

Artificial Intelligence Applied to Business Process Mapping

*Inteligência Artificial Aplicada ao Mapeamento de Processo
Empresarial*

Inteligencia Artificial aplicada al mapeo de procesos de negocio

Thamyres Duarte Colatino Star¹

thamyres.estrela@fatec.sp.gov.br

Lucicleide Viana dos Santos¹

lucicleide.santos@fatec.sp.gov.br

Wagner José da Silva¹

wagner.silva@fatec.sp.gov.br

1 – Fatec Americana

Recebido
Received
Recibido
Dez. 2024

Aceito
Accepted
Aceptado
Mar. 2025

Publicado
Published
Publicado
Jul./Set. 2025
Jul./Sep. 2025

<https://git.fateczl.edu.br>

e_ISSN
2965-3339

DOI
10.29327/2385846.3.4-2

São Paulo
v. 3 | n. 4
v. 3 | i. 4
e34065
Julho-Setembro
July-September
Julio-Septiembre
2025



Abstract:

This article aims to analyze the potential of using artificial intelligence (AI) applied to business process mapping in the context of Knowledge Management (KM). Mappings of two similar processes of two small companies were carried out, totaling four processes studied. The mapping was done conventionally and with the help of artificial intelligence, using the Heflo and ChatGPT tools, as well as BPMN (Business Process Model and Notation) notation, to design the processes. The study compared results using the following parameters: the execution time of the activities, the assertiveness in describing the processes verified in the company, and the quantity and relevance of suggestions for improving the mapped processes. The study revealed that, despite providing greater agility, the processes mapped with the aid of artificial intelligence demonstrated less assertiveness than those carried out without AI support, especially in the creation of the process design using BPMN notation.

Keywords: Process mapping; Artificial intelligence; Knowledge management; Business organization.

Resumo:

Este artigo visa analisar o potencial do uso da inteligência artificial (IA) aplicada ao mapeamento de processo empresarial no contexto de Gestão do Conhecimento (GC), foram realizados mapeamentos de dois processos semelhantes de duas empresas de pequeno porte, totalizando quatro processos estudados. O mapeamento foi feito de maneira convencional e com o auxílio da inteligência artificial, utilizando as ferramentas Heflo e ChatGPT e a notação BPMN (Business Process Model and Notation) para desenhar os processos. O estudo comparou os resultados tendo como parâmetros: o tempo de execução das atividades, a assertividade em relação à descrição dos processos verificados na empresa e a quantidade e relevância de sugestões de melhorias dos processos mapeados. O estudo revelou que, apesar de proporcionar maior agilidade, os processos mapeados com auxílio de inteligência artificial demonstraram menor assertividade em relação aos processos feitos sem suporte de IA, especialmente no tocante a criação do desenho do processo utilizando a notação BPMN.

Palavras-chave: Mapeamento de processo; Inteligência artificial; Gestão do conhecimento; Organização empresarial.

Resumen:

Este artículo tiene como objetivo analizar el potencial del uso de la inteligencia artificial (IA) aplicada al mapeo de procesos de negocio en el contexto de la Gestión del Conocimiento (KM). Se realizaron mapeos de dos procesos similares de dos pequeñas empresas, totalizando cuatro procesos estudiados. El mapeo se realizó de manera convencional y con ayuda de inteligencia artificial, utilizando las herramientas Heflo y ChatGPT y la notación BPMN (Business Process Model and Notation) para diseñar los procesos. El estudio comparó los resultados utilizando los siguientes parámetros: el tiempo de ejecución de las actividades, la asertividad en relación con la descripción de los procesos verificados en la empresa y la cantidad y relevancia de sugerencias para mejorar los procesos mapeados. El estudio reveló que, a pesar de proporcionar mayor agilidad, los procesos mapeados con la ayuda de la inteligencia artificial demostraron menos asertividad en relación con los procesos realizados sin el apoyo de la IA, especialmente en lo que respecta a la creación del diseño del proceso utilizando la notación BPMN.

Palabras clave: Mapeo del procesos; Inteligencia artificial; Gestión del conocimiento; Organización empresarial.

1. INTRODUCTION

Process mapping is one of the initial steps in knowledge management (KM). It allows for the extraction of tacit knowledge and its explicit expression through process descriptions and diagrams. This enables the identification of flaws or areas for improvement in the activities performed, making tasks more dynamic and efficient, thus contributing to the success of the business organization. In accordance with Correia (2002), processes represent resource-consuming activities, and thence, it is necessary to have mechanisms to manage them efficiently.

Process mapping, according to Hunt apud Villela (2000), emerged, was proposed and implemented by General Electric as one of the strategies for business improvement, being used to describe, in flowcharts and complementary texts, the vital steps of the organization's business process.

There are numerous techniques for process mapping, and more recently, there has been discussion about the use of emerging technologies for performing this and many other tasks in the corporate world. One of these technologies is artificial intelligence (AI), which, among other things, habilitates tasks to be performed automatically faster and more efficiently than humans.

Hence, this study aims to analyze the use of artificial intelligence in the knowledge extraction stage, specifically in business process mapping, comparing conventional process mapping with the same procedure aided by artificial intelligence. The comparison consists of verifying the execution time and accuracy of each task, as well as the quantity and relevance of suggestions for improving the processes studied.

2. THEORETICAL FRAMEWORK

Knowledge, as stated by Damian (2020), originates in the human mind and involves values, experiences, information, reflection, and other characteristics that make it challenging to structure and record. Precisely because of its individual characteristics, it is a strategic resource for organizations that must find ways to manage it. As claimed by Drucker (1999), knowledge stands out as the most relevant economic resource, being considered the new raw material of the 21st Century for fostering organizational competitiveness. Therefore, there is a field of study called Knowledge Management (KM), which, as maintained by Hoffmann (2016), is a strategic management model that leverages existing resources to improve both operational practices and decision-making processes.

As in all areas of knowledge, Knowledge Management undergoes constant technological improvements. Among these improvements, in accordance with Alqahtani (2022), is Artificial Intelligence (AI), a technology capable of simplifying many activities, including managerial ones, and can perform fewer complex tasks more quickly and efficiently. However, as stated by Estrela (2024), new technologies require knowledge and adaptations to be applied efficiently.

Estrela (2024) clarifies that AI contributes to the capture, storage, distribution,

and reuse of business knowledge, corroborating organizational efficiency; nevertheless, it should be used to support human decision-making, given the need for a balance between the use of AI and human intervention, since decision-making must consider cultural, legal, and ethical issues inherent to humans. Jarrahi (2022) clarifies that AI's effectiveness in specific tasks is evident; even though, he emphasizes that intelligence for strategic decision-making remains exclusively human, underscoring the dependence on human interaction for the extraction and explication of tacit knowledge.

Artificial intelligence is a relatively new technology, its popularization is quite recent, and researchers such as Liebowitz (2001) say that combining AI with knowledge management processes can enhance strategies in organizations, also contributing, as Taherdoost and Mandanchian (2023) point out, to boosting innovation and productivity, with the caveat that adaptations in organizational culture are necessary for the adoption of new technologies, which also appears as a concern in the publications of Silva (2023), who expresses the need to prepare employees to develop skills involving the use of new technologies such as AI.

Accordingly, it is understood that using AI to support knowledge management activities is relevant, and, considering the studies reviewed, one of the most sensitive steps in the use of technologies is precisely the one proposed for this work: the extraction and explication of knowledge.

3. METHOD

To carry out this study, two processes were selected from two distinct companies in the same line of business. Both companies are small and operate in the fruit and vegetable retail sector, with company A located in the city of Nova Odessa/SP, while company B is located in the city of Americana/SP; the following processes of these companies were analyzed: the process of purchasing products sold (process 1) and the process of reusing unsold products (process 2).

The initial stage of the study consisted of planning, during which the processes to be studied were defined, the tools for data collection and process design were identified, and the tool for process mapping with the aid of AI was selected.

Data collection was carried out through an electronic questionnaire administered to employees and managers of the companies, both questionnaires containing 21 questions. Open-ended questions were used to allow respondents to elaborate on their answers, increasing the amount of information extracted from each response. Informal interviews were also conducted with employees and managers of the companies, which corroborated the responses obtained from the questionnaires.

The next step involved tabulating the responses to begin describing the activities and designing the processes. Electronic spreadsheets were used to describe the activities.

The process diagrams were created using the standardized graphical notation for

modeling business processes called *Business Process Model and BPMN Notation* – a widely used notation for drawing end-to-end processes, from the simplest to the most complex. Due to the low complexity of the chosen processes, only four BPMN symbols were used: start, task, exclusive decision-making point, and end, along with the lines that connect the symbols and indicate the process flow.

For the process design phase, the free version of the online tool *Heflo* was used, available at <https://www.heflo.com/pt-br/>. This tool was chosen for the following reasons: the free version provides the necessary resources for conducting the study; it offers integrated artificial intelligence support; it is intuitive and straightforward to use; it provides many tutorials and explanatory videos; and it supports the BPMN notation.

After data collection, a description of each process's activities was prepared, and a process map was generated using BPMN notation. A process analysis was then conducted to identify areas for improvement. The execution time of each activity was recorded.

Next, the process mapping steps were carried out using artificial intelligence, with prompts created for each of the four processes. This information was first entered into the *Heflo* tool and then into the ChatGPT tool, which was also used to generate process improvement suggestions. Again, the time to complete the tasks was recorded.

After the tasks were completed, the time required, and the accuracy of the mappings were analyzed.

4. RESULTS AND DISCUSSION

For this study, four processes were considered: process 1 of company A, process 2 of company A, process 1 of company B, and process 2 of company B.

Regarding the time required to perform the activities with and without AI support, it was found that AI tools can perform the tasks considerably more quickly than processes without AI support, as shown in Table 1.

Table 1 – Comparison of times for mapping the processes

Process	Average completion time without AI.	Average completion time with AI in Heflo	Average completion time with AI in ChatGPT
Process 1	71 minutes	11 minutes	4 minutes
Process 2	30 minutes	8 minutes	4 minutes

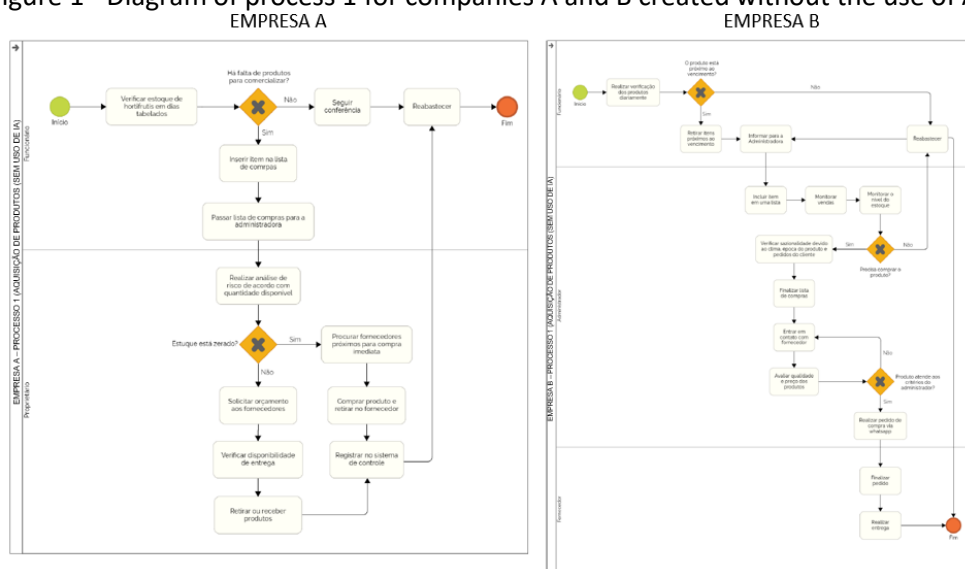
Source: authors (2024).

It is important to clarify that the calculation of the time to perform the activities without the use of AI was carried out considering the average time for describing the activities and the average time for designing the process, while the calculation of the time to perform the activities with the use of AI was carried out considering the average time for constructing the prompt and the average

response time of the AI.

Despite the creation of process diagrams, it was found that diagrams created without AI were complete and accurately described the sequence of steps listed in the process activity description, as shown in Figures 1 and 2.

Figure 1 - Diagram of process 1 for companies A and B created without the use of AI.



Source: authors (2024).

Figure 1 shows that the process flow includes elements such as decision-making and recursion, illustrating in detail how the process should be executed. It is also clear that the design includes multiple agents interacting at different points in the process.

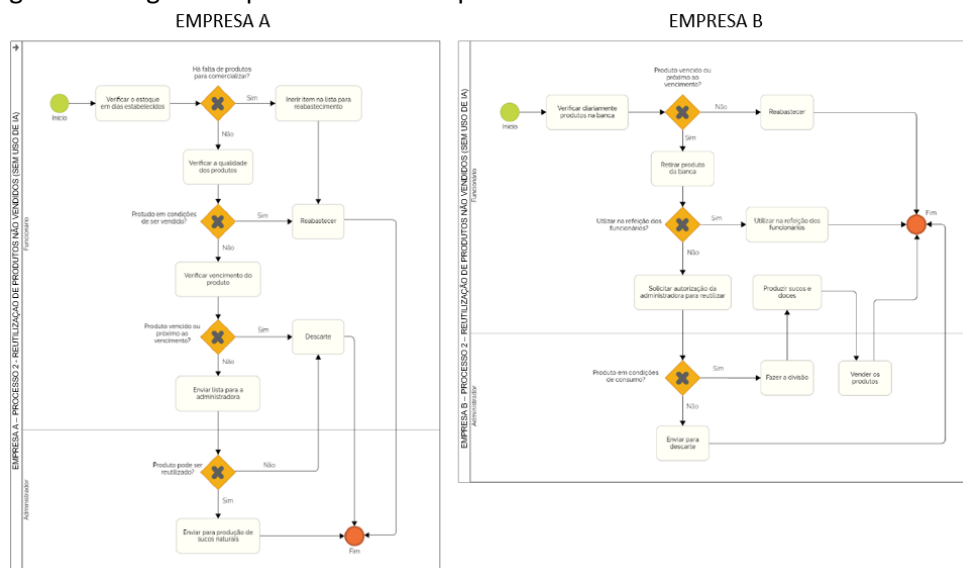
Figure 2 also shows that process design without AI allows for the representation of actions with multiple outputs, which are necessary to describe how processes occur within a business organization accurately.

The process mapping using artificial intelligence, in turn, began with the construction of prompts, one prompt for each process to be mapped, namely: process 1 of company A; process 2 of company A; process 1 of company B; and process 2 of company B.

Prompt for process 1 of company A: Map the purchasing process of a fruit and vegetable store in a small company. Consider: checking stock on scheduled days; creating a shopping list; passing the list to management; with zero stock, making an emergency purchase; in the case of an emergency purchase, picking up products from the supplier; for non-emergency purchases, requesting quotes; verifying delivery; picking up or receiving products; maintaining product control.

Prompt for process 2 from company A: Map the process for products nearing their expiration date in the produce section of a small business. Consider the following steps: check the products on the shelves daily; check for expired or near-expiration products; and, if authorized by the owner, reuse them to produce juices for sale. If they are not reused, the products are discarded.

Figure 2 - Diagram of process 2 for companies A and B created without the use of AI.



Source: authors (2024).

Prompt for process 1 from company B: Map the process for purchasing items sold by a fruit and vegetable store in a small business. Consider: daily product checks on the shelves; checking for expired or nearly expired products; if there are expired or nearly expired products, remove them from the shelf and inform management; create a list of unsold products; create a list of products to buy; sales monitoring; stock level monitoring; checking if it is necessary to buy the product as claimed by the stock level; considering seasonality in the purchasing process; considering the weather in the purchase decision; considering customer requests in the purchase decision; considering the quality and price of the supplier's products in the acquisition decision; the purchase can be made via *WhatsApp*; the supplier makes delivery.

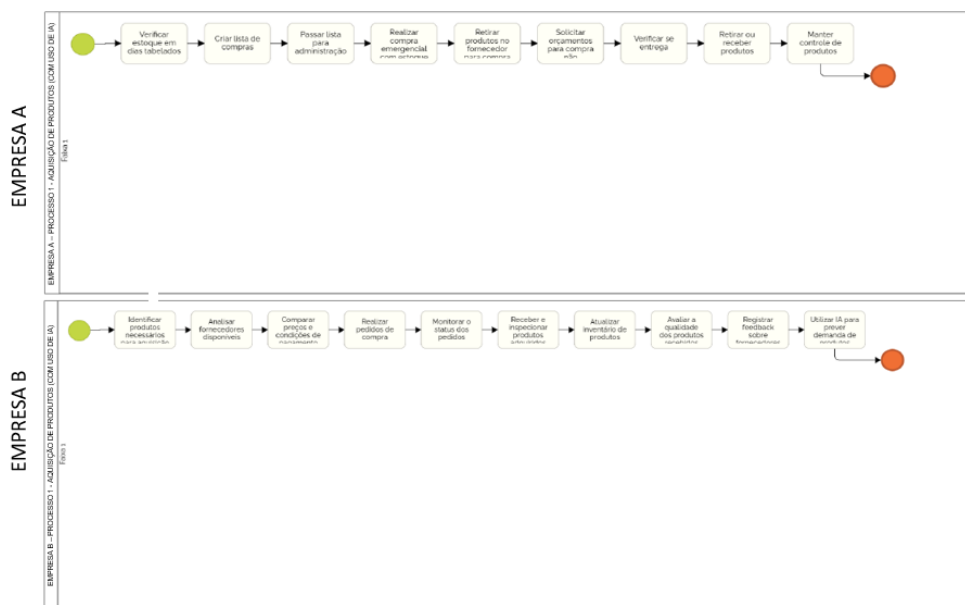
Prompt for process 2 from company B: Map the process for products nearing their expiration date in the produce section of a small company. Consider: daily product checks on the shelves; checking for expired or near-expiration products; expired or near-expiration products will be used in employee meals or to produce juices and sweets for sale, provided they are authorized by management. If the products are not reused, they are discarded.

The construction of process diagrams using artificial intelligence resources, in turn, resulted in simplistic graphical representations that do not accurately reflect the steps required to carry out the company's activities. Figures 3 and 4 show the process diagrams generated with the Heflo tool.

Figure 3 shows that the designs do not include multiple actors and that there are no decision-making actions in the process design described by the Heflo tool's artificial intelligence.

When comparing process diagrams made with and without AI support, it is noticeable that the diagrams created exclusively by humans better reflect the activities carried out in the company, as observed in process 1 and process 2.

Figure 3 - Diagram of process 1 for companies A and B created using AI in the Heflo tool.



Source: authors (2024)

Figure 4 - Diagram of process 2 for companies A and B created using AI in the Heflo tool.



Source: authors (2024)

Regarding process improvement suggestions, both humans and AI made suggestions that were consistent and inconsistent with the processes studied, as shown in Table 2.

Source: authors via ChatGPT tool (2024).

Figure 6 – Example of a process 1 diagram created by ChatGPT, requesting the use of BPMN notation.



Source: authors via ChatGPT tool (2024).

Table 2 – Comparison of suggestions for improvements in the processes studied.

Process	Without the use of AI.		Using AI	
	Process-related improvements	Improvements NOT related to the process	Process-related improvements	Improvements NOT related to the process
Process 1	02	03	05	02
Process 2	03	02	02	06

Source: authors (2024).

This shows that neither humans nor AIs are entirely accurate in analyzing process steps and suggesting improvements. Nonetheless, it is noticeable that artificial intelligence, in this case ChatGPT, has the potential to suggest more improvements in much less time than humans. In this example, the AI suggested 15 improvements, while the human suggested 10, taking both processes into account. Of these, 5 human improvements correspond to the process in question, while 7 proposed by AI relate to it.

5. CONCLUSION

Heflo and ChatGPT were used in this research to perform business process mapping, and the results demonstrate that AI can contribute to process mapping and knowledge management.

Analyzing the results on the potential and challenges of using AI in Knowledge Management (KM), specifically in mapping business processes, and comparing conventional human methods with AI-supported methods, it was found that AI tools were not sufficiently efficient at creating process diagrams. The AI tools used in this study did not yield results as satisfactory as those obtained through mapping without AI. The diagrams constructed without AI assistance demonstrated greater detail and efficiency in describing the organization's processes.

On the other hand, the study demonstrated that AI has the potential to be used as a support tool in the initial stages of knowledge management, such as process mapping, promoting an essential balance between the use of AI and human intervention, since it provides satisfactory suggestions both in the process description and in the process improvement stage. This balance between AI and human intervention is crucial in the organizational environment, as technologies face challenges in contextual interpretation, adaptation to specific needs, and ethical issues, where human analysis and judgment are indispensable.

REFERENCES

ALQAHTANI, M.; ALQAHTANI, K.; Mehmet, SA. **The Role of Artificial Intelligence and Information Technology in Promoting Knowledge Management in Business Firms: A Review**, International Journal of Engineering and Management Research, Saudi Arabia, volume 12, pages 13-23, April 2022.

CORREIA, Kwami Samora Alfama; LEAL, Fabiano; ALMEIDA, DA De. **Process mapping: an approach to business process analysis**. Proceedings of the XXII National Meeting of Production Engineering – ENEGEP. Curitiba, Brazil, 2002. Available at: https://www.academia.edu/download/80998919/enegep2002_tr10_0451.pdf. Accessed on October 26, 2024.

DAMIAN, IPM; CABERO, MMM. **Proposal of a knowledge management model focused on the characteristics of organizational memory**. Encontros Bibli: electronic journal of library science and information science, v. 25, p. 1-21, 2020. Available at: <https://www.redalyc.org/journal/147/14763386042/14763386042.pdf>. Accessed on: October 26, 2024.

DRUCKER, P. **Management Challenges for the 21st Century**. São Paulo: Pioneira, 1999.

ESTRELA, TD C; SANTOS, LV, SILVA, WJ. **Artificial Intelligence Applied to Business Knowledge Management: A Systematic Literature Review**. Revista Gestão, Tecnologia e Ciências, v. 20, p. 127 – 143, 2024. Available at: <https://revistas.fucamp.edu.br/index.php/getec/article/view/3589/2295>. Accessed on: October 28, 2024.

HOFFMAN, WAM. **Knowledge and information management in organizations based on competitive intelligence**. Ciência da Informação, v. 45, n. 3, 2016. Available at: <https://revista.ibict.br/ciinf/article/view/4045/3564>. Access On: October 26, 2024.

JARRAHI, MH, ASKAY, D., ESHRAGHI, A., SMITH, P. **Artificial Intelligence and Knowledge Management: A partnership between human and AI**. Business Horizons. p. 66. 10.1016/j.bushor, 2022. Available at: https://www.researchgate.net/publication/359399222_Artificial_Intelligence_and_Knowledge_Management_A_Partnership_Between_Human_and_AI. Accessed on: October 10, 2024.

Liebowitz, J.; Deutsch, Robert W. **Knowledge Management and Its Link to Artificial Intelligence, Expert Systems with Applications**, USA, volume 20, pages 1-6, January 2001.

Silva, Diego Moura Gomes Da. **Artificial Intelligence in Strategic Decision Making in Companies**. 2023, pages 1-16, Bachelor of Administration, Administration of the Unichristus University Center, Fortaleza, 2023. Available at: <https://repositorio.unichristus.edu.br/jspui/handle/123456789/1679>. Accessed on: August 10, 2024.

Taherdoost, Hamed; Madanchian, Mitra. **Artificial Intelligence and Knowledge Management: Impacts, Benefits, and Implementation**. Computers, USA, volume

12, pages 1-18, March 2023. Available at:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4626836. Accessed on:
August 10, 2024.

VILLELA, Cristiane da Silva Santos et al. **Process mapping as a tool for organizational restructuring and learning**. 2000. Doctoral thesis. Federal University of Santa Catarina, Technological Center. Postgraduate Program in Production Engineering. Available at:
<https://core.ac.uk/download/pdf/30359761.pdf>. Accessed October 30, 2024.

"The content expressed in the work, as well as the copyright of figures and data, and its spelling and adherence to standards, are the sole responsibility of the authors."

"The authors of this work declare that during the preparation of the manuscript, they used the tools/services *Heflo* BPM Business Process Management (free version) and ChatGPT (free version of Artificial Intelligence (AI)) to perform the necessary tests for the completion of the study. After using this tool/service, the authors edited and revised the content as needed and assume full responsibility for the content of the publication."