FROM ANALOG TO ALGORITHM: a comprehensive review of Artificial Intelligence's intersection with Management Literature and Actor-Network Theory

Wellington Rodrigo Monteiro (1), Eduardo Ayrosa (2)

(1) Universidade Positivo, Brasil, wmonteiro@outlook.com

(2) eduardo.ayrosa@up.edu.br

Abstract

In the digital age, the current Management literature remains heavily rooted in anthropocentric and analog perspectives, often overlooking the profound influence of algorithms and artificial intelligence (AI) in modern organizational dynamics. To this end, this systematic literature review seeks to bridge this gap by exploring the evolving landscape of AI in organizations and the role of the Actor-Network Theory (ANT) as a theoretical-methodological lens for understanding AI's impact on Management. Through a systematic literature review, we address research on the utilization of AI in Management over the past decade, the applications of ANT in non-IT or non-AI management studies, and studies explaining IT or AI concepts via ANT. Our findings highlight a significant research gap in understanding human-machine interactions and Business Management within organizations that use AI. Additionally, we identify potential avenues for future scholarly contributions, emphasizing the need for a more integrated approach that considers human and machine actors in organizational contexts.

Keywords: Artificial Intelligence; Actor-network Theory; Data Science; Management; Systematic Literature Review.

MONTEIRO, Wellington Rodrigo; AYROSA, Eduardo. From Analog to Algorithm: a comprehensive review of Artificial Intelligence's intersection with Management Literature and Actor-Network Theory. *Brazilian Journal of Information Science: Research trends*. vol. 18, publicação contínua, 2024, e024013. DOI: 10.36311/1981-1640.2024.v18.e024013.

Resumo

Na era digital, a literatura atual sobre Administração continua fortemente enraizada em perspectivas antropocêntricas e analógicas, muitas vezes negligenciando a profunda influência dos algoritmos e da inteligência artificial (IA) na dinâmica organizacional moderna. Para isso, esta revisão sistemática de literatura procura preencher essa lacuna ao explorar o cenário em evolução da IA nas organizações e o papel da Teoria Ator-Rede (ANT) como uma lente teórico-metodológica para entender o impacto da IA na Administração. Por meio de uma revisão sistemática da literatura, abordamos pesquisas sobre a utilização da IA na Administração na última década, as aplicações da ANT em estudos de gestão que não sejam de TI ou de IA e estudos que expliquem conceitos de TI ou IA por meio da ANT. Nossas descobertas destacam uma lacuna de pesquisa significativa na compreensão das interações homem-máquina e da Gestão de Negócios em organizações que usam IA. Além disso, identificamos possíveis caminhos para futuras contribuições acadêmicas, enfatizando a necessidade de uma abordagem mais integrada que considere os atores humanos e mecânicos em contextos organizacionais.

Palavras-chave: Inteligência Artificial; Teoria Ator-Rede; Ciência de Dados; Administração; Revisão Sistemática de Literatura.

1 Introduction

There is a mismatch between the predominantly analog and anthropocentric management literature and the digital reality of managers permeated by algorithms. The literature on Management and Strategy commonly treats the organization as a structure mostly comprised of people working in different departments, areas, and teams. These people have different backgrounds, training, skills, experiences, and seniorities. According to this literature, organizations are characterized by rational assumptions of suppliers, competitors, processes, environments, and hierarchies that are also made up of people and for people.

The literature aimed at executives contributes decisively to creating the archetype of the executive manager as a human being in his thirties overloaded with work meetings, solving management problems on a laptop inside the airport while waiting to board another business trip as his coffee cools. These organizations would, therefore, be led by young, experienced, and competent executives who make decisions that can be costly, relying mainly on their brains and instincts. The above description fits an organization from the 1990s or, barring a few minor adjustments (such as the laptop or the airport), from the end of the 19th century.

That said, the literature that forms the basis of these books and courses is rooted in concepts and theories from an era that has somehow passed – or is passing. Thus, managers of organizations

in an era of automation, data, and digitization are trained based on theories incompatible with this new reality composed of artificial intelligence (AI) algorithms.

These algorithms are commonly trained to generate accurate predictions for applications throughout the industry. Said algorithms are increasingly important to human lives, such as deciding whether a loan should be approved, predicting employee turnover, being used in predictive maintenance applications, and forecasting financial outcomes. The emergence of AI in practice within organizations causes profound changes in Management (Raisch & Krakowski, 2021). In the past, the domain knowledge owned by managers gave them expert power and status in organizations – however, AI supersedes it with institutionalized knowledge, leading to institutional action and change (Raisch & Krakowski, 2021).

In fact, Raisch and Krakowski (2021) points out an urgent need for Management scholars to be more involved in the research and adoption of AI in organizations. AI systems are reshaping and reconfiguring human-machine interactions and challenging human-centric notions (Borch, 2023).

Despite this urgency, Füller, Hutter, Wahl, Bilgram, and Tekic (2022) notes a gap for future research to study the role of human-machine interaction in Management. Also, Sarlak, Salamzadeh, and Farzad (2020) point out that there is a need to plan how AI can be managed within organizations, and ANT may be a promising approach to achieve that.

Actor-Network Theory (ANT) proposes that non-humans (which includes algorithms) are also endowed with the capacity to act. Data scientists, technology managers, and other managers constitute, together with their organization's AI algorithms, a machine that desires what it does not yet possess: to predict the future. This desire drives the development of algorithms with better accuracy than their previous versions, even though the current world has greater unpredictability in its relationships compared to the past. It makes data scientists test, learn, and implement new algorithms, techniques, and technical frameworks.

Therefore, this review aims to address the following questions:

a) What are the primary research documents (e.g., scientific articles and books) in Management that deal with using AI in Organizations within the last ten years?

b) What are the leading research documents (e.g., scientific articles and books) that make use of ANT in areas other than IT or AI and that have been published in the last ten years but that are related to management studies and have concepts, trends, or opportunities that can be applied to these areas?

c) What are the main pieces of research (such as scientific articles and books) that contribute to explaining IT or AI concepts based on ANT that have been published in the last ten years?

d) What gaps have been identified in this research that could be addressed as future scientific contributions?

Therefore, the purpose of these research questions is to understand the current research opportunities and challenges on the study of AI in Organizations through the theoretical-methodological lens of ANT.

2 Details and Methodology

This section contains information on the methodology adopted in the systematic literature review. The methodology used in this document is that of Kitchenham and Charters (Kitchenham & Charters, 2007). This methodology is commonly used in Software Engineering research due to its particularities, such as the fact that much of the empirical data in this area is proprietary; there are numerous research methods in the area, and there is less empirical research in this area compared to Medicine, the area that gave rise to systematic reviews (Kitchenham & Charters, 2007). Although this review does not belong to the research of an exclusive Software Engineering or Information Technology (IT) research, its context is IT and AI: areas in which experiments are primarily affected by the human factor and in which concepts such as randomized clinical trials or blind tests do not exist (Kitchenham & Charters, 2007).

The review focused on highly reputable international bibliographic databases for Management and Technology research: Scopus and Web of Science. As this systematic literature review aims to understand the recent studies that can be referenced in this document, as well as the practices and challenges encountered by these studies that are of interest to this research, the data synthesis stage uses techniques such as keyword analysis, analysis of research over the last ten years, and maps representing the places that produce the most research that is of interest to this review.

3 Execution

The research process is characterized by a manual search for dissertations, theses, books, and articles published in scientific journals or conference proceedings in the last ten years (i.e., from 2013 onwards). Considering their relevance, the databases used in the research are Clarivate Web of Science (WoS) and Scopus by Elsevier.

For all databases, we searched for articles or books published since January 1st, 2013, containing the following terms in the title, abstract, or keywords: “Actor-Network Theory”; “Actor-Network Theory” and (“Artificial Intelligence” or “Machine Learning”); “Actor-Network Theory” and (“Information Technology” or “Algorithm”); “Algorithms” and “Organizations.”

When permitted by the database search engine, we also aimed to use fuzzy search techniques. For example, instead of “algorithm,” the term “algorith*” can return variations of this term such as “algorithms,” “algorithmic,” and “algorithmically.”

Furthermore, the following types of results were removed in this review:

a) Scientific articles without peer review.

b) After the first selection of studies, when the number of results found is too high: keywords belonging to groups unrelated to the research context according to the co-occurrence analysis.

After applying the inclusion and exclusion criteria, the co-occurrence of keywords in the selected documents is analyzed using the VOSviewer software (Van Eck & Waltman, 2010),

which specializes in constructing and analyzing bibliometric networks. The goal is to find different groups and correlated search terms.

In addition, to understand research trends, maps and diagrams are also used to understand the locations and fields of study that produce the most relevant studies, where applicable. The remaining studies are analyzed individually to understand their relevance, observing the questions of the systematic literature review. Only the most cited documents will be analyzed according to the h-index if a search finds a high number of documents.

Finally, the data from the studies that are relevant to the review questions are included in the document either as qualitative information or within the citation data in order to provide details such as the name of the study; type of study (such as article or book); year in which it was published; and observations about the study.

Therefore, this section contains the results found from the search in each database. The Scopus and WoS databases returned results in English by default, regardless of the language adopted for each document indexed in these databases. For this reason, searches for these two databases are standardized in English.

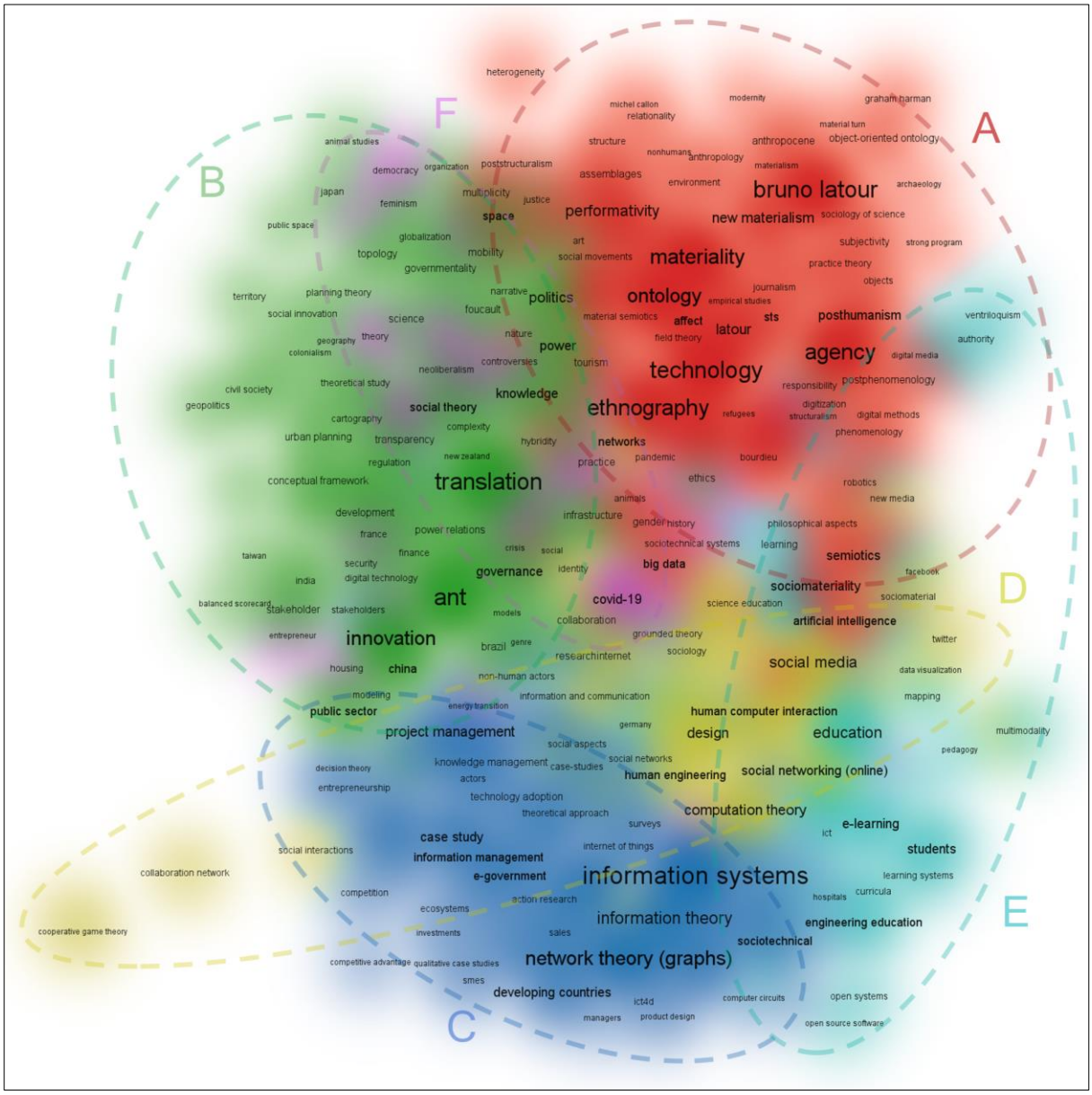
3.1 ANT

The search on the Scopus database (1) resulted in 2,442 documents, of which 1,793 (73.42%) were published in scientific journals, 321 (13.14%) as books, 191 (7.82%) in conference proceedings, and 137 (5.62%) in book series.

The visualization of the co-occurrence analysis of the keywords chosen by the author (author keywords) and the indexing of the database (index keywords) according to the VOSviewer software can be seen in Figure 3. The keyword “actor-network theory” and its variations were not included to give more detail to the other keywords. For the same reason, the keyword “social sciences computing,” which appeared very prominently in the analysis in Figure 1, has also been removed from this second visualization. The result is six large groups: the red cluster (A) highlights terms related to epistemological and ontological issues related to ANT. In addition, the authors cited among the keywords are Bruno Latour, Pierre Bourdieu, Graham Harman, and Michel

Callon. The green cluster (B) contains terms related to power narratives, public spaces, politics, and governments. The dark blue cluster (C) has terms close to IT, such as information management, information systems, information science, and network architecture.

Figure 1 - Co-occurrence analysis for ANT for the search on the Scopus database



Source: the authors

The yellow cluster (D) also has terms close to social networks and humans' use of the internet, such as social media, social interactions, Facebook, e-commerce, and virtual reality. The light blue cluster (E) has terms close to digital education, such as e-learning, learning technologies, and educational engineering. Finally, the pink cluster (F) has terms such as crisis, COVID-19, democracy, and pandemic.

Of these results, English is the predominant language, with 2,207 documents (90.38%). As for the fields of study, there is a predominance of studies published in the Social Sciences, with 1,566 documents (64.13%). As shown in Table 1, there is also research interest in Business, Management and Accounting, Computer Science, and Engineering.

Table 1 - Top 10 fields of study in terms of the number of publications on ANT in the Scopus database

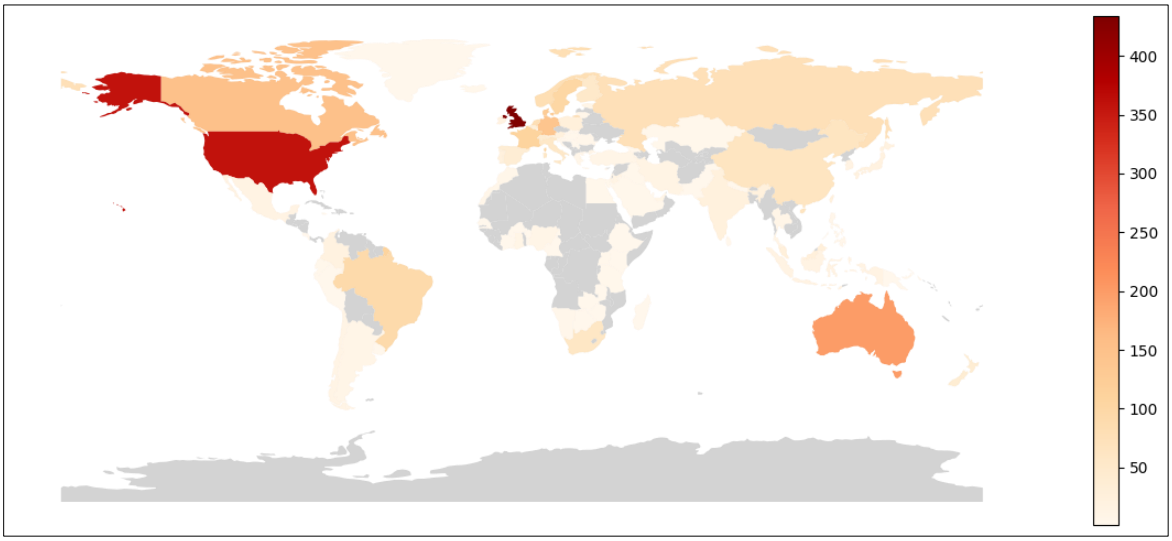
Field of Study	**Documents**
Social Sciences	1,566
Arts and Humanities	670
Business, Management, and Accounting	522
Computer Science	429
Engineering	240
Economics, Econometrics, and Finance	210
Decision Science	143
Mathematics	54
Energy	24
Multidisciplinary	14

Source: the authors

Figure 2 illustrates the production of documents by author and country. The leaders are English-speaking countries: the United Kingdom (434 entries), the United States (358 entries), Australia (200 entries) and Canada (151 entries). The list of the ten countries with the most entries continues with Germany (143 entries), Denmark (127 entries), France (110 entries), Sweden (102 entries), Brazil (93 entries) and Norway (81 entries). As with the first search, this list has more entries than documents (3,074 entries) since a document can have authors in different countries.

Of these documents, their relevance is also analyzed based on their citations. As calculated by Scopus, the h-index for this group of documents is 63 – that is, 63 documents have been cited at least 63 times. Therefore, considering the total number of documents found in the search, only these 63 documents with the most citations will be considered for the study analysis stage.

Figure 2 - Number of authors per country on ANT in the Scopus database search. Countries with no production are grayed out



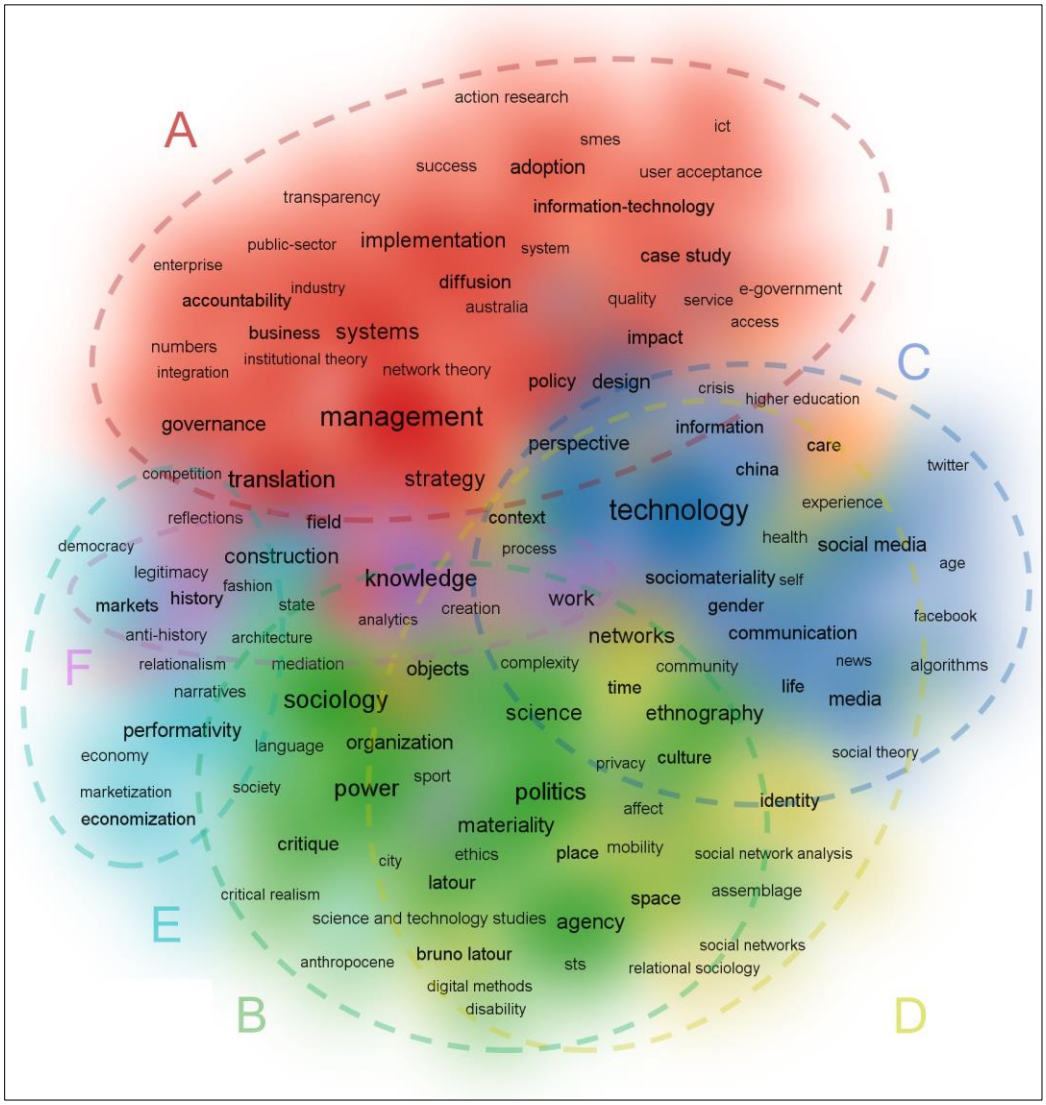
Source: the authors

As with the Scopus database, the same search was carried out on the WoS database. This search (2) resulted in 1,069 documents, of which 894 (80.26%) were published in scientific journals, 171 (16.00%) in conference proceedings, and 4 (3.74%) as book chapters.

A visualization of the co-occurrence analysis is shown in Figure 3. Six groups of keywords stand out. The red cluster (A) contains terms specific to organizations, such as “strategy,” “business,” “performance,” “management,” and “corporation.” The green cluster (B), in turn, includes sociological aspects such as “power,” “materiality,” “agency,” and “culture.” The dark blue cluster (C) includes IT-related terms such as “algorithms,” “technology,” “innovation,” “information,” and “artificial intelligence.” The yellow cluster (D), in turn, includes terms close to consumption, such as “consumers,” “experience,” “things” and “users.” The light blue cluster (E) includes terms close to the economy, such as “markets,” “competition,” and “economy.” Finally,

the pink cluster (F) includes terms such as “crisis,” “COVID-19,” “entrepreneurship,” “markets” and “uncertainty.”

Figure 3 - Co-occurrence analysis for ANT for the search on the WoS database



Source: the authors

There is still a predominance of English in this second search, with 986 documents (92.24%). In terms of fields of study, areas such as Management and Economics, Sociology, and Computer Science lead the way in terms of the number of documents, according to Table 2. There

are also areas such as Information Science and Library Science (82 documents) and Engineering (66 documents).

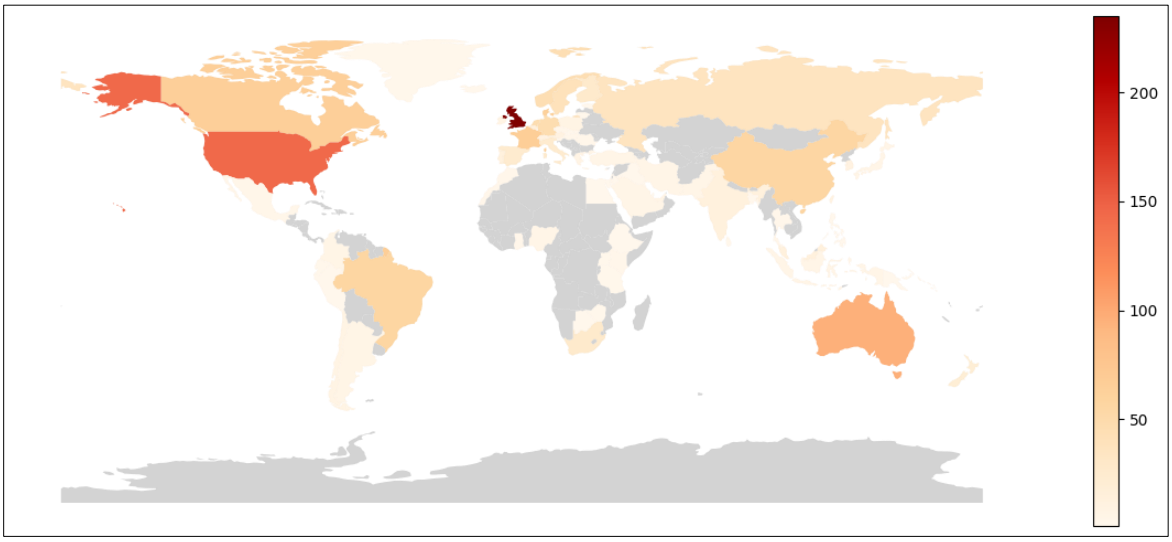
Table 2 - Top 10 fields of study in terms of the number of publications on ANT in the WoS database

Field of Study	**Documents**
Management and Economics	399
Sociology	226
Computer Science	168
Social Sciences – Other Topics	167
Communication	126
Information Science and Library Science	82
Engineering	66
Public Management	29
Government Law	25
Environmental Studies and Ecology	23

Source: the authors

As for publications by country, Figure 4 shows that English-speaking countries continue to predominate. The ten countries with the most contributions in this second search are the United Kingdom (235 entries), the United States (144 entries), Australia (96 entries), France (67 entries), Canada (65 entries), Denmark (64 entries), Brazil (57 entries), China (56 entries), the Netherlands (47 entries) and Germany (47 entries).

Figure 4 - Number of authors per country on ANT in the WoS database search. Countries with no production are grayed out



Source: the authors

Furthermore, as calculated by the WoS algorithm, the h-index of this group of documents is 47. In other words, 47 documents were cited at least 47 times. As many documents were found in the search, only these 47 documents will be considered for the analysis stage of the studies.

3.2 ANT and AI

Another search on the Scopus and WoS databases aimed to find all documents explicitly mentioning ANT and AI (or machine learning (ML)). Thus, the terms “artificial intelligence” and “machine learning” were included in the search.

Considering the Scopus database (3), 48 documents were found. Of these, 27 were published in scientific journals (56.25%), 9 in book series (18.75%), 8 in books (16.66%), and 4 in conference proceedings (8.33%). Most were written in English (42 documents, or 87.50%). The remaining documents were published in Portuguese (2 documents), Russian (2 documents), Czech (1 document), and German (1 document). Considering the areas of study, most studies are in Computer Science, Social Sciences, Arts and Humanities, and Business, Management, and Accounting.

The WoS database search (4) had returned a total of 38 documents. Of these documents, 29 were published in scientific journals (76.32%) and 9 in conference proceedings (23.68%). Concerning the language of the publications, the vast majority were in English (34 documents, or 89.47%). The remaining documents were published in Russian (2 documents), Bulgarian (1 document) and Czech (1 document).

As for the fields of study, 12 documents belong to the area of Computer Science, four to the area of Education, and three to each of the following areas: Control and Automation Systems, Management and Economics, Engineering, and Social Sciences – Other Topics. Literature and Philosophy have two documents each.

Since the number of documents found was low, all the documents found in both searches were further analyzed without relying on the h-index.

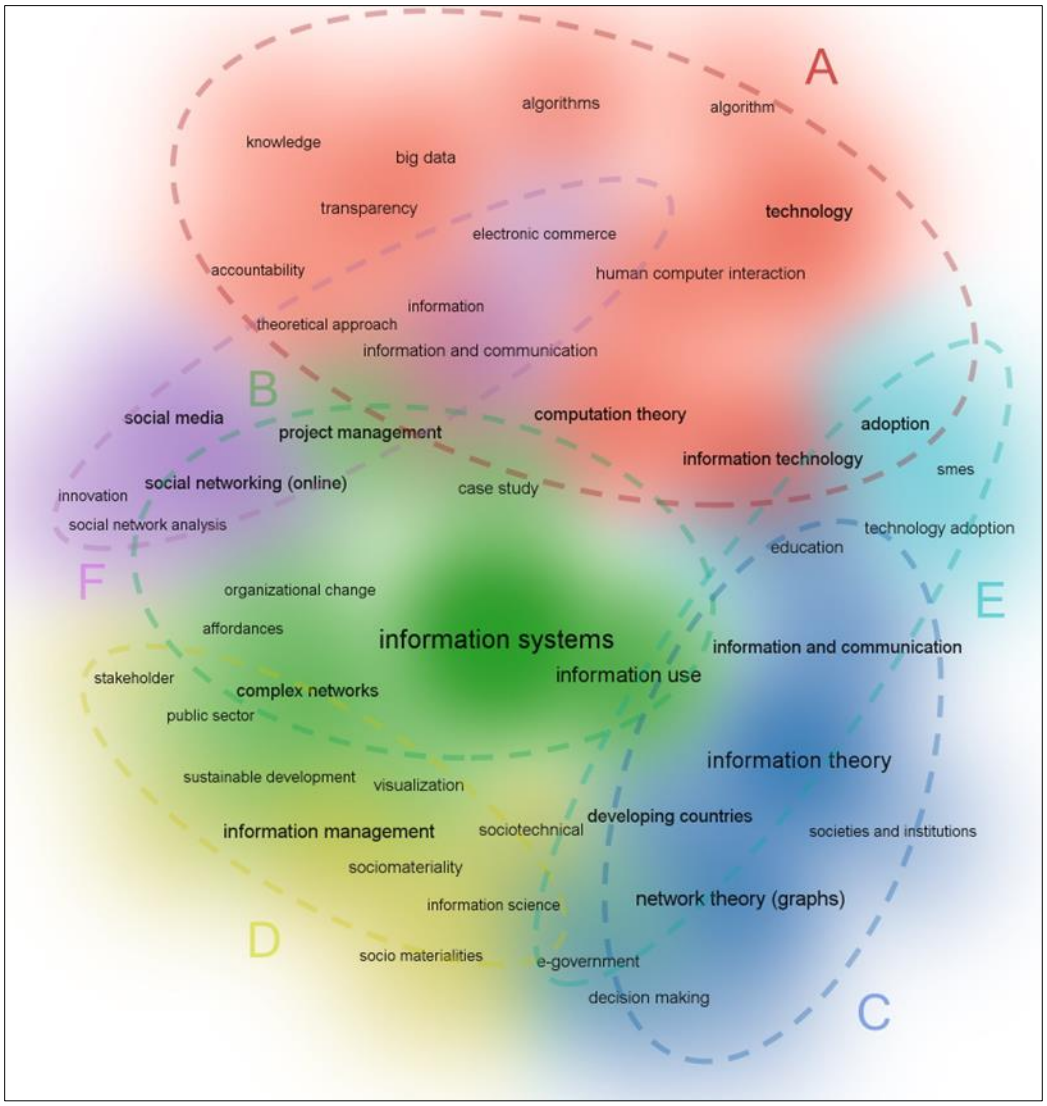
3.3 ANT and IT

As with AI, another search was conducted in both databases to find all documents containing keywords related to ANT and IT. The search terms used for IT included “algorith*,” “information technolog*,” “information theor*,” and “information system*.” Thus, 371 results were found for the Scopus database search (5). Of this group of documents, 218 (58.76%) are articles in scientific journals, 77 (20.75%) are articles published in conference proceedings, 51 (13.75%) are part of book series, and 25 (6.74%) are books.

Figure 5 illustrates the keyword co-occurrence analysis using the VOSviewer software (Van Eck & Waltman, 2010). This analysis considers the keywords chosen by the author (author keywords) and by indexing the database (index keywords). The keyword “actor-network theory” and its variations were not included to give more detail to the other keywords. The same applies to the term “social sciences computing.” The cluster in red (A) addresses keywords related to Computer Science concepts such as “algorithms,” “big data,” “human-computer interaction,” and “computer theory.” The cluster in green (B) includes items related to the discipline of Software Engineering with terms such as “project management,” “information systems,” and “case study.” The dark blue cluster (C), on the other hand, deals with the use of IT in societal applications with

terms such as “e-government,” “societies and institutions,” and “education.” The yellow cluster (D) is characterized by keywords related to the socio-technical aspect of Computing. The light blue cluster (E) addresses the implementation and dissemination of IT use with terms such as “technology adoption” and “decision-making.” Finally, the pink cluster (F) addresses terms related to people’s use of the internet by having terms such as “social media,” “e-commerce,” and “information and communication.”

Figure 5 - Co-occurrence analysis for ANT and IT for the search on the Scopus database



Source: the authors

From these results, the predominance of English is repeated with its use in 353 documents (95.15%). Regarding fields of study, Social Sciences and Computer Science share the most extensive number of published studies, with 178 documents each. The total number of documents per area exceeds 353 since a study can be in more than one area. A summary of the main fields of study is shown in Table 3.

Table 3 - Top 10 fields of study in terms of the number of publications on ANT and IT in the Scopus database

Field of Study	**Documents**
Computer Science; Social Sciences	178
Business, Management, and Accounting	84
Decision Science	64
Engineering	46
Arts and Humanities	39
Economics, Econometrics, and Finance	26
Mathematics	21
Materials Science; Energy	5
Multidisciplinary	3
Physics and Astronomy; Chemistry	2

Source: the authors

The ten countries with the most entries are the United Kingdom (53 entries), Australia (43 entries), the United States (35 entries), Brazil (27 entries), South Africa (26 entries), Canada (20 entries), France (19 entries), Germany (17 entries), Sweden (15 entries) and Denmark (12 entries). As with other searches, there are more entries (a total of 453 entries) than documents in this list because there are more authors than documents. In addition, according to the Scopus tools, the h-index for this set of documents is 31. Therefore, the 31 most cited documents will be further analyzed in more detail.

The same search also took place on the WoS database (6). This search returned 298 results. Of these, 206 are articles in scientific journals (69.12%), 91 are articles published in conference proceedings (30.54%), and 1 document is a book chapter (0.34%). In addition, 284 of these

documents were published in English (95.30%), 5 in Portuguese (1.68%), 5 in Russian (1.68%), 2 in French (0.67%), 1 in German (0.34%) and 1 in Spanish (0.34%).

Table 4 highlights the main fields of study for these documents. The main areas are Computer Science (112 documents, or 37.58%), Management and Economics (74 documents, or 24.83%), and Information Science and Library Science (66 documents, or 22.15%). According to the WoS tools, the h-index for this set of documents is 27. Therefore, considering this research's total number of documents, only 27 will be used in the analysis phase.

Table 4 - Top 10 fields of study in terms of the number of publications on ANT and IT in the WoS database

Field of Study	**Documents**
Computer Science	112
Management and Economics	74
Information Science and Library Science	66
Communication	34
Engineering	33
Sociology	26
Social Sciences – Other Topics	21
Control and Automation Systems	14
Telecommunications	14
Development Studies	6

Source: the authors

3.4 Management and AI

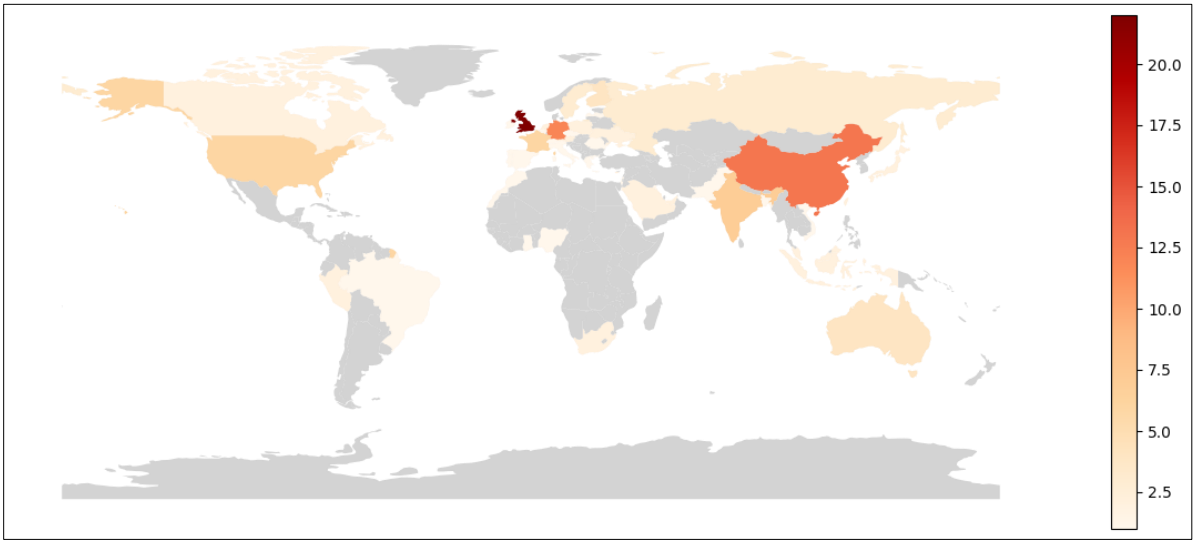
A final set of database searches were conducted to understand how AI algorithms are studied within organizations. The search, therefore, included the keyword "organization" and its variations (examples: "organization," "organizations," and "organizations") together with the keywords "artificial intelligence" or "machine learning."

As in other cases, this search was limited to books, book series, and articles published in conference proceedings or scientific journals, regardless of language. Ninety documents were found in the Scopus search (7). Of these, 72 (80.00%) are articles in scientific journals, 7 (7.78%)

are books, 7 (7.78%) are articles published in conference proceedings and 4 (4.44%) are part of book series. Once again, there was a predominance of materials produced in English, with 85 documents (94.45%). In addition, two documents were published in Spanish (2.22%), 1 in French (1.11%), 1 in German (1.11%), and 1 in Ukrainian (1.11%). There were no publications in Portuguese.

Figure 6 shows the contribution by author and country. The top ten countries are United Kingdom (22 entries), Germany (12 entries), China (10 entries), India (7 entries), France (6 entries), United States (6 entries), Finland (4 entries), Australia (4 entries), Sweden (3 entries), and Russia (3 entries). There are a total of 135 entries for the 90 documents. According to the Scopus tools, the h-index for this set of documents is 16. Therefore, the 16 most cited documents will be used to analyze the studies.

Figure 6 - Number of authors per country on Management and AI in the Scopus database search. Countries with no production are grayed out

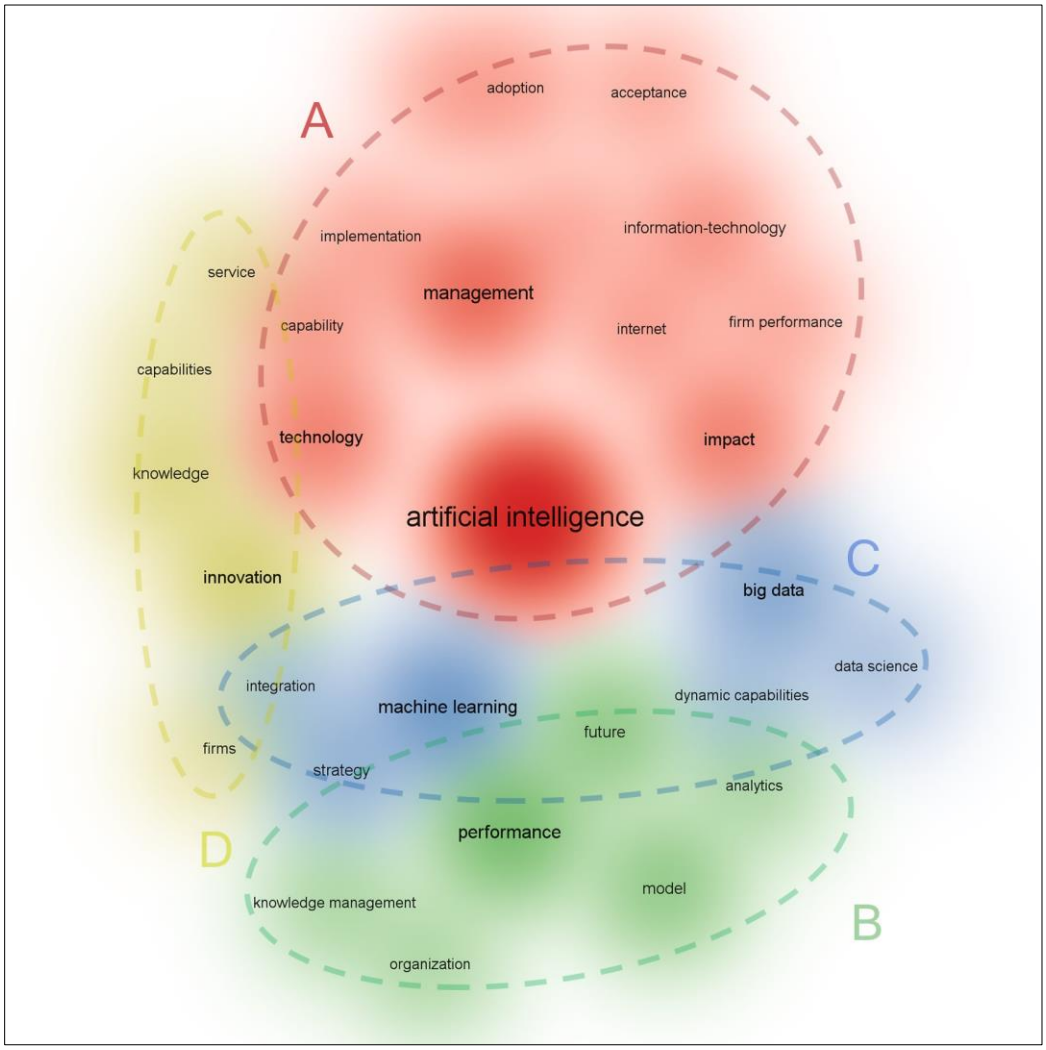


Source: the authors

On the other hand, the WoS database search (9) had returned a total of 216 documents, of which 200 were articles published in scientific journals (92.60%), and 16 were published in conference proceedings (7.40%). In addition, 215 of these documents were published in English (99.53%) and 1 in Russian (0.46%).

The co-occurrence analysis of the keywords of these documents generated with the VOSviewer software (Van Eck & Waltman, 2010) can be seen in Figure 7. A total of four groups were identified: The red cluster (A) has keywords related to Management and AI, such as "technology," "adoption," and "implementation." The green cluster (B) includes words related to data analysis in an organization, such as "knowledge management," "analytics," and "performance." The blue cluster (C) has keywords related to data areas, such as "big data," "machine learning," and "data science." Finally, the yellow cluster (D) includes keywords such as "innovation," "knowledge," and "service."

Figure 7 - Co-occurrence analysis for Management and AI for the search on the WoS database



Source: the authors

Considering the countries and out of 356 entries, 55 were from the United States, 43 from the United Kingdom, 27 from France, 21 from India, 21 from Germany, 21 from Australia, 17 from Italy, 15 from China, 10 from the Netherlands, and nine from Canada. According to the WoS tool, the h-index for this set of documents is 36. Therefore, considering this research's total number of documents, only 36 will be used in the analysis phase.

4 Study Analysis and Synthesis

The goal of this section is to investigate the relevance of the documents found in the past section to answer the questions in the systematic literature review.

4.1 AI in Organizations

Using big data and analytical intelligence solutions (such as ML and AI) in an organization is strongly related to gaining a competitive advantage over its competitors (Akhtar, Frynas, Mellahi, & Ullah, 2019). In this case, these technologies allow for expanding an organization's operations and discovering new business opportunities (Akhtar et al., 2019). For example, in manufacturing organizations, using AI algorithms brings more flexibility to strategies and reduces the risks of interruptions in the supply chain (Bag, Pretorius, Gupta, & Dwivedi, 2021). In addition, companies that offer products in a digital platform format with AI algorithms demonstrate a network effect (Gregory, Henfridsson, Kaganer, & Kyriakou, 2021). Organizations such as Uber, Google, Apple, Tesla, and Netflix are cases where consumers perceive greater value the more data they have, and the more improvements are made to these platforms through AI (Gregory et al., 2021).

The adoption of AI in organizations is not only a technological innovation but also an innovation in organizations' business models (Armour & Sako, 2020; Raisch & Krakowski, 2021). AI and disruptive technologies enable new challenges and entrants into an industry, promoting organizational strategies based on co-creation between consumers and companies (Buhalis et al., 2019). On the other hand, incumbent organizations in traditional industries also make use of the diffusion of IT techniques and AI and ML algorithms through the "digital transformation"

movement: an action that depends on the strategic renewal of an organization's business model or how collaboration takes place within it (Warner & Waeger, 2019).

On the other hand, the use of AI in organizations also poses challenges (Armour & Sako, 2020; Borch, 2023). They point out that, given the ethical challenges related to the use of AI, analysts in business areas need to be more hybrid – that is, to have technical skills in addition to their original specialization. For this reason, using AI algorithms also requires additional investment in worker training and IT infrastructure resilience (Bag et al., 2021). Despite this potential, many traditional organizations remain reluctant to invest, perpetuating a cost-cutting mentality of manufacturing organizations from the previous century (Bag et al., 2021).

From the point of view of workers (Brougham & Haar, 2018) aimed to understand their perception of the potential impact of AI and other disruptive technologies on their jobs and careers. The authors note that workers generally understand that these technologies can affect their jobs but not necessarily that there is a threat per se to their adoption in organizations.

Although some studies did not focus on AI, comparisons can be applied to this context. For example, Andersen, Danholt, Halskov, Hansen, and Lauritsen (2015) studied the participatory design process of an IT system. In participatory design, many actors exist, such as drawings, statistics, reports, and interested people. In AI, there are participants such as algorithms, databases, integration systems, and stakeholders.

In the context of Engineering, Burga and Rezania (2017) study a renovation project for a university building using ANT as a theoretical-methodological approach. Actors such as the project committee, architects, outsourced teams, and the construction are part of this network. In this study, the concept of "responsibility" was shared between the actors and understood differently. Similarly, IT projects have different actors, such as developers, managers, outsourced teams (consultancies), and systems.

In management accounting, Cooper, Ezzamel, and Qu (2017) use ANT to explore how the balanced scorecard technique has moved from a technique in this area to a general management practice. The article illustrates how this technique has become a practice over time and space and notes how management ideas and techniques are transformed and reconstructed by managers,

consultants, and scholars. Likewise, AI within organizations has been transformed, redefined, and reconstructed by technicians, managers, consultants, and scholars.

4.2 ANT in Organizations

In addition to the examples mentioned above (Burga & Rezania, 2017; Cooper et al., 2017), ANT has shown itself to be a versatile theoretical-methodological approach (Piekut, 2014) in a myriad of studies in recent years involving organizational departments or organizations in a variety of sectors. Examples include: Law (Armour & Sako, 2020); Hospitality and Customer Service (Belanche, Casalo, Flavian, & Schepers, 2020); Human Resources (Dery, Hall, Wailes, & Wiblen, 2013; Pan, Froese, Liu, Hu, & Ye, 2022; Pillai & Sivathanu, 2020); IT (Cecez-Kecmanovic, Kautz, & Abrahall, 2014; Dery et al., 2013; Elbanna, 2013; Fleming, 2019; Pollack, Costello, & Sankaran, 2013; Prado & Calani Baranauskas, 2014; Williams, 2020); Financial Governance (Campbell-Verduyn, Goguen, & Porter, 2017); Organizational Performance (Caputo, Cillo, Candelo, & Liu, 2019); Health (Greenhalgh et al., 2019; Pinto et al., 2022); Manufacturing (Kaasinen et al., 2022), and Accounting (Modell, Vinnari, & Lukka, 2017).

Among qualitative methods, ANT has also historically been combined with autoethnography in various studies on organizations (Alonso Trillo & Poliks, 2023; Bartrolí, 2021; Cecez-Kecmanovic et al., 2014). It has also been combined with ethnography in other studies (Andersen et al., 2015; Bartlett & Vavrus, 2014; Eze, Duan, & Chen, 2014; Greenhalgh et al., 2019; Lawrence & Dover, 2015; Martin & Schouten, 2014; Prado & Calani Baranauskas, 2014; Sidorova, 2018; Warner & Waeger, 2019).

The choice of ANT as a theoretical-methodological approach by different organizational studies is mainly due to its flexibility and symmetry between human and non-human actors. It is, for example, effective for developing research focusing on building models and theories (Pollack et al., 2013).

ANT also makes it possible to trace the flow of interests and the stabilization of power relations in a network of heterogeneous actors by granting the same importance at the social level to all of them – be they human or non-human (Bellanova, 2017; Prado & Calani Baranauskas,

2014). In addition, Modell et al. (2017) note that ANT can enrich the analysis of institutional change by better understanding the dynamic nature of power relationships and the changing meaning of practices.

In the case of IT projects, Dery et al. (2013) point out that the ANT enables a better understanding of the progress of implementing these projects. Martin and Schouten (2014) highlight the potential of using ANT in market dynamics studies. In addition, Flyverbom (2015) argues that he used ANT to make fuzzy concepts (such as transparency) tangible in operational and material problems. Waeraas and Nielsen (2016) have analyzed the use of ANT for organizational research and point out that its usefulness for understanding the processes of knowledge translation lies in the fact that it makes it possible to add a political dimension to mediate practices.

That said, Gunawong and Gao (2017) note that in order to exploit the benefits of this approach entirely, it is necessary to choose a case that represents the four "moments" of translation (problematization, *interéssement*, inscription, and mobilization).

Considering AI, Sarlak et al. (2020) point out that ANT can be a good guide for planning how to manage AI within organizations. In addition, van Rijmenam and Logue (2021) explore the understanding of AI agency in organizations. The authors point out that, like other technologies, AI also challenges organizational theories. More specifically, it challenges the notions of agency, structure, materiality, authorship, and intentionality. Furthermore, ANT allows for analyzing human and non-human agents in the same context without a presupposed hierarchy.

4.3 ANT and IT in Organizations

ANT has also been chosen as a theoretical-methodological approach by studies over the last ten years to analyze organizations' IT, AI, and ML cases. Borch (2023) highlights ANT's potential to analyze ML systems because it allows us to demonstrate the distribution of human agency in an actor-network with non-human actors. In addition, the development phase of new ML algorithms in an organization can also be studied as part of this same actor-network (Borch,

2023). There is also the potential of using ANT to understand the joint agency between humans and AI in organizations (Murray, Rhymer, & Sirmon, 2021).

Within the area of Financial Governance, Campbell-Verduyn et al. (2017) use ANT to understand the contrast between utopian and dystopian visions of the future of the use of big data and ML in this context. The article presents a myriad of actors, such as large financial companies, search engines, government agencies, members of civil society, credit bureau algorithms, and other credit ML algorithms.

From the point of view of Organizational Performance, Caputo et al. (2019) investigate the relationship between AI and humans to increase organizational performance. The study highlights that, prior to this research, contributions in the field of Management were focused on the opportunities and processes of AI in organizations rather than on the impact or relationships with humans in these organizations.

In industrial organizations, Kaasinen et al. (2022) used ANT to explore the interaction of teams of humans, robots, and AI in factory operations. On the other hand, Johnson and Verdicchio (2019) studied the case of emissions fraud in a German car industry to explain the agency of AI algorithms.

In the area of health, Pinto et al. (2022) used ANT to analyze the social barriers to using AI in the area of health – specifically, for the prediction of seizures. The authors point out that out of skepticism and for safety reasons, many authors prefer to use intrinsically explainable models for AI in this scenario, even though this diminishes the potential and performance of AI.

Considering IT projects, Cecez-Kecmanovic et al. (2014) used ANT to understand how the concepts of success and failure of IT projects are created and sustained in practice. This research highlighted numerous actors in an organization's IT project, such as human teams, software, IT equipment, and managers. Similarly, Sidorova (2018) used ANT to understand the relationship between computer vision ML algorithms, devices, and users.

Also, Elbanna (2013) adopted ANT to bring a more contextualized understanding of the role of support from an organization's top management in the success of IT projects – precisely,

in a scenario where multiple projects are executed simultaneously. As for small and medium-sized companies, Eze et al. (2014) studied IT adoption in these locations using ANT. The study showed that this adoption is a dynamic, interactive, and ongoing process. In the public sector, Gunawong and Gao (2017) adopted ANT to study e-government project failure in Thailand, and Missonier and Loufrani-Fedida (2014); Sperling, Stenliden, Nissen, and Heintz (2022) investigated IT and ML projects in the field of Education in France and Sweden, respectively. Both studies also adopted ANT as their theoretical-methodological approach.

Pollack et al. (2013) applied ANT to understand the implementation of an IT system for project management. The authors point out that the positive impact of this project was not only due to the software itself but also to a network of associations between researchers and users. Similarly, Prado and Calani Baranauskas (2014) used ANT to analyze the social forces involved in organizational changes when following an IT team at a public university in Brazil.

As for work within organizations, Dery et al. (2013) investigated the relationship between workers in the Human Resources area of an organization and the implementation of an IT system for this area from the perspective of the ANT. The authors point out that the ANT allows a better understanding of the progress of IT project implementations and that there is a need for non-IT scholars (in this case, Human Resources) to have more contact with the literature and contemporary concepts in this area. Pan et al. (2022); Pillai and Sivathanu (2020) analyzed the adoption of AI algorithms for hiring workers.

More broadly, Fleming (2019) addressed the discussion on the impact of robotics and AI on the future of work. The author seeks to demonstrate how organizational forces shape the application of technology to employability. Flyverbom (2015) adopted ANT to analyze the ideals of transparency in the digital domain and within organizations. In addition, Hansen and Flyverbom (2015) used the ANT to analyze the work of human actors and algorithms in producing transparency in organizations.

Studies have also sought to use ANT to understand better IT and AI interactions with humans outside of a specific organization, but rather in areas that span more than one organization. Examples include the analysis of digital mapping algorithms (Bittner, Glasze, & Turk, 2013),

border control (Andersson, 2016; Martin & Schouten, 2014), justice management (Contini, 2020), blockchains and cryptocurrencies (Islam, Mantymaki, & Turunen, 2019), health (Karmakar, 2022), digital media (Kumar & Rangaswamy, 2013), education (Sperling et al., 2022), and music (Alonso Trillo & Poliks, 2023).

5 Identified Research Gaps and Opportunities

As such, a plethora of research opportunities can be observed in the context of this systematic literature review. Borch (2023) emphasizes that seriously taking these challenges should be a critical task for sociological theory in the coming years. These opportunities include:

a) **Ethical challenges**: Armour and Sako (2020) highlighted the opportunity for future studies to address the ethical challenges of using AI in applications that directly influence people's lives, such as law.

b) **Transformative potential:** Borch (2023) notes a sociological interest in AI that has yet to be explored for its potential to transform subjectivity, organizations, and society. Also, Sarlak et al. (2020) note that in the field of Management, there needs to be more research to investigate the link between humans, AI, thoughts, values, resources, and other organizational entities. van Rijmenam and Logue (2021) note opportunities for studies in institutional theories to theorize the agency of AI, including as an actor. In addition, van Rijmenam and Logue (2021) comment that there is the potential for a revised organizational science for a coming era in which AI will be more autonomous and separate from the social, potentially behaving differently from humans.

c) **Organizational changes brought by AI**: Borch (2023) note a gap for future research to under-stand how expertise is reconfigured in areas such as Medicine or Finance, where ML systems are gaining ground and potentially challenging existing forms of specialization in these areas. In addition, Dery et al. (2013) comment that there is a need for scholars in non-technology fields (and, by extension, AI and ML)

to have more significant contact with contemporary literature and concepts in this area. Raisch and Krakowski (2021) also point out that Management studies need to be involved in the research and use of AI in organizations. The authors suggest, for example, analyzing how AI solutions change the role of managers in organizations. Previously, there was an emphasis on managers' domain knowledge, which gives them expert power and status in organizations. At a higher level, Raisch and Krakowski (2021) also suggest exploring how the emergence of AI and automation in Management leads to institutional action and change. The authors highlight that future research should study how broad networks of heterogeneous actors organize collective action to address problems related to the use of AI in Management. Borch (2023) also notes a gap for future research to understand the reshaping between human-machine interactions when machines have greater autonomy in decision-making. Lee and Bjorklund Larsen (2019) highlight that future research can show¨ how algorithms dynamically combine and reconfigure different social and material heterogeneities by analyzing the operations of connecting data and other actors with algorithms.

d) **Relationship with consumers**: Buhalis et al. (2019) highlight the opportunity for future re-search to explore how the prospecting of new technologies affects the customers who use the services and that, to a certain extent, they test these technologies for the benefit of the companies. Buhalis et al. (2019) also suggest that future studies seek to address how organizations can balance the strategies of exploitation (using the size of an organization's digital platform to test new features and create network effects) and exploration (using the popularity and familiarity of an organization's products to spread more products).

e) **Impacts of AI in different areas**: Campbell-Verduyn et al. (2017) highlight an opportunity for future research to investigate the impacts of AI algorithms and big data on other governance practices, industries, and other areas of organizational study.

f) **Governance practices and AI**: Campbell-Verduyn et al. (2017) also suggest examining the sources and systems of data ingestion for AI algorithms and the composition of the places in which algorithms and humans interact. According to the authors, this brings opportunities to understand how algorithms and the use of big data influence and transform contemporary governance practices. van Rijmenam and Logue (2021) also highlight the opportunity for future research to understand how AI algorithms make decisions to resolve conflicts and avoid uncertainty or how these algorithms change the nature of organizational design, strategy, power, and governance.

g) **Organizational performance and AI**: Caputo et al. (2019) highlight the need to investigate in depth the relationships between humans, organizational processes, and AI to make the most of the opportunities of this technology for organizational performance. Eze et al. (2014) note the possibility of examining and understanding the relationship between the advancement of IT and human actors in an organization – specifically, how actors influence and are influenced by the development of technologies for the organization's performance and competitive advantage. Gregory et al. (2021) highlight the opportunity to understand the relationship between the use of AI and the effects of data networks on the competitive advantage of organizations with platforms offering AI services. Murray et al. (2021) highlight the need for more analyses, theories, and philosophical discussions on the interface between humans and AI in organizations – especially qualitatively. Thus, the authors suggest that future studies seek to understand how the joint agency between humans and AI impacts organizational routines from a time perspective. Warner and Waeger (2019) emphasize an opportunity for future studies to explore the temporal role that digital transformation – characterized by the diffusion of IT techniques and AI and ML algorithms – plays in maintaining transient competitive advantage.

h) **Studies with multiple IT projects**: Elbanna (2013) highlight a need for more research into environments with multiple IT projects in organizations since most studies focus on a single project.

i) **Work and AI**: Fleming (2019) suggests that organizational studies contribute to broadening debates within public issues, such as the decentralization of the institution of work so that people are not so defenseless against changes in the job market brought about by the adverse effects brought about by the adoption of AI in organizations. Füller et al. (2022); Pan et al.¨ (2022) highlight a need for future research to understand better the impact and changes of AI-based innovation management on developing team competencies and capabilities. Pan et al. (2022) open up the opportunity for future research to discover which factors influence potential alienation and fear regarding using AI as a substitute for humans in organizational tasks.

j) **Management and AI:** Füller et al. (2022) also note a gap for future research to study the role of human-machine interaction in Management. Murray et al. (2021) also highlight that future studies should understand when and how AI serves as a coordination mechanism in contemporary organizations and what the suitability of these technologies would be to coordinate specific activities within an organization. Sarlak et al. (2020) note that there is a need to plan how AI can be managed within organizations, and ANT may be a promising approach to achieve that.

k) **AI autonomy**: Hansen and Flyverbom (2015) highlight the opportunity for future studies to explore the consequences for the organization when knowledge is reduced to data that "speaks for itself." Murray et al. (2021) also suggest that future studies analyze how flexibility between historical data and new situations can be inserted into AI algorithms in organizations, and what would be the ideal balance point for including contingencies and considering anomalies in algorithmic decisions.

l) **Other studies**: Although some research documents do not directly answer the questions of the systematic literature review, it does introduce the principal works and proponents of ANT, such as Bruno Latour, Michel Callon, and John Law. Examples include (Bajde, 2013; Blok, 2013; Borch, 2023; Domingo, Masip, & Costera Meijer, 2015; Frauenberger, 2019; Fuenfschilling & Binz, 2018; Iskanderov & Pautov, 2020; Law & Lien, 2013; Law & Singleton, 2013, 2014; Onno, Khan, Daftary, & David, 2023; Sayes, 2014; Shmargad, 2017; Williams, 2020).

6 Conclusions

This document presented a systematic literature review to understand the most relevant research published in the last ten years dealing with the themes of ANT, ANT and AI, ANT and IT, and Management and AI. Multiple themes were addressed because relevant research dealing with the use of AI in organizations does not necessarily employ the ANT as a theoretical-methodological approach. Similarly, research that uses ANT to study AI would not necessarily be a study of Management. In addition, there could be research into other case studies that could be applied to AI.

This research highlighted the opportunities found in the studies analyzed from the searches in the Scopus and WoS databases. These can be grouped into ethical challenges, studies of the transformative potential of AI in organizations and society, organizational changes brought about by AI, relationships with consumers, the impact of AI on different areas of the organization's activity, governance practices and AI, organizational performance and AI, studies with multiple IT projects, work relationships and AI, management relationships and AI, and the autonomy of AI in organizations.

Considering the ANT, although it can be considered less prevalent in contemporary organizational theoretical studies (van Rijmenam & Logue, 2021), it presents itself as pertinent for investigations that address the agency of AI within organizations – especially in a context in which

there is an interest in using AI in organizations, but its organizational dimension is not necessarily well explored.

In addition to being effective in developing research aimed at building models and theories (Pollack et al., 2013), it allows us to monitor the flow of interests and the stabilization of power relations in a network of heterogeneous actors, attributing the same social relevance to all, regardless of whether they are human or non-human (Bellanova, 2017; Prado & Calani Baranauskas, 2014). That said, there is a growth in the adoption of ANT in organizational studies since it is especially useful in a trend of increasing autonomy of AI for decision-making in organizations (Borch, 2023) and also considering its potential to transform subjectivity, organizations and society (Borch, 2023). Therefore, the above research opportunities can use ANT as a theoretical-methodological approach for their development.

Notes

(1) Query used: TITLE-ABS-KEY ("actor-network theory") AND PUBYEAR > 2012 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "b") OR LIMIT-TO (SRCTYPE , "p") OR LIMIT-TO (SRCTYPE , "k")) AND (EXCLUDE (SUBJAREA , "MEDI") OR EXCLUDE (SUBJAREA , "PSYC") OR EXCLUDE (SUBJAREA , "NURS") OR EXCLUDE (SUBJAREA , "HEAL") OR EXCLUDE (SUBJAREA , "NEUR") OR EXCLUDE (SUBJAREA , "IMMU") OR EXCLUDE (SUBJAREA , "PHAR") OR EXCLUDE (SUBJAREA , "VETE") OR EXCLUDE (SUBJAREA , "ENVI") OR EXCLUDE (SUBJAREA , "EART") OR EXCLUDE (SUBJAREA , "AGRI")) AND (EXCLUDE (EXACTKEYWORD , "Human") OR EXCLUDE (EXACTKEYWORD , "Humans") OR EXCLUDE (EXACTKEYWORD , "Health Care") OR EXCLUDE (EXACTKEYWORD , "Human Experiment") OR EXCLUDE (EXACTKEYWORD , "Adult") OR EXCLUDE (EXACTKEYWORD , "Female") OR EXCLUDE (EXACTKEYWORD , "Health") OR EXCLUDE (EXACTKEYWORD , "Sustainability") OR EXCLUDE (EXACTKEYWORD , "Climate Change") OR EXCLUDE (EXACTKEYWORD , "Ecology") OR EXCLUDE (EXACTKEYWORD , "Urban Area") OR EXCLUDE (EXACTKEYWORD , "Architecture") OR EXCLUDE (EXACTKEYWORD , "Urban Development") OR EXCLUDE (EXACTKEYWORD , "Urban Design") OR EXCLUDE (EXACTKEYWORD , "Agriculture")

(2) Query used: ((ALL=(actor-network theory) AND PY=(2013-2023)) AND DT=(Proceedings Paper OR Abstract of Published Item OR Article OR Book OR Book Chapter OR Early Access)) AND (TASCA==("MANAGEMENT" OR "SOCIOLOGY" OR "BUSINESS" OR "BUSINESS FINANCE" OR "SOCIAL SCIENCES INTERDISCIPLINARY" OR "INFORMATION SCIENCE LIBRARY SCIENCE" OR "COMPUTER SCIENCE INFORMATION SYSTEMS" OR "COMPUTER SCIENCE THEORY METHODS" OR "COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS" OR "ENGINEERING ELECTRICAL ELECTRONIC" OR "COMPUTER SCIENCE ARTIFICIAL INTELLIGENCE" OR "COMPUTER SCIENCE SOFTWARE ENGINEERING" OR "TELECOMMUNICATIONS" OR "AUTOMATION CONTROL SYSTEMS" OR "COMPUTER SCIENCE CYBERNETICS" OR "ENGINEERING MULTIDISCIPLINARY" OR "ENGINEERING INDUSTRIAL" OR "COMPUTER SCIENCE HARDWARE ARCHITECTURE" OR "MULTIDISCIPLINARY SCIENCES" OR "MEDICAL INFORMATICS" OR "MATHEMATICS" OR "MATHEMATICS APPLIED" OR "ROBOTICS" OR "SOCIAL SCIENCES MATHEMATICAL METHODS" OR "MATHEMATICS INTERDISCIPLINARY APPLICATIONS" OR "COMMUNICATION"))

(3) Query used: (TITLE-ABS-KEY ("actor-network theory")) AND (TITLE-ABS-KEY ("artificial intelligence") OR TITLE-ABS-KEY ("machine learning")) AND PUBYEAR > 2012 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "b") OR LIMIT-TO (SRCTYPE , "p") OR LIMIT-TO (SRCTYPE , "k"))

(4) Query used: (ALL=(actor-network theory) AND (ALL=(artificial intelligence) OR ALL=(machine learning)) AND PY=(2013-2023)) AND DT=(Proceedings Paper OR Abstract of Published Item OR Article OR Book OR Book Chapter OR Early Access)

(5) Query used: (TITLE-ABS-KEY ("actor-network theory")) AND (TITLE-ABS-KEY (information AND system*) OR TITLE-ABS-KEY (information AND technolog*) OR TITLE-ABS-KEY (information AND theor*) OR TITLE-ABS-KEY (algorith*)) AND PUBYEAR > 2012 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "b") OR LIMIT-TO (SRCTYPE , "p") OR LIMIT-TO (SRCTYPE , "k")) AND (EXCLUDE (SUBJAREA , "MEDI") OR EXCLUDE (SUBJAREA , "PSYC") OR EXCLUDE (SUBJAREA , "NURS") OR EXCLUDE (SUBJAREA , "HEAL") OR EXCLUDE (SUBJAREA , "NEUR") OR EXCLUDE (SUBJAREA , "IMMU") OR EXCLUDE (SUBJAREA , "PHAR") OR EXCLUDE (SUBJAREA , "VETE") OR EXCLUDE (SUBJAREA , "ENVI") OR EXCLUDE (SUBJAREA , "EART") OR EXCLUDE (SUBJAREA , "AGRI")) AND (EXCLUDE (EXACTKEYWORD , "Human") OR EXCLUDE (EXACTKEYWORD , "Humans") OR EXCLUDE (EXACTKEYWORD , "Health Care") OR EXCLUDE (EXACTKEYWORD , "Human Experiment") OR EXCLUDE (EXACTKEYWORD , "Adult") OR EXCLUDE (EXACTKEYWORD , "Female") OR EXCLUDE (EXACTKEYWORD , "Health") OR EXCLUDE (EXACTKEYWORD , "Sustainability") OR EXCLUDE (EXACTKEYWORD , "Climate Change") OR EXCLUDE (EXACTKEYWORD , "Ecology") OR EXCLUDE (EXACTKEYWORD , "Urban Area") OR EXCLUDE (EXACTKEYWORD , "Architecture") OR EXCLUDE (EXACTKEYWORD , "Urban Development") OR EXCLUDE (EXACTKEYWORD , "Urban Design") OR EXCLUDE (EXACTKEYWORD , "Agriculture"))

(6) Query used: (((ALL=(actor-network theory) AND (ALL=(algorithm*) OR ALL=(information technolog*) OR ALL=(information system*) OR ALL=(information theor*)) AND PY=(2013-2023)) AND DT=(Proceedings Paper OR Abstract of Published Item OR Article OR Book OR Book Chapter OR Early Access)) AND (TASCA==("MANAGEMENT" OR "SOCIOLOGY" OR "BUSINESS" OR "BUSINESS FINANCE" OR "SOCIAL SCIENCES INTERDISCIPLINARY" OR "INFORMATION SCIENCE LIBRARY SCIENCE" OR "COMPUTER SCIENCE INFORMATION SYSTEMS" OR "COMPUTER SCIENCE THEORY METHODS" OR "COMPUTER SCIENCE INTERDISCIPLINARY APPLICATIONS" OR "ENGINEERING ELECTRICAL ELECTRONIC" OR "COMPUTER SCIENCE ARTIFICIAL INTELLIGENCE" OR "COMPUTER SCIENCE SOFTWARE ENGINEERING" OR "TELECOMMUNICATIONS" OR "AUTOMATION CONTROL SYSTEMS" OR "COMPUTER SCIENCE CYBERNETICS" OR "ENGINEERING MULTIDISCIPLINARY" OR "ENGINEERING INDUSTRIAL" OR "COMPUTER SCIENCE HARDWARE ARCHITECTURE" OR "MULTIDISCIPLINARY SCIENCES" OR "MEDICAL INFORMATICS" OR "MATHEMATICS" OR "MATHEMATICS APPLIED" OR "ROBOTICS" OR "SOCIAL SCIENCES MATHEMATICAL METHODS" OR "MATHEMATICS INTERDISCIPLINARY APPLICATIONS" OR "COMMUNICATION")))

(7) Query used: ((TITLE-ABS-KEY ("artificial intelligence") OR TITLE-ABS-KEY ("machine learning")) AND (TITLE-ABS-KEY (organi?atio*))) AND PUBYEAR > 2012 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "b") OR LIMIT-TO (SRCTYPE , "p") OR LIMIT-TO (SRCTYPE , "k")) AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (EXACTKEYWORD , "Organizations") OR LIMIT-TO (EXACTKEYWORD , "Organization") OR LIMIT-TO (EXACTKEYWORD , "Organisational") OR LIMIT-TO (EXACTKEYWORD , "Organizational Framework"))

(8) Query used: ((ALL=(organi?atio*) AND (ALL=("artificial intelligence") OR ALL=("machine learning")) AND PY=(2013-2023) AND DT=(Proceedings Paper OR Abstract of Published Item OR Article OR Book OR Book Chapter OR Early Access))) AND ((TMSO==("6.3 Management") AND TASCA==("MANAGEMENT")) NOT (SJ==("ENVIRONMENTAL SCIENCES ECOLOGY" OR "PSYCHOLOGY" OR "COMPUTER SCIENCE" OR "ENGINEERING" OR "INFORMATION SCIENCE LIBRARY SCIENCE")))

References

Akhtar, P., Frynas, J. G., Mellahi, K., & Ullah, S. (2019, APR). Big data-savvy teams' skills, big data-driven actions and business performance. *British Journal of Management*, *30*(2, SI), 252-271. doi: https://doi.org/10.1111/1467-8551.12333

Alonso Trillo, R., & Poliks, M. (2023). Debris: Machine learning, archive archaeology, digital audio waste. *Organised Sound*. doi: https://doi.org/10.1017/S1355771823000249

Andersen, L. B., Danholt, P., Halskov, K., Hansen, N. B., & Lauritsen, P. (2015). Participation as a matter of concern in participatory design. *CoDesign*, *11*(3-4), 250 – 261. doi: https://doi.org/10.1080/15710882.2015.1081246

Andersson, R. (2016). Hardwiring the frontier? The politics of security technology in Europe's 'fight against illegal migration'. *Security Dialogue*, 47(1), 22 – 39. doi: https://doi.org/10.1177/0967010615606044

Armour, J., & Sako, M. (2020, Mar). AI-enabled business models in legal services: from traditional law firms to next-generation law companies? *Journal of Professions and Organization*, 7(1), 27-46. doi: https://doi.org/10.1093/jpo/joaa001

Bag, S., Pretorius, J. H. C., Gupta, S., & Dwivedi, Y. K. (2021). Role of institutional pressures and resources in the adoption of big data analytics powered artificial intelligence, sustainable manufacturing practices and circular economy capabilities . *Technological Forecasting and Social Change*, 163. doi: https://doi.org/10.1016/j.techfore.2020.120420

Bajde, D. (2013). Consumer culture theory (re)visits actor-network theory: Flattening consumption studies. *Marketing Theory*, *13*(2), 227 – 242. doi: https://doi.org/10.1177/1470593113477887

Bartlett, L., & Vavrus, F. (2014). Transversing the vertical case study: A methodological approach to studies of educational policy as practice. *Anthropology and Education Quarterly*, 45(2), 131 – 147. doi: https://doi.org/10.1111/aeq.12055

Bartrolí, M. A. (2021). *The university social responsibility framework by the international federation of catholic universities: A case of "intelligent" co-creation*. Springer. doi: https://doi.org/10.1007/978-3-030-70013-3_2

Belanche, D., Casalo, L., V, Flavian, C., & Schepers, J. (2020). Robots or frontline employees? Exploring customers' attributions of responsibility and stability after service failure or success. *Journal of Service Management*, 31(2, SI), 267-289. doi: https://doi.org/10.1108/JOSM -05-2019-0156

Bellanova, R. (2017). Digital, politics, and algorithms: Governing digital data through the lens of data protection. *European Journal of Social Theory*, 20(3), 329 – 347. doi: https://doi.org/10.1177/1368431016679167

Bittner, C., Glasze, G., & Turk, C. (2013). Tracing contingencies: Analyzing the political in assemblages of web 2.0 cartographies. *GeoJournal*, 78(6), 935 – 948. doi: https://doi.org/10.1007/s10708-013-9488-8

Blok, A. (2013, NOV). Pragmatic sociology as political ecology: On the many worths of nature(s). *European Journal Of Social Theory*, 16(4), 492-510. doi: https://doi.org/10.1177/1368431013479688

Borch, C. (2023). Machine learning and postcolonial critique: Homologous challenges to sociological notions of human agency. *Sociology*. doi: https://doi.org/10.1177/00380385221146877

Brougham, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. *Journal of Management & Organization*, 24(2), 239-257. doi: https://doi.org/10.1017/jmo.2016.55

Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019). Technological disruptions in services: lessons from tourism and hospitality. *Journal of Service Management*, 30(4, SI), 484-506. doi: https://doi.org/10.1108/JOSM-12-2018-0398

Burga, R., & Rezania, D. (2017). Project accountability: An exploratory case study using actor-network theory. *International Journal of Project Management*, 35(6), 1024-1036. doi: https://doi.org/10.1016/j.ijproman.2017.05.001

Campbell-Verduyn, M., Goguen, M., & Porter, T. (2017). Big data and algorithmic governance: the case of financial practices. *New Political Economy*, 22(2), 219 – 236. doi: https://doi.org/10.1080/13563467.2016.1216533

Caputo, F., Cillo, V., Candelo, E., & Liu, Y. (2019, SEP 12). Innovating through digital revolution the role of soft skills and big data in increasing firm performance. *Management Decision*, 57(8, SI), 2032-2051. doi: https://doi.org/10.1108/MD-07-2018-0833

Cecez-Kecmanovic, D., Kautz, K., & Abrahall, R. (2014). Reframing success and failure of information systems: A performative perspective. *MIS Quarterly: Management Information Systems*, 38(2), 561 – 588. doi: https://doi.org/10.25300/MISQ/2014/38.2.11

Contini, F. (2020). Artificial intelligence and the transformation of humans, law and technology interactions in judicial proceedings. *Law, Technology and Humans*, 2(1), 4–18. doi: https://doi.org/10.5204/lthj.v2i1.1478

Cooper, D. J., Ezzamel, M., & Qu, S. Q. (2017). Popularizing a management accounting idea: The case of the balanced scorecard. *Contemporary Accounting Research*, 34(2), 991 – 1025. doi: https://doi.org/10.1111/1911-3846.12299

Dery, K., Hall, R., Wailes, N., & Wiblen, S. (2013, SEP). Lost in translation? An actor-network approach to HRIS implementation. *Journal of Strategic Information Systems*, 22(3), 225-237. doi: https://doi.org/10.1016/j.jsis.2013.03.002

Domingo, D., Masip, P., & Costera Meijer, I. (2015). Tracing digital news networks: Towards an integrated framework of the dynamics of news production, circulation and use. *Digital Journalism*, 3(1), 53 – 67. doi: https://doi.org/10.1080/21670811.2014.927996

Elbanna, A. (2013, May). Top management support in multiple-project environments: an in-practice view. *European Journal of Information Systems*, 22(3), 278-294. doi: https://doi.org/10.1057/ejis.2012.16

Eze, S. C., Duan, Y., & Chen, H. (2014). Examining emerging ICT's adoption in SMEs from a dynamic process approach. *Information Technology and People*, 27(1), 63–82. doi: https://doi.org/10.1108/ITP-03-2013-0044

Fleming, P. (2019, JAN). Robots and organization studies: Why robots might not want to steal your job. *Organization Studies*, 40(1), 23-37. doi: https://doi.org/10.1177/0170840618765568

Flyverbom, M. (2015). Sunlight in cyberspace? On transparency as a form of ordering . *European Journal of Social Theory*, 18(2), 168 – 184. doi: https://doi.org/10.1177/1368431014555258

Frauenberger, C. (2019). Entanglement HCI the next wave? . *ACM Transactions on Computer-Human Interaction*, 27(1). doi: https://doi.org/10.1145/3364998

Fuenfschilling, L., & Binz, C. (2018, MAY). Global socio-technical regimes. *Research Policy*, 47(4), 735-749. doi: https://doi.org/10.1016/j.respol.2018.02.003

Füller, J., Hutter, K., Wahl, J., Bilgram, V., & Tekic, Z. (2022). How AI revolutionizes innovation management – perceptions and implementation preferences of AI-based innovators . *Technological Forecasting and Social Change*, 178. doi: https://doi.org/10.1016/j.techfore.2022.121598

Greenhalgh, T., Wherton, J., Shaw, S., Papoutsi, C., Vijayaraghavan, S., & Stones, R. (2019). Infrastructure revisited: An ethnographic case study of how health information infrastructure shapes and constrains technological innovation . *Journal of Medical Internet Research*, 21(12). doi: https://doi.org/10.2196/16093

Gregory, R. W., Henfridsson, O., Kaganer, E., & Kyriakou, S. H. (2021, JUL). The role of artificial intelligence and data network effects for creating user value. *Academy of Management Review*, 46(3), 534-551. doi: https://doi.org/10.5465/amr.2019.0178

Gunawong, P., & Gao, P. (2017). Understanding e-government failure in the developing country context: a process-oriented study. *Information Technology for Development*, 23(1), 153 – 178. doi: https://doi.org/10.1080/02681102.2016.1269713

Hansen, H. K., & Flyverbom, M. (2015). The politics of transparency and the calibration of knowledge in the digital age. *Organization*, 22(6), 872 – 889. doi: https://doi.org/10.1177/1350508414522315

Iskanderov, Y., & Pautov, M. (2020). Agents and multi-agent systems as actor-networks. In A. Rocha, L. Steels, & J. VanDenHerik (Eds.), *ICAART: Proceedings of the 12th International Conference on Agents and Artificial Intelligence*, vol 1 (p. 179-184). doi: https://doi.org/10.5220/0008935601790184

Islam, A. K. M. N., Mantymaki, M., & Turunen, M. (2019, Nov). Why do blockchains split? An actor-network perspective on bitcoin splits. *Technological Forecasting and Social Change*, 148. doi: https://doi.org/10.1016/j.techfore.2019.119743

Johnson, D. G., & Verdicchio, M. (2019, SEP). AI, agency and responsibility: the VW fraud case and beyond. *AI & Society*, 34(3), 639-647. doi: https://doi.org/10.1007/s00146-017-0781-9

Kaasinen, E., Anttila, A.-H., Heikkilä, P., Laarni, J., Koskinen, H., & Väätänen, A. (2022). Smooth and resilient human–machine teamwork as an industry 5.0 design challenge . *Sustainability (Switzerland)*, 14(5). doi: https://doi.org/10.3390/su14052773

Karmakar, S. (2022). Artificial intelligence: the future of medicine, or an overhyped and dangerous idea? . *Irish Journal of Medical Science*, 191(5), 1991–1994. doi: https://doi.org/10.1007/s11845 -021-02853-3

Kitchenham, B. A., & Charters, S. (2007). *Guidelines for performing systematic literature reviews in software engineering* (Tech. Rep.). Keele, United Kingdom: School of Computer Science and Mathematics, Keele University.

Kumar, N., & Rangaswamy, N. (2013). The mobile media actor-network in urban India. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (p. 1989–1998). doi: https://doi.org/10.1145/2470654.2466263

Law, J., & Lien, M. E. (2013). Slippery: Field notes in empirical ontology. *Social Studies of Science*, 43(3), 363 – 378. doi: https://doi.org/10.1177/0306312712456947

Law, J., & Singleton, V. (2013). Ant and politics: Working in and on the world. *Qualitative Sociology*, 36(4), 485 – 502. doi: https://doi.org/10.1007/s11133-013-9263-7

Law, J., & Singleton, V. (2014). ANT, multiplicity and policy . *Critical Policy Studies*, 8(4), 379–396. doi: https://doi.org/10.1080/19460171.2014.957056

Lawrence, T. B., & Dover, G. (2015, SEP). Place and institutional work: Creating housing for the hard-to-house. *Administrative Science Quarterly*, 60(3), 371-410. doi: https://doi.org/10.1177/0001839215589813

Lee, F., & Bjorklund Larsen, L. (2019). How should we theorize algorithms? Five ideal types in analyzing algorithmic normativities. *Big Data and Society*, 6(2). doi: https://doi.org/10.1177/2053951719867349

Martin, D. M., & Schouten, J. W. (2014, FEB). Consumption-driven market emergence. *Journal Of Consumer Research*, 40(5), 855-870. doi: https://doi.org/10.1086/673196

Missonier, S., & Loufrani-Fedida, S. (2014). Stakeholder analysis and engagement in projects: From stakeholder relational perspective to stakeholder relational ontology . *International Journal of Project Management*, 32(7), 1108 – 1122. doi: https://doi.org/10.1016/j.ijproman.2014.02 .010

Modell, S., Vinnari, E., & Lukka, K. (2017, Jul). On the virtues and vices of combining theories: The case of institutional and actor-network theories in accounting research. *Accounting Organizations and Society*, 60, 62-78. doi: https://doi.org/10.1016/j.aos.2017.06.005

Murray, A., Rhymer, J., & Sirmon, D. G. (2021, Jul). Humans and technology: Forms of conjoined agency in organizations. *Academy of Management Review*, 46(3), 552-571. doi: https://doi.org/10.5465/amr.2019.0186

Onno, J., Khan, F. A., Daftary, A., & David, P. M. (2023, Jun). Artificial intelligence-based computer aided detection (AI-CAD) in the fight against tuberculosis: Effects of moving health technologies in global health. *Social Science & Medicine*, 327. doi: https://doi.org/10.1016/j.socscimed .2023.115949

Pan, Y., Froese, F., Liu, N., Hu, Y., & Ye, M. (2022, Mar 26). The adoption of artificial intelligence in employee recruitment: The influence of contextual factors. *International Journal of Human Resource Management*, 33(6, SI), 1125-1147. doi: https://doi.org/10.1080/09585192.2021.1879206

Piekut, B. (2014). Actor-networks in music history: Clarifications and critiques . *Twentieth Century Music*, 11(2), 191 – 215. doi: https://doi.org/10.1017/S147857221400005X

Pillai, R., & Sivathanu, B. (2020, Nov 9). Adoption of artificial intelligence (AI) for talent acquisition in IT/ITES organizations. *Benchmarking: an International Journal*, 27(9), 2599-2629. doi: https://doi.org/10.1108/BIJ-04-2020-0186

Pinto, M. F., Leal, A., Lopes, F., Pais, J., Dourado, A., Sales, F., ... Teixeira, C. A. (2022). On the clinical acceptance of black-box systems for EEG seizure prediction. *Epilepsia Open*, 7(2), 247–259. doi: https://doi.org/10.1002/epi4.12597

Pollack, J., Costello, K., & Sankaran, S. (2013). Applying actor-network theory as a sensemaking framework for complex organisational change programs . *International Journal of Project Management*, 31(8), 1118–1128. doi: https://doi.org/10.1016/j.ijproman.2012.12.007

Prado, A. B., & Calani Baranauskas, M. C. (2014). Capturing semiotic and social factors of organizational evolution. In S. Hammoudi, J. Cordeiro, L. Maciaszek, & J. Filipe (Eds.), *Enterprise information systems, ICEIS 2013* (Vol. 190, p. 264-279). doi: https://doi.org/10.1007/978-3-319 - 09492-2

Raisch, S., & Krakowski, S. (2021, Jan). Artificial intelligence and management: The automation-augmentation paradox. *Academy of Management Review*, 46(1), 192-210. doi: https://doi.org/10.5465/amr.2018.0072

Sarlak, M. A., Salamzadeh, Y., & Farzad, F. S. (2020). *Actor-network theory and networked organizations, proposing a conceptual framework*. Springer. doi: https://doi.org/10.1007/978-981-15-7066-7_11

Sayes, E. (2014). Actor-network theory and methodology: Just what does it mean to say that nonhumans have agency? . *Social Studies of Science*, 44(1), 134 – 149. doi: https://doi.org/10.1177/0306312713511867

Shmargad, Y. (2017). Network perspectives on privacy and security in the internet of things: From actor-network theory to social network analysis. In: *2017 AAAI Spring Symposium – No 3 - Computational Context: Why It Is Important, What It Means, and Can It Be Computed?* Technical Report SS-17-03, p. 351 – 353. https://cdn.aaai.org/ocs/15243/15243-68241-1-PB.pdf

Sidorova, A. (2018). Interests and agency in ai: The case of image recognition with inception 3 model completed research papers. In *AMCIS 2018 Proceedings.* (24th Americas Conference on Information Systems (AMCIS) - Digital Disruption, New Orleans, LA, Aug 16-18, 2018)

Sperling, K., Stenliden, L., Nissen, J., & Heintz, F. (2022). Still w(AI)ting for the automation of teaching: An exploration of machine learning in Swedish primary education using actor-network theory . *European Journal of Education*, 57(4), 584 – 600. doi: https://doi.org/10.1111/ejed.12526

Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523-538.

van Rijmenam, M., & Logue, D. (2021). Revising the 'science of the organisation': theorising AI agency and actorhood . *Innovation: Organization and Management*, 23(1), 127–144. doi: https://doi.org/10.1080/14479338.2020.1816833

Waeraas, A., & Nielsen, J. A. (2016, Jul). Translation theory 'translated': Three perspectives on translation in organizational research. *International Journal Of Management Reviews*, 18(3, SI), 236-270. doi: https://doi.org/10.1111/ijmr.12092

Warner, K. S. R., & Waeger, M. (2019, Jun). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, 52(3), 326-349. doi: https://doi.org/10.1016/j.lrp.2018.12.001.

Williams, I. (2020). *Contemporary applications of actor network theory*. Springer. doi: https://doi.org/10.1007/978-981-15-7066-7.

Received: 18/02/2024 Accepted: 23/03/2024