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Editorial

What Is a Technological Article?

O Que É um Artigo Tecnológico?

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A TECHNOLOGICAL ARTICLE IS A SCIENTIFIC ARTICLE

In 2017, I wrote an editorial for the *Journal of Contemporary Administration* (RAC) (Motta, 2017), which contributed to advancing my thoughts on technological articles. After the publication, I received many more invitations from graduate programs, associations, scientific events, and the Brazilian agency Capes to discuss technological production, particularly technological articles. This experience highlighted two things for me: (a) after five years, it is time to update the thoughts I had in 2017; (b) being unfamiliar with this type of study is the main barrier for people to produce technological articles.

Thus, I am writing the following lines to invite you to a new reflection on what a technological article is. However, it is important to recognize that, strictly speaking, a technological article is a scientific article and is not worse or better than a traditional one. Depending on the audience, it may be more or less relevant, but not worse or better.

A technological article emphasizes practical contributions – in the case of administration, contribution mainly for managers and entrepreneurs. My reflection here is aligned with Bispo's (2022) assumption that theory and practice are interdependent. Fisher (2022) wrote an editorial categorizing articles published in the leading practitioner-focused journal *Business Horizons* into three types: (a) past orientation: articles that translate academic research into practical and valuable insights and applications for practitioners, as observed in the article by Pearce and Patel (2022); (b) present orientation: studies that detail the companies' challenges and seek solutions by applying existing academic theory (e.g., Anderson, 2022); and (c) future orientation: articles focusing on emerging phenomena and providing practical, theoretically sound, and forward-looking perspectives on possible business applications, as done by Standaert et al. (2022).

Fisher's (2022) categories are not exhaustive nor mutually exclusive and point to the interdependence between theory and practice alerted by Bispo (2022). Therefore, every technological article is a scientific article that proposes a relevant practical contribution.

Against this background, why are researchers unfamiliar with producing technological articles? Academic programs (called *stricto sensu* programs in Brazil) require some things that do not usually have systematic teaching. How many researchers were formally taught to read, write, and evaluate scientific articles? How many are taught about the editorial process?

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Actions to fill this gap are unusual. Researchers learn through trial and error, a practice that tends to reproduce established patterns. Thus, academic masters and doctoral programs count on well-established patterns helping professors to guide graduate students. However, the situation in professional graduate programs is different. In areas such as business administration, the faculty has many doubts about the concept of technology and how it is produced. In this case, anyone involved in the process of producing scientific articles is muddling through.

In this editorial, I will advance in my reflections on what is a technological article. Before that, it is essential to build basic concepts for technological research, technological production, technological publication, and technological articles, establishing their differences. The following section addresses this issue.

A TECHNOLOGICAL ARTICLE EMERGES FROM A TECHNOLOGICAL RESEARCH

It is possible to represent the four concepts using set theory, as shown in Figure 1.

Technological research refers to all scientific research (carried out with the same scientific method rigor as any other research) that is use-oriented. It aims to elaborate, design, develop, or create solutions to problems. Technological production is the set of possible results of a given process of technological research. Thus, technological production is the final part of technological research. The technological publication is any form of dissemination of the technological production process' specific outcome. In other words, it is the dissemination of technological products. And the technological article is a specific type of technological publication.

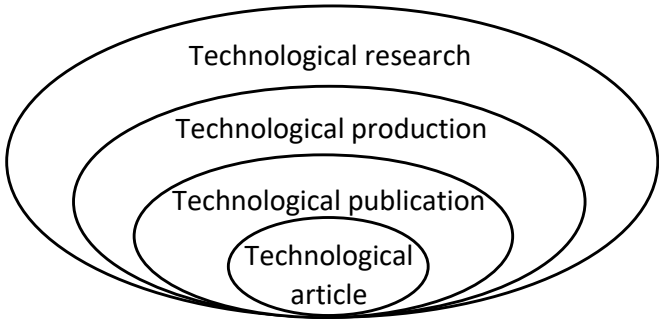

Figure 1. Conceptual representation.

Thus, the technological article is contained in the technological publication (i.e., it is one of many possibilities). The technological publication, in turn, is contained in technological production (it is a choice made afterward since one can choose for non-disclosure). And, finally, technological production is contained in technological research; it is a possibility emerging from the research conducted.

SO, WHAT IS A TECHNOLOGICAL ARTICLE?

Therefore, the technological article is one of the possible products that aims to disseminate the results of use-oriented scientific research. Figure 2 helps to understand this dynamic.

Figure 2 shows four publication formats and a flow to help understand the concepts presented here. Two of these formats are already well known to researchers and administration students: traditional scientific articles and teaching cases. The other two formats are technical and technological articles. For a complete comprehension of technological articles, it is essential to offer a concept for the former – this will be provided later in this editorial. Before that, Figure 2 allows us to see that technological articles must meet four criteria, discussed in the following section: (1) use orientation, (2) focus on problem-solving, (3) novelty, and (4) academic audience.

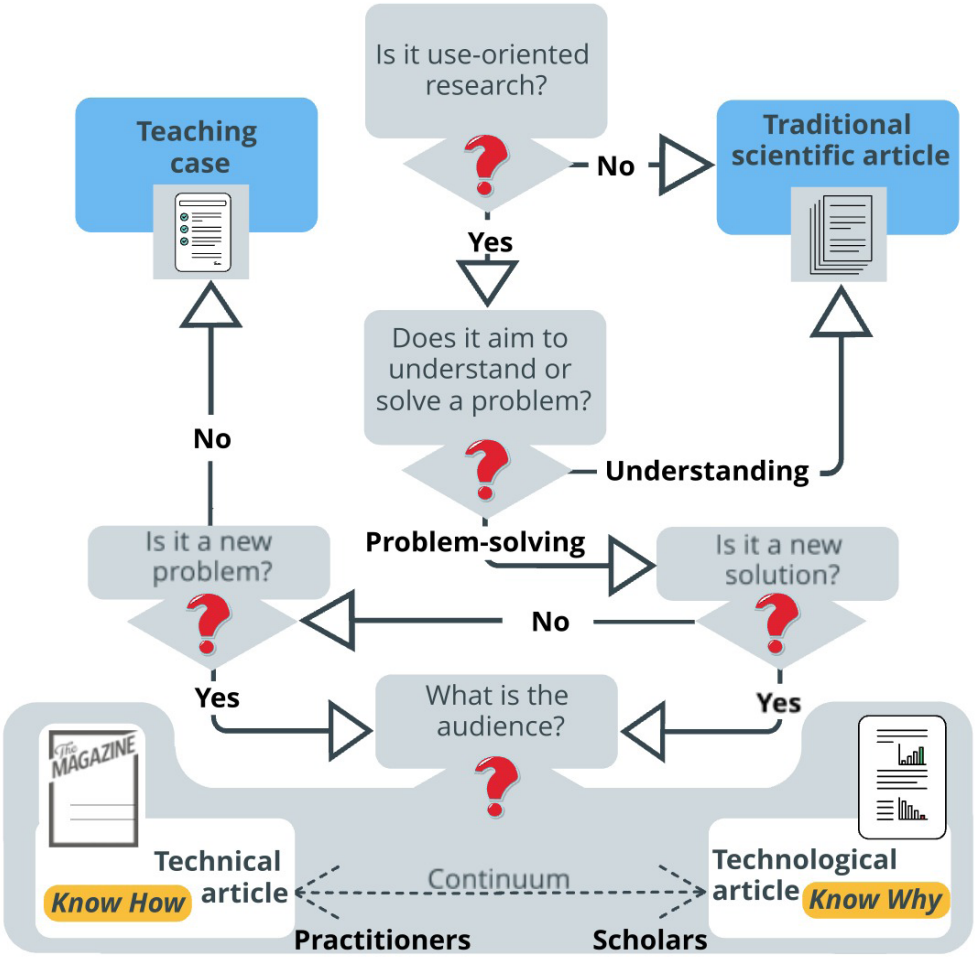

Figure 2. Flowchart.

THE CRITERIA FOR A TECHNOLOGICAL ARTICLE

The first criterion is that a technological article is the product of use-oriented research. The tendency to oppose basic and applied research is quite common, advocating that the technological article should be an outcome of applied research. However, my premise is that basic research can also be use-oriented, such as the Pasteur quadrant characterized by Donald Stokes (2005). In this case, defining 'use-oriented' as a criterion is a more inclusive measure. Therefore, non-use-oriented research leads to traditional scientific articles, whereas use-oriented research should be assessed considering the second criterion.

The second criterion is that a technological article must focus on problem-solving, and basic or applied use-oriented research may emphasize understanding phenomena. When use-oriented research does not pursue problem-solving, it must be addressed through traditional scientific articles.

After identifying that an article addresses use-oriented research and aims at problem-solving, the third criterion is related to novelty. The technological article must offer new solutions to known problems or apply known solutions to new problems, as discussed in Motta (2017).

Considering these three first criteria, it is worth reinforcing that opposing technological and scientific articles is inappropriate. However, the opposition between technological and traditional scientific articles is possible in administration, considering 'traditional' as the hegemonic paradigm of research focused on understanding (description, explanation, and, in some cases, prediction) of phenomena.

The difference between academic and professional productions lies in the approach. Professional productions, such as technological articles, must have a predominant problem-solving approach. Therefore, their audience encompasses professors, researchers, and practitioners.

In this context, the fourth criterion refers to the target audience, which is an element that may generate some confusion. It is common to identify an expectation that an audience of practitioners would be the target of productions elaborated according to scientific standards. However, this is a misconception that increases the tension in the relationship between academia and the market.

Academia requires a certain level of argumentation and writing standards to publish scientific papers that often alienate an audience of practitioners. A solid theoretical framework and detailed methodological procedures, requisites in academic writing, are elements that may scare off administration practitioners who have not gone through a scientific initiation process and are not in the habit of reading. It is unreasonable to believe this audience would feel encouraged to access such material.

Notwithstanding, it is important to clarify that this distance from scientific reading is not a failure of academia and is related to cultural issues. Practitioners from different areas, such as medicine and engineering, do not face the same barriers in scientific reading and, therefore, require less (or do not require) more direct forms of communication.

Thus, the target audience for technological articles is formed by scholars, which does not mean, under any circumstances, that its format should remain the same as the traditional format of scientific articles. However, those who want to reach an audience of practitioners should seek a journalistic and non-scientific format of communication, which I am calling 'technical articles,' such as those published in trade journals and daily newspapers.

Thus, there are different levels of technological products to disseminate knowledge from scientific research focused on problem-solving. Some journals are positioned at different points of the continuum observed in Figure 2 according to the format of their publications, some closer to what I call technical articles, others to technological articles. Table 1 highlights the main differences between technical articles and technological articles.

Table 1. Differences between a technical and a technological article.

	Technical article	Technological article
Target-audience	Practitioners	Scholars
Objective of the audience	Learning how to solve problems	Understanding the elements that generate technology

At one end of the continuum (also seen in Figure 2) are technical articles whose audience is predominantly practitioners. Their goal is to learn practical ways to solve problems. At the other end are the technological articles, with an audience of scholars and the goal of understanding the knowledge involved in the technology development process.

As the field of administration is much larger outside academia, managerial technologies should have more space (Bartunek, 2008). That is why I believe it is important to differentiate – even if only at the first moment – professional or technological products from traditional scientific products, even when they are aimed at the same target audience. Thus, the technological article is a document that is 'halfway' between an academic paper (traditional scientific article) and a document designed for practitioners (technical article).

There is a basic differentiation between technique and technology. Technique is related to knowing how to solve a problem and is, therefore, directly associated with the practitioner. Technology, on the other hand, is related to understanding 'why' or understanding the knowledge that led to the development of that product. Thus, technique is the procedure or the set of procedures that aim to obtain a specific outcome. Technology, on the other hand, is the scientific thought or discourse about techniques.

In this sense, technique does not intend to comprehend the world but helps and expands human capabilities and practices that can change it. Thus, it is perfectly possible to achieve a technical product from intellectual activity based on the scientific method. For example, let us imagine the elaboration of instructions for a production process. An operator using these instructions (manual, flowchart, scheme, or any other model) does not immediately acquire the knowledge explored during the development of that technology. The product the operator uses is technical, with material guidelines that allow them to use it but do not give access to the complete knowledge around that result.

The technical product is enough for practitioners but not for scholars. Scientifically, knowledge needs to be valid and reliable. It is necessary to describe the scientific bases and the methodological procedures adopted to achieve a

result. The knowledge has to be submitted to peer review and contributes to global scientific and technological development.

Therefore, the *Journal of Contemporary Administration* (RAC) considers that 'technological articles' are the most appropriate nomenclature in the field of administration. Keep in mind that it is possible to have a technical product as a result of scientific activity. However, this technical product alone cannot be scientifically evaluated.

The characteristics of the administration in Brazil mentioned in this editorial are corroborated by much of the worldwide literature. However, the cultural aspects of each location influence the relationship between academia and the market. International journals with a high impact factor become the primary references, as they tend to attract the most relevant research and researchers. Thus, based on some of the leading publishers in the field (Elsevier, John Wiley & Sons, Emerald, and Springer), it is possible to identify that the most used terminologies for technological publications are:

. Practitioner-oriented articles;

. Application-driven articles;

. Technical articles;

. Business articles.

The term 'practitioner-oriented articles' is the most used and, together with 'application-driven articles,' refers to documents with scientific characteristics. These two terms are equivalent to the concept of technological articles presented in this editorial. In most cases, they are documents published in practitioner-oriented journals, i.e., focused on a specific professional market. They differ from commercial journals as they maintain editorial standards that ensure the reliability of the content published. They also differ from traditional scientific journals as they are more oriented to the articles' practical implications. The terms 'technical articles' and 'business articles' are related to the definition of technical articles. They are quite different from the stylistics of academic writing, with a use closer to journalistic writing.

Thus, the section of technological articles at RAC aims to publish scientifically based documents with solid practical orientation for managers, entrepreneurs, and management professors. The journal wants to build a bridge uniting theory and academic research and their practical use, generating solutions to real-world opportunities and challenges.

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