

Article

Citation of Scientific Evidence from Video Description and Its Association with Attention and Impact

Pablo Dorta-González ^{1,*}  and María Isabel Dorta-González ²

¹ Institute of Tourism and Sustainable Economic Development (TIDES), Campus de Tafira, University of Las Palmas de Gran Canaria, 35017 Las Palmas de Gran Canaria, Spain

² Department of Ingeniería Informática y de Sistemas, University of La Laguna, Avenida Astrofísico Francisco Sánchez s/n, 38271 La Laguna, Spain; isadorta@ull.edu.es

* Correspondence: pablo.dorta@ulpgc.es

Abstract

This study investigates how YouTube content producers incorporate scientific evidence into their videos. The purpose is to understand which types of knowledge sources most influence science-related video production and how alternative communication channels shape the visibility of research. A dataset encompassing 81,302 scientific papers in biotechnology serves as the empirical foundation for this analysis. Through log-linear regression modeling, the results reveal a divergence. While a research paper's integration into digital video creation scales positively with its prominence in public-facing platforms (news and Wikipedia), it correlates negatively with traditional scholarly benchmarks, namely peer-reviewed citations, policy document references, and patent applications. Video creators, it appears, prioritize public visibility over conventional academic influence. This asymmetry underscores a systemic gap in how scholarly outputs filter into digital communication spaces.

Keywords: science communication; video; YouTube; altmetric; research impact; societal impact

1. Introduction

Institutional assessment mechanisms increasingly demand empirical evidence of how knowledge permeates social, cultural, economic, and institutional spheres outside the academy. Within the evaluative architecture of the Research Excellence Framework (REF, 2021), for instance, this phenomenon—conceptualized as societal impact—encompasses the explicit, tangible influence that academic outputs exert over broader collective life, from educational and cultural developments to macroeconomic trajectories (Wilsdon et al., 2015). It was precisely this imperative to track non-scholarly footprints that catalyzed the development of altmetrics. Conceived as a disruptive quantitative methodology, altmetrics uncovers dimensions of scholarly traction and public engagement that traditional citation indexes systematically obscure; an objective explicitly formalized under the NISO Alternative Assessment Metrics framework (NISO, 2016).

Changes in digital scholarly communication have played a central role in this reconfiguration of research assessment practices. Contemporary systems for research assessment have gradually distanced themselves from models grounded exclusively in citation accumulation, incorporating instead broader understandings of academic visibility, societal circulation, and public-facing engagement (see Bornmann, 2013; de Rijcke et al., 2016;



Academic Editor: Andrew Kirby

Received: 20 May 2026

Revised: 3 July 2026

Accepted: 10 July 2026

Published: 15 July 2026

Copyright: © 2026 by the authors.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

Bornmann & Haunschild, 2019). What becomes visible here is a broader understanding of research value, one that exceeds disciplinary recognition and incorporates societal consequences as a core evaluative dimension.

These shifts have destabilized traditional consensus, igniting an intense, ongoing epistemological debate regarding the interpretive boundaries and structural meaning of altmetrics. Digital engagement does not mirror societal influence linearly. Indeed, a critical faction within bibliometric literature cautions against misinterpreting raw web traffic as a direct proxy for real-world impact, proposing instead a highly contextualized decoding of online visibility (Spaapen & Van Drooge, 2011; Joly et al., 2015; Morton, 2015). Under this refined analytical lens, altmetrics function primarily as diagnostic instruments; they map the complex, often chaotic interactions between scientific institutions and the public sphere, tracking how knowledge circulates, mutates, and is received beyond peer-reviewed boundaries (Haustein et al., 2016; Cordoş et al., 2017; Ravenscroft et al., 2017). This conceptual pivot has only deepened. Subsequent critiques have challenged reductionist metric calculations altogether, pushing for more reflexive, nuanced frameworks to decode the mechanics of digital scholarly communication (Robinson-Garcia et al., 2018; Wouters et al., 2019). This theoretical trajectory remains active; contemporary investigations continue to hone these methodologies, broadening both the systemic implications and field applications of non-traditional indicators (Costas et al., 2021; Alperin et al., 2023; González-Betancor & Dorta-González, 2023).

Few mechanisms illustrate this outward migration of scientific knowledge into the machinery of state and industry quite like its integration into policy briefs and patent registries. When public sector frameworks cite academic literature, it signals a direct mobilization of empirical evidence within legislative and governance systems (Bornmann et al., 2016; Yu et al., 2023). In the case of patent citations, the symbiotic friction between academic discovery and industrial application is profound; patents function as explicit trace markers, detailing exactly how abstract research is translated into tangible innovative architecture (Oldham, 2022).

Digital visibility constitutes a critical, yet distinct, vector of contemporary societal impact (Dorta-González, 2023). While a robust body of literature examines why institutions and individual scholars leverage microblogging networks like X for dissemination, the mechanics of citation within video-sharing ecosystems remain under-researched. Even though many overlook it, video creators, especially those with academic backgrounds, frequently use peer-reviewed research to back up their claims and build trust with their audience (Shaikh et al., 2023). By linking to these studies in their descriptions, they are not just fact-checking; they give viewers a clear trail to verify the information themselves, which brings much-needed transparency to online science (Welbourne & Grant, 2016). Ultimately, by connecting popular content with real scholarship, these creators do more than just share random facts—they help the public become more media-literate and critical thinkers (Amarasekara & Grant, 2019; Shaikh et al., 2023; Yeung et al., 2024).

Video abstracts offer a highly engaging alternative that correlates with elevated download rates and sustained reader attention (Bonnevie et al., 2023). This correlation, however, resists reductionist cause-and-effect modeling. It is a bidirectional friction. While preexisting academic prominence increases the likelihood that a paper will be adapted into a video format, the subsequent audiovisual exposure simultaneously feeds back into its scholarly citation counts (Kohler & Dietrich, 2021).

While older studies mostly asked a simple, one-way question, do videos help boost traditional academic citation counts?, this study flips that idea on its head. Instead, it looks at the reverse: how scientific knowledge, as it already spreads across different public and academic platforms, shapes the way science videos are made. Methodologically,

we deployed a log-linear regression framework, isolating and quantifying the precise predictive weight that distinct communication channels exert on the probability of a study being integrated into YouTube's intellectual architecture.

2. Literature Review

2.1. *Altmetrics, Scientific Knowledge Dissemination and Media Convergence*

The dissemination of scientific knowledge has been moving away from the classic channels of scholarly communication and has been embracing digital platforms which allow for a wider and more immediate public interaction. Traditional bibliometric indicators of scientific influence have relied on citations within the academic literature, but altmetrics provide complementary indicators that capture attention in the news media, social networks, policy documents, Wikipedia, blogs, and online video (Priem et al., 2010; Bornmann, 2014). Altmetrics are not a substitute for citation-based indicators, but they provide a broader perspective on the visibility of research outputs in society and their circulation to the public.

This evolution is part of a wider process of media convergence, where scientific knowledge is communicated ever more through interlinked digital ecosystems that mix academic publications with social and multimedia platforms (Jenkins, 2006). In this context, research findings are communicated through a variety of channels, enabling scientific information to reach audiences beyond academia, but also creating new avenues for public attention to influence the visibility of scientific publications.

Studies suggest that altmetric indicators generally reflect dimensions of societal attention that are different from traditional scientific impact as measured by citations (Bornmann, 2014; Sugimoto et al., 2017). Nevertheless, little is known about how these alternative forms of visibility influence the choice of scientific publications cited by content creators on video-sharing platforms such as YouTube.

2.2. *Scientific Communication on YouTube and Audience Engagement*

Within the broader field of digital science communication, YouTube has emerged as a recurrent object of scholarly attention due to its growing relevance in the mediation, visibility, and social circulation of scientific information across online publics (Hutchinson, 2017; Iqbal, 2026). The platform's consolidation cannot be separated from the scale and continuity of user participation, nor from the geographically dispersed nature of its audiences, conditions that have contributed to its centrality within contemporary digital media infrastructures (O'Neil-Hart & Blumenstein, 2016; Sui et al., 2022).

Although science and technology do not constitute the dominant thematic core of YouTube, their presence remains far from marginal. Existing analyses place these categories at roughly 4% of the platform's uploaded material, a proportion sufficient to position them among the more visible content domains in the broader ecosystem of online video production (Hutchinson, 2017; Amarasekara & Grant, 2019). The sustained growth of channels devoted to scientific dissemination—often supported by large subscriber bases and high viewing volumes—suggests that public demand for this type of material is both stable and significant (Agarwal, 2024).

Less clear, however, is the degree to which researchers themselves actively participate in these communicative spaces. Empirical findings remain uneven. Some studies portray relatively modest academic involvement in media-sharing platforms such as YouTube or Flickr (Collins et al., 2016), while other contributions report substantially higher levels of engagement, including evidence indicating that close to half of surveyed scientists use these environments at least once per week (Nikiphorou et al., 2017).

Engagement with science-related audiovisual content on YouTube cannot be reduced to the passive reception of information. When looking at what makes digital science content work, researchers like [Yang et al. \(2022\)](#) found that three things keep people watching: how good the content feels, the style of the video, and whether the topic matters to the audience. [Welbourne and Grant \(2016\)](#) found pretty much the same thing when looking at top science channels.

Quantitative indicators embedded within the platform itself provide another perspective from which these communicative processes can be examined. Visibility on YouTube is closely tied to specific audiovisual and interface-related decisions. [Velho et al. \(2020\)](#) observed that elements often regarded as secondary—thumbnail design, title formulation, or video length—can substantially condition both algorithmic exposure and aggregate audience reach. Yet an exclusive focus on platform mechanics risks overlooking the heterogeneous actors operating behind the content. Seeking to address this dimension, [Velho and Barata \(2020\)](#) explored the professional trajectories, institutional limitations, economic pressures, and communicative motivations characterizing science YouTubers.

Beyond formal aesthetics and algorithmic optimization lies the vital role of narrative architecture. Clarity is a prerequisite, not a differentiator. [Huang and Grant \(2020\)](#) observed that sustained viewer traction requires a deliberate fusion of structural storytelling, visual cohesion, and deliberate emotional resonance. This cognitive-affective duality is central to the user experience. By modeling how intellectual decoding and emotional immersion intersect during consumption, [Dubovi and Tabak \(2021\)](#) dismantled simplistic reception models, replacing them with a nuanced framework that accounts for how public audiences internalize, experience, and negotiate scientific discourse within contemporary digital spaces.

2.3. Scientific Citations in YouTube Videos

The addition of references to peer-reviewed publications in the descriptions of YouTube videos increases the credibility of scientific communication, since viewers can cross-check the claims made in the videos and directly access the original research ([Welbourne & Grant, 2016](#); [Shaikh et al., 2023](#)). These citations establish particular links between the scientific literature and mass media and contribute to the wider dissemination of scientific knowledge.

Current evidence suggests that citation practices vary greatly across scientific disciplines, with biotechnology, medicine, psychology, and public health receiving substantially more attention from science communicators than many other research fields ([Shaikh et al., 2023](#)). Recent work has also pointed to the possibility that content creators may choose scientific publications for a variety of reasons, weighing public visibility, scientific credibility, and wider societal significance ([Dorta-González, 2025](#)).

Nevertheless, an important gap remains in the literature. Prior work has mostly examined either which scientific disciplines are represented on YouTube, or properties of science communication channels. Even less is known about how the wider visibility of scientific publications (both bibliometric and altmetric indicators) relates to the probability of being cited by YouTube creators. Most importantly, previous studies have not systematically compared the association of traditional measures of scientific impact and measures of public attention with the use of scientific evidence in YouTube video descriptions. The current study tries to fill this gap.

3. Materials and Methods

3.1. Data

Empirical data extraction was executed via the document search interface hosted on Altmetric.com. Rather than scanning the platform globally, the service deploys a

targeted monitoring architecture that tracks a curated cohort of YouTube channels vetted for their commitment to scholarly dissemination and intellectual outreach. Whenever these selected channels publish new content, a specialized data collector crawls the descriptions, systematically capturing any embedded direct links to peer-reviewed publications.

To maintain thematic containment, the analytical framework was anchored to the Field-of-Research (FoR) classification system, specifically isolating disciplines displaying robust, sustained activity in video-based communication. This categorization methodology relies on automated artificial intelligence models whose exact precision remains an open question, a systemic limitation that introduces the potential for minor classification errors. Despite this systemic variable, Medical Biotechnology (FoR code 3206) emerged as the single most heavily cited discipline across the entire audiovisual corpus.

The temporal parameters of the study were restricted to research articles published between 2018 and 2023. This six-year window strikes a delicate equilibrium: it captures contemporary digital dynamics while providing the longitudinal runway necessary for slower, lagging indicators—such as mentions in Wikipedia, patent applications, and policy briefs—to accumulate meaningful volume. To insulate the dataset from editorial filler, book reviews, or conference abstracts, the search parameters were strictly limited to the document type “research article.” This filtering protocol yielded a definitive, highly substantive dataset of 81,302 papers.

3.2. Methodology

The operational profile of the quantitative variables underlying this analysis is detailed in Table 1. The independent variables of the present study are theoretically divided into two separate groups according to their main target audiences, institutional formalization and communication velocity (Bornmann, 2014; Priem et al., 2010). To evaluate the impact of different sources of knowledge on digital video production, the first set of benchmarks consists of traditional scholarly metrics, such as peer-reviewed citations, patent applications, and policy documents. They are formalized, slow-moving academic and institutional forces, and they conform to rigid mechanisms of expert validation. The second group, by contrast, aggregates public-facing digital platforms, including news media, Wikipedia entries, and social media metrics. This binary classification is theoretically grounded in the fundamental difference between formal scientific reward systems and informal public science communication. Traditional benchmarks measure epistemic authority and institutional utility in the scientific estate, whereas public-facing platforms measure immediate socio-cultural attention, cognitive accessibility, and broader societal engagement.

Methodologically, the structural idiosyncrasies of the accumulated dataset dictated the rejection of Pearson’s product-moment formulation in favor of Spearman’s rank correlation coefficient.

Although the number of citations a paper obtains in videos was thought to be modeled by a Poisson distribution, the data revealed overdispersion (variance above the mean). After adding one to each value, the analysis changed to a Gamma distribution, which was then applied to the data. Dealing with positively skewed continuous data, like the recollection of a rare occurrence, this model works especially well. Gamma regression uses a maximum likelihood method for parameter estimation.

Thus, the model is written as

$$\log(Y_i) = \beta_0 + \beta_1 x_{i1} + \dots + \beta_j x_{ij},$$

which is equivalent to

$$Y_i = e^{\beta_0 + \beta_1 x_{i1} + \dots + \beta_j x_{ij}} = e^{\beta_0} e^{\beta_1 x_{i1}} \dots e^{\beta_j x_{ij}}.$$

The parameters are interpreted as follows. The e^{β_j} is the multiplicative effect on the average of Y of a 1 unit increase in x_j . Thus:

- (1) When $\beta_j = 0$, then $e^{\beta_j} = 1$ and the count expected, Y , and the x_j are not related.
- (2) If $\beta_j > 0$, then $e^{\beta_j} > 1$ and the expected count is e^{β_j} larger than the case when $x_j = 0$.
- (3) If $\beta_j < 0$, then $e^{\beta_j} < 1$ and the expected count is e^{β_j} times less than when $x_j = 0$.

Table 1. Quantitative variables describing types of references to research papers.

Type	Measure	Variable	Description	Source
Societal Influence	Scientific impact	Citations	Number of citations received in scholarly publications	Dimensions ¹
	Technological impact	Patent	Number of citations appearing in patent documents	Altmetric
	Impact on policies	Policy	Number of citations identified in policy documents	Altmetric
	Impact on readers	Readers	Number of times an article has been saved in bibliographic reference management systems	Mendeley ¹
Societal Attention	Media attention	News	Number of mentions in digital news outlets	Altmetric
	Blogging attention	Blog	Number of references in blog posts	Altmetric
	Social media attention	X, Facebook	Number of interactions and conversations across social media platforms	Altmetric
	Encyclopedic attention	Wikipedia	Number of references appearing in Wikipedia entries	Wikipedia ¹
	Video attention	YouTube	Number of references to a paper identified in YouTube video channels	YouTube ¹

¹ Note: Altmetric was used as an indirect or secondary source of information.

4. Results

This section presents the results from a Log-linear Regression Model for all research articles in Biotechnology in the cohort 2018–2023 ($N = 81,302$). Several statistics regarding the variables taken into consideration are displayed in Tables 2 and 3. According to the paper’s acknowledgments section, 63% of the research publications were funded in some way (Table 2).

Table 2. Statistics for the qualitative variables in the regression model.

Variable	Category	Frequency	%
Funding	Funded	51,472	63.3
	Unfunded	29,830	36.7
Year	2018	11,669	14.4
	2019	11,599	14.3
	2020	13,294	16.4
	2021	15,643	19.2
	2022	15,718	19.3
	2023	13,379	16.5

Table 3. Statistics for research articles in Biotechnology in 2018–2023 (N = 81,302).

Variable	Obs.	Missing	Min	Max	Mean	SD
YouTube + 1	81,302	0	1	142	1.020	0.702
News	81,302	0	0	548	0.728	6.965
Blog	81,302	0	0	43	0.093	0.625
Policy	81,302	0	0	33	0.016	0.244
Patent	81,302	0	0	223	0.146	1.528
X	81,302	0	0	29,750	8.223	167.453
Facebook	81,302	0	0	25	0.139	0.706
Wikipedia	81,302	0	0	23	0.039	0.377
Readers	81,302	0	0	4099	36.896	75.341
Citations	81,302	0	0	3836	21.723	49.575

The data distributions are extremely skewed towards zero (see Table 3). Bibliometric data frequently exhibit this skewness, which calls for the application of particular statistical methods. As previously mentioned, when the assumptions of ordinary least squares are broken, Gamma regression provides a reliable substitute for modeling continuous data with positive skewness. Furthermore, Spearman correlations (see Table 4) are especially well-suited for evaluating the associations between variables since they are less susceptible to the effects of extreme values and non-normality. As can be observed in Table 4, the number of readers on Mendeley strongly correlates with the number of citations in Dimensions.

Table 4. Spearman correlation coefficient for the quantitative variables in the regression model (N = 81,302).

	News	Blog	Policy	Patent	X	Facebook	Wikipedia	Readers	Citations
News	1	0.687	0.150	0.053	0.184	0.271	0.202	0.177	0.143
Blog	0.687	1	0.122	0.076	0.209	0.337	0.210	0.233	0.194
Policy	0.150	0.122	1	0.008	0.070	0.084	0.083	0.114	0.101
Patent	0.053	0.076	0.008	1	0.019	0.058	0.075	0.185	0.179
X	0.184	0.209	0.070	0.019	1	0.158	0.061	0.078	0.060
Facebook	0.271	0.337	0.084	0.058	0.158	1	0.107	0.199	0.170
Wikipedia	0.202	0.210	0.083	0.075	0.061	0.107	1	0.187	0.156
Readers	0.177	0.233	0.114	0.185	0.078	0.199	0.187	1	0.875
Citations	0.143	0.194	0.101	0.179	0.060	0.170	0.156	0.875	1

Note: Cell shading reflects the magnitude of the correlation coefficient. Darker shades of red indicate stronger positive correlations, whereas lighter shades indicate weaker positive correlations.

The goodness of fit for the log-linear regression model using a Gamma distribution is presented in Table 5. The null model, which includes only a constant and no explanatory variables, serves as a reference. To compare the deviance between the null model and the adjusted model, a G^2 test for goodness of fit, corresponding to $-2 \cdot \log\text{-likelihood}$, was conducted. A smaller G^2 value is preferred. The G^2 test yielded a very small p -value (<0.0001), indicating that the full model significantly outperforms the null model. Moreover, the R^2 (McFadden) is 0.49. This is a coefficient between 0 and 1 that measures how well the model is adjusted. This coefficient is equal to 1 minus the ratio of the likelihood of the adjusted model to the likelihood of the null model.

Table 5. Goodness of fit for the log-linear regression model using a Gamma distribution.

Statistics	Null Model	Adjusted Model
Obs.	81,302	81,302
DF	81,301	81,289
G ² (−2·log-lik)	216,177	109,752
p-value (Pr > Chi ²)		<0.0001
R ² (McFadden)	0.000	0.492
AIC	216,181	109,782

The equation of the model in Table 6 is the following:

$$\text{Pred (YouTube + 1)} = \exp (1 + 0.005 \times \text{News} - 0.004 \times \text{Blog} - 0.019 \times \text{Policy} - 0.008 \times \text{Patent} + 0.000 \times \text{X} - 0.031 \times \text{Facebook} + 0.013 \times \text{Wikipedia} - 0.001 \times \text{Citations} - 0.327 \times \text{Unfunded} - 0.805 \times \text{Year}_{2019} - 0.822 \times \text{Year}_{2020} - 0.836 \times \text{Year}_{2021} - 0.842 \times \text{Year}_{2022})$$

Table 6. Model parameters for the log-linear regression model using the Gamma distribution.

Source	Coef.	SE	Wald Chi ²	Pr > Chi ²	95% CI	Incidence Ratio (e ^{coef})
Intercept	1.000					
News	0.005	0.000	169.285	<0.0001	0.004 to 0.005	1.005
Blog	−0.004	0.004	1.400	0.237	−0.012 to 0.003	0.996
Policy	−0.019	0.006	10.453	0.001	−0.030 to −0.007	0.981
Patent	−0.008	0.001	112.237	<0.0001	−0.009 to −0.006	0.992
X	0.000	0.000	7.682	0.006	0.000 to 0.000	1.000
Facebook	−0.031	0.002	189.664	<0.0001	−0.035 to −0.026	0.970
Wikipedia	0.013	0.005	7.987	0.005	0.004 to 0.022	1.013
Citations	−0.001	0.000	1539.433	<0.0001	−0.001 to −0.001	0.999
Funded	0.000	0.000				
Unfunded	−0.327	0.003	9648.602	<0.0001	−0.333 to −0.320	0.721
Year_2018	0.000	0.000				
Year_2019	−0.805	0.005	31,322.401	<0.0001	−0.814 to −0.796	0.447
Year_2020	−0.822	0.004	37,615.864	<0.0001	−0.830 to −0.814	0.439
Year_2021	−0.836	0.004	44,567.406	<0.0001	−0.844 to −0.829	0.433
Year_2022	−0.842	0.004	45,361.711	<0.0001	−0.850 to −0.834	0.431
Year_2023	0.000	0.000				
Scale	0.000	0.000	0.000	<0.0001	0.000 to 0.000	1.000

For each extra unit in the explanatory variable, the coefficient interpretations shown in Table 6 indicate the percentage change in the number of citations inside video channels. Similarly, when the explanatory variable increases by one unit, the incidence ratio in the last column (e^{coef}) indicates the multiplicative effect on the average number of citations in YouTube videos.

Except for the metric for blog citations, every variable incorporated into the model demonstrates acute statistical significance ($p < 0.01$). Financial backing exerts a massive deterministic influence on an article's digital lifecycle; its complete absence severely depresses subsequent video-based engagement. When you look at the numbers, the gap is pretty stark. Unfunded studies have an incidence ratio of 0.72, meaning they are about 33% less likely to get cited in YouTube videos compared to research that has financial backing. On the flip side, having coverage in Wikipedia and the news makes a real difference. With incidence ratios of 1.013 and 1.005, these two factors have the biggest positive impact on video citations. In fact, for every extra mention a study gets on Wikipedia, its video citations bump up by 1.3%, while each news reference brings a 0.5% increase. Conversely, with incidence ratios ranging from 0.970 to 0.999, Facebook mentions, citations in policy papers,

patents, and research journals are the quantitative variables that have the biggest negative impact on citations in videos.

For instance, every policy citation reduces video references by 2%, and every Facebook posting reduces video citations by 3%. Similarly, every patent reference reduces video mentions by less than 1%, and every scientific citation reduces video citations by only 0.1%. Despite their small size, these consequences are significant when all other factors are held constant. Interestingly, given how often it is cited in scholarly works compared to patents or policies, this conclusion is by no means inconsequential. Specifically, every 100 additional citations in research publications are associated with a 10% decrease in the number of citing videos. This confirms the previous findings that social attention has a greater influence on video producers than scientific or technological advancements.

5. Discussion

The results indicate that the drivers of scientific research visibility on YouTube differ from those of traditional academic recognition. This suggests that the research selected by science-oriented video creators is not related to scholarly impact, policy influence, or patent applications, but rather to measures of public attention. This demonstrates how digital media can supplement the dissemination of scientific knowledge and suggests that measures of public engagement capture aspects of research visibility that are not fully reflected in conventional bibliometric indicators.

This study's key finding—that public-facing platforms (news and Wikipedia) positively influence YouTube citations, but traditional scholarly benchmarks (citations, patents, and policy documents) tend to negatively correlate—reflects a fundamental mismatch between how formal academia and digital (science) communication work. This pattern can be accounted for by cognitive accessibility and institutional incentives. Traditional benchmarks are dense, highly specialized knowledge structures, often behind paywalls, optimized for peer consumption or structural utility (e.g., industrial application, policy formulation). High barriers to entry for digital content creators exist because these documents have slow-moving timelines and prioritize technical rigor over broad comprehensibility.

In contrast, news media and Wikipedia act as epistemic intermediaries: translating complex biotechnological findings into pre-formed, narrative-driven, open access, and context-rich formats. YouTube producers, by virtue of working in an attention economy that rewards short production cycles and immediate audience engagement, naturally draw on these pre-digested sources of knowledge. In other words, the negative correlation with academic benchmarks does not imply a rejection of high-quality science but rather signals a systematic filter: digital video creators privilege the communicative readiness and public salience of a paper over its traditional institutional prestige.

The negative relationship linking peer-reviewed citations, policy references, and patent filings to YouTube visibility exposes an acute structural disconnect—one rooted in divergent audience orientation, rhetorical demands, and accessibility barriers (Sui et al., 2022). Liturgies of formal science, statecraft, and industrial patenting demand absolute technical insularity, hyper-specialized methodologies, and precise execution targeted exclusively at peer researchers, legal experts, and state actors. Video communication rejects this density. Creators engineer their content for a distributed public whose engagement is mediated by narrative accessibility, conceptual simplification, and engagement value (Yang et al., 2022).

Resource allocation introduces an equally sharp structural cleavage. When a study lacks financial sponsorship, its digital footprint collapses, suffering a 33% deficit in YouTube citations relative to funded counterparts. This steep decline is directly bound to structural inequalities; the institutional constraints, narrow visibility networks, and restricted dissem-

ination pathways typical of unfunded research severely diminish its capacity to penetrate the online video ecosystem (Dorta-González & Dorta-González, 2023).

As for the performance of specific predictors in the log-linear regression model, some variables, such as the coverage of papers in scientific blogs ($p = 0.237$), did not achieve statistical significance at conventional levels. This lack of significance means that, in the specific domain of biotechnology, mentions in blogs do not systematically or consistently affect the selection behavior of YouTube content creators. This pattern might reflect the highly fragmented nature of the scientific blogosphere relative to the more centralized high-traffic information hubs such as Wikipedia or mainstream news media. These non-significant predictors were intentionally kept in the final model specification as control covariates even though they were not statistically significant. This approach ensures robust statistical control, minimizes the risk of omitted variable bias, and confirms that the strong, significant effects observed for other public-facing platforms and academic benchmarks are stable and independent of alternative digital attention channels.

Some considerations regarding the generalization of the results are as follows. Disciplinary boundaries dictate fundamentally divergent communication cultures, public salience, and citation protocols; this intense heterogeneity prevents the direct extrapolation of these data to fields absent from our corpus—especially those reliant on alternative public-facing strategies or historically low-visibility paradigms.

On the other hand, Altmetric does not monitor the entire YouTube ecosystem; instead, it monitors a curated set of channels selected for their demonstrated interest in scientific and scholarly communication. This means that the dataset analyzed in this paper is more likely to be representative of content produced by established science communicators than it is of the larger and more diverse population of YouTube creators. This selection can introduce a sampling bias that may under-represent channels that discuss scientific research but are not in Altmetric's monitoring system. Thus, the results should be taken as indicative of citation practices within a particular curated subset of science-oriented YouTube channels, and extrapolation of the findings to all of YouTube should be done cautiously.

A key contextual consideration for this study is the timeframe examined (2018–2023), which encompasses unprecedented global events, most notably the COVID-19 pandemic. These were such extraordinary incidents that they fundamentally reshaped the landscape of biotechnology outreach, and they accelerated the consumption and production of popular science online. This period was characterized by a level of public interest in biotechnological research, vaccine development, and public health messaging that was unprecedented and may have changed the typical dynamics of the selection and dissemination of scientific evidence by video creators.

As this study did not use any specific control variables to control for the confounding effects of the pandemic or other global crises, the observed trends should be interpreted with caution. For some biotech topics, the increased public use of digital platforms during lockdowns could have artificially increased the gap between public visibility (e.g., news and Wikipedia) and traditional academic benchmarks (e.g., peer-reviewed citations).

Future research should remedy this shortcoming by including time-series control variables or event-study methods that formally separate the confounding effects of major global disruptions. This will allow for a more nuanced appreciation of the systematic trickle of scholarly outputs into digital video platforms in normal circumstances, by separating out these anomalous periods from baseline patterns of digital communication.

This study makes a strong case for the decoupling of public-facing platforms and traditional scholarly standards. There are, however, some limitations to the covariates of the baseline model. As it is, our analytical framework includes research funding and publication year, but future extensions of this work should include a broader set of paper-

level and journal-level covariates to account for nuanced confounding effects. Specifically, the paper length, the institutional affiliation of the corresponding author, and the impact metrics of the journal might have an impact on academic prestige and digital discoverability. Notably, adding the Open Access (OA) status of papers is an important avenue for future research. As shown in the science communication literature, OA repositories greatly reduce access barriers and may result in these papers being more easily found and cited by online content producers (Dorta-González & Gómez-Déniz, 2025).

Furthermore, separating purely theoretical research from applied research may shed some light on whether video producers are naturally inclined to report actionable, practical biotechnological findings. Considering these additional dimensions will refine our understanding of the specific mechanisms that lead to scientific evidence selection in digital media spaces.

6. Conclusions

The incorporation of video formats into scientific communication has been discussed as a mechanism capable of extending the reach of research outputs beyond conventional academic circulation. Some authors argue that this expanded visibility may eventually translate into higher citation performance for scholarly publications (Shaikh et al., 2023). The appeal of video-based dissemination lies not only in exposure itself, but also in the communicative affordances of audiovisual media, which can render complex scientific material more accessible and, in certain cases, encourage broader engagement with the associated literature (Bonnevie et al., 2023).

However, the connection between a video getting views and a paper getting cited is not a simple one-way street. Evidence from Kohler and Dietrich (2021) shows that this relationship can go both ways, or even be completely lopsided. Instead of videos actually causing more citations, it might just be that creators choose to make videos about papers that are already famous in the academic world. At the same time, both things can happen at once, with the video and the paper feeding into each other's popularity. Against this backdrop, the present study approached the issue from the opposite analytical direction, examining whether the diffusion of scientific knowledge across distinct communication environments contributes to the subsequent production of video content.

This study has found a small but significant and positive association between the citations a paper receives in news items and Wikipedia and its citations in YouTube videos. On the other hand, there is a weak but negative correlation between citations in videos and citations in other scholarly articles, policy documents, and patents. There is a small but noticeable negative link between how often a paper is cited in videos and how much it is talked about on social media.

This highlights a deep divide between the academic world and the everyday audiences on video platforms, forcing us to rethink how we share knowledge. It reveals a tough trade-off between getting institutional approval and actually reaching the public.

At the heart of the issue is a strange contradiction: even though video creators could easily source their scripts from prestigious, peer-reviewed journals, they usually choose easier, pre-digested options like news articles and Wikipedia pages. The problem is structural. Traditional science publishing just is not built for the quick, accessible needs of digital creators and their viewers.

To bridge this gap, the scientific community—including authors, universities, and publishers—needs to change how they share their work. They have to completely redesign how they communicate with the public to make high-impact research truly accessible to digital content creators. The strategic focus must pivot away from insular, metric-driven archiving and toward the creation of accessible, high-utility frameworks tailored specifically

for digital science communicators. Only by restructuring this pipeline can we foster a more rigorous, empirically grounded public discourse within the YouTube ecosystem.

Author Contributions: Conceptualization, P.D.-G.; methodology, P.D.-G. and M.I.D.-G.; software, M.I.D.-G.; validation, P.D.-G. and M.I.D.-G.; formal analysis, P.D.-G. and M.I.D.-G.; investigation, P.D.-G. and M.I.D.-G.; resources, P.D.-G.; data curation, P.D.-G. and M.I.D.-G.; writing—original draft preparation, P.D.-G. and M.I.D.-G.; writing—review and editing, P.D.-G. and M.I.D.-G.; supervision, P.D.-G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data that support the findings of this study were retrieved from Altmetric.com via its document search interface. Due to proprietary restrictions and licensing agreements governing the platform, the raw dataset cannot be made publicly available by the authors. Access to these data, or replication of the tracking protocols used herein, requires a valid subscription or institutional agreement with Altmetric LLC. All tracking filters, Field-of-Research (FoR) classification queries, and specific parameter constants utilized to compile the final cohort of 81,302 papers are fully detailed within Section 3.1 of this manuscript.

Acknowledgments: We declare the analytical utilization of OpenAI's ChatGPT (GPT-5.5; accessed July 2026) during the final manuscript refinement phase; its deployment was restricted strictly to linguistic optimization, syntactic precision, and grammatical stabilization. Compliance with COPE guidelines and specific journal ethical benchmarks was strictly maintained—every automated modification underwent human critique, and the authors retain full, unshared intellectual responsibility for the entire conceptual content of this work.

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

References

- Agarwal, A. (2024, February 26). *100 science YouTube channels for science news, videos, research and scientific concepts*. Available online: https://blog.feedspot.com/science_youtube_channels/ (accessed on 15 May 2026).
- Alperin, J. P., Fleerackers, A., Riedlinger, M., & Haustein, S. (2023). Second-order citations in altmetrics: A case study analyzing the audiences of COVID-19 research in the news and on social media. *BioRxiv*. [CrossRef]
- Amarasekara, I., & Grant, W. J. (2019). Exploring the YouTube science communication gender gap: A sentiment analysis. *Public Understanding of Science*, 28(1), 68–84. [CrossRef] [PubMed]
- Bonnevie, T., Repel, A., Gravier, F. E., Ladner, J., Sibert, L., Muir, J. F., Cuvelier, A., & Fischer, M. O. (2023). Video abstracts are associated with an increase in research reports citations, views and social attention: A cross-sectional study. *Scientometrics*, 128(5), 3001–3015. [CrossRef] [PubMed]
- Bornmann, L. (2013). What is societal impact of research and how can it be assessed? A literature survey. *Journal of the American Society for Information Science and Technology*, 64(2), 217–233. [CrossRef]
- Bornmann, L. (2014). Do altmetrics point to the broader impact of research? An overview of benefits and disadvantages of altmetrics. *Journal of Informetrics*, 8(4), 895–903. [CrossRef]
- Bornmann, L., & Haunschild, R. (2019). Societal impact measurement of research papers. In W. Glänzel, H. F. Moed, U. Schmoch, & M. Thelwall (Eds.), *Springer handbook of science and technology indicators* (Springer Handbooks). Springer. [CrossRef]
- Bornmann, L., Haunschild, R., & Marx, W. (2016). Policy documents as sources for measuring societal impact: How often is climate change research mentioned in policy-related documents? *Scientometrics*, 109(3), 1477–1495. [CrossRef] [PubMed]
- Collins, K., Shiffman, D., & Rock, J. (2016). How are scientists using social media in the workplace? *PLoS ONE*, 11(10), e0162680. [CrossRef] [PubMed]
- Cordoş, A.-A., Bolboacă, S. D., & Drugan, C. (2017). Social media usage for patients and healthcare consumers: A literature review. *Publications*, 5(2), 9. [CrossRef]
- Costas, R., de Rijcke, S., & Marres, N. (2021). Heterogeneous couplings: Operationalizing network perspectives to study science-society interactions through social media metrics. *Journal of the Association for Information Science and Technology*, 72(5), 595–610. [CrossRef]
- de Rijcke, S., Wouters, P. F., Rushforth, A. D., Franssen, T. P., & Hammarfelt, B. (2016). Evaluation practices and effects of indicator use—A literature review. *Research Evaluation*, 25(2), 161–169. [CrossRef]
- Dorta-González, P. (2023). Factors that influence how scientific articles and reviews are mentioned on Twitter. *Journal of Scientometric Research*, 12(3), 577–584. [CrossRef]

- Dorta-González, P. (2025). The evidence citation patterns of video creators and their relationships with other science communicators. *Journal of Science Communication*, 24(4), A08. [CrossRef]
- Dorta-González, P., & Dorta-González, M. I. (2023). The funding effect on citation and social attention: The UN Sustainable Development Goals (SDGs) as a case study. *Online Information Review*, 47(7), 1358–1376. [CrossRef]
- Dorta-González, P., & Gómez-Déniz, E. (2025). A two-stage model for factors influencing citation counts. *Publications*, 13(2), 29. [CrossRef]
- Dubovi, I., & Tabak, I. (2021). Interactions between emotional and cognitive engagement with science on YouTube. *Public Understanding of Science*, 30(6), 759–776. [CrossRef] [PubMed]
- González-Betancor, S. M., & Dorta-González, P. (2023). Does society show differential attention to researchers based on gender and field? *Journal of Informetrics*, 17(4), 101452. [CrossRef]
- Haustein, S., Bowman, T. D., & Costas, R. (2016). Interpreting ‘altmetrics’: Viewing acts on social media through the lens of citation and social theories. In C. R. Sugimoto (Ed.), *Theories of informetrics and scholarly communication* (pp. 372–406). De Gruyter Saur. [CrossRef]
- Huang, T., & Grant, W. J. (2020). A good story well told: Storytelling components that impact science video popularity on YouTube. *Frontiers in Communication*, 5, 581349. [CrossRef]
- Hutchinson, A. (2017, September 14). *Mind-blowing YouTube stats, facts and figures for 2017 [infographic]*. Available online: <https://www.socialmediatoday.com/social-business/mind-blowing-youtube-stats-facts-and-figures-2017-infographic> (accessed on 15 May 2026).
- Iqbal, M. (2026). *YouTube revenue and usage statistics 2026*. Available online: <https://www.businessofapps.com/data/youtube-statistics/> (accessed on 9 July 2026).
- Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York University Press. Available online: <https://www.jstor.org/stable/j.ctt9qffwr> (accessed on 15 May 2026).
- Joly, P.-B., Gaunand, A., Colinet, L., Larédo, P., Lemarié, S., & Matt, M. (2015). ASIRPA: A comprehensive theory-based approach to assessing the societal impacts of a research organization. *Research Evaluation*, 24(4), 440–453. [CrossRef]
- Kohler, S., & Dietrich, T. C. (2021). Potentials and limitations of educational videos on YouTube for science communication. *Frontiers in Communication*, 6, 581302. [CrossRef]
- Morton, S. (2015). Progressing research impact assessment: A ‘contributions’ approach. *Research Evaluation*, 24(4), 405–419. [CrossRef]
- Nikiphorou, E., Studenic, P., Ammitzbøll, C. G., Canavan, M., Jani, M., Ospelt, C., & Berenbaum, F. (2017). Social media use among young rheumatologists and basic scientists: Results of an international survey by the Emerging EULAR Network (EMEUNET). *Annals of the Rheumatic Diseases*, 76(4), 712–715. Available online: <https://ard.bmj.com/content/76/4/712> (accessed on 15 May 2026). [CrossRef] [PubMed]
- NISO. (2016). *Outputs of the NISO alternative assessment metrics project. A recommended practice of the national information standards organization* (NISO RP-25-2016). National Information Standards Organization (NISO). [CrossRef]
- Oldham, P. (2022). Chapter 6 patent citations. In *The WIPO patent analytics handbook*. WIPO. Available online: <https://wipo-analytics.github.io/handbook/> (accessed on 15 May 2026).
- O’Neil-Hart, C., & Blumenstein, H. (2016, April). *The latest video trends: Where your audience is watching*. Available online: <https://www.thinkwithgoogle.com/consumer-insights/video-trends-where-audience-watching/> (accessed on 15 May 2026).
- Priem, J., Taraborelli, D., Groth, P., & Neylon, C. (2010). *Altmetrics: A manifesto*. Available online: <https://digitalcommons.unl.edu/scholcom/185/> (accessed on 15 May 2026).
- Ravenscroft, J., Liakata, M., Clare, A., & Duma, D. (2017). Measuring scientific impact beyond academia: An assessment of existing impact metrics and proposed improvements. *PLoS ONE*, 12(3), e0173152. [CrossRef] [PubMed]
- REF. (2021). *United Kingdom Research Excellence Framework (REF) to evaluate research quality in higher education institutions*. Available online: <https://www.ref.ac.uk/> (accessed on 6 November 2023).
- Robinson-Garcia, N., van Leeuwen, T. N., & Ràfols, I. (2018). Using almetrics for contextualised mapping of societal impact: From hits to networks. *Science and Public Policy*, 45(6), 815–826. [CrossRef]
- Shaikh, A. R., Alhoori, H., & Sun, M. (2023). YouTube and science: Models for research impact. *Scientometrics*, 128(2), 933–955. [CrossRef] [PubMed]
- Spaapen, J., & Van Drooge, L. (2011). Introducing ‘productive interactions’ in social impact assessment. *Research Evaluation*, 20(3), 211–218. [CrossRef]
- Sugimoto, C. R., Work, S., Larivière, V., & Haustein, S. (2017). Scholarly use of social media and altmetrics: A review of the literature. *Journal of the Association for Information Science and Technology*, 68(9), 2037–2062. [CrossRef]
- Sui, W., Sui, A., & Rhodes, R. E. (2022). What to watch: Practical considerations and strategies for using YouTube for research. *Digital Health*, 8, 20552076221123707. [CrossRef] [PubMed]
- Velho, R. M., & Barata, G. (2020). Profiles, challenges, and motivations of science YouTubers. *Frontiers in Communication*, 5, 542936. [CrossRef]

- Velho, R. M., Mendes, A. M. F., & Azevedo, C. L. N. (2020). Communicating science with YouTube videos: How nine factors relate to and affect video views. *Frontiers in Communication*, 5, 567606. [[CrossRef](#)]
- Welbourne, D. J., & Grant, W. J. (2016). Science communication on YouTube: Factors that affect channel and video popularity. *Public Understanding of Science*, 25(6), 706–718. [[CrossRef](#)] [[PubMed](#)]
- Wilsdon, J., Allen, L., Belfiore, E., Campbell, P., Curry, S., Hill, S., Jones, R., Kain, R., Kerridge, S., Thelwall, M., Tinkler, J., Viney, I., Wouters, P., Hill, J., & Johnson, B. (2015). *The metric tide: Report of the independent review of the role of metrics in research assessment and management*. Higher Education Funding Council for England (HEFCE). [[CrossRef](#)]
- Wouters, P., Zahedi, Z., & Costas, R. (2019). Social media metrics for new research evaluation. In W. Glänzel, H. F. Moed, U. Schmoch, & M. Thelwall (Eds.), *Springer handbook of science and technology indicators* (Springer Handbooks). Springer. [[CrossRef](#)]
- Yang, S., Brossard, D., Scheufele, D. A., & Xenos, M. A. (2022). The science of YouTube: What factors influence user engagement with online science videos? *PLoS ONE*, 17(5), e0267697. [[CrossRef](#)] [[PubMed](#)]
- Yeung, A. W. K., Matin, M., Mickael, M. E., Behrens, S., Hrg, D., Ławirński, M., Hammerle, F. P., & Atanasov, A. G. (2024). Bibliometric analysis of papers dealing with dental videos on YouTube. *Publications*, 12(3), 22. [[CrossRef](#)]
- Yu, H., Murat, B., Li, J., & Li, L. (2023). How can policy document mentions to scholarly papers be interpreted? An analysis of the underlying mentioning process. *Scientometrics*, 128, 6247–6266. [[CrossRef](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.