
Classifying the Breadth of Knowledge Management Frameworks: towards the conjunctive category

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Abstract

This study aims to analyze Knowledge Management frameworks and categorize them based on their specification breadth. A total of 27 frameworks, selected from the temporal spectrum spanning 1995 to 2016 and representative of the field of Knowledge Management, were examined using content analysis. This research employs a qualitative, exploratory, descriptive, and bibliographic approach. Among the 27 frameworks examined, 12 were identified as descriptive, while 15 exhibited hybrid characteristics. Additionally, existing typologies lack sufficient detail for successful replication. Consequently, it is imperative to develop structures underpinned by a conjunctive approach. Such structures should provide both a comprehensive overview and detailed prescriptions of the “what,” “why,” “who,” “how,” and “when” aspects of implementing and operationalizing Knowledge Management. The prevalence of hybrid frameworks is notable within the examined set, highlighting the need for an integrated approach that combines breadth and depth. Organizations require a sufficiently comprehensive and detailed roadmap to implement Knowledge Management effectively. This analysis expands upon prior research concerning the classification of Knowledge Management frameworks and introduces a novel and anticipated approach to classifying specification breadth.

Keywords: Knowledge management; Frameworks; Descriptive; Prescriptive; Hybrid; Conjunctive

1 Introduction

Within a production context, two individuals observe the same scenario: a manufacturing plant where physical inputs undergo processing on a conveyor belt to assemble a specific product. Their focus is driven by the shared goal of reducing assembly time. Despite both individuals looking at the same scene, their views are inherently subjective. While one concentrates on refining the conveyor system, the other envisions pre-assembling certain inputs before they even reach the conveyor belt. These differing perspectives stem from their intellectual backgrounds, consisting of past experiences, information, and insights that comprise the intertwined knowledge within each individual's mind. This reservoir of knowledge can be harnessed to streamline the assembly process and achieve the desired reduction in time.

This brief context underscores the corporate imperative to foster Knowledge Management (KM), as the advancement of businesses hinges on the knowledge held by their associates. Simultaneously, KM, as a facet of Information Science, presents itself as both practical and theoretical. It offers a pragmatic approach and endeavors to establish frameworks that effectively translate into organizational practice. A framework serves as an abstraction of reality, facilitating the clear expression of a phenomenon and its interconnections. Hence, it functions as a valuable schematic representation for promoting this form of management while considering its constituent relationships (Corrêa et al. 2021).

Nevertheless, it is important to highlight that there exists a significant proliferation of KM frameworks, as “[...] there is no generally accepted for KM” (Fteimi 2015, 1-2). This has prompted researchers such as Holsapple and Joshi (1999), Rubenstein-Montano (2001), Heisig (2009), Fteimi and Franz (2018), and Harb and Abu-Shanab (2020) to engage in the task of classifying these structures in order to grasp the landscape of this management domain. In common, these classifications, fundamentally forged in information science, explore the specification breadth nature of frameworks, with “descriptive,” “prescriptive,” and “hybrid” assigned as classification types.

Descriptive frameworks are those that characterize or describe the elements that make up KM, such as strategy and people management (Corrêa et al. 2021). The spectrum of framework

specifications can be broad or specific to some elements (Holsapple; Joshi, 1999). Moreover, the prescriptive kind establishes procedures (tasks) to promote this management but does not present specific details of how they should be carried out (Holsapple; Joshi, 1999). For Rubenstein-Montano et al. (2001), prescriptive frameworks neglect specification of elements due to focusing on tasks, while descriptive frameworks do not express a consensus on the elements that should be considered.

The hybrid nature for the classification of KM frameworks was pointed out by Rubenstein-Montano et al. (2001) as an approach to address the weaknesses of the preceding ones. For Heisig (2009), hybrid frameworks are a combination of the previous ones that should establish how things should be done (Weber, 2002). Furthermore, Fteimi (2015) assigns that a prescriptive framework can be broad or specific, as established for descriptives. Ziviani, Corrêa and Muylder (2018) thus synthesize these natures.

[...] the descriptive model characterizes or describes the elements of KM, while the prescriptive one establishes tasks without specific details of how they can or should be performed; both can be broad or specific. The hybrid type incorporates the two previous classifications and indicates ‘how things should be done’ [...]; however, it assumes the weaknesses of both. (Ziviani; Corrêa; Muylder, 2018, 11).

Considering these classifications, Fteimi (2015) highlighted a limitation in the presented classification framework, specifically in its reliance on a limited number of studies for its development. Fteimi noted that “[...] future research can test its applicability by considering further literature on specific KM topics and domains” (Fteimi 2015, 12). Given the dedicated efforts of these researchers and the foundational principle of science in fostering cumulative knowledge, this study aims to scrutinize KM frameworks and their positioning based on their classification nature with respect to specification breadth.

The objective of this research is to analyze and categorize KM frameworks based on their classification nature regarding specification breadth, supporting the development of a novel approach. This study seeks to identify and address the gaps in existing typologies by proposing a conjunctive approach that integrates both descriptive and prescriptive elements. Consequently, it

is expected to enable organizations to manage and utilize their knowledge resources more effectively by offering a more integrated and practical framework.

The findings of this research are elucidated in this article, structured into the following sections. Alongside this introduction, the subsequent section delineates the methodological procedures employed for its execution. Subsequently, these procedures are applied, and the resulting outcomes are elaborated. Moving forward, a comprehensive discussion of the findings is presented, culminating in the conclusion. Finally, the references that have informed this investigation are provided, thus concluding the article.

2 Methodological procedures

Aligned with the objective of analyzing Knowledge Management frameworks to situating them within their classification context, this research qualifies as qualitative, exploratory, descriptive, and bibliographical. Qualitative because it is based on understanding the phenomenon by interpretive means, not making use of mathematization for this purpose. This approach is "[...] commonly used in Social Sciences, and its fundamental characteristic is the appreciation of the subjective and variant (not absolute) aspects of the problem" (Barros; Vital, 2019, 10), being related to what is proposed by this research.

The exploratory nature of this research stems from its aim to establish a heightened familiarity with the phenomenon. This approach is substantiated by the endeavor to comprehend the intricate essence of frameworks, encompassing the descriptive, prescriptive, and hybrid classifications. Thus, "[...] exploratory research is justified when the interest is to deepen preliminary concepts" (Fossa et al. 2020, 302), that is, to understand nuances of the phenomenon under investigation better. Descriptive for exposing and articulating the findings and, therefore, "[...] it raises and describes characteristics of the research object" (Café; Barros 2018, 309).

Additionally, the research adopts a bibliographical approach, drawing from "[...] source documents already published by other people" (Café; Barros 2018, 309). In this sense, the frameworks to be analyzed consist of 27 structures, dated from 1995 to 2016, selected by the

temporal spectrum and/or representation in the field of KM, namely: 1) Nonaka and Takeuchi (Corrêa et al., 2019c); 2) Davenport and Prusak (1998); 3) Teixeira Filho (2000); 4) Futami (Corrêa et al., 2019b); 5) Federal Data Processing Service – SERPRO (Ziviani et al., 2019); 6) Probst, Raub and Romhardt (2002); 7) Bukowitz and Williams (Corrêa et al., 2020a); 8) Angeloni (Corrêa; Ziviani, 2019); 9) Costa (Corrêa et al., 2020b); 10) Hanashiro (Corrêa; Batista; Ferreira, 2020); 11) Terra (Corrêa et al., 2019d); 12) Cajueiro (Corrêa; Lima; Tolentino, 2020); 13) Petrobras (Balceiro; Antônio 2010); 14) Pereira, Skrobot and Danielsson (2010); 15) Batista (2012); 16) Tuamsuk, Phabu and Vongprasert (Correa et al., 2020c); 17) Rojas, Bermudez and Morales (Corrêa; Ziviani; Carvalho, 2019b); 18) Castillo and Cazarini (2014); 19) Mutuwa and Maiga (Corrêa; Ziviani; Carvalho, 2019a); 20) Pons, Pérez, Stiven and Quintero (Corrêa et al., 2022); 21) Fivaz and Pretorius (Corrêa, 2020); 22) Piraquive, García and Crespo (2015); 23) TransCelerate (Corrêa; Pinheiro; Cardoso, 2020); 24) Bem, Coelho and Dandolini (2016); 25) Sánchez and Ponjuán Dante (2016); 26) Moscoso-Zea et al. (Corrêa et al., 2021) and; 27) Farías, Mercado and Gonzáles (Corrêa et al., 2019a).

Content analysis is employed to analyze these frameworks. According to Bardin (1997, 42), this method promotes the “[...] analysis of communications aiming to obtain, by procedures, systematic and objective description of the content of the messages, indicators (quantitative or not) that allow the inference of knowledge”. Thus, concerning the specification breadth nature, the registration units (Bardin, 1977) are assumed to be closed, being descriptive, prescriptive, or hybrid, and considering that these are mutually exclusive. Thus, the frameworks are interpreted through a complete reading of the literature mentioned earlier in order to understand and indicate their nature.

In essence, the procedure is to subject the aforementioned frameworks to content analysis, enabling the examination of their classificatory nature concerning the breadth of their specifications and deepen knowledge about these structures. Thus, describing the findings contributes to Fteimi (2015) further research and with the theme of KM, especially regarding the classification of the specification breadth.

3 Results

Among the structures analyzed, the organizational environment of KM framework applications stands out, such as SERPRO (Ziviani et al., 2019), Petrobrás (Balceiro; Antônio, 2010) and TransCelerate (Corrêa; Pinheiro; Cardoso, 2020). Just as specified before, frameworks categorized as descriptive comprise structures that describe elements to be considered in KM, which may consider a single element or several of them. In this sense, Teixeira Filho (2000) proposal broadly describes KM but represents it from a descriptive and specifically technological perspective and, therefore, is characterized as descriptive. In the SERPRO instance, the framework is supported by policies and guidelines to be applied by each organizational unit. Consequently, the specification does not establish “how” to implement such policies; therefore, the framework is classified as descriptive.

The descriptive nature also applies to Terra (Corrêa et al., 2019d) framework of seven dimensions, Pereira, Skrobot and Danielsson (2010, 220) for “[...] presenting the conceptual bases for a corporate model of Knowledge Management”, and Tuamsuk, Phabu and Vongprasert (Correa et al., 2020c), which does not present a sequence of process execution. Rojas, Bermudez and Morales (Corrêa; Ziviani; Carvalho, 2019b) strictly describe the elements of KM, focusing on technology, without prescribing actions for its implementation; while Mutuwa and Maiga (Corrêa; Ziviani; Carvalho, 2019a) discuss the dimensions that make up this management, limiting themselves to positioning them in an archetype, being an imperative representation of the descriptive type. Angeloni (Corrêa; Ziviani, 2019) work consists of a collection of texts that discuss the elements of KM and is limited to the essential description of their relationships without emphasizing how to accomplish it.

In Bem, Coelho and Dandolini (2016), three constructs that interact with each other and affect the whole are expressed, but the interactions exposed in the model have a descriptive intent; they describe how the relationship between the elements. The framework description by Sánchez and Ponjuán Dante (2016) highlights the elements to be considered in virtual learning. It has a strictly descriptive characteristic, similar to the proposal by Farías, Mercado and Gonzáles (Corrêa et al., 2019a). Likewise, Moscoso-Zea et al. (Corrêa et al., 2021) articulate how Business

Intelligence and enterprise architecture technologies can be helpful in knowledge discovery, so categorically descriptive.

On the other hand, the frameworks of Nonaka and Takeuchi (Corrêa et al., 2019c) and Davenport and Prusak (1998) are presented as hybrids. They explain an archetype with the constituent elements and explain actions to promote it without any details. This same characterization applies to the frameworks of Futami (Corrêa et al., 2019b), Probst, Raub and Romhardt (2002), Bukowitz and Williams (Corrêa et al., 2020a), Costa (Corrêa et al., 2020b), and Hanashiro (Corrêa; Batista; Ferreira, 2020). Cajueiro (Corrêa; Lima; Tolentino, 2020) describes the elements of strategy, structure, people, and processes in the context of private educational institutions and points out steps for conducting the framework, which characterizes it as a hybrid. Likewise, the Petrobras framework (Balceiro; Antônio 2010) describes some elements of KM and prescribes procedures for its implementation.

Batista (2012) framework aims to guide public organizations in the KM implementation, granting the construction of a plan for this management as the central point. In essence, it does not establish specific tools but a mix of them, in some cases, and the need for reflection on how to accomplish its intent in other cases. By first describing the elements of KM and, further, prescribing them in order to demonstrate how to promote the implementation of this management in an organization, this characterizes it as a hybrid.

Castillo and Cazarini (2014) broadly described the elements of KM (descriptive) and prescribed procedures (prescriptive), showing the hybridity of the structure. Pons, Pérez, Stiven and Quintero (Corrêa et al., 2022) promote an unfolding of Nonaka and Takeuchi (Corrêa et al., 2019c) Socialization, Externalization, Combination, and Internalization into activities (tasks), characterizing it as a hybrid. Piraquive, García and Crespo (2015) framework is a reduced approach to KM in the context of project management and prescribes some actions, such as the role of senior management regarding infrastructure, being hybrid, as well as the proposals of Fivaz and Pretorius (Corrêa, 2020) and TransCelerate (Corrêa; Pinheiro; Cardoso, 2020). In short, Table 1 consolidates the natures of these frameworks regarding the specification breadth.

Table 1 - Specification breadth classification of Knowledge Management frameworks

| Year | Framework Authors | Source | D | P | H |
|------|----------------------------------|--|---|---|---|
| 1995 | Nonaka and Takeuchi | Corrêa et al. (2019c) | | | X |
| 1998 | Davenport and Prusak | Davenport and Prusak (1998) | | | X |
| 2000 | Teixeira Filho | Teixeira Filho (2000) | X | | |
| 2001 | Futami | Corrêa et al. (2019b) | | | X |
| 2001 | SERPRO | Ziviani et al. (2019) | X | | |
| 2002 | Probst, Raub and Romhardt | Probst, Raub and Romhardt (2002) | | | X |
| 2002 | Bukowitz and Williams | Corrêa et al. (2020a) | | | X |
| 2002 | Angeloni | Corrêa and Ziviani (2019) | X | | |
| 2005 | Costa | Corrêa et al. (2020b) | | | X |
| 2005 | Hanashiro | Corrêa, Batista and Ferreira (2020) | | | X |
| 2005 | Terra | Corrêa et al. (2019d) | X | | |
| 2008 | Cajueiro | Corrêa, Lima and Tolentino (2020) | | | X |
| 2010 | Petrobrás | Balceiro and Antônio (2010) | | | X |
| 2010 | Pereira, Skrobot and Danielsson | Pereira, Skrobot and Danielsson (2010) | X | | |
| 2012 | Batista | Batista (2012) | | | X |
| 2013 | Tuamsuk, Phabu and Vongprasert | Correa et al. (2020c) | X | | |
| 2013 | Rojas, Bermudez and Morales | Corrêa, Ziviani and Carvalho (2019b) | X | | |
| 2014 | Castillo and Cazarini | Castillo and Cazarini (2014) | | | X |
| 2014 | Mutuwa and Maiga | Corrêa, Ziviani and Carvalho (2019a) | X | | |
| 2014 | Pons, Pérez, Stiven and Quintero | Corrêa et al. (2022) | | | X |
| 2015 | Fivaz and Pretorius | Corrêa (2020) | | | X |
| 2015 | Piraquive, García and Crespo | Piraquive, García and Crespo (2015) | | | X |
| 2016 | TransCelerate | Corrêa, Pinheiro and Cardoso (2020) | | | X |
| 2016 | Bem, Coelho and Dandolini | Bem, Coelho and Dandolini (2016) | X | | |
| 2016 | Sánchez and Ponjuán Dante | Sánchez and Ponjuán Dante (2016) | X | | |
| 2016 | Moscoso-Zea et al. | Corrêa et al. (2021) | X | | |
| 2016 | Fariás, Mercado and Gonzáles | Corrêa et al. (2019a) | X | | |

Titles: D: Descriptive; P: Prescriptive; H: Hybrid

Source: The authors. Belo Horizonte (2023).

Each structure has a uniqueness and can be specific as to the elements they address, such as the technological perspective expressed in Teixeira Filho (2000), Rojas, Bermudez and Morales (Corrêa; Ziviani; Carvalho, 2019b), and Moscoso-Zea et al. (Corrêa et al., 2021), or broad about such elements, as expressed in Davenport and Prusak (1998) and TransCelerate (Corrêa; Pinheiro; Cardoso, 2020). Their extent differs in prescription, as some are borderline, such as Pons, Pérez,

CORRÊA, Fábio; CARVALHO, Dárlinton Barbosa Feres; FARIA, Vinícius Figueiredo de; ZIAVIANI, Fabrício; RIBEIRO, Jurema Suely de Araújo Nery. Classifying the Breadth of Knowledge Management Frameworks: towards the conjunctive category. *Brazilian Journal of Information Science: research trends*, vol.18, publicação contínua, 2024, e024026. DOI: 10.36311/1981-1640.2024.v18.e024026.

Stiven and Quintero (Corrêa et al., 2022), while others have a higher prescription, such as Castillo and Cazarini (2014), but both are not detailed enough.

4 Discussion

Of the 27 analyzed frameworks, 12 fall into the descriptive category, while the remaining 15 are classified as hybrid. Descriptive frameworks characterize or describe the elements that make up KM (Corrêa et al., 2021). As an example, the structures of Angeloni (Corrêa and Ziviani, 2019), Terra (Corrêa et al., 2019d), and Farías, Mercado and Gonzáles (Corrêa et al., 2019a) articulate the elements of this management without establishing how to promote them in practice. Commonly, such articulations use schematic representations to highlight what must be considered in this management and are limited to describing its elements.

Hybrid frameworks, in turn, express the elements to be considered in the KM and describe them, such as in the descriptive nature, but also prescribe how to operationalize them (Holsapple; Joshi, 1999). In this sense, hybrids move from representation to operationalization, although not being thoroughly detailed. An example is the framework of Castillo and Cazarini (2014), which, from a visual perspective, articulates stages of a process on how to promote KM, but without providing details. The recommended initial step is to diagnose the internal environment, evaluating the “[...] organizational elements (business strategy, culture, structure, intellectual capital, current partnerships, resources, processes and other activities) relevant to KM” (Castillo; Cazarini, 2014, 156). Although this step is pre-established, the detailed statement of how to accomplish it is not unveiled.

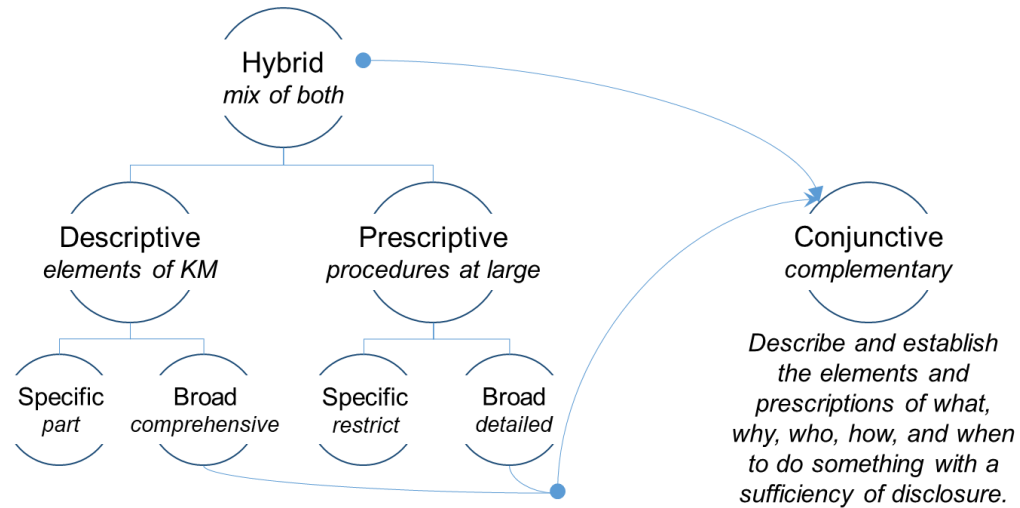
Still, none of the analyzed frameworks solely belong to the prescriptive nature. No structure that discusses how to carry out KM without first describing its elements was found among the analyzed frameworks. An example of a framework of this nature is Tom Beckman, published in 1997, as presented by Holsapple and Joshi (1999). In this way, the hybrid nature is settled as an approach to overcome the weaknesses of the previous ones (Rubenstein-Montano et al., 2001), being a combination of descriptive and prescriptive (Heisig, 2009) that should establish how to perform KM (Weber, 2002).

However, a gap remains. Considering the descriptive and prescriptive natures can be broad or specific (Fteimi, 2015) and the hybrid emerges as an approach to solve their weaknesses (Rubenstein-Montano et al., 2001), the analyzed hybrid frameworks still lack better specification since “how” things should be done are presented at large. The lack of sufficiency of disclosure requires additional definitions of the framework instances to put KM into operation. Thus, KM frameworks that fill this gap in such a way to highlight structural elements besides thoroughly operationalizing were not found.

A way to fill this gap in frameworks specification is to employ tools and techniques from other sciences, such as administration. For example, Davenport and Prusak (1998), Bukowitz and Williams (Corrêa et al., 2020a), Terra (Corrêa et al., 2019d) articulate the need to promote the alignment of KM with organizational strategy, but they do not establish how to accomplish it. In turn, Balceiro and Antônio (2010) defend the same perspective at Petrobrás and point to applying the tool Strengths, Weaknesses, Opportunities and Threats (SWOT) inherent to the science of administration. The appointment of a tool makes the operationalization of this alignment more feasible for implementation by others, showing an advance in terms of the hybrid nature. However, this must be presented in all procedures (tasks) for KM, which does not occur in Balceiro and Antônio (2010), since they do not consider organizational culture in their framework.

Thus, the identified gap in the specification of KM frameworks also reveals a limitation within the existing classification scheme, given that this scheme was formulated based on pre-existing frameworks. Accordingly, acknowledging this gap suggests the conception of a new type for classification required to assign frameworks with a sufficiency of disclosure. This classification nature, called conjunctive, expects that the specification of KM framework must be broadly descriptive, elucidating the elements of KM, and broadly prescriptive to elucidate “how” such procedures could, or should, be performed in practice. Thus, a conjunctive framework assumes the potential of the previous ones and eliminates gaps present in them, as shown in Figure 1.

Figure 1 - Conjunctive nature characterization for a specification breadth classification



Source: The authors, based on Holsapple and Joshi (1999), Rubenstein-Montano et al. (2001), Weber (2002), Heisig (2009), Fteimi (2015) and Ziviani, Corrêa and Muylder (2018).

The conjunctive type is based on complementarity, with the absorption of the potential of other types and treating their deficiencies by filling the specification gap. A conjunctive framework aims to promote a new perspective to be contemplated in KM by presenting a broad description and sufficiently detailed prescription of “what,” “why,” “who,” “how,” and “when” to do something to implement and operationalize KM in an organization. To clarify the nuances of these classification types, Table 2 expresses their characteristics.

Table 2 - Categories of specification breadth classification for KM Frameworks

| Category | Guidance | Action | Gap | Author |
|---------------|--|--|---|---|
| Descriptive | Characterize or describe. | Describe the main elements, broadly or specifically. | It can be specific and is limited to the essential description of the relationships without emphasizing how to do them. | Holsapple and Joshi (1999) |
| Prescriptive | Establish procedures. | Contemplate the procedures for promoting KM without detailing. They can be specific or broad. | It does not inform (detail) how such procedures can or should be performed. | Holsapple and Joshi (1999) Fteimi (2015) |
| Hybrid | Describe and establish procedures for “how things should be done”. | Summation composition of descriptive and prescriptive categories. | It combines the gaps from the previous categories, which can be specific or broad, and, although it regards “how things should be done,” such procedures are detailed at large. | Rubenstein-Montano et al. (2001), Weber (2002), and |
| Heisig (2009) | | | | |

Source The authors, adapted from Ziviani, Corrêa and Muyllder (2018, p. 12).

While the descriptive nature characterizes the main elements of KM as a whole (broadly) or in part (strictly), this definition still leaves the gap on how to implement actions to operationalize them. This gap of the descriptive nature is filled by the prescriptive category, which elucidates procedures (tasks) to promote this management; however, without specific details on how the procedures could, or should, be performed, even if such prescriptions are broad or restricted. In both cases, the gaps reveal the incompleteness of the specifications, making it difficult to put these frameworks operational in practice.

The lack of specific detailing of the procedures inherent to the prescriptive nature is a gap not necessarily filled by the hybrid nature since it just sums up the two previous ones – descriptive and prescriptive – maintaining the essential properties that constitute them. Therefore, the frameworks analyzed by the studies by Holsapple and Joshi (1999), Rubenstein-Montano et al. (2001), Heisig (2009), and Fteimi (2015) and by this research tend to present gaps regarding the

previous natures, even if these are of the hybrid type, attributing relevance to the conjunctive nature.

5 Conclusion

Driven by the intention to analyze KM frameworks to position them according to their classification nature concerning specification breadth, this research conducted a comprehensive assessment of 27 prominent structures spanning the years from 1995 to 2016. The prescriptive nature was not specifically found; however, it is present in the hybrid nature, as it mixes the prescriptive and descriptive natures. However, the hybrid assumes the weaknesses of its predecessors, not necessarily revealing details of how to promote KM.

KM is a practical and theoretical theme, acknowledged as a discipline of information science, which includes using tools from many disciplines since this kind of management is grounded in the context of organizations. The theory must advance to foster the specification of KM frameworks with a sufficiency of disclosure so that others can apply it in organizational practice. A thorough specification can be accomplished by detailing the use of tools and techniques, for instance, from other disciplines like administration. Therefore, a conjunctive nature for KM frameworks specification is required to fulfill the gaps of the other classificatory natures towards an approach that expresses a broad description and sufficiently detailed prescription of “what,” “why,” “who,” “how,” and “when” to do something to implement and operationalize KM in an organization.

The frameworks analyzed in this research express several nuances of KM and already outline associated processes and tasks. In the meantime, this research contributes to these structures evolution since it promotes a classification and explains the general modus operandi of their application, identifying gaps in their specification. Besides, it raises awareness of a new nature to be considered in classifying frameworks in this theme. Thus, the adjustment of existing frameworks and the proposal of a new one with a sufficiency of disclosure, supported by the conjunctive nature, are suggestions for future research.

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