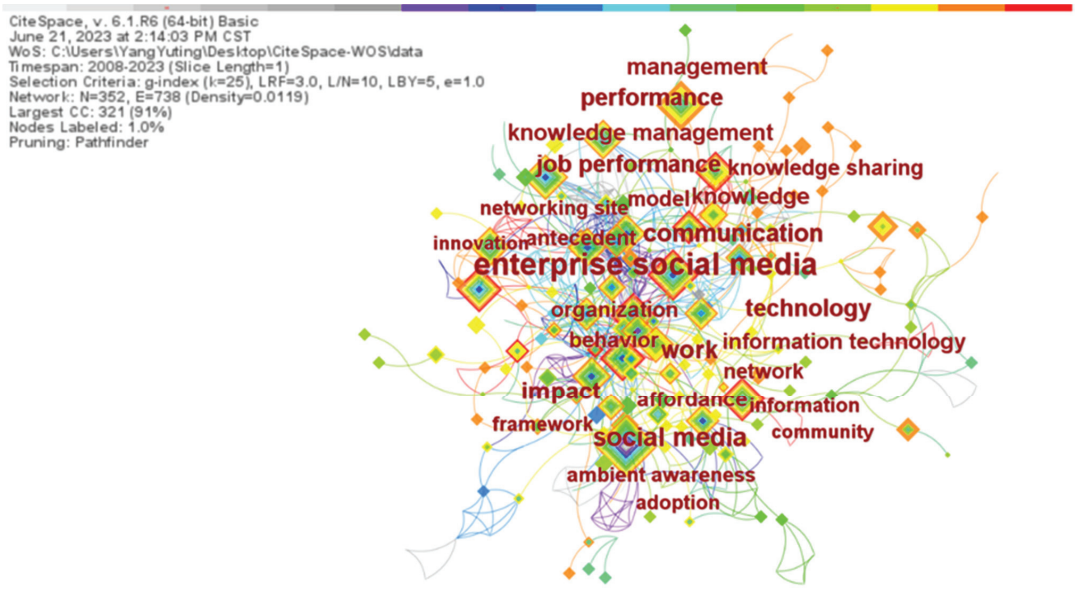

Figure 5. Keyword co-occurrence analysis map of enterprise social media research.

Table 5. Statistical table of high-frequency keywords.

Serial Number	Keyword	Year	Frequency	Centrality
1	Enterprise social media	2013	133	0.03
2	Social media	2009	57	0.19
3	Work	2015	48	0.13
4	Impact	2013	47	0.02
5	Communication	2013	43	0.22
6	Job performance	2018	40	0.04
7	Technology	2015	39	0.04
8	Performance	2018	38	0.00
9	Knowledge	2013	37	0.04
10	Knowledge management	2011	35	0.04

Enterprise social media is a critical medium for information exchange and external governance. Leonardi et al. [23] have mentioned that enterprise social media can serve as a tool for communication among employees and be used in organizational work. As a platform for users to create, disseminate, and acquire information, enterprise social media offers convenience and efficiency in its operation [52]. Zhao [53] found that employees can establish faster connections with others and obtain and disseminate information more quickly through social media. In the era of the digital economy, social networks and other media have expanded the spatial scope of information dissemination [54]. The rise of social media has significantly reduced the speed and distortion rate of original information dissemination, improved information accuracy, and enabled employees to quickly access

and share information, thereby increasing the diversity of information acquisition channels and accelerating the speed of information dissemination [55]. Companies can utilize social networking to establish direct communication and good relationships with customers, further bringing sustainable performance to the organization [56]. Mantymaki et al. [57] studied how employees use corporate social networks from a knowledge management perspective and explored the value of using corporate social networks. They identified five purposes through qualitative content analysis: problem-solving, idea exploration, updates on activities, task management, and informal conversations. The use of social media can facilitate collaborative knowledge management and reduce the complexity of knowledge management through the integration of individual and collective knowledge [58]. Zhao et al. [59] suggest that managers should adopt an open attitude towards the use of social media. They should actively encourage employees to use social media for communication, bridging the gaps in formal communication within the organization, ensuring rapid information dissemination, and promoting effective knowledge sharing among employees.

3.3.2. Timeline Analysis

Using the "Timeline" feature in CiteSpace software, we drew a keyword timeline map to analyze the hotspots and evolutionary trends in research on enterprise social media. The keyword timeline graph is arranged in chronological order from left to right, and the size of nodes is proportional to the frequency of the corresponding keywords [60]. In Figure 6, the identified node clusters represent the forefront of enterprise social media research. Ever since Andrew P. McAfee proposed the concept of "Enterprise 2.0" in 2006, scholars' attention to related topics has shown a gradual increase. In 2008, Antony Mayfield [61] first introduced the concept of social media, considering it as a series of online media where users can form interconnected community networks, allowing for greater engagement. Users can actively participate in these online media by paying attention to, commenting on, providing feedback for, and analyzing information, which stimulates their own interests and facilitates bidirectional content dissemination. Initially, scholars extended the topic of "social media", focusing primarily on studying topics such as information, knowledge, and others. With the rapid development and convenience of social media, it has drawn increasing attention from businesses, leading to the emergence of the concept of enterprise social media and related research. Enterprise social media has gradually become a hot topic within the field. In terms of research content, the current foci include four aspects: the definition, adoption, use, and impact of enterprise social media [62]. Researchers began to focus on various aspects, including technology, behavior, community, and innovation, with a particular emphasis on performance and motivation. In recent years, research interests have become more comprehensive, encompassing areas such as information overload, creativity, challenge stressors, and emotional exhaustion. The literature has shifted from a singular focus to a more diverse perspective, with tighter connections between nodes and a greater variety of research perspectives.

3.3.3. Cluster Analysis

Based on the co-occurrence of keywords in the relevant literature, a cluster analysis of the keywords was conducted using the log-likelihood ratio algorithm in CiteSpace software to identify the core theories and hot topics in the theoretical knowledge. The Modularity Q value and Mean Silhouette S value of the literature clusters indicate a good clustering profile. The Cluster ID represents the post-clustering numbering, presented in the form of #0, #1, #2, and so on in the graph. The smaller the cluster number, the earlier the theme appeared, and the larger the number of labels included in the cluster, the larger the cluster size. From Figure 7, it can be observed that the keyword clustering map displays a total of 17 reasonable cluster categories, including #0 knowledge sharing, #1 impact, #2 coordination, #3 challenge stressors, #4 popularity, #5 digital transformation, #6 social media, etc., representing the main themes in the research on enterprise social media.

Table 6 presents the top ten clusters based on the clustering results. We will discuss these ten clusters at the individual level and the organizational level.

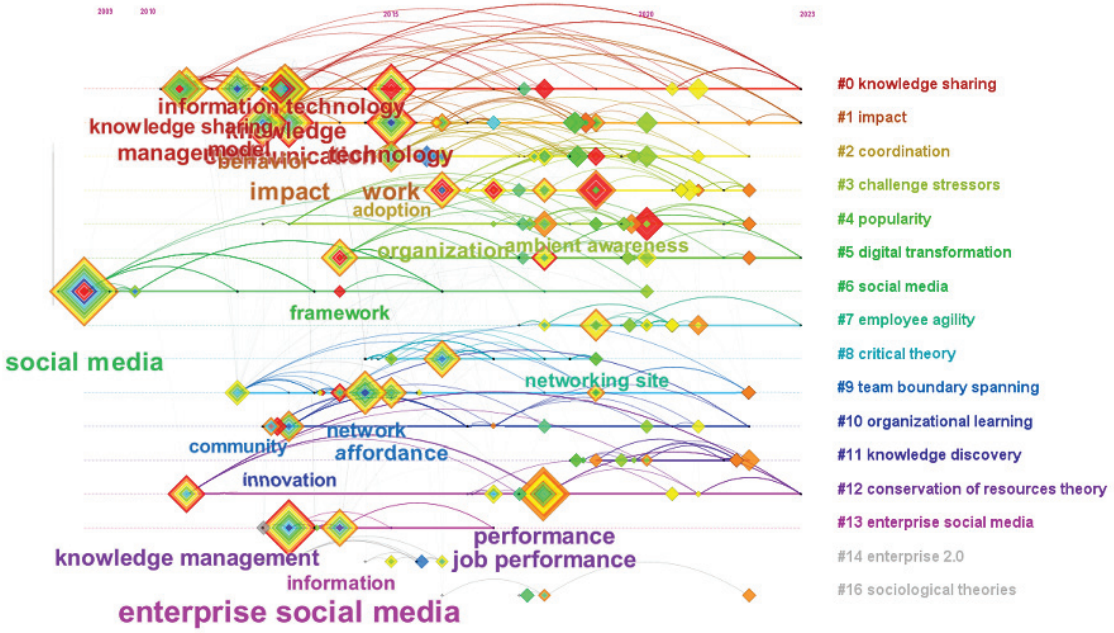

Figure 6. Timeline of keywords in enterprise social media research.

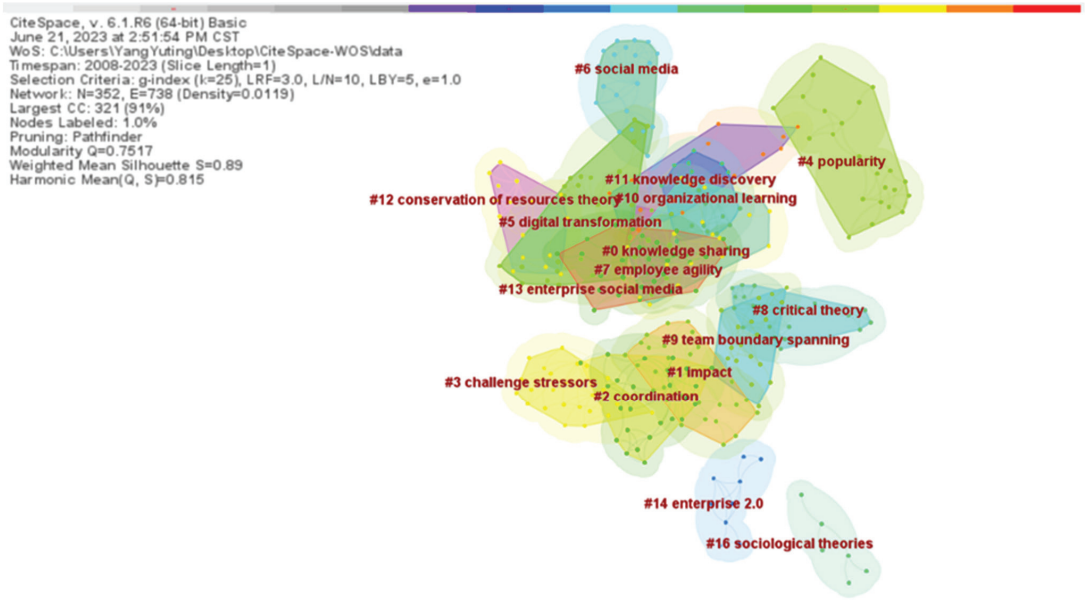

Figure 7. Keyword clustering map of enterprise social media research.

Table 6. Clustering analysis of keywords in enterprise social media.

Cluster ID	Cluster Name	Year	Size	Main Keywords
#0	knowledge sharing	2015	33	organizational social media; knowledge work; reflective learning
#1	impact	2017	32	job satisfaction; work-related use; topic analysis
#2	coordination	2018	25	enterprise social software; enterprise social networks; perceived task autonomy
#3	challenge stressors	2020	24	interruption overload; hindrance stressors; psychological transition
#4	popularity	2018	23	celebrity; referrals; business outcomes; social media use
#5	digital transformation	2019	22	online social relationship; small organizations; proactive creativity
#6	social media	2013	21	enterprise social media; social networks; knowledge sharing
#7	employee agility	2020	21	communication quality; firm performance; social media marketing
#8	critical theory	2016	20	contingency interactivity; German media theory; social media exposure
#9	team boundary spanning	2016	20	hierarchy; ESM usage regret; job reattachment; task performance

1. The Impact of Enterprise Social Media on Individuals

Cluster #0 "knowledge sharing" is the largest cluster. Knowledge sharing refers to the process wherein members of an organization share their individual knowledge with other members through various forms of communication, ultimately transforming it into an organizational intellectual asset [63]. Only by using information technology, appropriate management practices, and other means can knowledge be effectively utilized. The introduction of enterprise social media in organizations is driven by the need to improve internal communication and knowledge sharing [64]. The motivation for sharing knowledge through social media platforms within the organization is to assist colleagues and the organization in problem-solving and goal achievement [39]. Lam et al. [40] advocate that social media within companies can facilitate internal and cross-organizational information exchange and knowledge sharing, further enhancing interaction between companies and customers, and improving both internal and external collaborations. Users can acquire customer knowledge from enterprise social media to enhance customer relationship management in large organizations [65] and improve product innovation [66]. Companies can also utilize social media to reduce information asymmetry with the market, enhance corporate transparency, and improve market efficiency [67]. Chen et al. [68] confirmed that knowledge sharing serves as the best mediator for workplace social media usage and employee skill improvement. However, Leonardi [69] explicitly points out that the potential of enterprise social media in communication visibility may lead employees to conceal certain knowledge to maintain exclusive skills and competitive advantages. Lin et al. [70] believe that when users are in an environment lacking incentives for knowledge sharing, they are more inclined to refrain from participating in community contributions, often leading to knowledge hiding behaviors. Knowledge hiding may result from various factors, such as distrust, previous non-reciprocity, negative personal relationships, prior interactions, risks to reputation or status, subject complexity, time and effort constraints, task relevance, and organizational atmosphere [71]. Nevertheless, Ford et al. [72] discovered that employees may simultaneously engage in both knowledge sharing and knowledge hiding.

Cluster #1, "impact", involves keywords such as job satisfaction, work-related use, and topic analysis. The use of social media enhances job satisfaction by increasing employee engagement and organizational commitment [73]. Social media in the workplace can have a significant impact on knowledge sharing within the organization and help members achieve professional and personal goals, resulting in substantial cost savings. The use of enterprise social media can be divided into two categories: work-related use and social-related use [74]. Work-related use refers to employees using it for work purposes, and activities related to work may have a positive impact on their task performance and outcomes [75]. Conversely, social-related use involves employees using enterprise social media to build and maintain social relationships. Fu et al. [21] found that both work-related and social-related use have positive effects on social capital bonding and bridging. Furthermore, bundled social capital promotes job satisfaction, while bridging social capital inhibits job satisfaction. Eliane et al. [76] discovered that work-related social media has no significant impact on

employees' job satisfaction, whereas social-related social media has a positive influence on job satisfaction.

Cluster #2, "coordination", reflects the perceived task autonomy for individual employees, which indicates their perception of having a certain degree of control over the management process and decision-making freedom regarding task assignments. The use of enterprise social media requires a significant amount of time balancing task scheduling, leading to no impact on perceived task autonomy for employees [77].

Cluster #3, "challenge stressors", includes interruption overload, hindrance stressors, and psychological transitions. Challenge stressors are a type of stressor that can generate challenges and may lead to positive outcomes [78]. Employees can overcome this type of stress to achieve their work goals and developmental capabilities [79]. On the contrary, hindrance stressors arise from constraints that hinder individual developmental goals. Prevalent hindrance stressors include bureaucracy, organizational politics, job insecurity, and career stagnation [80]. Liu et al. [18] argue that the use of social media enriches emotional communication among employees, increases their social interaction scope, and provides them with more social support and networking resources. Consequently, this can lead to a reduction in both challenge stressors and hindrance stressors. The social use of enterprise social media during working hours can result in interruption overload and psychological transitions, which negatively impact employee well-being, creativity, and overall productivity [81]. Harris et al. [82] indicated that the use of social media may lead to social overload and even task overload, resulting in emotional exhaustion and tension.

Cluster #6, "social media", emphasizes that through social media, employees can not only communicate their explicit knowledge in written form but also share tacit knowledge. Social media allows for an increasingly diverse range of knowledge-sharing activities, and actively using social media enables users to gain knowledge and information to help them solve problems [37].

Cluster #7, "employee agility", refers to the ability of employees to adapt to rapidly changing and unpredictable environments [83]. Individuals can use enterprise social media to cope with unpredictable market changes [84]. Sherehiy et al. [85] propose autonomy, job demands, and collaboration as important strategies to promote individual agility. Lai et al. [86] found that task autonomy significantly influences employee agility. High communication quality and trust among employees lead to high agility [87]. The pressures related to enterprise social media can reduce the relationship between communication visibility and employee agility. However, the pressures related to enterprise social media have an insignificant moderating effect on the relationship between communication quality and employee agility [88]. Ma et al. [89] applied the Grounded Theory to investigate and found that the use of enterprise social media can impact employees' work performance through work efficiency and emotional maintenance.

2. The Impact of Enterprise Social Media on Organizations

Cluster #4, "popularity", reveals that key factors such as external pressure, internal readiness, expected benefits, strategic goals, and perceived risks influence the use of social media within organizations. This subsequently affects the performance outcomes in operations and marketing, as well as customer, employee, partner, and supplier satisfaction [90]. Zhang et al. [91] pointed out that in influencer marketing, influencer outreach is a crucial step, where brands engage with influencers and establish cooperative relationships. When customers perceive a brand as highly interactive on social media, they are more likely to purchase the brand's products. Additionally, perceived social media interactivity has a positive influence on customer purchase, recommendation, influence, and knowledge, varying depending on the brand and social media platform type [92].

Cluster #5, "digital transformation", involves online social relationships, small organizations, and proactive creativity. It suggests that internal social media within organizations can help establish a flexible platform that facilitates employee communication and collaboration [93].

Cluster #8, "critical theory", states that media theory provides a specific perspective that explains how media shape, form, support, promote, hinder, and determine organizational communication [94].

Cluster #9, "team boundary spanning", involves keywords such as ESM usage regret, job reattachment, and task performance. Team boundary spanning indicates that the relationship between enterprise social media use, network structure, and content with task performance varies depending on the degree of team dispersion in terms of geography and time. The use of enterprise social media significantly influences the content and structure of individual social networks, thereby enhancing task performance. While the use of social media has certain benefits, it can also have negative impacts. For example, social media use is positively correlated with work overload, leading to reduced employee performance, and information overload in social media can affect workplace anxiety among employees [95]. Deng et al. [77] found that employees' perception of task structure plays a mediating role between the use of enterprise social media and task performance.

Through the above analysis, it is found that the use of enterprise social media has both positive and negative impacts on individuals and organizations. For instance, enterprise social media can facilitate internal and external knowledge sharing [40,68], improve employee satisfaction [73,76], enhance employee agility [84,88], and boost overall corporate performance [75,77,89]. However, it may also lead to negative effects such as knowledge hiding [69,72], hindrance to individual development [81], and information overload for employees [82]. Therefore, for different types and scales of enterprises, further research is needed to effectively enhance the positive effects and mitigate the adverse effects brought about by enterprise social media. This will enable the maximization of net benefits for employees and organizations, thereby promoting sustainable development for the enterprise.

3.3.4. Burst Word Analysis

We used the "Burstness" option in the CiteSpace software to identify burst keywords in the literature on enterprise social media. These burst keywords were further analyzed to examine their variations across different years. This method distinguishes the burst keywords in different time periods using different colors, thereby displaying potential research turning points for the topic in certain years [96]. From Figure 8, it can be observed that a total of 16 burst keywords were found in the research on enterprise social media, indicating high scholarly attention to these thematic terms during specific time periods. Among them, the highest burstiness intensity was observed for "social media" (6.1), followed by "technology", with the second highest burstiness intensity (4.32), and "framework", ranked third, with a burstiness intensity of 3.29. This indicates significant attention to these topics in the field of enterprise social media research. In terms of burst timing, both "social media" and "knowledge sharing" keywords attracted scholars' attention from the beginning, suggesting that the initial exploration of enterprise social media development focused on the study of social media and knowledge sharing. The burstiness of "knowledge sharing" lasted for a relatively long time, starting from 2011 and continuing until 2017, making it a hot research topic for several years. Subsequently, keywords such as "culture", "technology", "organization", "online", and "job performance" had relatively shorter research durations. In recent years, the keyword "employee" has continued to be a topic of research interest and is expected to receive continued attention from scholars, becoming a research hotspot and frontier area.

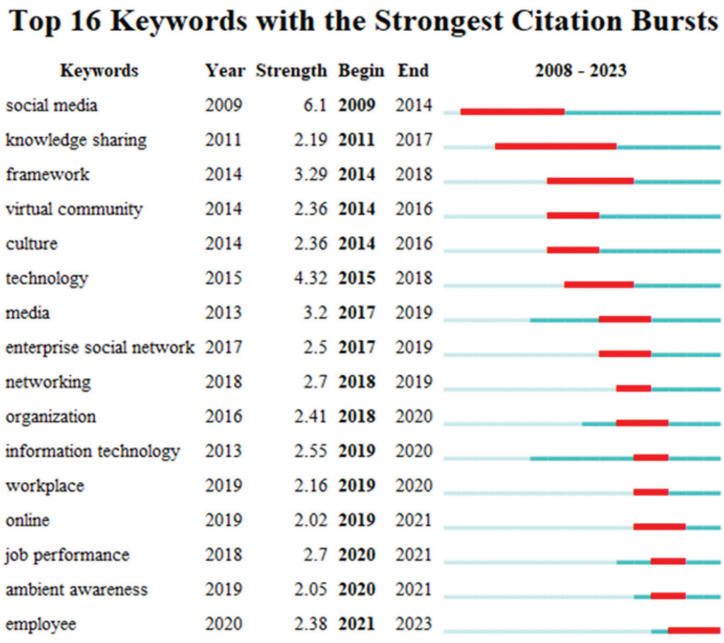

Figure 8. Top sixteen keywords with the strongest citation bursts.

4. Discussion

4.1. Research Implications

This study carries significant implications for both researchers and practitioners in the field of enterprise social media. For researchers, this paper summarizes key countries, institutions, highly cited literature, and core authors in the field of enterprise social media research. It aids researchers to quickly identify hot-topic journals and core authors in the domain and to locate valuable information. Additionally, we employed CiteSpace software to analyze the current status and emerging trends in enterprise social media research and propose potential future research directions. This endeavor aids researchers to focus on the research hotspots in this domain. For business managers, our study sheds light on the impact of enterprise social media on employees. It highlights positive facets such as improved communication and collaboration among team members, as well as negative effects like information overload, distraction, emotional fatigue, and burnout. As a result, managers can actively guide employees to properly use enterprise social media in the workplace, mitigating negative impacts and promoting employee motivation, thereby promoting enterprises' transition to digitalization. Within enterprises, employees can gain insight from understanding the various advantages inherent to enterprise social media. This comprehension empowers them to leverage its benefits to create more value for themselves and their organizations.

4.2. Future Research Directions

With the development and application of enterprise social media technology, the knowledge map also demonstrates the importance and necessity of research in this field. Based on the previous analysis, future research on enterprise social media needs to advance in the following aspects:

1. Explore the enterprise human–machine collaborative models within the context of artificial intelligence. Social media plays a role in facilitating communication and knowledge sharing within organizations, promoting emotional exchange among

employees and teams. With the rapid popularity of generative AI, employees may gradually shift their communication from person-to-person to conversations with intelligent machines due to trust, risk, and other factors. Whether this new form of emotional exchange enhances or replaces effective communication through enterprise social media and whether it reduces team cohesion are questions worth further research by scholars. The use of enterprise social media and the human–machine collaborative office model may also have an impact on employee competence. It is important to examine how this human–machine collaboration model will influence the digital transformation of enterprises.

2. Ensure the privacy of users during the use of enterprise social media. While enterprise social media provides convenient services to users, it also involves risks such as user identity and privacy breaches. Privacy breaches related to enterprise social media users may directly trigger a trust crisis in the platform and even raise doubts about the entire internet [97]. To some extent, this could decrease user satisfaction and usage rates, consequently driving users away from engaging with enterprises. Therefore, it is necessary for companies to pay attention to issues such as safeguarding users' personal information and privacy, as well as creating a favorable information security environment for users.
3. Focus on the impact of enterprise social media use on employees' physical and mental health. The main source of value creation in companies is human capital, so it is particularly important to pay attention to employees' physical and mental health. With the development of digital technology, various software technologies have brought about significant changes in human life and work. The use of enterprise social media allows employees to work remotely online, strengthening communication and collaboration among members, but it also brings negative effects such as information overload, distraction, emotional exhaustion, and fatigue. It may even lead to employees complaining about the blurring of boundaries between work and personal life due to the use of enterprise social media. Therefore, companies should pay attention to the negative impacts arising from employees' use of enterprise social media, improve their physical and mental well-being, enhance employee satisfaction, enable efficient utilization of digital technologies for new forms of office work, and promote sustainable development within the organization.

5. Conclusions, Limitations, and Prospects

5.1. Conclusions

This study uses literature from the Web of Science Core Collection database as the data source and employs CiteSpace software to construct scientific knowledge maps, aiming to help interpret the research hotspots and evolutionary trends of enterprise social media within the context of the digital economy. The following conclusions are drawn:

From the analysis of literature and journals, it can be observed that the publication volume of research on enterprise social media has been steadily rising, but the overall quantity of literatures is relatively small; there is still a significant research space. Prominent outlets such as *Research*, *Information Technology People*, and the *International Journal of Information Management* have published the most literature and become the primary platforms for enterprise social media literature publications. Highly cited literature reflects scholars' heightened attention to sub-topics such as the prospects of enterprise social media, knowledge sharing, and work performance.

Based on the distribution of authors and national institutions, it can be observed that there is not a strong overall level of collaboration among authors, and there is not a discernible pattern pointing towards sustained long-term collaboration. From the analysis of regions and research institutions, it can be seen that the United States and Germany have been conducting research on enterprise social media earlier and continuously, whereas China started relatively late but has published research results in recent years. The institu-

tions with a higher publication volume are mainly concentrated in Chinese and American higher education institutions.

From the perspective of hotspots and evolutionary trends in enterprise social media research, several important key themes have been extended from the core subject of enterprise social media. These themes include social media, communication, work performance, knowledge sharing, and others. Scholars are increasingly focusing on the impact of enterprise social media, as well as hot topics related to corporate management and performance. The literature research has evolved from a single focus to a more diverse array of research perspectives.

By integrating cluster diagrams and emergent word analysis, it was found that research on enterprise social media originally started from the field of social media research and then expanded into the realm of enterprise social media. In its early stages, the research primarily focused on knowledge-sharing themes and had a longer research history. In recent years, there has been increasing attention to topics such as performance and challenge stressors, with employee-related research being ongoing and expected to become a hot and cutting-edge research area.

5.2. Limitations and Future Research

Despite the contribution of our research, there is still room for improvement. Firstly, in terms of the selection of research samples, this paper utilizes CiteSpace software for literature analysis, the data only comes from the Web of Science Core Collection database, and the literature type of this paper is English articles. In future studies, a broader set of academic papers, including conference papers and other types of literature, could be included, and data could be extracted from multiple platforms for conducting literature research. Secondly, with respect to the research content, scholars could initiate research from other perspectives, such as human–computer collaboration, employee mental and physical well-being, user interests, and the privacy of enterprise social media users.

Author Contributions: Conceptualization, W.Z., Y.Y. and H.L.; methodology, W.Z. and Y.Y.; software, Y.Y.; validation, W.Z., Y.Y. and H.L.; formal analysis, W.Z., Y.Y. and H.L.; writing—original draft preparation, W.Z. and Y.Y.; writing—review and editing, W.Z., Y.Y. and H.L.; visualization, Y.Y.; supervision, H.L.; funding acquisition, W.Z. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Shaanxi Social Science Foundation Project (2023R200); Shaanxi Soft Science Program Research Project (2022KRM172); Project of Shaanxi Intellectual Property Office (YJ2023-15); Postgraduate Teaching Reform Project of Xi'an University of Finance and Economics (2023J022); Research project on education and teaching reform of Xi'an University of Finance and Economics (23xcj013).

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Tu, Y.; Liu, R.; Li, H. The Development of Digital Economy and the Future of the Trade Union Law of the People's Republic of China. *J. Chin. Hum. Resour. Manag.* **2022**, *13*, 76–85. [CrossRef]
2. Chen, J.; Zhang, W.; Song, L.; Wang, Y. The coupling effect between economic development and the urban ecological environment in Shanghai port. *Sci. Total Environ.* **2022**, *841*, 156734. [CrossRef]
3. Guo, B.; Wang, Y.; Zhang, H.; Liang, C.; Feng, Y.; Hu, F. Impact of the digital economy on high-quality urban economic development: Evidence from Chinese cities. *Econ. Model.* **2023**, *120*, 106194. [CrossRef]
4. Goldfarb, A.; Tucker, C. Digital Economics. *J. Econ. Lit.* **2019**, *57*, 3–43. [CrossRef]
5. Du, K.; Li, J. Towards a green world: How do green technology innovations affect total-factor carbon productivity. *Energy Policy* **2019**, *131*, 240–250. [CrossRef]
6. Ren, B.; Li, P. Six Paths for China's High-Quality Econimic Development under the Backgroud of Digital Economy. *Econ. Rev. J.* **2023**, 55–67.
7. Liu, H.; Liu, Y.; Huang, T. The Process and Mechanism of Digital Technology Driving High-end Disruptive Innovation: An Explortory Case Study. *J. Manag. World* **2023**, *39*, 63–82+99.

8. Zhao, J. High-quality Development of Digital Economy: Theoretical Logic and Policy Supply. *J. Beijing Univ. Technol. Soc. Sci. Ed.* **2023**, *23*, 78–92.
9. Xing, Z.; Huang, J.; Wang, J. Unleashing the potential: Exploring the nexus between low-carbon digital economy and regional economic-social development in China. *J. Clean. Prod.* **2023**, *413*, 137552. [CrossRef]
10. Zhao, S.; Zhang, L.; An, H.; Peng, L.; Zhou, H.; Hu, F. Has China's low-carbon strategy pushed forward the digital transformation of manufacturing enterprises? Evidence from the low-carbon city pilot policy. *Environ. Impact Assess. Rev.* **2023**, *102*, 107184. [CrossRef]
11. Jia, X.; Xie, B.; Wang, X. The impact of network infrastructure on enterprise digital transformation—A quasi-natural experiment from the "broadband China" Strategy. *Appl. Econ.* **2023**, *102*, 107184. [CrossRef]
12. Attaran, M. The impact of 5G on the evolution of intelligent automation and industry digitization. *J. Ambient Intell. Humaniz. Comput.* **2021**, *14*, 5977–5993. [CrossRef]
13. Ren, L.; Zhou, S.; Peng, T.; Ou, X. A review of CO_2 emissions reduction technologies and low-carbon development in the iron and steel industry focusing on China. *Renew. Sustain. Energy Rev.* **2021**, *143*, 110846. [CrossRef]
14. Li, H.; Liang, B.; Cao, Z. Research on the Impact of Digital Transformation on Firms' Markup. *J. Hunan Univ. Soc. Sci.* **2023**, *37*, 65–76.
15. Wu, H.; Hao, Y.; Ren, S.; Yang, X.; Xie, G. Does internet development improve green total factor energy efficiency? Evidence from China. *Energy Policy* **2021**, *153*, 112247. [CrossRef]
16. Wang, B.; Kang, Q. Digital Transformation and Enterprise Sustainable Development Performance. *Bus. Manag. J.* **2023**, *45*, 161–176.
17. Leonardi, P.M.; Emmanuelle, V. Social Media and Their Affordances for Organizing: A Review and Agenda for Research. *Acad. Manag. Ann.* **2017**, *11*, 150–188. [CrossRef]
18. Liu, D.; Hou, B.; Liu, Y.; Liu, P. Falling in Love With Work: The Effect of Enterprise Social Media on Thriving at Work. *Front. Psychol.* **2021**, *12*, 769054. [CrossRef]
19. Huang, F.; Guo, T. The Strategic Path for Business Practice in Social Media Marketing. *J. Tech. Econ. Manag.* **2018**, *25*, 75–79.
20. Chen, X.; Wei, S.; Davison, R.M.; Rice, R.E. How do enterprise social media affordances affect social network ties and job performance? *Inf. Technol. People* **2020**, *33*, 361–388. [CrossRef]
21. Fu, J.; Sawang, S.; Sun, Y. Enterprise Social Media Adoption: Its Impact on Social Capital in Work and Job Satisfaction. *Sustainability* **2019**, *11*, 4453. [CrossRef]
22. Mettler, T.; Winter, R. Are business users social? A design experiment exploring information sharing in enterprise social systems. *J. Inf. Technol.* **2016**, *31*, 101–114. [CrossRef]
23. Leonardi, P.M.; Huysman, M.; Steinfield, C. Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organizations. *J. Comput. Mediat. Commun.* **2013**, *19*, 1–19. [CrossRef]
24. Sun, Y.; Liu, Y.; Zhang, J.; Fu, J.; Hu, F.; Xiang, Y.; Sun, Q. Dark Side of Enterprise Social Media Usage: A literature Review from the Conflict-based Perspective. *Int. J. Inf. Manag.* **2021**, *61*, 102393. [CrossRef]
25. Sun, Y.; Zhou, X.; Jeyaraj, A.; Shang, R.; Hu, F. The Impact of Enterprise Social Media Platforms on Knowledge Sharing: An Affordance Lens Perspective. *J. Enterp. Inf. Manag.* **2019**, *32*, 233–250. [CrossRef]
26. Wu, C.; Zhang, Y.; Huang, S.; Yuan, Q. Does Enterprise Social Media Usage Make the Employee More Productive? A Meta-analysis. *Telemat. Inform.* **2021**, *60*, 101578. [CrossRef]
27. Liu, Y.; Bakici, T. Enterprise Social Media Usage: The Motives and the Moderating Role of Public Social Media Experience. *Comput. Hum. Behav.* **2019**, *101*, 163–172. [CrossRef]
28. Liu, Z.; Chen, Y.; Hou, H. *Scientific Knowledge Graph: Methods and Applications*; People's Publishing House: Beijing, China, 2008.
29. Chen, C.; Hu, Z.; Liu, S.; Tseng, H. Emerging trends in regenerative medicine: A scientometric analysis in CiteSpace. *Expert Opin. Biol. Ther.* **2012**, *12*, 593–608. [CrossRef]
30. Qiv, J. Topics and Knowledge Mapping in Social Media Research—Visual Analysis Based on CNKI(2008–2017). *J. Xizang Minzu Univ. Philos. Soc. Sci. Ed.* **2018**, *39*, 137–142.
31. Hua, R.; Cheng, D. Visualization Analysis on Intellectual Structures and Frontiers of Social Media. *J. Beijing Inst. Technol. Soc. Sci. Ed.* **2019**, *21*, 171–180.
32. Li, Y.; Shi, S.; Wu, Y.; Chen, Y. A Review of Enterprise Social Media: Visualization of Landscape and Evolution. *Internet Res.* **2021**, *31*, 1203–1235. [CrossRef]
33. Wang, L.; Lv, Y.; Huang, S.; Liu, Y.; Li, X. The Evolution of Research on C&D Waste and Sustainable Development of Resources: A Bibliometric Study. *Sustainability* **2023**, *15*, 9141.
34. Yin, Q.; Liu, H.; Zhou, T. CiteSpace-Based Visualization Analysis on the Trombe Wall in Solar Buildings. *Sustainability* **2023**, *15*, 11502. [CrossRef]
35. Yue, Z.; Zhao, S. The research status and trend of innovation network in China. *Sci. Res. Manag.* **2022**, *43*, 141–153.
36. Guo, C.; Wang, Q.; Su, Z. Value Realization of Firms' Digital Transformation: International Research Progress and Prospects. *Sci. Sci. Manag. S. T.* **2023**, *44*, 32–49.
37. Kwahk, K.Y.; Park, D.H. The effects of network sharing on knowledge-sharing activities and job performance in enterprise social media environments. *Comput. Hum. Behav.* **2016**, *55*, 826–839. [CrossRef]
38. Razmerita, L.; Kirchner, K.; Nielsen, P. What factors influence knowledge sharing in organizations? A social dilemma perspective of social media communication. *J. Knowl. Manag.* **2016**, *20*, 1225–1246. [CrossRef]

39. Vuori, V.; Okkonen, J.M. Knowledge Sharing Motivational Factors of Using Intra-Organizational Social Media Platform. *J. Knowl. Manag.* **2012**, *16*, 592–603. [CrossRef]
40. Lam, H.K.S.; Yeung, A.C.L.; Cheng, T.C.E. The impact of firms' social media initiatives on operational efficiency and innovativeness. *J. Oper. Manag.* **2016**, *47–48*, 28–43. [CrossRef]
41. Cai, Z.; Huang, Q.; Liu, H.; Wang, X. Improving the agility of employees through enterprise social media: The mediating role of psychological conditions. *Int. J. Inf. Manag.* **2018**, *38*, 52–63. [CrossRef]
42. Fulk, J.; Yuan, Y.C. Location, Motivation, and Social Capitalization via Enterprise Social Networking. *J. Comput. Mediat. Commun.* **2013**, *19*, 20–37. [CrossRef]
43. Krasnova, H.; Veltri, N.F.; Eling, N.; Buxmann, P. Why men and women continue to use social networking sites: The role of gender differences. *J. Strateg. Inf. Syst.* **2017**, *26*, 261–284. [CrossRef]
44. Meire, M.; Hewett, K.; Ballings, M.; Kumar, V.; Van den Poel, D. The Role of Marketer-Generated Content in Customer Engagement Marketing. *J. Mark.* **2019**, *83*, 21–42. [CrossRef]
45. Leidner, D.E.; Gonzalez, E.; Koch, H. An affordance perspective of enterprise social media and organizational socialization. *J. Strateg. Inf. Syst.* **2018**, *27*, 117–138. [CrossRef]
46. Mei, S.; Jia, Z.; Xiaohao, L.; Liyan, Z.; Xuguang, H.; Mengxue, L. Developments and Trends in Energy Poverty Research—Literature Visualization Analysis Based on CiteSpace. *Sustainability* **2023**, *15*, 2576.
47. Li, X.; Li, B. Analysis on the Evolution of Digital Innovation Research Hotspots. *J. Stat. Inf.* **2022**, *37*, 115–128.
48. Chen, C. CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *J. Am. Soc. Inf. Sci. Technol.* **2005**, *57*, 359–377. [CrossRef]
49. Yue, T.; Li, M.; Chen, H.; Long, R.; Wang, Y. Carbon neutrality research hotspots and evolution trend: Based on the scientific knowledge map. *Resour. Sci.* **2022**, *44*, 701–715. [CrossRef]
50. Chen, G.; Ren, M.; Wei, Q.; Guo, X.; Yi, C. Data-Intelligence Empowerment: A New Leap of Information Systems Research. *J. Manag. World* **2022**, *38*, 180–196.
51. Wang, Q. Characteristics and Technical Response of Online Ideology in the Data Era. *Media Obs.* **2022**, *39*, 67–77.
52. Chen, R.; Wu, D.; Sun, J. An Analysis of the Research Situation of Information Science Based on Social Media Information Communication. *Res. Libr. Sci.* **2013**, *32*, 2–5+90.
53. Zhao, Y. Research on the Impact of Social Media on Information Dissemination in Enterprises: Based on the Perspective of Social Network. *Media* **2014**, *16*, 68–70.
54. Chen, D.; Hu, Q. Corporate Governance Research in the Digital Economy: New Paradigms and Frontiers of Practice. *J. Manag. World* **2022**, *38*, 213–240.
55. Li, X.; Wang, K. Social Media Users' Marketing Information Sharing Behavior: Perspective of Evaluation Apprehension and System Feedback. *J. Manag. Sci.* **2020**, *33*, 82–97.
56. Wibowo, A.; Chen, S.-C.; Wiangin, U.; Ma, Y.; Ruangkanjanases, A. Customer Behavior as an Outcome of Social Media Marketing: The Role of Social Media Marketing Activity and Customer Experience. *Sustainability* **2021**, *13*, 189. [CrossRef]
57. Mäntymäki, M.; Riemer, K. Enterprise Social Networking: A knowledge Management Perspective. *Int. J. Inf. Manag.* **2016**, *36*, 1042–1052. [CrossRef]
58. Razmerita, L.; Kirchner, K.; Nabeth, T. Social Media in Organizations: Leveraging Personal and Collective Knowledge Processes. *J. Organ. Comput. Electron. Commer.* **2014**, *24*, 74–93. [CrossRef]
59. Zhao, Y.; Yang, G.; Xie, C. Influence Study on Social Media to Enterprise Knowledge Sharing Based on SNA. *Financ. Econ.* **2014**, *39*, 92–101.
60. Tao, Y.; Lin, P.-H. Analyses of Sustainable Development of Cultural and Creative Parks: A Pilot Study Based on the Approach of CiteSpace Knowledge Mapping. *Sustainability* **2023**, *15*, 10489. [CrossRef]
61. Mayfield, A. *What is Social Media*; Spanner Works: London, UK, 2008.
62. Miao, R.; Huang, L. A Review of Enterprise Social Media Research: Concepts, Adoption, Use, and Impact. *China J. Inf. Syst.* **2017**, *11*, 107–122.
63. Wei, J.; Wang, Y. Research on the mode of knowledge sharing within the enterprise. *J. Tech. Econ. Manag.* **2004**, *11*, 68–69.
64. Veeravalli, S.; Vijayalakshmi, V. A Morphological Review of Enterprise Social Media Literature. *J. Organ. Comput. Electron. Commer.* **2019**, *29*, 139–162. [CrossRef]
65. Chua, A.Y.K.; Banerjee, S. Customer Knowledge Management via Social Media: The Case of Starbucks. *J. Knowl. Manag.* **2013**, *17*, 237–249. [CrossRef]
66. Nguyen, B.; Yu, X.; Melewar, T.C.; Chen, J. Brand Innovation and Social Media: Knowledge Acquisition from Social Media, Market Orientation, and the Moderating Role of Social Media Strategic Capability. *Ind. Mark. Manag.* **2015**, *51*, 11–25. [CrossRef]
67. Gu, C.; Kurov, A. Informational Role of Social Media: Evidence from Twitter Sentiment. *J. Bank. Financ.* **2020**, *121*, 105969. [CrossRef]
68. Chen, M.; Babar, M.; Ahmed, A.; Irfan, M. Analyzing the Impact of Enterprise Social Media on Employees' Competency through the Mediating Role of Knowledge Sharing. *Sustainability* **2023**, *15*, 9499. [CrossRef]
69. Leonardi, P.M. Ambient Awareness and Knowledge Acquisition: Using Social Media to Learn Who Knows What and Who Knows Whom. *MIS Q.* **2015**, *39*, 747–762. [CrossRef]

70. Lin, L.; Shi, J.; Tang, D. Knowledge sharing incentive of project teams based on the perspective of knowledge withholding. *Sci. Res. Manag.* **2015**, *36*, 162–170.
71. Connelly, C.E.; Zweig, D.; Webster, J.; Trougakos, J.P. Knowledge hiding in organizations. *J. Organ. Behav.* **2012**, *33*, 64–88. [CrossRef]
72. Ford, D.P.; Staples, D.S. What is Knowledge Sharing from the Informer's Perspective? *Int. J. Knowl. Manag.* **2008**, *4*, 1–20. [CrossRef]
73. Zhang, X.; Ma, L.; Xu, B.; Xu, F. How Social Media Usage Affects Employees' Job Satisfaction and Turnover Intention: An Empirical Study in China. *Inf. Manag.* **2019**, *56*, 103136. [CrossRef]
74. Chen, X.; Wei, S. Enterprise social media use and overload: A curvilinear relationship. *J. Inf. Technol.* **2019**, *34*, 22–38. [CrossRef]
75. Sun, Y.; Zhu, M.; Zhang, Z. How Newcomers' Work-Related Use of Enterprise Social Media Affects Their Thriving at Work—The Swift Guanxi Perspective. *Sustainability* **2019**, *11*, 2794. [CrossRef]
76. Bucher, E.; Fieseler, C.; Suphan, A. The Stress Potential of Social Media in the Workplace. *Inf. Commun. Soc.* **2013**, *16*, 1639–1667. [CrossRef]
77. Deng, M.; Liu, H.; Huang, Q.; Ding, G. Effects of Enterprise Social Media Usage on Task Performance Through Perceived Task Structure: The Moderating Role of Perceived Team Diversity. *Inf. Technol. People* **2021**, *34*, 930–954. [CrossRef]
78. Hase, A.; O'Brien, J.; Moore, L.; Freeman, P. The relationship between challenge and threat states and performance: A systematic review. *Sport Exerc. Perform. Psychol.* **2019**, *8*, 123–144. [CrossRef]
79. Wallace, J.C.; Edwards, B.D.; Arnold, T.; Frazier, M.L.; Finch, D.M. Work stressors, role-based performance, and the moderating influence of organizational support. *J. Appl. Psychol.* **2009**, *94*, 254–262. [CrossRef] [PubMed]
80. Boswell, W.R.; Olson-Buchanan, J.B.; LePine, M.A. Relations between stress and work outcomes: The role of felt challenge, job control, and psychological strain. *J. Vocat. Behav.* **2004**, *64*, 165–181. [CrossRef]
81. Adeel, L.; Shalini, T.; Ayesha, M.; Amandeep, D. Does Enterprise Social Media Use Promote Employee Creativity and Well-being? *J. Bus. Res.* **2021**, *131*, 40–54.
82. Harris, K.J.; Harris, R.B.; Carlson, J.R.; Carlson, D.S. Resource loss from technology overload and its impact on work-family conflict: Can leaders help? *Comput. Hum. Behav.* **2015**, *50*, 411–417. [CrossRef]
83. Alavi, S. The influence of workforce agility on external manufacturing flexibility of Iranian SMEs. *Int. J. Technol. Learn. Innov. Dev.* **2016**, *8*, 111. [CrossRef]
84. Lu, Y.; Pan, T. The Effect of Employee Participation in Enterprise Social Media on Their Job Performance. *IEEE Access* **2019**, *7*, 137528–137542. [CrossRef]
85. Sherehiy, B.; Karwowski, W. The relationship between work organization and workforce agility in small manufacturing enterprises. *Int. J. Ind. Ergon.* **2014**, *44*, 466–473. [CrossRef]
86. Lai, H.; Pitafi, A.H.; Hasany, N.; Islam, T. Enhancing Employee Agility Through Information Technology Competency: An Empirical Study of China. *SAGE Open* **2021**, *11*, 18. [CrossRef]
87. Luteng, Z.; Yan, X.; Chunchun, C.; Rui, Z. Predicting the Factors of Employee Agility Using Enterprise Social Media: The Moderating Role of Innovation Culture. *Front. Psychol.* **2022**, *13*, 911427.
88. Pitafi, A.H.; Ren, M. Predicting the Factors of Employee Agility Using Enterprise Social Media: Moderating Effects of Enterprise Social Media-Related Strain. *Internet Res.* **2021**, *31*, 1963–1990. [CrossRef]
89. Ma, L.; Zhang, X.; Wang, G. The impact of enterprise social media use on employee performance: A grounded theory approach. *J. Enterp. Inf. Manag.* **2021**, *35*, 481–503. [CrossRef]
90. Cao, Y.; Ajjan, H.; Hong, P.; Le, T. Using Social Media for Competitive Business Outcomes. *J. Adv. Manag. Res.* **2018**, *15*, 211–235. [CrossRef]
91. Zhang, J.; Li, X.; Wu, B.; Zhou, L.; Chen, X. Order matters: Effect of use versus outreach order disclosure on persuasiveness of sponsored posts. *J. Res. Interact. Mark.* **2023**. *ahead-of-print*. [CrossRef]
92. Bozkurt, S.; Gligor, D.M.; Babin, B.J. The Role of Perceived Firm Social Media Interactivity in Facilitating Customer Engagement Behaviors. *Eur. J. Mark.* **2020**, *55*, 995–1022. [CrossRef]
93. Lu, B.; Guo, X.; Luo, N.; Wang, X.; Chen, G. Intra-Organizational Social Media and Employee Idea Generation: Analysis based on the Spanning-Relevance Framework. *J. Syst. Sci. Syst. Eng.* **2022**, *31*, 649–676. [CrossRef]
94. Hoof, F.; Boell, S.K. Culture, Technology, and Process in 'Media Theories': Toward a Shift in the Understanding of Media in Organizational Research. *Organization* **2019**, *26*, 636–654. [CrossRef]
95. Wang, C.; Yuan, T.; Feng, J.; Peng, X. How can Leaders Alleviate Employees' Workplace Anxiety Caused by Information Overload on Enterprise Social Media? Evidence from Chinese Employees. *Inf. Technol. People* **2023**, *36*, 224–244. [CrossRef]
96. Cao, Y.; Ye, Y. Current Status and Frontier Analysis of Multidimensional Relative Poverty Research in China. *Stat. Decis.* **2021**, *37*, 33–37.
97. Duan, Q.; Zhang, D.; Xie, X. A Research on the Effect of User Trust Repair Strategies in the Context of Social Media Privacy Violation. *Res. Libr. Sci.* **2022**, 75–86+68.

MDPI
St. Alban-Anlage 66
4052 Basel
Switzerland
www.mdpi.com

Sustainability Editorial Office
E-mail: sustainability@mdpi.com
www.mdpi.com/journal/sustainability

Academic Open
Access Publishing

mdpi.com

ISBN 978-3-0365-8801-8