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Three-stage publishing to support evidence-based management practice

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Abstract

A Spanish version of the article is provided (see section before annex).

This article proposes a 4-step model for scientific dissemination that aims to promote evidence-based professional practice in Operations Management or Human Resource Management as well as research with a more transparent and reproducible process. These 4 steps include:1 social network announcements, 2 dissemination to scientific journals, 3 dissemination to social networks, and 4 scientific dissemination to professional journals. Central to the 4-step model is a three-stage publication process within the second step, which adds an additional stage to the two previously proposed (Marin-Garcia, 2015). These three publication stages begin with a protocol paper, are followed by a data paper, and finish with a traditional article. Each stage promotes research with merit which is citable and recognizable as such before the scientific evaluation bodies. As two of these stages are largely unknown within the fields of Business and Management, I define the details of a protocol paper and a data paper including their contents. In addition, I provide examples of both papers as well as the other steps of the science dissemination model. This model can be adopted by researchers as a means of achieving greater impact and transfer of research results. This work intends to help researchers to understand, to evaluate, and to make better decisions about how their research reaches society at large outside of academia.

In this way, WPOM aligns with the recommendations of several leading journals in the field of business management on the need to promote transparent, accessible, and replicable science (Beugelsdijk et al., 2020). WPOM goes one step further in compliance with this direction by having relevant journals that not only accept, but also actively encourage the publication of protocol papers and data papers. WPOM strives to pioneer in this field of Business and Management.

This article also explores the potential prevalence of protocol papers and data papers within the set of all articles published in journals indexed in Clarivate Web of Science and Scopus.

With this editorial, WPOM is committed to promoting this model by accepting for review any of the three types of scientific contributions including protocol papers, data papers, and traditional papers.

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Keywords: *evidence-based; operations management; human resources management; open science; replication; transparency; disclosure; implementing research; data paper; protocol paper; registered report; knowledge mobilisation; knowledge dissemination; scientific communication*

Introduction

In the context of medicine evidence-based practice has been defined as the integration of three components (Sackett et al., 2000; Thyer, 2004): 1) the best available evidence from published research; 2) the previous knowledge and/or experience of the professional; and, 3) patient/user preferences. In this way, a diagnosis-therapy coupling can be created to optimize the desired results. Ultimately, this method makes it possible to construct practical guidelines which indicate the steps necessary to implement specific interventions the available research has shown, on the whole, to be the most effective treatments for a particular problem within a given context (Thyer, 2004).

This concept developed originally in the field of medicine (Straus et al., 2019). Evidence-Based Medicine (EBM) encompasses both the practice of professionals who care for patients and those who train future physicians. Typically, in the context of EBM, health sciences faculty and researchers are often practicing medical professionals resulting in roles overlapping in the same individual professional. However, in the fields of operations management and human resources those engaged in research are almost exclusively engaged in training others to become good operations management professionals, good people management professionals, or simply good managers. They seldom actively exercise their professional capacity as managers within organizations. In Spain this situation can be readily observed (Sanchez-Ruiz & Diez-Busto, 2020), which I think can be extrapolated to other contexts.

Perhaps this helps explain why evidence-based professional practice has been difficult to introduce into the field of business management (Lawler Iii, 2007; Rousseau, 2006; Rousseau & McCarthy, 2007), despite its success in the field of health sciences for years in both medicine (Straus et al., 2019) and in nursing (Cannon & Boswell, 2016). Another reason may be social phenomena are susceptible to alternative interpretations and rarely fit in the context of definitive objective judgements (Davis, 2017). Considering both reasons in tandem, adaptations may be necessary to extend the evidence-based concept to management (Burke & Rau, 2010; Nielsen & Miraglia, 2016), similar to when applied to educational sciences (Rousseau & McCarthy, 2007).

Another aspect to consider is evidence-based practice requires scientific results considered valid and credible. This credibility hinges on the transparency of the scientific process. I have not located data on the full transparency of research in the fields of Business and Management, nor in specific sub-areas such as Operations Management or Human Resource Management. However, research exists in psychology (Hardwicke et al., 2021) were is extremely rare to find research with public access to protocols (0/188; 0%, 95% CI = [0%, 1%]), access to original research data (raw data) (4/188; 2%, 95% CI = [1%, 4%]), analysis scripts (1/188; 1%, 95% CI = [0%, 1%]), or preregistration (5/188; 3%, 95% CI = [1%, 5%]). Along the same lines, there are few replication studies (10/188; 5%, 95% CI = [3%, 8%]) and few papers are reused

in subsequent systematic reviews or meta-analyses (21/183; 11%, 95% CI = [8%, 16%]). The same seems to hold true in the health sciences (Amaral & Neves, 2021). These data lead me to think that transparency and reproducibility in the field of psychology are scarce and in the fields of Business and Management they are probably as, or even more, scarce.

The main contribution of this paper is to propose a three-stage publication model that supports and serves to foster evidence-based Operations Management or Human Resource Management. This model adds one additional stage to the two stages already proposed six years ago (Marin-Garcia, 2015) and links to a four-step science dissemination model. I will justify this model based on the most demanding and current standards of good practice for scientific creation and dissemination aligned with the criteria of transparency and social impact. (Aguinis et al., 2020; Aguinis et al., 2018; Beugelsdijk et al., 2020; Bonett, 2020; Köhler & Cortina, 2019; LERU, 2020; Li et al., 2018). I will also cite various articles which serve as examples of protocol papers and data papers. With this paper, WPOM is committed to promoting this model by accepting for review any of the three types of scientific contributions including protocol papers, data papers, and traditional papers.

Proposal for 4-step scientific dissemination

Increasingly, there are calls for more transparent research and the facilitation of the reproducibility of scientific contributions in order to promote their validity and credibility (Center for Open Science, 2015; Delgado-López-Cózar et al., 2021; Li et al., 2018; Nosek et al., 2015; Serghiou et al., 2021; Travers et al., 2016). In practice, this means reported research should include a recorded protocol, any code used in the analyses, and the relevant data should be accessible (Center for Open Science, 2015; Closa, 2021; Nosek et al., 2015; Serghiou et al., 2021). These three characteristics are rarely met in recent research in areas such as biomedicine (Serghiou et al., 2021) and psychology (Hardwicke et al., 2021). This suggests that the practice has poor adaptation in fields with a supposed tradition of open science, evidence-based professional practice, and replicability. If this is correct then in areas such as Management, where some of these aspects are unknown or un-shareable, the situation undoubtedly is worse.

A proposed solution to this situation is a 4-step model for the dissemination of science. This proposal is based on publication in three stages, which serves to promote replicability, transparency, and transfer to society (Figure 1).

The first step consists of diffusion within social networks, both scientific and professional, of the core idea of the research to be developed. This allows for the generation of expectation, promotion of support gathering, and solicitation of ideas or opinions on the topic to be addressed. It can also generate a commitment in the research team to set dates in which to respond to the proposed initiative. The use of videos or visual summaries (e.g., cartoon abstracts) can be an ideal way to disseminate at this stage. For example, below are two entries from my blog illustrating different possible forms of this first step:

- What have academics conducted research on related to internal communication between 2013 and 2018? (https://jamg.blogs.upv.es/2019/04/15/2173/)
- Preliminary analysis of organizational structures facilitating continuous improvement (https://jamg.blogs.upv.es/2019/04/08/2136/).

The second step in dissemination consists of the publication of articles in scientific journals. I visualize this step containing three stages. The first stage is the publication of research protocols, which present and justify the actions that will be carried out in the course of the research (Closa, 2021). This first stage ensures three things associated with transparency and replication including public access to the protocols, access to

the analysis code (analysis scripts), and a public record of the research to be conducted (Center for Open Science, 2015). Some examples of protocols are:

- WPOM (Marin-Garcia & Alfalla-Luque, 2018; Marin-Garcia et al., 2018)
- Frontiers in Psychology (Hogekamp et al., 2016; Soyyılmaz et al., 2017)
- Cochrane (Akl et al., 2013; Gillen et al., 2017)

The second stage is the data paper which describes in detail the sources of information that will be analysed to obtain results, how they were gathered, and how they can be reused. With the publication of a data paper, the open dissemination of the data is guaranteed by peer review to verify the correct reporting of the data (Center for Open Science, 2015). Some examples of data papers are:

- WPOM (Marin-Garcia, in press; Marin-Garcia et al., 2021)
- Frontiers in Psychology (Duñabeitia et al., 2016; Leganés-Lavall & Pérez-Aldeguer, 2016; Mascarenhas et al., 2018; Ondé & Alvarado, 2018)
- Data in Brief (Adeniji et al., 2018; Al-Rahmi et al., 2019; Ogunnaike et al., 2018; Popoola, Atayero, Badejo, John, et al., 2018; Popoola, Atayero, Badejo, Odukoya, et al., 2018; Sanchez-Ruiz & Blanco, 2019)

The third stage is the publication of a traditional paper which includes links to the articles of the two previous stages, summarizes the methodology to reflect important decisions, notes deviations from the planned protocol, and marks events that have affected the research (Closa, 2021).

During the three stages of this second step scientific conferences present an excellent opportunity to discuss progress with colleagues and to refine the research, to improve the protocol, and to prepare the publication of the article. To this end, these conferences should have a good peer review system and the sessions should be designed to encourage dialogue and interaction among the attendees and not simply monologues by the person presenting their work.

The third step consists of dissemination to the general public or to professionals (Aguinis & Gabriel, 2021; Evans, 2019). Additional information on this point can be found on the following web pages:

- https://www.harzing.com/blog/2020/01/social-media-in-academia-options
- https://www.harzing.com/blog/2020/04/social-media-in-academia-putting-it-all-together
- https://www.harzing.com/blog/2018/01/how-to-ensure-your-paper-achieves-the-impact-it-deserves.

For this third step, it is possible to have a media presence or to participate on social networks commenting on the conclusions and contributions of the research completed. As in the first step, visual formats (e.g., video or cartoon abstracts) are suitable formats for dissemination. Here are some examples that illustrate this step:

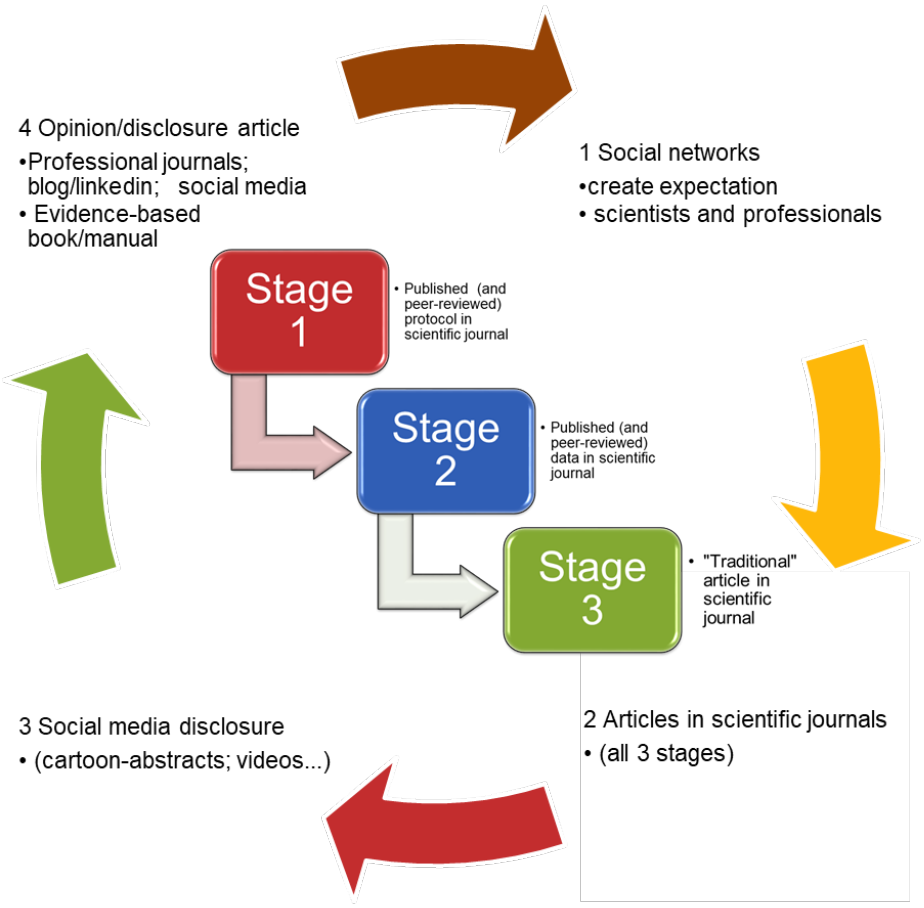
- https://www.youtube.com/watch?v=QFenyNYOPug
- https://www.facebook.com/permalink.php?story_fbid=687524948091832&id=100005029993160
- https://jamg.blogs.upv.es/2016/09/28/1081/
- https://jamg.blogs.upv.es/2016/09/
- https://www.researchgate.net/publication/303713546_Cartoon_Abstract-foraging-in-the-city-web-final
- https://twitter.com/iambenhudson/status/750645236171415552

- https://harzing.com/blog/2020/03/social-media-in-academia-twitter
- https://harzing.com/blog/2020/02/social-media-in-academia-linkedin
- Infographics in Journal of New Approaches in Educational Research: https://naerjournal.ua.es/infographics

Finally, the fourth step consists of writing opinion articles in professional or educational journals or chapters for manuals and books of an educational nature (https://www.harzing.com/blog/2020/04/social-media-in-academia-blogging). Some examples are:

- https://harzing.com/blog/2017/02/what-if-fully-agree-doesnt-mean-the-same-thing-across-cultures
- https://harzing.com/blog/2017/04/challenges-in-international-survey-research-illustrations-and-solutions
- https://harzing.com/blog/2016/10/trailblazers-of-diversity-editors-and-editorial-board-diversity

Figure 1. Four-step model for scientific dissemination



The next sections explain protocol papers and data papers in more detail as they are relatively unknown types of articles, particularly in the fields of Business and Management.

Protocol paper

Protocol papers are a form of scientific contribution which aligns with the concept of registered reports and refers to research published in several stages (Figure 1) resulting in linked scientific articles. In the final stage, the published protocol must be linked either in a footnote or explicitly in the methodology and additional material section (Center for Open Science, 2015).

Protocols are empirical research articles where the content is focused on justifying the importance and relevance of the research questions and ensuring the adequacy of the proposed methodology to answer those questions (Chambers et al., 2014; Toth et al., 2021). This format can be applied to both original studies and to replication studies. Protocols are considered primary research articles which undergo a peer review process prior to fieldwork, data collection, and analysis (Chambers et al., 2014; Toth et al., 2021). In some journals such as WPOM, the publication of a protocol itself carries an in-principle acceptance for the traditional article to follow which describes the analyses and main results after applying the protocol upon research completion. In this case, the review process of the third stage paper will focus on adherence to the protocol and, if any, the appropriateness of any deviations from the protocol (Marin-Garcia, 2015). The editorial decision to publish the research report will not be affected by whether the hypotheses have been confirmed or whether the results present significant or relevant magnitudes.

The basic components of a protocol are:

- Title and/or keywords specifically containing the phrase *protocol paper*
- Explicit definitions of the main variables of the study
- Identification of previous relevant literature related to the addressed questions. It is not necessary to develop these in detail, only to compile the main works and use them to justify the relevance of the research questions
- Research questions to be addressed by the research
- Justification of why the research is relevant, the contribution to academics and/or practitioners
- Description of the research design discussing in detail the proposed methodology for data collection and analysis and including a step-by-step guide and a justification of the analysis tools and procedures
- Optionally, a pilot test demonstrating the feasibility of the proposal
- Expected timelines
- Favourable report from an ethics committee, as required

In short, a protocol consists of three important blocks. The first block presents a brief justification of the contribution or the research question to be addressed. Normally this block contains many citations and little text. The block requires citations endorsing the research contribution as currently relevant and pertinent with respect to the development of science in the field of knowledge, and emphasizing its value for researchers and professionals (Aguinis et al., 2020).

The second block contains a brief and clear definition of each of the variables appearing in the models such as antecedent variables, outcome variables or variables that are associated with the antecedents, adjustment variables, and confounding or control variables (variables affecting both antecedents and outcomes) (Losilla et al., 2005). The block also reviews previous publications on the understood relationships between these variables and the relevant populations within which they have been studied.

The third block details a description of the methodology. This block declares the proposal to answer the research question posed, the timeline, and the planned steps to achieve resolution (Chambers et al., 2014;

Toth et al., 2021). In contrast to phase three articles where the methodology section is usually brief, the protocol describes in detail the specific population or group targeted from which to form generalizations or to extrapolate conclusions from the planned work including territorial scope, specific selection conditions, and sample size; duration or complexity of the data collection tools; justifications of the variable measurements; the process that will be used to collect the data; justifications of the methods to be used; practical suggestions and methods for solving contingencies; which people will intervene and how they will intervene; and how the work will be verified for consistency, adequateness, validity and/or reliability. The block should also include the relevant syntax of the analysis procedure (can be executed with test or pilot data) (Beugelsdijk et al., 2020). At its core, a protocol is a detailed step-by-step guide which anyone, even without direct participation in the research, could replicate (Bonett, 2020; Köhler & Cortina, 2019) by allowing performance of the same tasks (Aguinis et al., 2018; Beugelsdijk et al., 2020).

Interesting links related to protocols:

- https://journals.plos.org/plosone/s/other-article-types#loc-registered-reports
- https://blog.frontiersin.org/2015/05/13/the-protocols-article-a-robust-step-by-step-guide-to-performing-fundamental-scientific-experiments/
- http://fron.tiers.in/go/gfCkgN
- https://www.aje.com/en/arc/how-to-write-an-easily-reproducible-protocol/
- https://support.jmir.org/hc/en-us/articles/115002860428-Why-should-I-publish-my-protocol-or-grant-proposal-

Protocol guides by type:

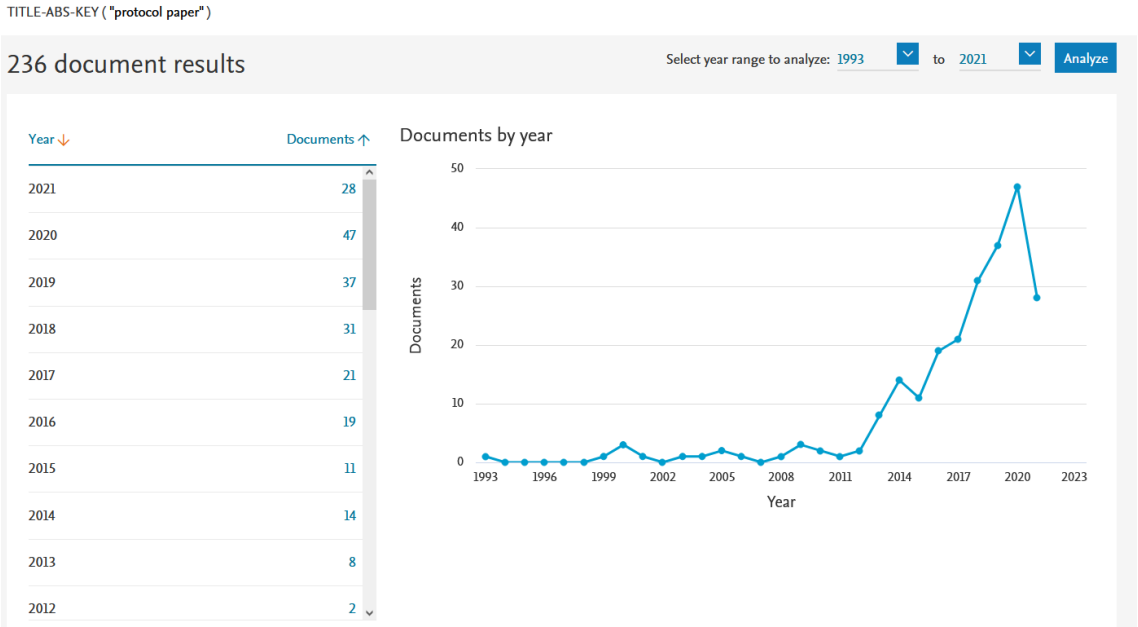
- Observational studies: (Mahajan et al., 2020) and https://media.upv.es/#/portal/video/de5c4840-7ae5-11e9-b19c-2d7bc55b9633
- Systematic review and qualitative synthesis: (Fadahunsi et al., 2019; Moher et al., 2015; Page et al., 2021; Welch et al., 2016)
- Meta-ethnography: (France et al., 2019) and https://media.upv.es/#/portal/video/de5c4840-7ae5-11e9-b19c-2d7bc55b9633
- Qualitative research: (COREQ) (Tong et al., 2007)
- Case reports: (Marin-Garcia & Garcia-Sabater, 2021)
- Action research on teaching experiences: (Marin-Garcia & Alfalla-Luque, 2021)
- Trials: https://media.upv.es/#/portal/video/c5b9ac10-7ae5-11e9-b19c-2d7bc55b9633
- Measurement instrument validation: https://media.upv.es/#/portal/video/e881a220-7ae5-11e9-b19c-2d7bc55b9633

The majority of journals accepting protocols are from the fields of biology, medicine, or psychology. For example:

- Nature: (https://www.nature.com/nprot/)
- Biology Methods & Protocols: (https://academic.oup.com/biomethods)
- Current Protocols: (https://currentprotocols.onlinelibrary.wiley.com/hub/about)
- Journal of Clinical Trials: (https://www.omicsonline.org/clinical-trials.php)
- Methods and Protocols: (https://www.mdpi.com/journal/mps)
- JMIR Research Protocols: (https://www.researchprotocols.org/)

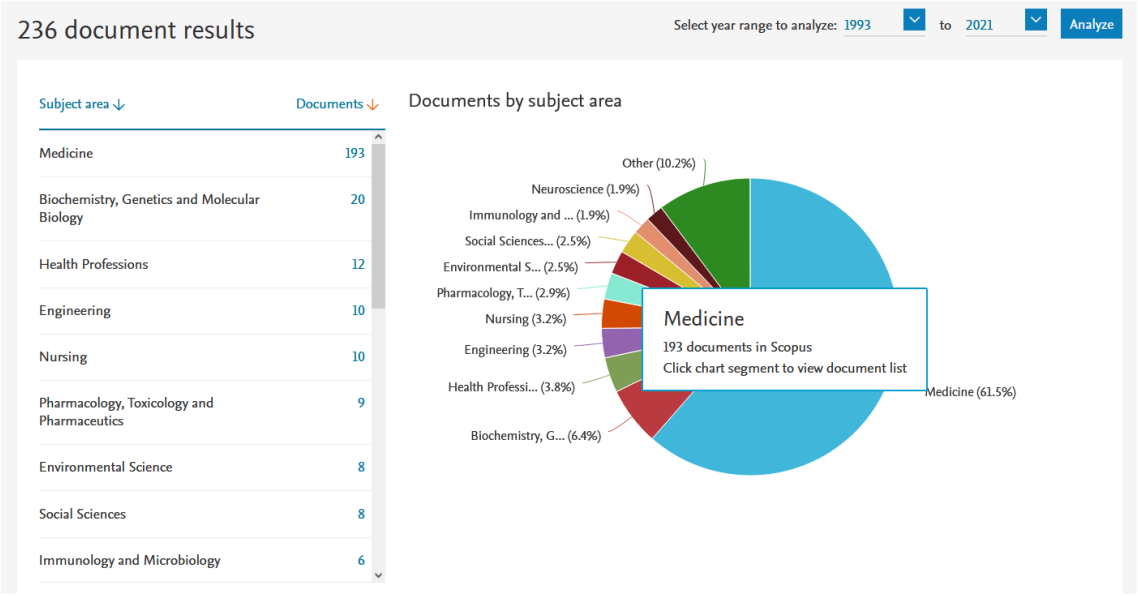
A search in Scopus executed on 28 August 2021 with the term *protocol paper* in TOPIC (Figure 2) showed the term as an emerging topic with less than 5 years since take-off and still representing a small volume of total publications (236 articles in total, 50 papers per year most recently).

Figure 2.- Number of *protocol paper* documents per year in Scopus



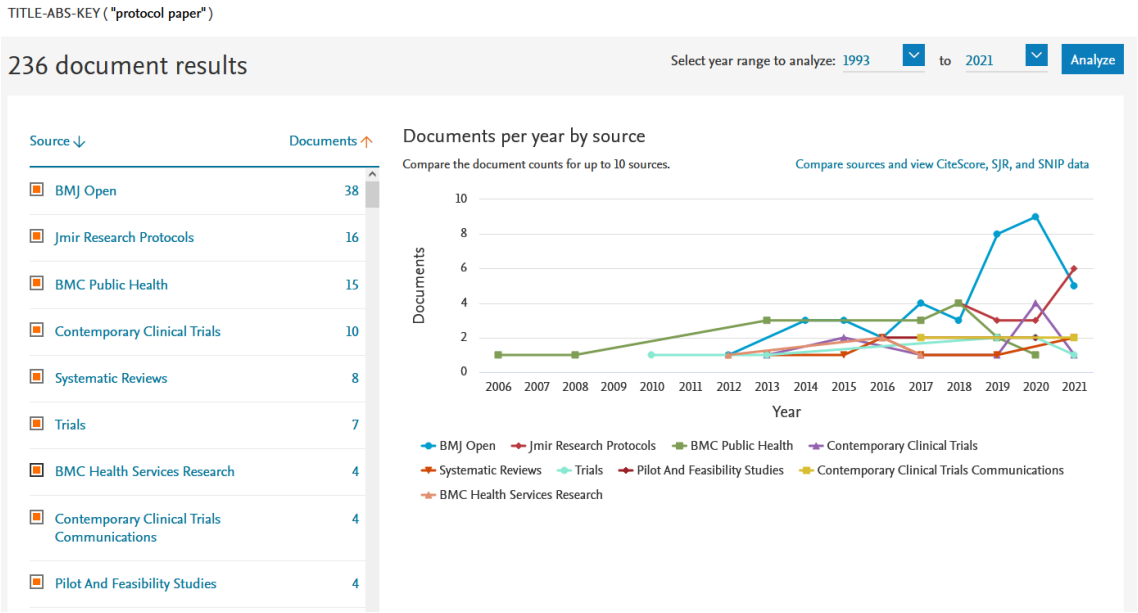
The majority of these papers were in the fields of life sciences (Figure 3).

Figure 3. *Protocol papers* by subject area



There were only 9 journals that published 4 or more articles labelled as *protocol papers* (Figure 4).

Figure 4. Scopus journals with more than 4 published *protocol papers*



The search for *protocol paper* can generate many false negatives if the term has not yet been used within the scientific community (see annex). We repeated the search in Scopus with the search parameters *protocol** in the title, limited to only articles, and excluding the entire branch of telecommunications or information technology (these generate many false positives due to articles on communication network protocols as opposed to research protocols):

TITLE (*"protocol*"*) AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (EXCLUDE (SUBJAREA , *"COMP"*)) AND (EXCLUDE (EXACTSRCTITLE , *"IEEE Transactions On Vehicular Technology"*) OR EXCLUDE (EXACTSRCTITLE , *"Sensors Switzerland"*) OR EXCLUDE (EXACTSRCTITLE , *"IEEE Transactions On Communications"*) OR EXCLUDE (EXACTSRCTITLE , *"Electronics Letters"*) OR EXCLUDE (EXACTSRCTITLE , *"Telecommunication Systems"*) OR EXCLUDE (EXACTSRCTITLE , *"Dianzi Yu Xinxi Xuebao Journal Of Electronics And Information Technology"*) OR EXCLUDE (EXACTSRCTITLE , *"Indian Journal Of Science And Technology"*) OR EXCLUDE (EXACTSRCTITLE , *"Chinese Journal Of Electronics"*) OR EXCLUDE (EXACTSRCTITLE , *"IEEE Sensors Journal"*) OR EXCLUDE (EXACTSRCTITLE , *"International Journal Of Recent Technology And Engineering"*) OR EXCLUDE (EXACTSRCTITLE , *"Journal Of Communications"*) OR EXCLUDE (EXACTSRCTITLE , *"Transactions On Emerging Telecommunications Technologies"*) OR EXCLUDE (EXACTSRCTITLE , *"IEEE Transactions On Consumer Electronics"*) OR EXCLUDE (EXACTSRCTITLE , *"International Journal Of Quantum Information"*) OR EXCLUDE (EXACTSRCTITLE , *"Annales Des Telecommunications Annals Of Telecommunications"*) OR EXCLUDE (EXACTSRCTITLE , *"Journal Of Sensors"*) OR EXCLUDE (EXACTSRCTITLE , *"Nanjing Youdian Daxue Xuebao Ziran Kexue Ban Journal Of Nanjing University Of Posts And Telecommunications Natural Science"*) OR EXCLUDE (EXACTSRCTITLE , *"Undefined"*))

This search will still yield many false positives yet the results can help to complete the picture of the much more specific previous search. The more than 80,000 results found were concentrated in the areas of medicine and biochemistry (Figure 5) and, as can be seen in Figure 6, prior to 2006 it was extremely rare to find an article with *protocol** in the title published in any of the journals that to date had published the most articles of this type.

Figure 5. Results of Scopus search for *protocol in the title by subject area**

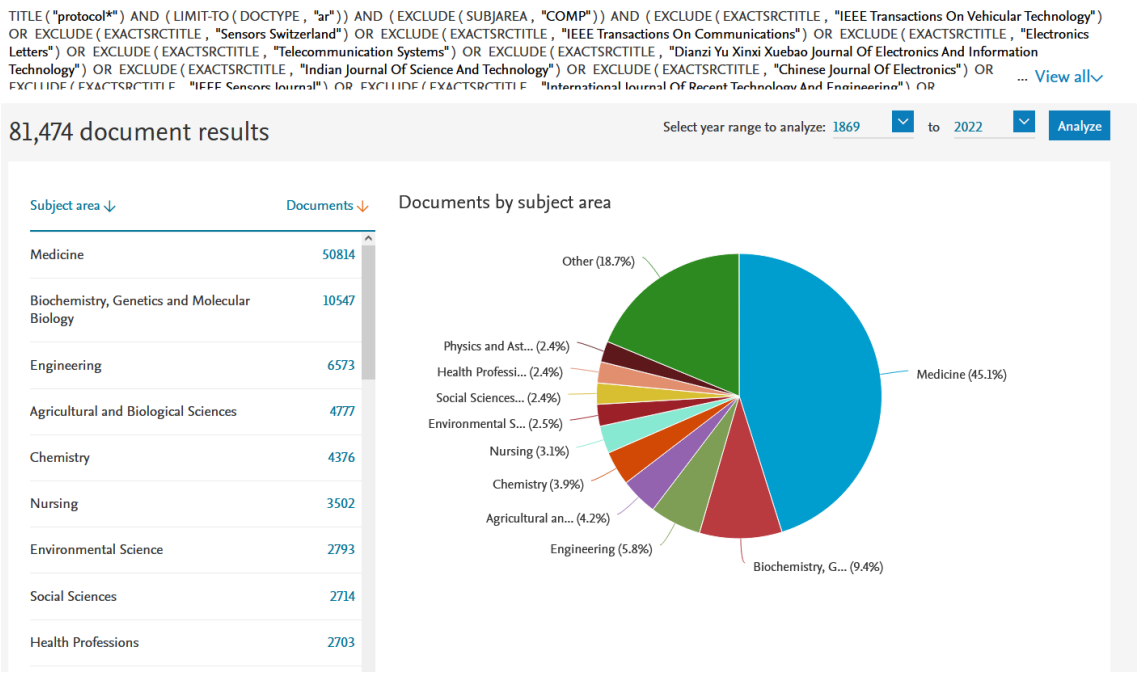
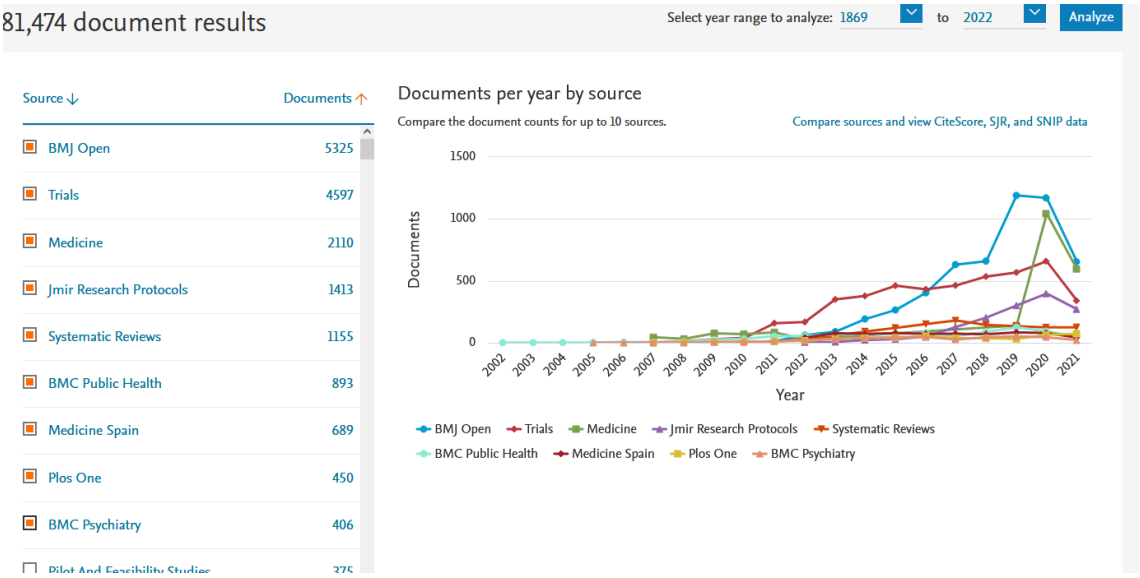


Figure 6. Evolution of protocols per year in main Scopus journals



In a similar search in Clarivate Web of Science (WOS) (*protocol paper* in topic 28 August 2021) there was virtually nothing published before 2010 (Figure 7). As in Scopus, the areas of medicine or the health sciences dominated the results (Figure 8).

Figure 7. *Protocol papers* in WOS by year

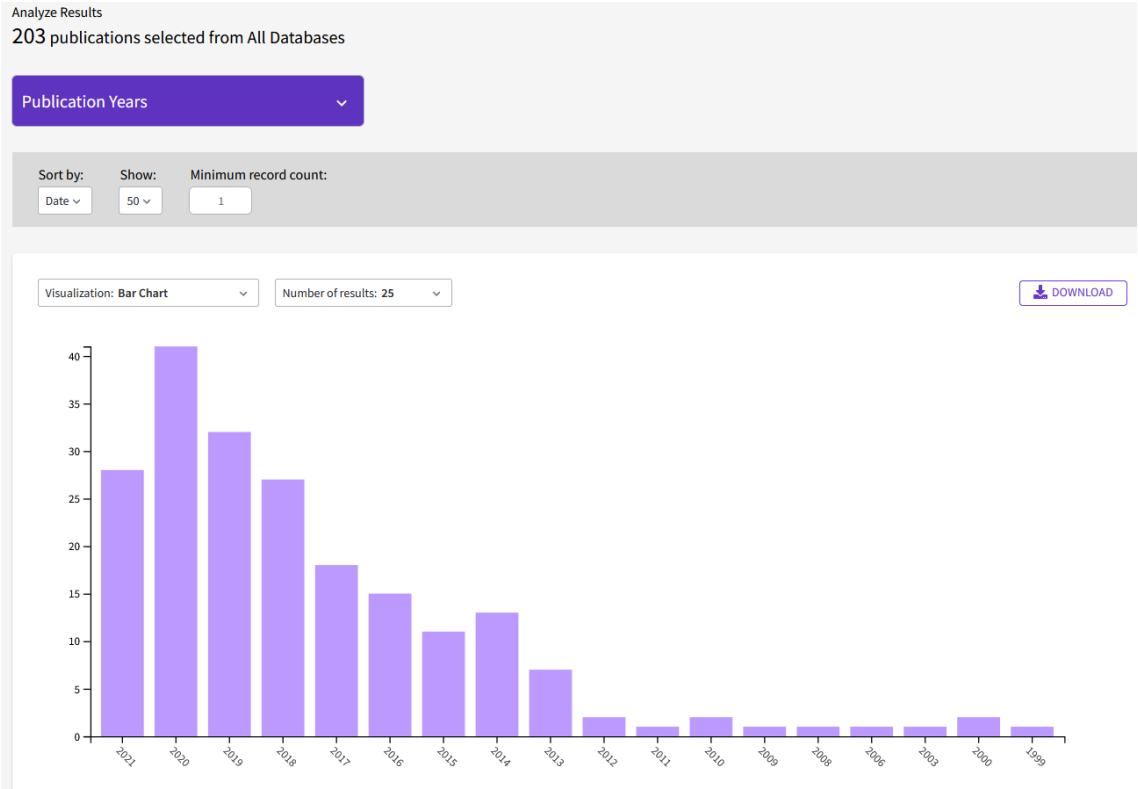
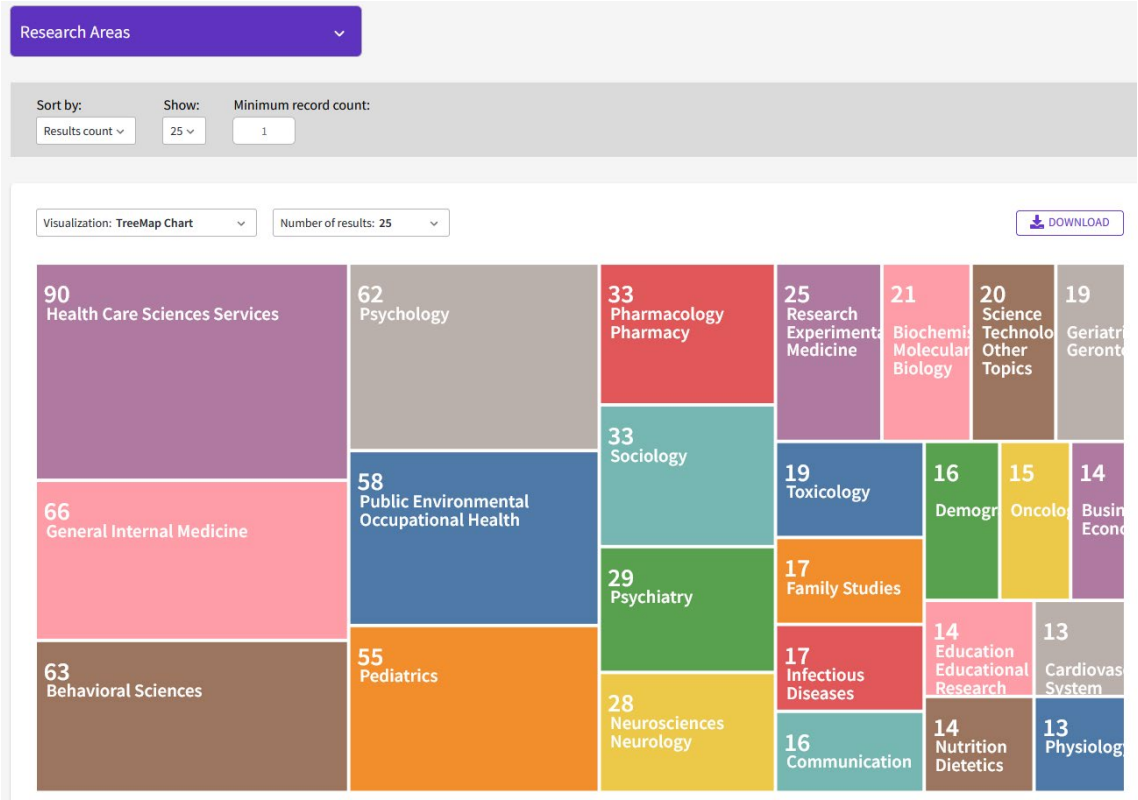
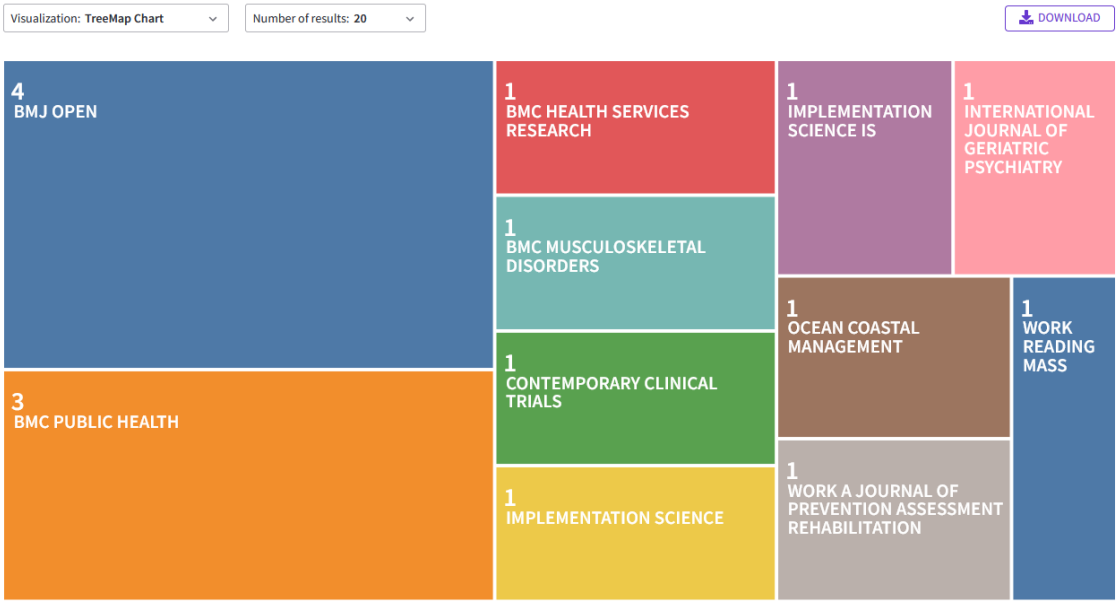


Figure 8. Main areas of research of *protocol papers* in WOS



In fact, of the 14 results classified as business and economics, one was a false positive and the other 13 were all published in health journals (Figure 9)

Figure 9. Journals where *protocol papers* are labelled as business and economics are published by WOS



Advantages of protocols

Protocol papers promote a more robust methodology as they are debated and reviewed by experts before application, improve the transparency and reproducibility of the research, and reduce publication biases such as presenting only information favourable to certain results or conclusions (Amaral & Neves, 2021; Center for Open Science, 2015; Chambers et al., 2014; Toth et al., 2021). In addition, as they are published in advance of the research, the possibility of manipulating the data or adapting the procedures to those favouring a certain type of result is further reduced. In support, recent developments in the conduct of clinical trials defended the usefulness of protocols to facilitate the process (Angus et al., 2019; Berry, 2020; Noor et al., 2020).

For research authors, writing a protocol forces them to identify previous literature, to clearly define the variables to be used, and to justify the contribution of the work. The protocol allows the feasibility of the project and its contribution to be reviewed before embarking on data collection, which often is costly in terms of time and money or other resources. In addition, the protocol keeps the research personnel focused on the overall objectives and the specific tasks to be performed with reduced ambiguity and fewer memory gaps. This information is sometimes difficult to retrieve retrospectively or when requested in the review process several months or years after the tasks were performed. The protocol creates a citable and attributable scientific report and can facilitate the subsequent publication of the work derived from the protocol, either because it is pre-accepted in the journal that submitted the protocol or because it allows endorsement of the relevance of the contribution and the tasks performed. In fact, some medical journals already require prior protocol publication in order to admit for review any scientific work. Another advantage is that the protocol allows the establishment of collaborations to extend the research with other research groups and to receive pertinent suggestions to improve the design of the work.

Data paper

I use the definition of data as "all that material that has been recorded during the research, recognized by the scientific community, and that serves to certify the results of the research being carried out [...] that must come from a single source" (OECD, 2007; Roa-Martinez et al., 2017).

Data papers, also called data reports or data articles among other synonyms, are a quality contribution verified as part of a scientific review process. Instead of testing hypotheses, data papers strive to help fellow researchers to reuse data. To this end, they offer facts pertaining to the data, a link to the data set (which may be hosted in the journal itself or in an external repository specialized in data archiving such as https://riunet.upv.es/, https://zenodo.org/, or similar), the description of that data set (what, where, how, when, who, and why those data were collected), and with relevant citations included comparable in every respect to traditional research papers (Candela et al., 2015; Center for Open Science, 2015; Kim, 2020; Roa-Martinez et al., 2017; Schöpfel et al., 2019).

The origin of data papers can be traced back to around 2009 and 2010 when several journals launched editorials proposing this type of article (Candela et al., 2015; Chavan & Penev, 2011; El-Tawil & Agrawal, 2019; Machuca-Martinez, 2020; Newman & Corke, 2009; Puerta-Piñero et al., 2020; Rushby, 2015). Data papers attempt to overcome the drawbacks of other forms of previously existing data sharing (such as including it in the body of a traditional research article or as supplementary material) and make it possible to find, conveniently access, and reuse reviewed data, complete with full meta-data (Candela et al., 2015; European Organization For Nuclear Research & OpenAIRE, 2013; Kim, 2020; Rico-Castro, 2019).

For data to be useful they must not only be shared but also published (Roa-Martinez et al., 2017) so sharing is guaranteed and open to the entire current and future scientific community. In addition, sharing facilitates vetting of the quality of these data. The data publication should enjoy the same curricular recognition as any conventional or traditional article (Rico-Castro, 2019; Roa-Martinez et al., 2017) because, ultimately, it has followed the same review processes as any other research report. Without the same level of appreciation one of the incentives for this type of article would be perverted, i.e., gaining recognition for providing valuable data for the advancement of research (Candela et al., 2015; Newman & Corke, 2009; Schöpfel et al., 2019). Without this recognition, these types of contributions facilitating transparency, the reproducibility of information, the validation of the results disclosed, and the generation of new research would be lost (Beugelsdijk et al., 2020; Roa-Martinez et al., 2017).

The typical format of a data paper is:

1. Title or key words that specifically contain data paper
2. Previous assumptions and the contribution of these data to scientific progress
    a. Context of the research
    b. Purpose of the data or research questions that the data can help to answer
    c. Added value of potential of the data for the scientific community and other potential consumers
3. Methodology for obtaining or generating the data
    a. What, where, how, when, why, and by whom data were collected
    b. Sampling methodology
    c. Instruments, questionnaires, materials used to collect the data
    d. Analysis or filtering methods proposed for the data
4. Analysis that guarantees the quality of the data or measurements
5. Ethics and conflict of interest statement
    a. As required, informed consent from the participants or complete anonymization of participant data
6. Guidelines for access (with link to data repository), interpretation, and reuse or replication of the data
7. Structured description of the data set
    a. Format
    b. Data structure and data dictionary
    c. Language
    d. Range of values for each variable
    e. Explanation of special values
8. Future lines of research using the data set
9. References

Some examples of data sets include: (Brandenburg & Hahn, 2018; Fernández-Muñoz & Topa, 2018; Marin-Garcia et al., 2021; Motilewa, 2018; Sanchez-Ruiz & Blanco, 2019).

The number of journals accepting data papers and the number of data papers published has grown exponentially since 2010 (Candela et al., 2015). However, they continue to be a minority type of publication and the majority are for research related to health science, life science, or physical science. Only 9 of the journals identified by Candela et al. (2015) were in the social sciences and none of them were specifically related to Business or Management. This fact contrasts with the recommendations of several leading

journals in the field of Business and Management to provide access to data to those who desire and to maintain this access for a reasonable period of time (Beugelsdijk et al., 2020).

To reveal the prevalence of these types of articles in the journals indexed in the main databases a search was performed on 28 August 2021. I took advantage of the fact that both Clarivate-WOS (with the syntax (DT==("DATA PAPER")) and Scopus (with the syntax DOCTYPE ("dp")) labelled these type of articles. However, the classifications of these databases are not perfect and can lead to both false positives and false negatives. For example, Clarivate started using this type of label for articles only from 2016 (before then data papers were simply labelled as an article).

The publication of data papers is infrequent in journals indexed in WOS and is a recent phenomenon (Figure 10). Most of the data papers were in the fields of health sciences or biomedicine and the journal where they were published most frequently is Data in Brief (a journal with an Article Processing Charge (APC), like most journals where data papers are published) (Figure 11).

Figure 10. Data papers published in WOS by year

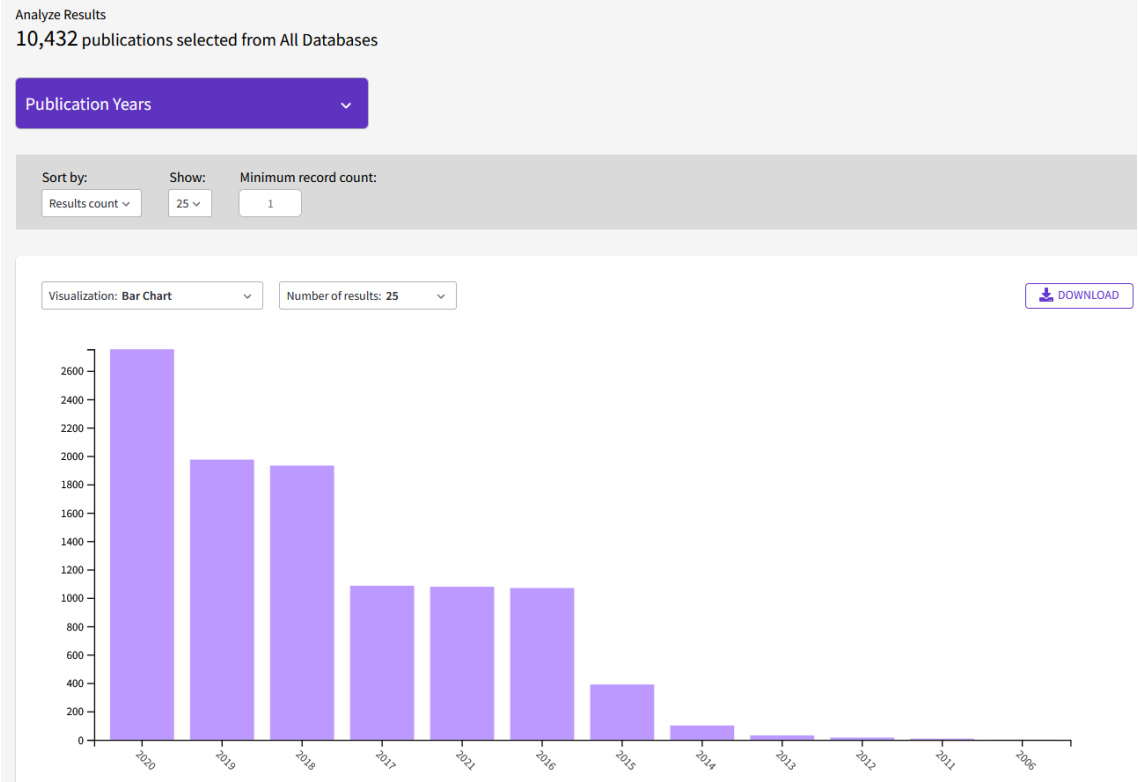
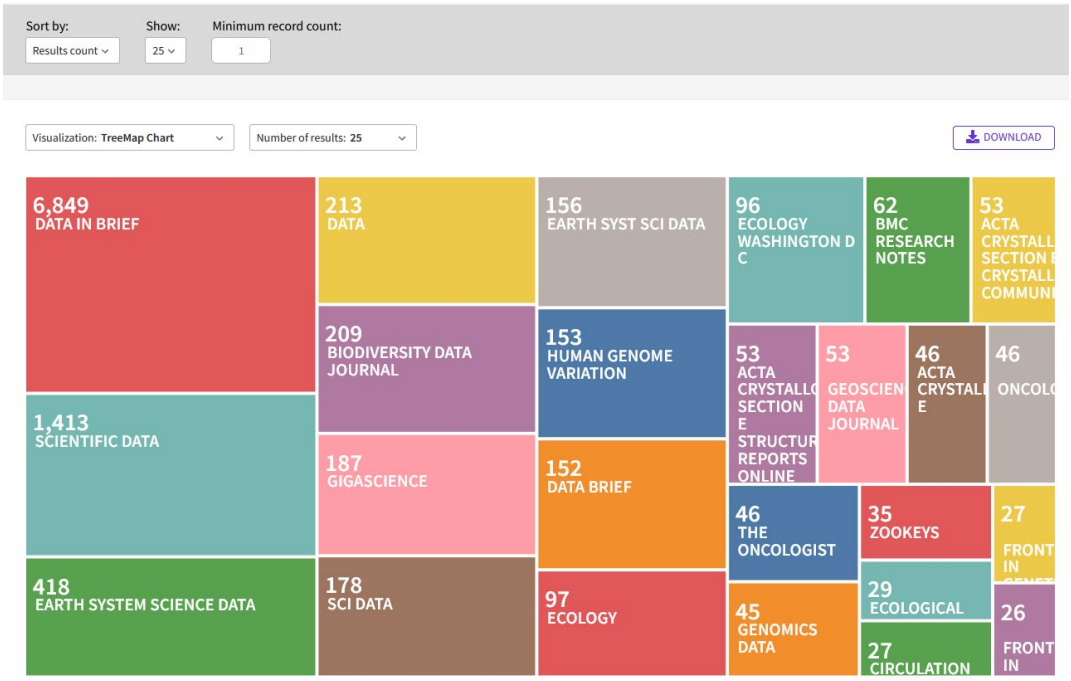


Figure 11. Journals that publish data papers in WOS



Filtering the 10,432 results to focus on business or economics data papers (management does not have a specific area in WOS) showed virtually all of those which were not false positives were published in the journal Data in Brief. (Figure 12).

> ((DT==("DATA PAPER"))) AND ((SJ==("BUSINESS ECONOMICS" OR "OPERATIONS RESEARCH MANAGEMENT SCIENCE" OR "ENGINEERING")) NOT (SJ==("MATHEMATICAL COMPUTATIONAL BIOLOGY" OR "COMPUTER SCIENCE" OR "RADIOLOGY NUCLEAR MEDICINE MEDICAL IMAGING" OR "GENETICS HEREDITY" OR "BIOPHYSICS" OR "AGRICULTURE" OR "CELL BIOLOGY" OR "COMMUNICATION" OR "NEUROSCIENCES NEUROLOGY" OR "MATHEMATICS" OR "BIOCHEMISTRY MOLECULAR BIOLOGY" OR "INFORMATION SCIENCE LIBRARY SCIENCE" OR "PHYSICS" OR "CHEMISTRY" OR "PLANT SCIENCES" OR "BIODIVERSITY CONSERVATION" OR "SOCIOLOGY" OR "ZOOLOGY" OR "ENERGY FUELS" OR "METEOROLOGY ATMOSPHERIC SCIENCES") OR SJ==("FOOD SCIENCE TECHNOLOGY" OR "GOVERNMENT LAW" OR "CONSTRUCTION BUILDING TECHNOLOGY" OR "PHARMACOLOGY PHARMACY" OR "RESPIRATORY SYSTEM" OR "CARDIOVASCULAR SYSTEM CARDIOLOGY" OR "INFECTIOUS DISEASES" OR "ANTHROPOLOGY" OR "INSTRUMENTS INSTRUMENTATION" OR "MATERIALS SCIENCE" OR "NUTRITION DIETETICS" OR "OBSTETRICS GYNECOLOGY" OR "ONCOLOGY" OR "TOXICOLOGY" OR "WATER RESOURCES" OR "ARTS HUMANITIES OTHER TOPICS" OR "BIOTECHNOLOGY APPLIED MICROBIOLOGY" OR "DEMOGRAPHY" OR "FISHERIES" OR "GASTROENTEROLOGY HEPATOLOGY" OR "GENERAL INTERNAL MEDICINE" OR "GEOLOGY" OR "MEDICAL INFORMATICS" OR "PATHOLOGY" OR "PHYSIOLOGY" OR "ENVIRONMENTAL SCIENCES ECOLOGY"))) (https://www.webofscience.com/wos/alldb/summary/24bca03b-0d29-46ca-84b3-7a866ac4d9e4-05ff93cc/relevance/1)

Figure 12. Data papers in Management, Business or Economics in WOS

Select All ☐	Field: Publication/Source Titles	Record Count	% of 92
☐	DATA IN BRIEF	62	67.391%
☐	EARTHQUAKE SPECTRA	24	26.087%
☐	EARTHQ SPECTRA	2	2.174%
☐	SCIENTIFIC DATA	2	2.174%
☐	AUSTRALIAN ECONOMIC REVIEW	1	1.087%
☐	DATA BRIEF	1	1.087%
☐	JOURNAL OF BRIDGE ENGINEERING	1	1.087%
☐	RISK MANAGEMENT AND INSURANCE REVIEW	1	1.087%
☐	TRIBOLOGY LETTERS	1	1.087%

Analyze Data Table

The picture in SCOPUS was similar. There were no results for data papers before 2013 (Figure 13) and the journal with by far the largest number of data papers published was Data in Brief (Figure 14).

Figure 13. Data papers published in Scopus by year

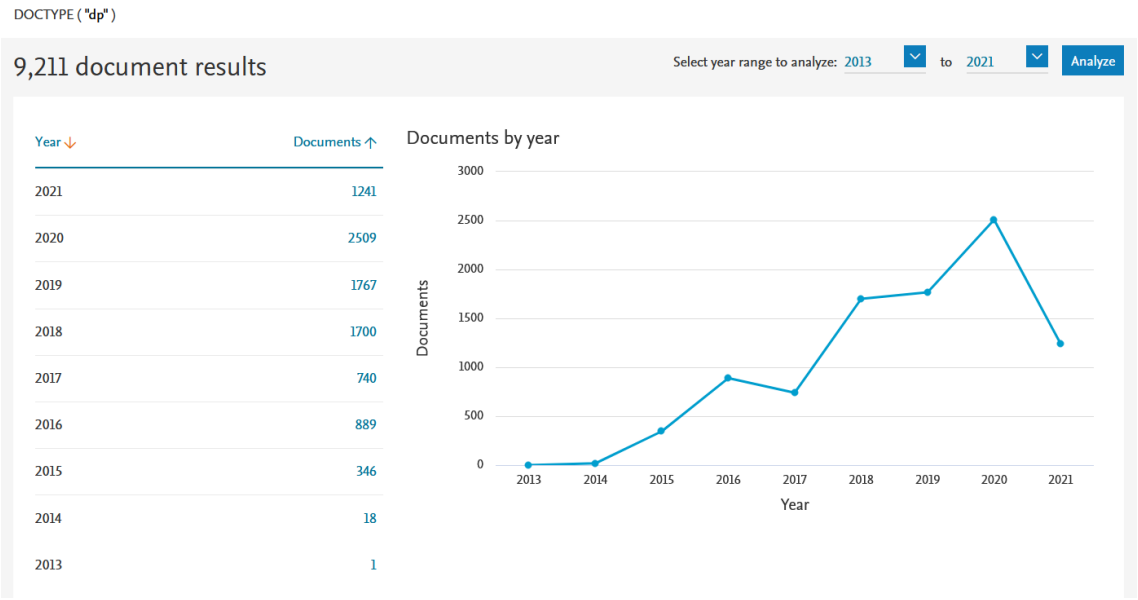
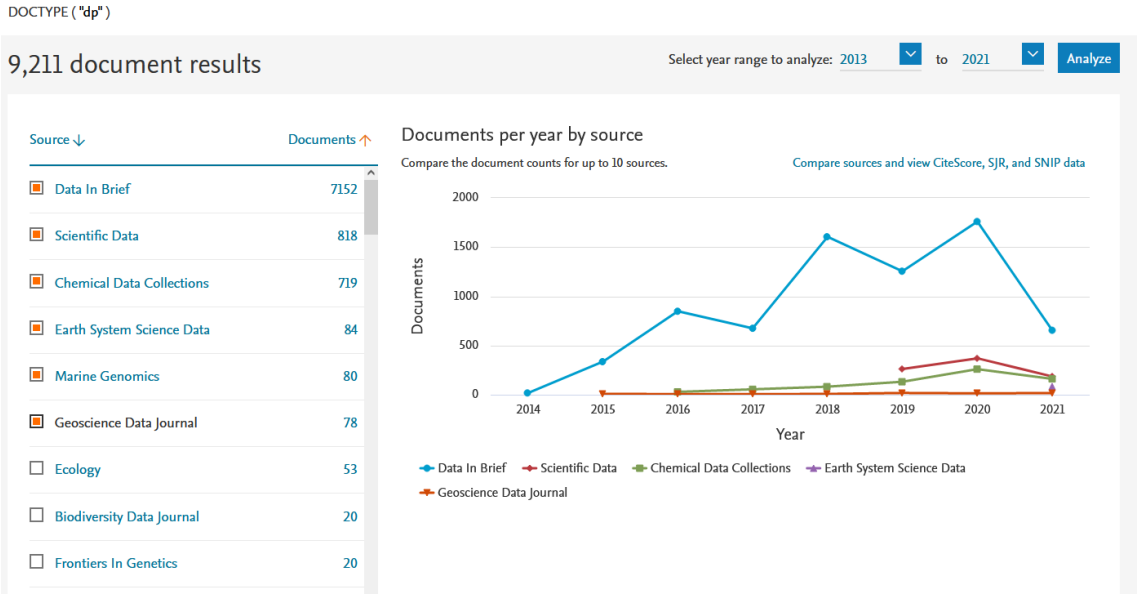
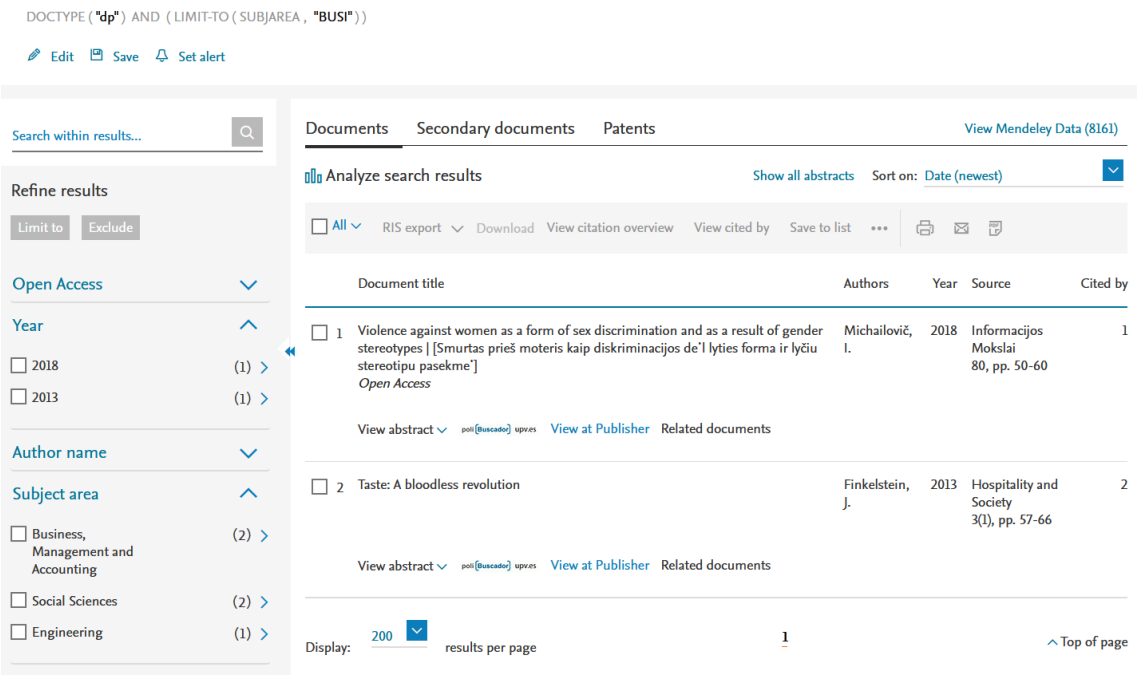


Figure 14. Scopus journals with more than 70 published data papers



Finally, none of the data papers labelled as business were actually business or management (the two labelled as such were false positives) (Figure 15).

Figure 15. Data papers in Business according to Scopus



Advantages of data papers

Data papers are considered an essential contribution to scientific progress because they increase the transparency of the process of data collection, processing, and analysis (provided they are published as a *data paper* before a traditional article), facilitate the reproducibility of results, and increase the visibility of data sets, their quality, accessibility, preservation, and reuse.

At the same time, they offer advantages for authors. Among the most recognised is data papers raise the possibility of extending the network of collaborators, increase the citations received (not only of the data article but also of the articles linked to them), and guarantee recognition for the authors.

Conclusions

In this article, I have proposed a model for the dissemination of science which can be adopted by those doing research in Business or Management in order to achieve greater impact and transfer of research results. The intention is to help understand how research can connect with society, with professionals, and with institutions, and to encourage them to evaluate and make better decisions about how the research conducted reaches society at large (outside the academic world).

I have justified with recent citations the model fits with the most current views of how to execute and disseminate science. In this way, WPOM is aligned with the recommendations of several leading journals in the fields of Business or Management on the need to favour transparent, accessible, and replicable science (Beugelsdijk et al., 2020). The model goes a step further as one of the ways to comply is to host journals in the research area which not only admit, but also promote the publication of protocols and data papers, and WPOM strives to be a pioneer in this field.

At a central part of the model, in step two, a three-stage publication process is proposed, each stage of which gives rise to a research merit that is citable and recognizable as such before scientific evaluation bodies. Because two of these stages are practically unknown in Business and Management, I have defined in detail both a protocol paper and a data paper including their contents. In addition, I have provided examples of each and of the other steps of the science dissemination model.

In addition, I explored the prevalence of protocol papers and data papers within the set of all articles published in journals indexed in Clarivate Web of Science and in Scopus. This revealed protocols were so rare they were not considered their own document types in Scopus or Clarivate (see appendix). However, there seemed to be protocols published frequently since 2000 (likely a more mature concept than data articles).

I am aware the proposed approach has its drawbacks for those in charge of the research. Some of the drawbacks, such as the fact that pre-publishing protocol papers and data papers makes it difficult to falsify the data or results, ultimately have a positive side effect for science. These articles may also be seen as a waste of time (especially if the evaluating bodies or the scientific community come to consider these contributions as minor or insignificant). In my opinion, writing protocol papers or data papers is not a waste of time, it is an investment of time that you will later recover in the whole process of conducting the research. Not only are you going to do a more rigorous and robust research, but, overall, you are going to save time because the research team will work in a more focused manner, with fewer distractions and knowing at all times what needs to be done. All this, moreover, is justified and there will be fewer surprises at the end.

However, there may be real barriers to the dissemination of protocol papers and data papers (Candela et al., 2015). In fact, some of them appear already to be at work and preventing further contributions of this type

from being published. One of the most insidious ones is that their use can spur groups of forager researchers who dedicate themselves to consuming research projects, copying the ideas of others, and executing them in record time. This is all done without having to invest time in the initial development and without attributing or involving the original creators. From my point of view, the advantages for fostering transparency and replication of science far outweigh any of the stated disadvantages. A primary reason is publication acts as a laboratory log and makes it possible to identify the origins of ideas and, at the same time, helps to detect unethical behaviour by unscrupulous researchers. This should make it possible to take action. However, all of this would be of little use if publishing this type of article lacks incentives for its authors (Candela et al., 2015).

Evaluation criteria for each type of scientific communication

Protocol paper (generic)

1. Title and/or keywords specifically containing the phrase *protocol paper*
2. Explicit definitions of the main variables of the study
3. Identification of previous relevant literature related to the addressed questions. It is not necessary to develop these in detail, only to compile the main works and use them to justify the relevance of the research questions
4. Research questions to be addressed by the research
5. Justification of why the research is relevant, the contribution to academics and/or practitioners
6. Description of the research design discussing in detail the proposed methodology for data collection and analysis and including a step-by-step guide and a justification of the analysis tools and procedures
7. Optionally, a pilot test demonstrating the feasibility of the proposal
8. Expected timelines
9. Favourable report from an ethics committee, as required

Systematic literature review protocol paper

1. Is it understandable by someone who is not an expert?
2. Are all the "variables" properly defined?
3. Does it describe the rationale for the review in the context of what is already known. (SLRTemp2a)
4. Does it provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). (SLRTemp2b)
5. If extending previous research on the topic, does it explain why a new study is needed
6. Specify and justify basic strategy: manual search, automated search, or mixed
7. Identify the inclusion criteria for primary studies b) identify the exclusion criteria
8. Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched
9. Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated
10. For manual searches, identify the journals and conferences to be searched
11. Specify the time period to be covered by the review and any reasons for your choice
12. Identify any ancillary search procedures, e.g. asking leading researchers or research groups, or accessing their web sites; or checking reference lists of primary studies
13. Specify how the search process is to be evaluated (e.g. against a known subset of papers; or against the results from a previous systematic review)

Data paper

1. Title or key words that specifically contain data paper
2. Introduction presents the general and specific context of the research, the research question (s) that led to the data collection, the value and / or potential of the data
3. Method. It is explained in detail and sufficient clarity, the methods and conditions (of time, space, etc.) of collection, sampling methodology, materials used. Ethical Statement is present when needed
4. Analysis that guarantees the quality of the data or measurements
5. Data set description. Formats, data structure, language, domains or range of values that the data can take, explanations of data with special values, identifier of the data set that can be the DOI, data deposit (link and type)
6. Guidelines for access (with link to data repository), interpretation, and reuse or replication of the data
7. Future lines of research using the data set

Acknowledgments

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Spanish version

Abstract

En este artículo se propone un modelo de 4 pasos (anuncio en redes sociales, difusión en revistas científicas, difusión en redes sociales y divulgación científica en revisas profesionales) para la divulgación científica que pretende fomentar la práctica profesional de Dirección de Operaciones o la de Gestión de Recursos Humanos basada en la evidencia y, al mismo tiempo, una investigación con un proceso más transparente y reproducible. Como parte central del modelo se plantea, dentro del segundo paso, un proceso de publicación en tres etapas (protocol paper, data paper y "articulo tradicional"), añadiendo una etapa a las dos propuestas hace cuatro años (Marin-Garcia, 2015). Cada una de las etapas da origen a un mérito de investigación citable y reconocible como tal ante organismos evaluadores de producción científica. Puesto que dos de esas etapas son prácticamente desconocidas en Organización de Empresas, he definido con detalle qué es y que contenidos tiene un protocol paper y un data paper. Además, he proporcionado ejemplos de ambos y de los otros pasos del modelo de difusión de la ciencia. Este modelo puede ser adoptado por los investigadores-as como medio para lograr un mayor impacto y mayor transferencia de los resultados de la investigación. La intención es ayudar a que se comprenda, evalúe y se tomen mejores decisiones acerca de cómo la investigación realizada llega a la sociedad en general (fuera del mundo académico).

De este modo, WPOM se alinea con las recomendaciones de varias revistas punteras en el área de gestión de empresas sobre la necesidad de favorecer una ciencia transparente, accesible, replicable (Beugelsdijk et al., 2020). Y además, va un paso más allá pues una de

las formas de cumplir con esta sugerencia es contar con revistas en el área que no solo admitan, sino que impulsen la publicación de protocol papers y data papers. WPOM quiere ser la pionera en este campo en Organización de Empresas.

Además, se explora la posible prevalencia de los protocol paper y los data paper dentro del conjunto de todos los artículos publicados en revistas indexadas en Clarivate Web Of Science y Scopus.

Con esta editorial, WPOM se compromete a fomentar este modelo, aceptando para revisión cualquiera de los tres tipos de contribuciones científicas (protocol papers, data papers y "traditional" papers).

Keywords: *evidence-based; operations management; human resources management; open science; replication; transparency; disclosure; implementing research; data paper; protocol paper; registered report; knowledge mobilisation; knowledge dissemination; scientific communication*

Introducción

La práctica profesional basada en evidencia ha sido definida en el contexto de medicina como la integración de tres cosas (Sackett et al., 2000; Thyer, 2004): 1) la mejor evidencia disponible gracias a la investigación publicada; 2) el conocimiento o experiencia previa del profesional; 3) las preferencias de pacientes/usuarios. Con ello se consigue crear un binomio de diagnóstico/terapia que permite optimizar los resultados deseados. En el fondo, gracias a esto se pueden construir guías prácticas que indican los pasos necesarios para poner en marcha intervenciones concretas que la investigación disponible ha demostrado, sin lugar a dudas (o con unas dudas razonablemente pequeñas), que son los mejores tratamientos para un problema particular en un contexto concreto (Thyer, 2004).

Originariamente, este concepto se desarrolló en el área de medicina (Straus et al., 2019). La medicina basada en la evidencia (EBM por las siglas en inglés de *Evidence-Based Medicine*) abarca tanto la práctica de profesionales que atienden pacientes como a las personas que forman a futuros-as médicos. Normalmente, en el contexto de EBM, el personal docente e investigador en ciencias de la salud es, muchas veces, profesional médico en activo. Es decir, varios roles se superponen en una misma persona. Sin embargo, en el área de la gestión de operaciones o de los recursos humanos, las personas que se dedican investigar casi siempre se dedican a formar a otras para que sean buenos profesionales de dirección de operaciones o buenos profesionales de dirección de personas o simplemente buenos mandos. Pero pocas veces ejercen su actividad profesional como mandos en organizaciones. Por ejemplo, en España se puede observar fácilmente esta situación (Sanchez-Ruiz & Diez-Busto, 2020), que creo que es extrapolable a otros contextos.

Quizás éste sea un aspecto relevante a la hora de explicar por qué la práctica profesional basada en la evidencia le cuesta introducirse en el área de gestión de Empresas(Lawler Iii, 2007; Rousseau, 2006; Rousseau & McCarthy, 2007), a pesar de que lleva años en el área de ciencias de la salud, no solo en medicina (Straus et al., 2019), sino también en enfermería (Cannon & Boswell, 2016). Otra razón posible es que los fenómenos sociales son susceptibles de interpretaciones alternativas y pocas veces encajen en el contexto de veredictos objetivos definitivos (Davis, 2017). Aunando ambas razones, quizás sea necesario hacer adaptaciones para extender el concepto *evidence-based* a área de gestión (Burke & Rau, 2010; Nielsen

& Miraglia, 2016), del mismo modo que ha habido que hacerlas cuando se aplicaba a ciencias de la educación (Rousseau & McCarthy, 2007).

Otro aspecto a tener en cuenta es que la práctica basada en evidencia requiere de unos resultados científicos que sean considerados válidos y creíbles. Esa credibilidad depende de la transparencia del proceso científico. No he localizado datos sobre la transparencia de la investigación en el campo de Organización de Empresas, ni de subáreas específicas como Dirección de Operaciones, o Gestión de Recursos Humanos. Sin embargo, hay investigaciones (Hardwicke et al., 2021) donde se ha manifestado que en las publicaciones del área de psicología, donde son extremadamente infrecuentes el acceso público a los protocolos (0/188; 0%, 95% CI = [0%, 1%]), el acceso a los datos originales de investigación (*raw data*) (4/188; 2%, 95% CI = [1%, 4%]), la sintaxis de análisis (*analysis scripts*) (1/188; 1%, 95% CI = [0%, 1%]) o un pre registro de la investigación (*preregistration*) (5/188; 3%, 95% CI = [1%, 5%]). En la misma línea, apenas existen estudios de replicación (*Replication studies*) (10/188; 5%, 95% CI = [3%, 8%]) y muy pocos trabajos son reutilizados en revisiones sistemáticas posteriores o meta-análisis (21/183; 11%, 95% CI = [8%, 16%]). Lo mismo parece ocurrir en ciencias de la salud (Amaral & Neves, 2021). Estos datos me llevan a pensar que la transparencia y la reproducibilidad en el área de psicología son muy escasos. Probablemente en el área de Organización de Empresas (*Management*) sean igual o aún más escasos.

Como contribución principal de este trabajo, quiero proponer un modelo de publicación en tres fases que apoye y sirva para fomentar la Dirección de Operaciones o la Gestión de Recursos Humanos basada en la evidencia. Este modelo añade una fase a las dos fases propuestas hace cuatro años (Marin-Garcia, 2015) y se vincula con un modelo de difusión de la ciencia en cuatro pasos. Justificaré este modelo basándome en los estándares más exigentes y actuales de buenas prácticas para la creación y difusión científica alineada con criterios de transparencia e impacto social (Aguinis et al., 2020; Aguinis et al., 2018; Beugelsdijk et al., 2020; Bonett, 2020; Köhler & Cortina, 2019; LERU, 2020; Li et al., 2018). También citaré algunos artículos que pueden servir de ejemplos de *protocol papers* o *data papers*. Con esta editorial, WPOM se compromete a fomentar este modelo, aceptando para revisión cualquiera de los tres tipos de contribuciones científicas (*protocol papers*, *data papers* and *"traditional" papers*).

Propuesta para la difusión científica en cuatro pasos

Cada vez se solicita con más frecuencia que la investigación sea más transparente y se facilite la reproducibilidad de las aportaciones científicas para fomentar la validez y la credibilidad de dichas aportaciones (Center for Open Science, 2015; Delgado-López-Cózar et al., 2021; Li et al., 2018; Nosek et al., 2015; Serghiou et al., 2021; Travers et al., 2016). En la práctica, esto significa, entre otras cosas, que las investigaciones deberían tener un protocolo registrado y que el código utilizado en los análisis y los datos fuesen accesibles (Center for Open Science, 2015; Closa, 2021; Nosek et al., 2015; Serghiou et al., 2021). Estas tres características son escasamente cumplidas en la investigación reciente de áreas como la biomedicina (Serghiou et al., 2021) o la psicología (Hardwicke et al., 2021). Esto hace pensar que apenas ha calado la práctica en áreas con una supuesta tradición en ciencia abierta (*open science*), práctica profesional basada en evidencias (*evidence based*) y replicabilidad. Si esto fuese cierto, en áreas como la Organización de Empresas (*Management*), donde algunas de estas cosas son desconocidas o innombrables, la situación debe de ser abrumadoramente peor.

Una de las formas para intentar resolver esta situación es mi propuesta de un modelo de 4 pasos (*steps*) en la difusión de la ciencia. Esta propuesta se apoyada en la publicación en tres fases (*stages*), que sirve para fomentar la replicabilidad, la transparencia y la transferencia a la sociedad (Figure 1).

El primer paso consiste en una difusión en redes sociales, tanto científicas como profesionales, de la idea básica de la investigación a desarrollar. Esto permite, por un lado, crear cierta expectación, recoger apoyos, ideas u opiniones sobre el tema a tratar. Por otro lado, permite generar cierto compromiso en el equipo investigador para fijarse unas fechas en las cuales dar respuesta a la iniciativa planteada. El uso de videos o resúmenes visuales (*cartoon abstracts*) puede ser una forma ideal de difundir en esta fase. Por ejemplo, sin ser demasiado visuales, y con mucho margen de mejora, estas dos entradas de mi blog pueden servir para ilustrar a lo que me refiero como resultado de este primer paso:

- ¿Qué han investigado los académicos sobre comunicación interna entre 2013 y 2018? (https://jamg.blogs.upv.es/2019/04/15/2173/)
- Análisis preliminar de las estructuras organizativas que facilitan la mejora continua (https://jamg.blogs.upv.es/2019/04/08/2136/).

El segundo paso en la difusión sería la publicación de artículos en revistas científicas. Este paso yo lo visualizo con tres etapas. La primera es la publicación de los protocolos de investigación (*research protocols*), que diseñan y justifican las acciones que se llevarán a cabo para realizar la investigación (Closa, 2021). Con esta primera etapa, se garantizarían tres cosas necesarias para la transparencia y replicación: el acceso publico a los protocolos, el acceso al código previsto para el análisis (*analysis scripts*) y un registro público de la investigación a abordar (Center for Open Science, 2015). Algunos ejemplos de *protocol papers*:

- En WPOM (Marin-Garcia & Alfalla-Luque, 2018; Marin-Garcia et al., 2018)
- En Frontiers in Psychology (Hogekamp et al., 2016; Soyyılmaz et al., 2017)
- En Cochrane (Akl et al., 2013; Gillen et al., 2017).

La segunda etapa, son los *data papers*, donde se describe con detalle las fuentes de información que se analizarán para extraer resultados, cómo se han obtenido y cómo se pueden reutilizar. Con la publicación de los *data papers* se garantiza la difusión en abierto de los datos con una revisión por pares para comprobar el reporte correcto de los mismos (Center for Open Science, 2015). Algunos ejemplos de *data papers*:

- En WPOM (Marin-Garcia, in press; Marin-Garcia et al., 2021)
- En Frontiers in Psychology (Duñabeitia et al., 2016; Leganés-Lavall & Pérez-Aldeguer, 2016; Mascarenhas et al., 2018; Ondé & Alvarado, 2018)
- En Data in Brief (Adeniji et al., 2018; Al-Rahmi et al., 2019; Ogunnaike et al., 2018; Popoola, Atayero, Badejo, John, et al., 2018; Popoola, Atayero, Badejo, Odukoya, et al., 2018; Sanchez-Ruiz & Blanco, 2019)

La tercera etapa sería la publicación de un "*traditional paper*", en el que, entre otras cosas, se debería enlazar los artículos de las dos etapas anteriores, resumir la metodología para reflejar las decisiones importantes, las desviaciones sobre el protocolo previsto y los eventos que han afectado a la investigación (Closa, 2021).

Durante las tres etapas de este segundo paso, los congresos científicos son una oportunidad excelente para debatir con colegas y pulir la investigación, de cara a mejorar el protocolo o preparar la publicación del artículo "tradicional". Para ello, estos congresos deberían de contar con un buen sistema de revisión por pares y las sesiones estén pensadas para fomentar diálogos e interacción entre las personas asistentes y no solo monólogos de la persona que expone su trabajo.

El tercer paso consiste en la difusión para el público general o para los profesionales (Aguinis & Gabriel, 2021; Evans, 2019). Sobre este punto, hay información adicional en estás páginas web:

- https://www.harzing.com/blog/2020/01/social-media-in-academia-options
- https://www.harzing.com/blog/2020/04/social-media-in-academia-putting-it-all-together
- https://www.harzing.com/blog/2018/01/how-to-ensure-your-paper-achieves-the-impact-it-deserves.

Para este tercer paso, se puede tener presencia en los medios de comunicación o en las redes sociales comentando las conclusiones y contribuciones de la investigación realizada. Al igual que en el primer paso, los formatos visuales (video o *cartoon abstracts*) son muy adecuados para la difusión. A continuación, enumero algunos ejemplos que pueden ilustrar este paso:

- https://www.youtube.com/watch?v=QFenyNYOPug
- https://www.facebook.com/permalink.php?story_fbid=687524948091832&id=100005029993160
- https://jamg.blogs.upv.es/2016/09/28/1081/
- https://jamg.blogs.upv.es/2016/09/
- https://www.researchgate.net/publication/303713546_Cartoon_Abstract-foraging-in-the-city-web-final
- https://twitter.com/iambenhudson/status/750645236171415552
- https://harzing.com/blog/2020/03/social-media-in-academia-twitter
- https://harzing.com/blog/2020/02/social-media-in-academia-linkedin
- Infografías en Journal of New Approaches in Educational Research: https://naerjournal.ua.es/infographics

Por último, el cuarto paso consiste en la escritura de artículos de opinión en revistas profesionales o de divulgación o capítulos de manuales o libros con carácter divulgativo (https://www.harzing.com/blog/2020/04/social-media-in-academia-blogging). Algunos ejemplos al respecto:

- https://harzing.com/blog/2017/02/what-if-fully-agree-doesnt-mean-the-same-thing-across-cultures
- https://harzing.com/blog/2017/04/challenges-in-international-survey-research-illustrations-and-solutions
- https://harzing.com/blog/2016/10/trailblazers-of-diversity-editors-and-editorial-board-diversity

Las próximas secciones las dedicaré a explicar con más detalle los *protocol papers* y los *data papers*, por ser una tipología de articulo poco conocida, especialmente en el área de Organización de empresas (*Management*).

Protocol paper

Los *protocol papers* son una modalidad de contribución científica que se alinea con el concepto de "*registered reports*" y hace referencia a una investigación que se publica en varias etapas (Figure 1) dando lugar a artículos científicos enlazados. En la etapa final hay que vincular el protocolo publicado, bien en

una nota al pie de página o de forma explícita en la sección de metodología y material adicional (Center for Open Science, 2015).

Los protocolos son artículos de investigación empírica donde la contribución se centra en justificar la importancia y pertinencia de la pregunta de investigación y garantizar la adecuación de la metodología propuesta para responder a esas preguntas (Chambers et al., 2014; Toth et al., 2021). Este formato se puede aplicar a estudios originales y a replicaciones. Los *protocol papers* se consideran *primary research articles* sometidos a un proceso de revisión por pares antes de realizar el trabajo de campo, recoger datos y de analizar la información recogida (Chambers et al., 2014; Toth et al., 2021). En algunas revistas como WPOM, la publicación de un *protocol paper* es un *in-principle accept* para el articulo "tradicional" que describe los análisis y principales resultados tras aplicar el protocolo, una vez completada toda la investigación. En este caso, el proceso de revisión del articulo (de la tercera etapa) se centrará en la adherencia al protocolo o en la idoneidad de las deviaciones al mismo si las hubiera (Marin-Garcia, 2015). No afectará a la decisión editorial de publicación del informe de investigación que las hipótesis hayan sido confirmadas o no, o que los resultados presenten magnitudes significativas o relevantes.

Los contenidos básicos de un *protocol paper* son:

- Titulo o palabras clave que contengan específicamente "*protocol paper*"
- Definiciones explícitas de las variables principales del estudio
- Identificación de la literatura previa relevante relacionada con las cuestiones a tratar. No es preciso desarrollarla con detalle solo recopilar los principales trabajos y utilizarla para justificar la relevancia de las preguntas de investigación.
- Preguntas de investigación que se pretenden resolver con la investigación
- Justificación de por qué es interesante plantear la investigación: contribución para académicos y/o profesionales
- Descripción del diseño de la investigación comentando con todo detalle la metodología propuesta para la recolección y análisis de los datos. Incluyendo una guía paso a paso y una justificación de los instrumentos y procedimientos de análisis
- Opcionalmente, se pueden mostrar una prueba piloto que demuestre la viabilidad de la propuesta
- Plazos previstos
- Informe favorable de un comité de ética cuando sea necesario

En definitiva, un protocolo consta de tres bloques importantes. El primero de ellos consiste en una justificación breve de la contribución o pregunta de investigación que se quiere abordar. Normalmente este bloque va a contener muchas citas y poco texto. Lo que se necesita son citas que avalen que la contribución es relevante y es pertinente en estos momentos tal como está el desarrollo actual de la ciencia en el área de conocimiento y hacer incidencia de su valor para investigadores y para profesionales del área a la cual se está dirigiendo esta investigación (Aguinis et al., 2020).

El segundo de los bloques contiene una definición breve pero muy clara de cada una de las variables que aparecen en los modelos: variables antecedentes; variables de resultados o que están asociadas a los antecedentes; variables de ajuste, de confusión o de control (variable de confusión que afectan antecedentes y a resultados) (Losilla et al., 2005). También incluye el repaso de las publicaciones anteriores sobre cuál es la relación que se sabe que existe entre estas variables, y las poblaciones en las que han sido estudiadas.

Por último, la tercera de las grandes patas del *protocol paper* es una descripción detallada de la metodología. Decir qué se va a hacer para responder a la pregunta de investigación planteada, cuándo vas a hacerlo y

cómo vas a hacerlo (Chambers et al., 2014; Toth et al., 2021). Al contrario que los artículos de la fase 3, donde lo habitual es que la sección de metodología sea muy breve, en el protocolo se describe de manera detallada la población o colectivo específico sobre la cual se quiere intentar generalizar o extrapolar conclusiones del estudio que se está trabajando, incluyendo ámbito territorial, condiciones específicas de selección y tamaño de la muestra; duración o complejidad del instrumento de toma de datos; por qué se elige una forma de medir las variables y no otra; el proceso que se usará para recoger los datos; los métodos a utilizar y por qué se han elegido esos y no otros; sugerencias prácticas y métodos de resolver posibles problemas; qué personas van a intervenir y cómo van a intervenir; cómo se comprobará que lo que se hace es consistente, adecuado, válido o fiable. Se debe también incluir la sintaxis del procedimiento de análisis (que se puede realizar con unos datos de prueba o piloto) (Beugelsdijk et al., 2020). En el fondo, un protocolo es una guía detallada, paso a paso, que cualquier persona, aunque no haya participado en la investigación, pudiera replicarla (Bonett, 2020; Köhler & Cortina, 2019) siendo capaz de realizar las mismas tareas (Aguinis et al., 2018; Beugelsdijk et al., 2020).

Enlaces de interés relacionados con protocolos

- https://journals.plos.org/plosone/s/other-article-types#loc-registered-reports
- https://blog.frontiersin.org/2015/05/13/the-protocols-article-a-robust-step-by-step-guide-to-performing-fundamental-scientific-experiments/
- http://fron.tiers.in/go/gfCkgN
- https://www.aje.com/en/arc/how-to-write-an-easily-reproducible-protocol/
- https://support.jmir.org/hc/en-us/articles/115002860428-Why-should-I-publish-my-protocol-or-grant-proposal-

Guías de protocolos para:

- Estudios obervacionales (*observational studies*) (Mahajan et al., 2020) and https://media.upv.es/#/portal/video/de5c4840-7ae5-11e9-b19c-2d7bc55b9633
- Revisiones sistemáticas y síntesis cualitativas (systematic review and qualitative synthesis) (Fadahunsi et al., 2019; Moher et al., 2015; Page et al., 2021; Welch et al., 2016)
- Meta etnografía (*Meta-ethnography*) (France et al., 2019) and https://media.upv.es/#/portal/video/de5c4840-7ae5-11e9-b19c-2d7bc55b9633
- Investigación cualitativa (*Qualitative research*) (COREQ) (Tong et al., 2007)
- *Case Reports* (Marin-Garcia & Garcia-Sabater, 2021)
- Investigación acción de experiencias docentes (*Teaching experiences based on action research)* (Marin-Garcia & Alfalla-Luque, 2021)
- Estudios deiIntervención (*trails*): https://media.upv.es/#/portal/video/c5b9ac10-7ae5-11e9-b19c-2d7bc55b9633
- Validación de instrumento de medida: https://media.upv.es/#/portal/video/e881a220-7ae5-11e9-b19c-2d7bc55b9633

La mayoría de las revistas que admiten protocolos son del área de biología, medicina o psicología. Por ejemplo: Nature (https://www.nature.com/nprot/); Biology Methods & Protocols (https://academic.oup.com/biomethods); Current Protocols (https://currentprotocols.onlinelibrary.wiley.com/hub/about); Journal of Clinical Trials

(https://www.omicsonline.org/clinical-trials.php); Methods and Protocols (https://www.mdpi.com/journal/mps); JMIR Research Protocols (https://www.researchprotocols.org/).

Una búsqueda en Scopus, realizada el 28 de agosto de 2021, con el término "protocol paper" en TOPIC (Figure 2) demuestra que es un tema emergente, con menos de 5 años desde el despegue y que aún representan un volumen ínfimo de todo lo publicado (236 artículos en total. 50 documentos por año en los más recientes)

La mayoría de estos documentos pertenecen al área de ciencias de la vida (Figure 3).

Solo hay 9 revistas que hayan publicado 4 o más artículos etiquetados como *protocol paper* (Figure 4).

Dado que la búsqueda por "protocol paper" puede generar muchos falsos negativos, si el término aún no se ha usado por la comunidad científica (ver annexo), hemos repetido la búsqueda en Scopus con la estrategia "protocol*" en *title*, sólo *articles*, excluyendo toda la rama de telecomunicaciones o tecnología de la información (donde hay muchos falsos positivos porque se publican artículos de protocolos de redes de comunicación y no protocolos de investigación):

Aun siendo conscientes de que esta búsqueda arrojará muchos falsos positivos, podemos completar la visión de la búsqueda anterior, que era mucho más específica. Los más de 80.000 resultados encontrados se concentran en las áreas de medicina y bioquímica (Figure 5) y, como puede apreciarse en la Figure 6, antes de 2006 era extremadamente raro encontrar un artículo con "protocol*" en el titulo publicado en alguna de las revistas que más artículos de este tipo han publicado.

Si hacemos una búsqueda similar en Clarivate Web Of Science (WOS) ("protocol paper" en topic 28 agosto 2021) no hay prácticamente nada publicado antes de 2010 (Figure 7). Al igual que en Scopus, las áreas de medicina o ciencias de la salud dominan los resultados (Figure 8).

Incluso, de los 14 clasificados como *business and economics*, uno es un falso positivo y los otros 13 son todos publicados en revistas de salud (Figure 9)

Ventajas de los protocolos

Los *protocol papers* favorecen una metodología más robusta, pues es debatida y revisada por expertos antes de ser aplicada, mejora la transparencia y reproducibilidad de las investigaciones y reduce los sesgos de publicación y de presentar solo la información favorable a determinados resultados o conclusiones (Center for Open Science, 2015; Chambers et al., 2014; Toth et al., 2021) (Amaral & Neves, 2021). Además, al ser publicados con antelación a la investigación, se reduce la posibilidad de maquillar los datos o adaptar los procedimientos a los que favorezcan un determinado tipo de resultado. Por otra parte, los desarrollos recientes para realizar ensayos clínicos (trials) defienden la utilidad de los protocolos para facilitar el proceso (Angus et al., 2019; Berry, 2020; Noor et al., 2020).

De cara a los autores de la investigación, el escribir un protocolo fuerza a identificar literatura previa, definir con claridad las variables a emplear y a justificar la contribución del trabajo. Permite comprobar la viabilidad del proyecto y su contribución antes de embarcarse en la toma de datos, que siempre es costosa en cuanto a tiempo y dinero u otros recursos. Además, mantiene a las personas investigadoras centradas en los objetivos y en las tareas concretas que se deben realizar sin ambigüedades y sin lagunas de memoria de qué se hizo o cuándo o por qué. Esta información a veces es difícil de recuperar de manera retrospectiva o si son solicitadas en el proceso de revisión varios meses o años después de realizadas las tareas. Por otra parte, crea un informe científico citable y atribuible y puede facilitar la posterior publicación de los trabajos derivados del protocolo, bien porque sea un pre-aceptado en la revista que se envió el protocolo o porque

permita avalar la pertinencia de la contribución y las tareas realizadas. De hecho, algunas revistas del área de medicina ya exigen una publicación previa del protocolo para admitir a revisión cualquier trabajo científico. Otra ventaja adicional es que permite establecer colaboraciones para ampliar la investigación con otros grupos de investigadores y recibir sugerencias interesantes para mejorar el diseño del trabajo.

Data paper

Consideraré como datos "todo aquel material que ha sido registrado durante la investigación, reconocido por la comunidad científica y que sirve para certificar los resultados de la investigación que se realiza […] que debe provenir de una fuente única" (OECD, 2007; Roa-Martinez et al., 2017).

Los *data papers*, también llamados *data reports* o *data articles* entre otros sinónimos, son una contribución de calidad garantizada, entre otras acciones por un proceso de revisión científica. En lugar de comprobar hipótesis, su objetivo es ayudar a otros investigadores a reutilizar datos. Para ello ofrecen hechos (*facts*) sobre datos; el enlace al conjunto de datos (*data set*) (que puede estar alojado en la propia revista o en un repositorio externo especializado en archivo de datos como https://riunet.upv.es/, https://zenodo.org/ o similares), y la descripción de ése conjunto de datos (qué, dónde, cómo, cuándo, quién y por qué se han recogido esos datos) con las citas pertinentes incluidos en un documento en todo punto comparable a los artículos de investigación tradicionales (Candela et al., 2015; Center for Open Science, 2015; Kim, 2020; Roa-Martinez et al., 2017; Schöpfel et al., 2019).

Parece que el origen de los *data papers* puede situarse en torno a 2009/20010 cuando varias revistas lanzaron editoriales proponiendo esta nueva tipología de artículos (Candela et al., 2015; Chavan & Penev, 2011; El-Tawil & Agrawal, 2019; Machuca-Martinez, 2020; Newman & Corke, 2009; Puerta-Piñero et al., 2020; Rushby, 2015). Los *data papers* intentan superar los inconvenientes de otras formas de compartir los datos que existían anteriormente (como el incluirlos en el cuerpo de un artículo de investigación "tradicional" o como material suplementario) y permiten encontrar, acceder cómodamente y poder reutilizar datos revisados, con meta-datos completos (Candela et al., 2015; European Organization For Nuclear Research & OpenAIRE, 2013; Kim, 2020; Rico-Castro, 2019).

Para que los datos sean útiles no solo deben compartirse, sino que deben publicarse (Roa-Martinez et al., 2017) para que el compartir esté garantizado y abierto a toda la comunidad científica actual y venidera. Además, eso permite garantizar la calidad de esos datos. Esa publicación debe gozar de los mismos reconocimientos curriculares que cualquier artículo convencional o tradicional (Rico-Castro, 2019; Roa-Martinez et al., 2017) ya que, en el fondo, ha seguido los mismos procesos que cualquier otro reporte de investigación. De lo contrario, se pervierte uno de los incentivos para este tipo de artículos: conseguir reconocimiento por aportar datos valiosos para el avance de la investigación (Candela et al., 2015; Newman & Corke, 2009; Schöpfel et al., 2019). Sin esa garantía, se perderán este tipo de aportaciones que facilitan la transparencia, la reproducibilidad de la información, la validación de los resultados divulgados y la generación de nuevas investigaciones (Beugelsdijk et al., 2020; Roa-Martinez et al., 2017).

Contenidos de un *data paper*:

10. Titulo o palabras clave que contengan específicamente "*data paper*"
11. Supuestos previos y contribución de estos datos al avance científico
    a. Contexto de la investigación
    b. Objetivo de los datos o preguntas de investigación que los datos pueden ayudar a responder

    c. Valor añadido o potencial de los datos para la comunidad científica y quienes pueden ser los beneficiarios
12. Metodología de obtención o generación de datos
    a. Qué, dónde, cómo, cuándo, quién y por qué se han recogido esos datos
    b. Metodología de muestreo
    c. Instrumentos/cuestionarios/materiales usados para recoger los datos
    d. Métodos de análisis o filtrado que se proponen para los datos
13. Análisis que garanticen la calidad de los datos o las medidas (*measurements*)
14. Declaración de ética y de conflictos de interés
    a. When appropriate, informed consent from the participant or that the participant data are fully anonymized
15. Guía para el acceso (con enlace al depósito de datos), la interpretación y la reutilización de los datos o la replicación de los mismos
16. Descripción estructurada del conjunto de datos
    a. Formato
    b. Estructura y diccionario de datos (*data structure*)
    c. Idioma
    d. Rango de valores de cada variable
    e. Explicación de valores especiales
17. Futuras líneas de investigación usando el *data set*
18. Referencias

Algunos ejemplos de *data sets*: (Brandenburg & Hahn, 2018; Fernández-Muñoz & Topa, 2018; Marin-Garcia et al., 2021; Motilewa, 2018; Sanchez-Ruiz & Blanco, 2019)

El número de revistas que admiten *data papers* y el número de *data paper*s publicados ha crecido exponencialmente desde 2010 (Candela et al., 2015). Sin embargo, siguen siendo un tipo de publicación minoritario y la mayoría de ellos son de investigaciones relacionadas con ciencias de la salud *(health science*) o ciencia de la vida (*life science*) o física (*physical science*). Solo 9 de las revistas identificadas por Candela et al. (2015) eran de ciencias sociales y ninguna de ellas relacionada específicamente con Organización de Empresas (Management). Este hecho contrasta con la recomendación de varias revistas punteras en el área de gestión de empresas sobre la necesidad de favorecer el acceso a los datos a las personas que lo deseen y mantener ese acceso "un tiempo razonable" (Beugelsdijk et al., 2020).

Para ver la prevalencia de este tipo de artículos en las revistas indexadas en las principales bases de datos se ha realizado una búsqueda el día 28 de agosto de 2021. He aprovechado que, tanto clarivate-WOS (sintaxis (DT==("DATA PAPER")) como Scopus (sintaxis DOCTYPE ("dp")), tienen etiquetados este tipo de artículos. Aunque se debe ser consicente de que las clasificaciones de estas bases de datos no son perfectas y pueden dar lugar a falsos positivos y falsos negativos. Por ejemplo, Clrivate empezó a usar este tipo de eticqueta para los articulos a partir de 2016 (antes de esa fecha los *data papers* se etiquetaban como *articl*e).

La publicación de *data papers* no es frecuente en las revistas indexadas en WOS y se trata de un fenómeno muy reciente (Figure 10). La mayoría de los *data papers* son del área de ciencias de la salud o biomedicina y, sin lugar a dudas, la revista donde se publican con más frecuencia es "Data in Brief" (una revista con Author Procesing Charges, como la mayoría de las revistas donde se publican los data papers) (Figure 11)

Filtrando estos 10,432 resultados para centrarnos en los *data papers* de negocios o economía (Organizaciónd de Empresas no tiene area específica en WOS):

Practicamente todos los que no son falsos positivos, han sido publicados en la revista Data in Brief (Figure 12)

El panorama en SCOPUS es muy similar. No hay resultados de *data papers* antes de 2013 (Figure 13). La revista que acumula, con diferencia, la mayor de *data papers* publicados en Data in Brief (Figure 14).

Por último, ninguno de los *data papers* etiquetados como del área de "*Business*" son realmente de *business* o de *management* (los dos clasificados como tal son falsos positivos) (Figure 15)

Ventajas de los data papers

Se considera que los *data papers* son una contribución esencial para el avance científico porque aumentan la transparencia del proceso de recogida, tratamiento y análisis de los datos (siempre que se publiquen como *data paper* antes de un artículo tradicional), facilitan la reproducibilidad de resultados y permiten incrementar la visibilidad de los data sets, su calidad accesibilidad, preservación y reutilización.

Al mismo tiempo deberían presentar ventajas para los autores. Entre las más comentadas, que abre la posibilidad de extender la red de colaboradores, aumenta las citas recibidas (no solo del artículo de datos, sino de los artículos vinculados a ellos), garantiza el reconocimiento para los autores.

Conclusiones

En este artículo he propuesto un modelo para la difusión de la ciencia que puede ser adoptado por las personas que investigan en Organización de Empresas si se quiere lograr un mayor impacto y mayor transferencia de los resultados de la investigación. La intención es ayudar a que se comprenda cómo la investigación puede conectar con la sociedad, con profesionales y con las instituciones; y fomentar que evalúe y se tomen mejores decisiones acerca de cómo la investigación realizada llega a la sociedad en general (fuera del mundo académico).

He justificado con citas recientes que el modelo encaja con los modelos más actuales de cómo hacer y difundir ciencias. De este modo, WPOM se alinea con las recomendaciones de varias revistas punteras en el área de gestión de empresas sobre la necesidad de favorecer una ciencia transparente, accesible, replicable (Beugelsdijk et al., 2020). Y, además, va un paso más allá pues una de las formas de cumplir con esta sugerencia es contar con revistas en el área que no solo admitan, sino que impulsen la publicación de protocolos y *data papers* y WPOM quiere ser la pionera en este campo.

Como parte central del modelo, dentro del paso 2, se plantea un proceso de publicación en tres etapas, cada una de las cuales da origen a un mérito de investigación citable y reconocible como tal ante organismos evaluadores de producción científica. Puesto que dos de esas etapas son prácticamente desconocidas en Organización de Empresas, he definido con detalle qué es y qué contenidos tiene un *protocol paper* y un *data paper*. Además, he proporcionado ejemplos de ambos y de los otros pasos del modelo de difusión de la ciencia.

Además, he explorado la posible prevalencia de los *protocol paper* y los *data paper* dentro del conjunto de todos los artículos publicados en revistas indexadas en Clarivate Web Of Science y Scopus. En este sentido, los protocolos son tan raros que ni siquiera son un "*document type*" en Scopus ni en clarivate (ver anexo). Pero parece que existen protocolos publicados con frecuencia desde el año 2000 (probablemente sea un concepto más maduro que los artículos de datos).

Soy consciente de que la propuesta planteada tiene sus inconvenientes para las personas a cargo de la investigación. Alguno de ellos, como el hecho de que publicar previamente los *protocol papers* y los *data papers* hace muy complicado que se puedan "cocinar" los datos o los resultados, son un efecto colateral positivo para la ciencia. También puede considerarse como una pérdida de tiempo (sobre todo si los organismos evaluadores o la comunidad científica pasan a considerar estas aportaciones como aportaciones menores o insignificantes). En mi opinión, escribir *protocol papers* o *data papers* no es una pérdida de tiempo, es un tiempo invertido que luego vas a recuperar en todo el proceso de realizar la investigación. No sólo vas a hacer una investigación más rigurosa y robusta, sino que, en conjunto, vas a ahorrar tiempo porque el equipo investigador trabajará más centrado, con menos distracciones y sabiendo en cada momento qué es lo que se tiene que hacer. Todo ello, además, está justificado y no vas a tener sorpresas al final.

Sin embargo, pueden existir barreras reales para la difusión de los *protocol papers* y los *data papers* (Candela et al., 2015). De hecho, algunas de ellas deben estar ya actuando e impidiendo que haya más contribuciones de este tipo publicadas. Una de las más negativas es que pueden generar un colectivo de investigadores carroñeros, que se dediquen a fagocitar proyectos de investigación, copiando ideas y llevándolas a cabo en tiempo récord, sin tener que invertir tiempo en el desarrollo inicial, sin atribuir, ni hacer partícipes a las personas creadoras originales. Desde mi punto de vista, las ventajas para fomentar la transparencia y replicación de la ciencia superan con creces cualquiera de los inconvenientes manifestados. Una de las razones es que la publicación actúa como diario de laboratorio y permite identificar el origen de las ideas y, al mismo tiempo, ayuda a detectar conductas poco éticas de investigadores carroñeros. Esto debería permitir poder tomar acciones al respecto. Pero todo esto serviría de muy poco si publicar este tipo de artículos carece de incentivos para sus autoras-es (Candela et al., 2015)

Annex

Document types covered in clarivate (WOS)

Source: http://webofscience.help.clarivate.com/Content/document-types.html (28 august 2021)

Article: Reports of research on new and original works that are considered citable. Includes research papers, brief communications, technical notes, chronologies, full papers, and case reports (presented like full papers) that were published in a journal and/or presented at a symposium or conference. Articles usually include author abstract, graphs, tables, and lists of cited references.

Art Exhibit Review: Reviews of gallery or museum showings of artworks, crafts, manuscripts, memorabilia, artifacts, or collections of sorts.

Bibliography: A list, often with descriptive or critical notes, of writings relating to a particular subject.

Biographical-Item: Obituaries or articles focusing on the life of an individual, and articles that are tributes to or commemorations of an individual.

Book: A monograph or publication written on a specific topic.

Book Chapter: A monograph or publication written on a specific topic within a main division in a book.

Book Review: A critical appraisal of a book (often reflecting a reviewer's personal opinion or recommendation) that evaluates such aspects as organization and writing style, possible market appeal, and cultural, political, or literary significance. The book being reviewed is processed as the source title. The reviewer is processed as the author.

Correction: Correction of errors found in articles that were previously published and which have been made known after that article was published. Includes additions and errata. Retraction Items were processed as corrections prior to 2016. A correction title will include the citation to the article being corrected.

Dance Performance Review: Reviews of solo dance recitals, complete dance productions, dance programs consisting of several works, and other types of performed dances.

Data Paper: A scholarly publication describing a particular dataset or collection of datasets and usually published in the form of a peer-reviewed article in a scholarly journal. The main purpose of a data paper is to provide facts about the data (metadata, such as data collection, access, features etc.) rather than analysis and research in support of the data, as found in a conventional research article. A Data Paper will have a dual document type: Article; Data Paper. Prior to 2016, a Data Paper was processed as an Article only.

Database Review: A critical appraisal of a database, often reflecting a reviewer's personal opinion or recommendation. Refers to a structured collection of records or data that is stored in a computer system.

Early Access: An article that has been electronically published by a journal before it has been assigned to a specific volume and issue. An Early Access article will have a dual document type that will include the document type assigned and Early Access: Article; Early Access. When the article is later indexed from the issue, it is updated with the volume, issue, date, page information and the Early Access document type is removed. The processing of Early Access articles began in December 2017. Only journals that have been onboarded for early access contain Early Access articles.

Editorial Material: An article that gives the opinions of a person, group, or organization. Includes commentaries (depending on the content), editorials, interviews, discussions between individuals, post-paper discussions, round table symposia, conference summary, research highlights, introduction, preface and conclusion.

Excerpt: A selection from or a fragment of a literary or musical work, which cannot stand as a separate work in its own right (that is not a short story from a collection of stories or a poem from a book of poems).

Fiction, Creative Prose Includes short stories and other works (non-poetry) classified as creative writing rather than objective reporting of events or a scholarly presentation of facts.

Film Review: A review of a motion picture.

Hardware Review: A critical appraisal of computer hardware, often reflecting a reviewer's personal opinion or recommendation. Refers to objects that you can actually touch, like disk drives, keyboards, printers.

Letter: Brief Contributions or correspondence from the readers to the journal editor concerning previously published material. Includes “Readers Write”, “Questions and Answers”, “Letters to the Editor” and “Comments”.

Meeting Abstract: An abstract or extended abstract of completed papers that were or will be presented at a symposium or conference.

Meeting Summary: A paper that covers multiple meeting abstracts in a variety of subjects.

Music Performance Review: Review of a live musical performance (recital, concert, and opera).

Music Score: Transcript of the original and entire draft of a musical composition or an arrangement with the parts for the different instruments or voices written on staffs one above another.

Music Score Review: Review of a bound musical composition or bound collection of musical compositions.

News Item: News, current events, and recent developments usually unauthored and less than a page long.

Poetry: Compositions in verse; metrical writing.

Proceedings Paper: Full papers in a wide range of disciplines that were or will be presented at a symposium or meeting. The papers to be included must have been presented in full at a conference, meeting, symposium or similar gathering. Generally published in a book of conference proceedings. Records covered in the two Conference Proceedings indexes (CPCI-S and CPCI-SSH) are identified as Proceedings Paper. However, the same records covered in the three indexes (SCI-E, SSCI, and A&HCI) are identified as Article when published in a journal. Proceedings papers will have a dual document type: Article; Proceedings paper.

Record Review: Reviews of recorded music or speech.

Reprint: An article that was previously published. Reprinted information is included in the source title and the original article is cited.

Retracted Publication: An article that has been withdrawn by an author, institution, editor, or a publisher because of errors or unsubstantiated data. The Retracted Article will have a dual document type: Article; Retracted Publication was created in 2016 and will only be assigned if a retraction notice is published.

Retraction: A public notice that an article should be withdrawn because of errors or unsubstantiated data. Prior to 2016, retractions were processed as corrections. The original article information is included in the title of the retraction item and the original article is cited.

Review: Detailed, critical surveys of published research. A review article may summarize previously published studies and draw some conclusions but will not present new information on the subject. Includes Reviews, Review of Literature, Mini-reviews, and Systematic reviews. If an article is listed under the review section in a journal and/or Review of Literature appears in the title it will be assigned a review. If an article is not assigned a review by the journal but Review, Systematic Review or Mini-review appears in the title, it must also appear someplace else in the article (abstract/summary or introduction) in order to be assigned the document type review.

Script: Includes film scripts, plays, TV, and radio scripts.

Software Review: A critical appraisal of computer software, often reflecting a reviewer's personal opinion or recommendation. Refers to programs, procedures, and rules, along with associated documentation pertaining to the operation of a computer system.

Theater Review: Review of a performed play.

TV Review, Radio Review: Reviews of television, videos, and radio broadcasts.

Document types covered in Scopus

Source: content coverage guide (28 August 2021) (https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi2zqyHiNbyAhXMz4UKHQU9ATUQFnoECAQQAQ&url=https%3A%2F%2Fwww.elsevier.com%2F__data%2Fassets%2Fpdf_file%2F0007%2F69451%2FScopus_ContentCoverage_Guide_WEB.pdf&usg=AOvVaw13XP_0axvPN_v3Q2oyYCXO) and https://www.ilovephd.com/list-of-document-types-covered-in-scopus/

1. Article: The article is original research or opinion. Articles in peer-reviewed journals are usually several pages in length, most often subdivided into sections: abstract, introduction, materials & methods, results, conclusions, discussion and references. However, case reports, technical and research notes and short communications are also considered to be articles and may be as short as one page in length. Articles in trade journals are typically shorter than in peer-reviewed journals, and may also be as brief as one page in length.

2. Article-in-Press (AiP) : Article-in-Press (AiP) is the accepted article made available online before the official publication.

3. Book: A whole monograph or the entire book. Book type is assigned to the whole. Additionally, for books with individual chapters, each chapter, along with a general item summarizing the book, is also indexed with the source type Book.

4. Chapter: A book chapter is a complete chapter in a book or book series volume where the item is identified as a chapter by a heading or section indicator.

5. Conference paper: A conference paper is an original article reporting data presented at a conference or symposium. Conference papers are of any length reporting data from a conference, with the exception of conference abstracts. Conference papers may range in length and content from full papers and published conference summaries to short items as short as one page in length.

6. Data paper: Data papers are searchable metadata documents describing an online accessible dataset or group of datasets. The intent of a data paper is to offer descriptive information on the related dataset(s) focusing on data collection, distinguishing features, access, and potential reuse rather than information on data processing and analysis.

7. Editorial: Editorial is a summary of several articles or provides editorial opinions or news. Editorials are typically identified as editorial, introduction, leading article, preface or foreword, and are usually listed at the beginning of the table of contents.

8. Erratum: Erratum is a report of an error, correction or retraction of a previously published paper. Errata are short items citing errors in, corrections to, or retractions of a previously published article in the same journal to which a citation is provided.

9. Letter: Letter to or correspondence with the editor. Letters are individual letters or replies. Each individual letter or reply is processed as a single item.

10. Note: Note, discussion or commentary. Notes are short items that are not readily suited to other item types. They may or may not share characteristics of other item types, such as author, affiliation and references. Discussions and commentaries that follow an article are defined as notes and considered to be items in their own right. Notes also include questions and answers, as well as comments on other (often translated) articles. In trade journals, notes are generally shorter than half a page in length.

11. Retracted article: Published articles that the author(s) or publisher has requested to retract. Articles with a published retraction note will be updated to the document type “Retracted.” Usually, these articles are indicated with the words retracted or retraction.

12. Review: A significant review of original research also includes conference papers. Reviews typically have an extensive bibliography. Educational items that review specific issues within the literature are also

considered to be reviews. As non-original articles, reviews lack the most typical sections of original articles such as materials & methods and results.

13. Short survey : Short or mini-review of original research. Short surveys are similar to reviews, but usually are shorter (not more than a few pages) and with a less extensive bibliography.

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