

Communication

# The Link between Business Process Management and Quality Management

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**Abstract:** In an environment of intense globalization and digitalization, business organizations are increasingly faced with various challenges such as rising costs, strong competition, rapidly evolving technologies, increasingly demanding and whimsical consumers, and, in social terms, changing societal demands. It is within this context that the effectiveness and efficiency of the management of business organizations is actualized. The paper addresses the following fundamental questions regarding the scientific problem at the theoretical level: What is the place of Business Process Management (BPM) in the context of Quality Management (QM)? Should BPM be the axis of QM? There is a lack of interdisciplinary research on the link between Business Process Management and Quality Management, and this study aims to ground this link. Methods of the research are literature review and the critical analysis of the scientific sources on the issue. The findings show that there exists confusion, overlaps among different paradigms of QM and BPM. The BPM paradigm might be considered as an integral part of almost all essential quality management paradigms. BPM is like a horizontal area “crossing” different paradigms of quality management (e.g., TQM, SMS, Lean, Six Sigma). The conclusions drawn are useful for organizations that implement quality management systems. The integration of BPM into quality management systems and tools creates preconditions for the development of an effective and efficient organization.

**Keywords:** process; business process management; quality management; total quality management; Lean; Six Sigma; ISO 9000

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## 1. Introduction

In an environment of intense globalization and digitalization, business organizations are increasingly faced with various challenges such as rising costs, strong competition, rapidly evolving technologies, increasingly demanding and whimsical consumers, and, in social terms, changing societal demands. Companies operating in this context seek to make the best decisions (Beilmann and Clever 2019). Becker et al. (2013a) describe competition as a “mobile war”, where success depends on anticipating pertinent market trends and responding quickly to changing consumer needs. The insights of these authors are extremely relevant because most organizations have already entered or are entering the digital transformation that enables critical business changes. This leads not only to the fundamental transformation of an organization but also that of the entire industry. Digitization of business processes in many cases becomes the key to increasing business efficiency (Osmundsen et al. 2019). In other words, in recent years, the digital transformation has been changing the economic environment of organizations (Fischer et al. 2019), which highlights the importance of business process management while developing digitization (Martinez 2019). Business process management (BPM) is one of the most popular business practices nowadays, which is being explored both in the business world and by the scientific society. The relevance of this methodology is undeniable, as BPM is vital to every

organization. The relevance of BPM has become even more pronounced in the last decade, during which the functioning of organizations has been significantly affected by digitization (Pereira et al. 2019; Chountalas and Lagodimos 2019; Van Looy 2020).

To manage business processes, it is first necessary to comprehend the concept of “process” (Seethamraju 2012; Iden 2012). Quality Management (QM) has been based on this definition since the beginning of the 20th century. For several decades already, business organizations have been identifying, describing, and, in some cases, standardizing (for instance, ISO 9001) their business processes by introducing quality management systems and applying/constructing quality management models. Thus, quality management conceptions such as Total Quality Management (TQM), Lean, Six Sigma, and others do not consider processes to be a peripheral area (Chang 2006). This can be illustrated by Bhat and Fernandez’s (2010) insight, which implies that process professionals may look at BPM with suspicion, considering that it might simply be “the old wine in new bottles”—that is, the same quality management. The truth of most management ideas is that they are often constructed “on top of each other,” sharing key themes that have not changed over the years. Be it TQM in 1980 or Business Process Reengineering (BPR) in 1990, the main theme uniting these management ideas is the concept of process management to increase value. The existing theories of process management have emerged from the quality movement and the BPR movement over the past two decades (Chang 2006). Several twentieth-century management initiatives, including TQM, Lean, Six Sigma, and BPR, cover the core area of processes and process management. The origins and essential philosophical basis of process management are related to TQM, which generalizes the use of business management, information technology, and quality management methods (Seethamraju 2012; Klimas 2013). So, the question arises as to whether BPM is an integral part of quality management.

This paper analyses two management methodologies—that is, Business Process Management (BPM) and Quality Management (QM). The scientific problem of this paper focuses on the following fundamental questions at the theoretical level: What role does business process management play in the context of quality management? Should BPM be considered as the axis of QM? Alternatively, is BPM a completely separate discipline which has nothing to do with QM? The subject of the research is the link between BPM and QM. This conceptual topic is particularly relevant for science, as the most recent research on the link between QM and BPM, which is fragmented, may lead to appropriate decisions in terms of evolving quality management concepts, such as the direction of ISO management standards or the need of certifying other QM systems (that are not being certified yet), etc. This would allow the scientific substantiation of the relevance and benefits of the link between BPM and QM (perhaps even the convergence of these concepts) to the specifics of the business sector—that is, application of new theories (in this case, QM and BPM theories) to the solution of the phenomenon. Thus, this paper aims to define the link between the essential aspects of business process management and quality management based on theoretical insights.

The methods of the research are literature review and the critical analysis of the scientific sources on the issue. Scientific articles and other scientific sources (dissertations, books) published over a period of 20 years (2000–2020) were analyzed, looking for the research conducted on the topic of the links between BPM and QM. International databases were investigated by entering the following keywords: Business Process Management and Quality Management, the link between BPM and QM, the link between BPM and TQM, Six Sigma, Lean.

## 2. Concept of Business Process Management

The definition of the business process, which is relevant in the conception of BPM, is still not properly perceived in business. The process is inherently dynamic (agile). It is not just what needs to be designed or redesigned; it is an important complex organizational unit that needs to be managed. A business process is a set of all the activities of an organization, including the roles, resources, and rules required to produce and deliver a product or service to external or internal users (Iden 2012). It is a complex phenomenon and is more than just a sequence of actions (Becker et al. 2013a). Thus,

a business process is an agile, complex organizational unit with a logical and time-bound sequence of actions. This process should be managed in an organization to create a user-defined value. Given the dynamic nature of the business process, continuous process improvement is a prerequisite for creating and maintaining a long-term competitive advantage for an organization.

BPM has been developed as an important management tool that helps organizations to grow and innovate. This methodology includes designing (or re-designing) the business logic of the organization; modeling its implementation; execution; management; monitoring and changes needed to meet customers' needs to the greatest extent. "The axis of the BPM philosophy and the implementation of its principles is the satisfaction of customers' needs; therefore, it can be stated that the BPM philosophy remains as a future management philosophy" (Klimas 2013, p. 12). In other words, BPM is a management approach that treats the functioning of an organization as a network of interconnected business processes. With this approach, to increase dynamism in an ever-changing environment, most organizations partially or completely change traditional hierarchical organizational structures by focusing them on processes (Chountalas and Lagodimos 2019). Thus, while traditional organizations are established on the basis of departments and functional silos, BPM positions organizations as networks or process systems (Chang 2006). Business processes are a core unit of BPM that is focused on identification, discovery, analysis, redesign, execution, and monitoring as a body of methods, techniques, and tools. In this way, the aim is to improve performance (Dumas et al. 2018).

Iden (2012) distinguishes four dimensions of BPM: process awareness, process ownership, process measurement, and process improvement. Process awareness is defined as the most important criterion of process management; that is, business organization processes should be identified, named, and documented. This is reflected in a comprehensive process map that visualizes the processes of the organization and their interrelationships. It should be supplemented by a set of documents describing individual processes and distinguishing activities, roles, resources, rules, and results. However, to meet the criteria of understanding the processes, having documents alone is not enough. Managers and employees should comprehend these processes; employees should have a deep understanding of the processes they are involved in from the beginning to the end. This most important criterion is about how employees and managers perceive the organization—that is, how it is structured, how it works. Moreover, in case processes are immeasurable, it is impossible to define the value they create. Measurements provide a basis for the improvement of processes (Chang 2006).

To sum up, it should be emphasized that BPM is a management concept that defines the performance of an organization as a system of related, interacting processes. The management of such an organization is based on networked processes. The BPM concept should have the following components: (1) the process should be correctly understood (this is the most important part of BPM); (2) the process should have a process owner assigned; (3) the process should be evaluated/measured; (4) the process should be systematically improved in the context of other processes. The process architecture is the basis of the BPM methodology, which demonstrates how the organization provides value to users. The essential condition of the process architecture is a correct understanding of processes.

### 3. Evolution of Business Process Management: The Context of Digitization

The origins of BPM can be traced to F. W. Taylor, who shaped the principles of scientific management, and H. Simon, who applied systemic thinking to organizations (Chountalas and Lagodimos 2019). Shewhart (1931) was one of the first to argue for process monitoring in product control. During 1970, the methodologies of dealing with processes were refined as Just-In-Time (JIT) and Lean Production (Palmberg 2010). In 1980 and 1990, the area of monitoring the process was greatly developed and covered all areas of the organization.

Process management emerged as early as in 1980, but, despite many other management concepts, interest in process management remains very high (Palmberg 2010). Despite a relatively early discussion on the subject of processes among academics, the focus on processes began in 1980 following the approaches published by Gaitanides (1983), Scheer (1990), Porter (1989), Davenport (1993), Hammer

and Champy (1993), and Hammer (1996) (Becker et al. 2013a). However, the most powerful assumptions in shaping the BPM concept came from the works of Porter (1985) and Deming (1986), who described the horizontal interrelationships of individual activities that extend throughout the organization, perceiving these activities as a unified system (Porter's "Value Chain", Deming's "Flow Diagram"). These activities were not known as business processes; they were formally defined as a set of clearly specified, structured, and logically related activities that function together and use resources to transform specific inputs into desired outcomes (Chountalas and Lagodimos 2019).

In 1990, when the business was dominated by the Total Quality Management philosophy, to increase stakeholders and value, reduce organizational costs, and improve performance, the process-centered view, the so-called conception of Business Process Reengineering (BPR), incorporated a radical process redesign. BPR is a systematic management methodology which, in the form of an independent project of change, involves a radical redesign of the process. BPR quickly spread from production sources to non-productive areas. The first success stories of organizations appeared (for instance, Ford's Billing Division, IBM Credit Corporation). Radical managerial approaches to process improvement were used, which were publicized in management journals such as the Harvard Business Review. However, the growing interest of the management community in the concept of BPR received considerable criticism from the scientific community, which argued that BPR evokes more myths than practical methodologies (Klun and Trkman 2018). Its implementation was a major challenge for managers and not always successful. Studies show that the rate of failure of the implementation of BPR was between 50 and 80 percent. As BPR is a large, high-risk change project, failure can have a huge negative impact on an organization (Chountalas and Lagodimos 2019). It is important to note that the BPR movement made a particularly significant contribution to highlighting the importance of inter-functional processes (not just processes) (Näslund 2008). Recently, and in parallel with this conceptual transformation, the process-centered view reached a new dimension—that is, process management—which emphasizes the continuous improvement of organizational processes (Iden 2012). "BPM is a revival of BPR, as indeed BPM adopts the process-centred view on organizations" (Dumas et al. 2018, p. 15).

One of the most recent terms used in the context of BPM is Business Process Change (BPC). Harmon (2019, cit. in Javidroozi et al. 2020) defines BPC as the analysis, redesign, and improvement of existing processes to achieve competitive advantage in operations. This is implemented through the BPM program, which helps understand business requirements, the need for change, and the impact of BPC on business. Business processes, especially in large organizations, are complex; the BPC approach implies managing this complexity.

The organizations that integrate and implement digital technologies are much more innovative than other organizations (Osmundsen et al. 2019). Information systems have paid special attention to BPM and have begun to incorporate this concept into the curriculum of the IS model, research, and practice (Seethamraju 2012). The new paradigm of conceptual process management created by Hammer has led to new organizational structures and solutions that are closely related to information technology. The rapid development of IT focused on business process automation has begun. However, most of these information and communication technology-based process approaches failed because the solution of the IT software selected in the organization was more dominant than focusing on the challenges of fair business and IT alignment (Becker et al. 2013a).

Business process modeling has received special attention in recent decades, both in practical and theoretical terms. Modeling has always been the essence of BPM activities; process models have always been used to improve the organization. Gantt charts and flow charts were the earliest tools for modeling business processes (Aguilar-Savén 2004; Adamides and Karacapilidis 2006, cit. in Klun and Trkman 2018). Business process modeling languages using IT tools abound, ranking from early languages such as EPC (event-driven process chain) to BPMN (Business Process Model and Notation) and UML Activity Diagrams (Becker et al. 2013b). The most frequently and commonly used notations for business process modeling are flow chart diagrams, PetriNets, Integrated Definition for Function Modeling (IDEF0), event-driven process chains (EPC), Unified Modeling Language (UML),

and Business Process Model and Notation (BPMN). However, all these mark-up languages are criticized by practitioners and researchers. The limitations are particularly related to the lack of standardization, which poses challenges to the reuse of business processes as well as those in changing management (Becker et al. 2013b).

One of the latest technologies that enables the automation of repetitive business processes is Robotic Process Automation (RPA), which addresses the typical and relatively simple tasks of the employees of an organization. Typical examples include processing bank loans, taxes, insurance claims, or consumer inquiries. RPA is a software robot that replicates human activities in processes with structured data, clear rules of action leading to unambiguous results. Studies show that RPA has a profound effect on business operations. These robots manage structured tasks accurately, and the services of an organization are improved quickly and qualitatively, which expands the availability of services and increases compliance with the norms established. According to research, the return on investment in RPA varies from 30 to 200 percent in the first year. Research also reveals that RPA affects some activities, and the effect usually includes increasing productivity and the reduction in redundancies or removal of processes/functions from the organization (Osmundsen et al. 2019). It should be noted, however, that the IT standardization should follow the standardization of processes and not the other way round (Schönreiter 2018). A study by Martinez (2019) illustrates that the process improvement approach allows organizations to incorporate digital elements into their processes. This procedural approach encourages organizations to improve their business models by incorporating new digital elements. The results of the study confirmed that process perfection is a mandatory requirement for the introduction of new technologies. Despite the ever-growing number of scientific sources on IT-based BPM topics, BPM is essentially a management concept, and IT is its peripheral field (Chountalas and Lagodimos 2019).

Without the process, companies would fall into a spiral of chaos and internal conflict. However, the existence of BPM as a separate autonomous discipline is questionable. It is neither a new management theory nor another form of automation that governs the life cycle of improvement and optimization (Hammer 2003, cit. by Seethamraju 2012). Seethamraju (2012) notes that BPM is currently treated as a “missing middle” between business strategy and IT. BPM seems to have to convert strategies into business processes for consistent and effective management.

The BPM methodology can be summarized by Schönreiter’s (2018) insight, noting that the main interest of BPM is focused on how to manage the flow of value-creating processes across the organization. BPM is often not treated as a completely separate, autonomous management discipline.

## 4. Links between BPM and QM

### 4.1. Evolution of BPM and QM

Schönreiter (2018) uses the term quality management synonymously with the term process management, arguing that processes themselves are the subject of quality management. A process-oriented quality management system encompasses, manages, and directs all the activities in the organization. Process management is an integral part of a model quality system (Iden 2012). Different sectors apply quality management to manage processes and ensure the quality of products and services.

TQM today seems to represent an “umbrella” enveloping a growing body of knowledge, science, and technology that has been popular in organizations for the past 3 decades. The TQM philosophy broadly encompasses different approaches (for instance, BPR, Six Sigma, Lean) at the conceptual level. In some parts of the world, especially in India, TQM is particularly popular as a process and quality management philosophy (Bhat and Fernandez 2010). Process management plays a huge role in it. TQM covered a particularly large body of business process management literature (Chountalas and Lagodimos 2019).

The potential of the implementation of BPM exists in each of the following four paradigms: TQM, Standardized Management Systems (SMS) (ISO 9001, ISO 14001, ISO 50001, ISO 27001, ISO 22000,

etc.), BPR, and Six Sigma; that is, BPM can be seen as an integral part of these quality management paradigms. The principles of each of these paradigms directly affect the features inherent in BPM. Despite some differences, the structure of BPM in all these paradigms confirms the classic stages of the BPM life cycle. However, each of these paradigms assigns different weights to each stage and thus reflects the different levels of BPM implementation. As described in the previous section, there exists a general paradigm-independent BPM model (Chountalas and Lagodimos 2019). The four paradigms still attract a lot of researchers' attention. They have evolved effectively over the last 3 decades. Chountalas and Lagodimos (2019), using the data from the Scopus database (20 April 2018), graphically represented the number of annually published scientific papers where these paradigms are mentioned in the title or abstract (articles, conferences, reviews, book chapters, etc.). Although Six Sigma appeared later than the other three paradigms (SMS, BPR, TQM), it evolved even into the first paradigm in the implementation of BPM.

As DeToro and McCabe (1997, cit. in Chountalas and Lagodimos 2019) aptly observed, alongside other management paradigms, BPM itself was initially unknown as a concept. Since 2000, however, it has begun to be treated as a separate concept but more closely related to IT than to management (Chountalas and Lagodimos 2019). In case there is no strong quality management on the part of the organization, process management will focus on IT. In many Indian organizations, quality management is governed by a central independent organization representing the management level. This logically implies that BPM should explore strong and synergistic partnership with quality management programs within the organization. For instance, process modeling initiatives under the BPM umbrella need to be integrated with process documentation repositories/process architectures—that is, maintained as part of the quality management system. BPM methods and tools should be combined with the quality models and awards that the organization seeks. For instance, BPM can be a great tool to facilitate Six Sigma projects (Bhat and Fernandez 2010).

To sum up, BPM is not a completely separate autonomous concept. Neither is it just another management theory existing in parallel with the concept of quality management. Business process management can be treated as an integral part of the quality management paradigm. Process management is like a horizontal field, “crossing” different paradigms of quality management (for instance, TQM, SMS, Lean, Six Sigma). This generalization is substantiated in detail in the next section of this paper.

#### 4.2. BPM as Part of QM

The conception of process management can be traced in the definition of the quality management system itself. A quality management system is understood as the structure, policies, processes, procedures, and resources (including human resources) of the organization required to implement quality management (Bollaert 2014). This system is based on a procedural and systemic approach, where the quality of activities is created and ensured by processes that are constantly improved and merged into a coherent system (Ruževičius et al. 2008). The main purpose of the quality system is to substantiate the management of activities and processes. The concept of process is essential in quality management systems. Thus, quality systems nowadays are focused on processes and are characterized as having a beginning and an end, which resembles a cross-functional view of an organization (Iden 2012). By implementing quality management cycles, organizations can manage internal and external disorders. The result is a stabilized or even improved performance of the business process (Schröder et al. 2015).

Quality management has evolved over 100 years; innovative quality management methods and tools have been introduced and are constantly being improved. Thus, quality management has facilitated innovation and raised standards. Quality management will remain the essential success factor for each organization, society, as well as every end-user of each organization (Weckenmann et al. 2015). However, in the 21st century, quality management requires a combination of ways of thinking and application of several tools and methods from different paradigms depending on the context. It is

a multidimensional concept that encompasses four paradigms: (1) the Empirical Paradigm—that is, quality implies compliance with the requirements—uses seven tools, Six Sigma, Statistical Process Control (SPC); the risk of the paradigm is bureaucracy; (2) the Reference Paradigm—that is, quality implies compliance with the purpose—uses ISO 9000 series, Balanced Scorecard (BSC), European Foundation for Quality Management (EFQM), National Malcolm Baldrige Quality Award (NMBQA); to improve processes, Plan-do-check-act cycle (PDCA) is used; the risk of the paradigm is “indulgence”; (3) the Reflective Paradigm, which implies that quality is subjective; the quality cannot be defined, it can be discussed through stories, meetings, etc.; the risk of this paradigm is arrogance; (4) the Emergence Paradigm implies compliance with is the era of rapid change; the quality can be defined for a limited period. The fourth paradigm seeks quality to reinforce processes by adapting to context, sometimes breakthrough, or complete reorganization. All these four paradigms together form the concept of TQM. At present, the Emergence Paradigm has not received enough attention, and new methods should be sought (van Kemenade and Hardjono 2019). The new context paradigm is also called Theory C, where quality management is treated as an adaptation to the context; that is, there is no single way to implement quality management in an organization (van Kemenade 2014). As it can be seen, in the context of this fourth paradigm, special attention is paid to processes. Recent research has already addressed the philosophy of global quality management, which also emphasizes the need for inter-organizational coordination and process management (Bashan and Notea 2018).

There are seven quality management practices most studied in empirical research: top management support; relationship with customers; relationship with suppliers; management of workforce; quality information; product/ service design, and process management. They represent the broad scope of QM and are implemented within the organization to continuously improve all activities (Zu 2009). There is a consensus in the QM literature that QM practices are improved in two dimensions: essential or hard QM practices (technologically and methodologically oriented practices involving quality data and information, product design process, and use of statistical process management techniques and other process improvement techniques) and infrastructure or soft QM practices (people and culture oriented, focusing on organizational change and improvement in the areas of managerial commitment and leadership, relationships with external users and suppliers, and human resource management) (Zu 2009). Thus, when quality managers improve and support the QM systems of their organization, to achieve the effectiveness of the QM system, adequate resources should be allocated to both practices. Process management is an essential/hard QM practice.

The use of QM tools and techniques is essential for problem-solving and process management (Bunney and Dale 1997, Stephens 1997, cit. in Zu 2009). Tari´ and Sabater (2004) investigated the importance of using TQM tools and techniques (internal audit, graphs, SPC, flow charts, quality costs, histograms, comparability, Pareto charts, cause-and-effect charts, etc.) (Zu 2009). Tauge (2005, cit. in Näslund 2008) discussed 148 different tools, dividing them into six categories (project planning and measure implementation, idea generation, process analysis, data collection and analysis, cause analysis, evaluation, and decision-making tools). All these tools are applied in business process management.

BPM is recognized as an integral part of most TQM systems. The TQM paradigm focuses on all processes across the organization, and this is primarily based on a systematic approach to BPM. The PDCA cycle can be considered as a general BPM structure within TQM. In other words, under the TQM paradigm, BPM focuses on the integration of TQM principles, methods, and tools into processes (Chountalas and Lagodimos 2019).

The European Foundation for Quality Management (EFQM) Excellence Model has an area of the assessment called “processes” that relates to all the value-generating activities of an organization. This area examines how processes are identified, analyzed, and, if necessary, redesigned to ensure continuous improvement of the organization. In the MBNQA model, the criterion “process management” examines the design and provision of the processes of core products and service of an organization; the core non-product and non-service processes (information and knowledge management, etc.) of an organization, and the key supporting processes (finance and accounting,

infrastructure management, legal services, human resources services, etc.). Nowadays, this focus on the concept of processes in the field of competitive quality is reflected even as a precondition for normative quality (Biazzo and Bernardi 2003).

A quality management system requires standardized processes. Process standardization means the unification of business processes and forming the foundation for actions among different departments or locations in an organization (Schönreiter 2018). Beilmann and Clever (2019) noted that the use of BPM methodology in developing quality management in an organization according to the well-known ISO 9001 standard is excellent proof of how to effectively and productively integrate two areas: quality management and business process management. These researchers demonstrate that in the practice of ISO 9001 certification, BPM like an iceberg covers all areas of the quality management system. In the ISO 9000 standard, quality management is strictly based on the following seven principles: customer orientation, leadership, people involvement, process-oriented approach, continuous improvement, evidence-based decision-making, and relationship management. One of the most important factors indicating the level of success in the implementation of ISO 9001 is process management (Chountalas et al. 2019). However, the early versions of SMS (ISO quality management systems) of 1980 and 1990 did not pay much attention to BPM. The first version of these standards required a lot of documentation. From that point on, the quality was understood as a system loaded with huge documentation and a high level of bureaucracy, completely non-procedural for employees (Bacoup et al. 2018). The newer versions of ISO 9001 marked a shift in focus from individual requirements to a more holistic, process-oriented approach, considering ever changing contexts. However, the myth of the ISO 9001 documentation nightmare is still present in some sectors. Many companies that are ISO 9001 certified have too much documentation and are developing cumbersome Quality Documentation Systems that provide little value (Bacoup et al. 2018). While all certified organizations receive a certificate of a standard form, it is a public secret that these organizations do not implement the requirements of the standard at the same level. It is convenient to treat ISO 9001 as a “black box” and accept it instead of analyzing phenomena such as motivation, benefits, and barriers to certification. To open the “black box”, an in-depth study of the day-to-day activities conducted by certified organizations is required (Chountalas et al. 2019). Organizations need the BPM standards to have an indicator of the maturity of processes, such as the ISO 9000 series. This would make it possible to see how well they are managed, measured, and prepared for continuous improvement. Well-defined standardized practices consistently cover their costs and operational objectives and reduce the risk of failure. Thus, ISO 9001, despite its bureaucratic nature, provides standardization, which is a highly desirable attribute of any management system. When processes are repetitive and systematically implemented, consistency is achieved to help maintain quality at the high-level set. In contrast, uncontrolled variability in processes is the primary cause of quality problems (Schönreiter 2018; Chountalas et al. 2019).

In 1994, Womack and Jones (cit. in Näslund 2008) defined Lean as a systematic elimination of squander conducted by all members of an organization in all areas of value flow creation. The Lean concept is based on mapping and analyzing activities in processes. In Lean terminology, this is called value stream mapping. In most cases, Lean is an updated version of the JIT approach. Both focus on processes—that is, adding value and eliminating losses in processes. Both methods come from the Toyota Production System (TPS). The tools to implement Lean are the same as the tools offered by JIT. Well-known tools include process/value flow mapping, Kaizen, 5S, and Kanban. Lean has an excellent reputation for its focus on process efficiency and effectiveness. The Lean philosophy provides principles and practices aimed at updating innovation capacity (Solaimani et al. 2019). Thus, BPM is also actualized in the Lean philosophy.

Six Sigma is a methodology of systemic management in the form of an autonomous change project involving the incremental (step-by-step) restructuring of the process. It is a method for improving process capacity and developing process penetrability. Six Sigma focuses more on individual processes than on systemic interactions among processes. Thus, BPM is applied in this paradigm as an individual process approach. Over time, the development of Lean Six Sigma has begun, focusing on a systematic



approach to BPM already—that is, on the management of interaction among processes. In the Six Sigma paradigm, process improvement is structured according to the DMAIC (define, measure, analyze, improve, control) methodology. In addition to the widespread DMAIC methodology, alternative methodologies in the context of Design for Six Sigma (DFSS) are proposed that specifically focus on the design of new and innovative processes, such as DMADV (define, measure, analyze, design, verify) and IDOV (identify, design, optimize, validate). The Six Sigma paradigm focuses more on the management of processes itself than on their layout and interaction (Näslund 2008; Chountalas and Lagodimos 2019).

Qualifying TQM, Six Sigma, and Lean concepts from the perspective of processes, TQM is designed to improve and unify processes; Six Sigma is meant to reduce variation and improve processes; and Lean is used to improve flow in processes (Andersson et al. 2006). BPR and TQM differ in their scope. BPR is a methodology for implementing BPM, and TQM is a broader management philosophy that incorporates BPM as one of the individual principles (Chountalas and Lagodimos 2019). In other words, “BPM inherits from the continuous improvement philosophy of TQM, embraces the principles and techniques of operations management, Lean and Six Sigma, and combines them with the capabilities offered by modern information technology to optimally align business processes with performance objectives of an organization” (Dumas et al. 2018, p. 8).

## 5. Conclusions and Discussion

The study of the scientific sources discussed in this paper has revealed relevant insights for future research. Looking at the definitions and evolution of QM and BPM, the role of BPM in the context of quality management is actualized (Chang 2006, Chountalas and Lagodimos 2019). Having investigated the evolution of BPM (Chountalas and Lagodimos 2019) and its components (Biazzo and Bernardi 2003; Iden 2012; Becker et al. 2013a), it is obvious that these aspects are covered by quality management, and its paradigms are distinguished as well (TQM, Six Sigma, Lean). Based on the insights of Chang (2006), Schönreiter (2018), Chountalas and Lagodimos (2019), and other researchers reviewed in this paper, it can be argued that BPM is not just a completely separate autonomous concept. Moreover, it is not a management concept focused exclusively on IT (Osmundsen et al. 2019). Neither is it just another management theory running in parallel with the concept of quality management. BPM is like a horizontal area that “crosses” different quality management paradigms (for instance, TQM, SMS, Lean, Six Sigma). There is confusion, overlaps among different paradigms of quality management and business process management. Business process management is not the aim in itself. It is a tool to help achieve business goals. The business process management paradigm can be called an integral part of virtually all quality management paradigms. Thus, frequently, BPM is not treated as a completely separate, autonomous management discipline. It is neither a new management theory nor another form of automation that manages the life cycle of improvement and optimization.

This paper contributes to the scientific sources by presenting a theoretical link between Business Process Management and Quality Management. It is also relevant in the practical sense. The conclusions drawn are useful for organizations that implement quality management systems. The integration of BPM into quality management systems and tools creates preconditions for the development of an effective and efficient organization. Organizations should not view BPM and QM as separate management disciplines with different tools. BPM can be seen as a tool integrated into quality management paradigms. Thus, quality goals can be achieved by efficiently and effectively managing processes.

We admit that this paper of communicative type is not without limitations. Firstly, a quantitative review of scientific sources has not been performed. This paper is based on researchers’ insights identified in the scientific literature to scientifically substantiate and communicate the theoretical links between QM and BPM. In the future, it would be beneficial to conduct a systematic literature review, involving a quantitative analysis of scientific investigations. Thus, other methods of research should be used. Secondly, this paper does not seek to refine the terminology in the field of quality management (how quality management systems, models, methods, practices, tools are defined). Different scientific

sources use different terms to define certain QM phenomena; for instance, in one source, Lean is referred to as a QM system, but in another source, it is a method, etc. The issue of the definition of the terms related to quality can be the subject of future research. The future research on the topic of the links between BPM and QM substantiating the effectiveness and efficiency of quality management systems while dealing effectively with quality management systems through BPM is very relevant. Highly emphasized is the need for business process digitization research to reveal the impact of digitization on the effectiveness of quality management systems.

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