Knowledge Management in Argentine Free Software Cooperatives: Challenges and Perspectives

Federico Brest*, Brenda Baruzzini

Universidad Tecnológica Nacional, Buenos Aires, Argentina

Abstract

Argentina leads the world in the number of free software cooperatives, with the Argentine Federation of Worker Cooperatives for Technology, Innovation, and Knowledge (FACTTIC), founded in 2012 to strengthen the sector, standing out. These cooperatives, which operate under democratic principles of transparency and equitable distribution of surpluses, find a key strategic ally in the Latin American Free Software Installation Festival (FLISoL). FLISoL, the largest free software dissemination event in Latin America since 2005, is held annually to promote its use and philosophy among a diverse audience. There is a symbiotic relationship between the two: the festival provides a crucial platform for cooperatives to showcase their projects, attract users and collaborators, and establish connections, while the cooperatives actively contribute to the organization and development of the event. This study focuses on exploring the perspectives and challenges related to knowledge management and decision-making in Argentine free software cooperatives, considering the diverse audiences involved.

Keywords

Free software cooperatives, Knowledge management, FACTTIC, FLISoL, Argentina, Open source software

1. Introduction

The objective of this study is to present the perspectives and underlying themes that can clarify the reasoning behind the difficulties faced by a cooperative software company regarding knowledge transfer in various areas and the resulting decision-making process for diverse audiences.

The paper is structured as follows: Section 2 describes the theoretical framework of the research; Section 3 defines the scope and research question; Section 4 presents the research method and study design; Section 5 describes the study execution; Section 6 analyzes the results; Section 7 presents the results; Section 8 addresses threats to validity; and Section 9 summarizes and concludes.

2. Theoretical framework

Free software, based on collective ownership of source code, collaborative work, and community development, has demonstrated its potential to drive innovation and achieve significant efficiency in development processes. At the same time, it fosters decentralized production methods and greater autonomy for both developers and users, as highlighted by Tuomi [1]. Providing these solutions generally requires lower initial investment, which facilitates market entry.

On the other hand, free alternatives make it possible to offer tools in areas less attractive to proprietary software, thus addressing specific social and cultural needs. Access to available code and applications facilitates the appropriation of a considerable amount of prior work and knowledge, avoiding redundancy and shifting costs to clients or end users. In this context, programmers are compensated based on the volume of work completed and the value they add to existing creations. This fosters dynamic development and greater dissemination of innovations [2].

Development with free software has been problematized in Latin America, gaining state support

ICAIW 2025: Workshops at the 8th International Conference on Applied Informatics 2025, October 8–11, 2025, Ben Guerir, Morocco
*Corresponding author.
federiconbrest@gmail.com (F. Brest); bbaruzzini@frba.utn.edu.ar (B. Baruzzini)
0009-0008-7225-2609 (F. Brest)

in various countries. Usuaria Research[1] highlights that the current situation is marked by the dual challenge of competing (...) in terms of "socially owned knowledge", confronting the monopolistic model of "private ownership of knowledge," and, at the same time, the confrontation on national levels, between a country that consumes technology and one that finds a space to participate in the technological development process.

According to a list provided by the P2P Foundation, Argentina is the country with the largest number of free software cooperatives globally[2].

The Argentine Federation of Worker Cooperatives for Technology, Innovation, and Knowledge was formed in 2012 by a group of ten pioneering cooperatives with the goal of establishing a network and designing promotional strategies, as well as strengthening collaborative work among entrepreneurs. It is currently part of the Federation of Worker Cooperatives of the Argentine Republic, which includes various productive sectors. FACTTIC is intended as a support platform for new ventures, sharing experiences and providing tools for their consolidation. Its website [3] defines it as: Cooperativism promotes forms of organization that enhance collaborative work and, in our view, improve development processes. Cooperatives are democratic enterprises interested in the development of the community in which they live. Other strong points are transparency in access to company information, fair distribution of surpluses, and the provision of incentives for professional growth.

On the occasion of the annual Latin American Free Software Installation Festival (FLISoL), various software development cooperatives gather to attract new users and collaborators. This event, by bringing together a broad audience interested in open source software, represents an ideal opportunity for these organizations to showcase their projects, their operational reality, and their current status in the market.

According to its official website (https://flisol.info/), this festival is the largest free software dissemination event in Latin America. Its origins date back to 2005, and since 2008, it has been held annually on the fourth Saturday of April. The main purpose of this initiative is to promote the use of free software, disseminating its philosophy, scope, progress, and development to the general public. This annual event is aimed at a diverse audience, including students, academics, entrepreneurs, workers, public officials, enthusiasts, and even individuals with limited computer skills looking to explore new ways to use their computers.

The event is organized by various local free software communities and takes place simultaneously in multiple venues, offering free and legal installation of free software on attendees' computers. Additionally, in parallel, talks, presentations, and workshops are offered that address local, national, and Latin American topics related to free software in all its forms: artistic, academic, business, and social.

There is a symbiotic relationship between the aforementioned festival and free software cooperatives. While the former promotes the use and dissemination of open source software, cooperatives are organizations that develop and distribute this type of software, often with a focus on collaboration and sustainability. Thus, the festival acts as a showcase for the work of these cooperatives, providing them with a platform to showcase their projects and connect with users and potential collaborators. In turn, the cooperatives frequently participate actively in the organization of this festival and offer technical support and presentations about their projects throughout the festival. Undoubtedly, the Latin American Free Software Installation Festival and free software cooperatives function as strategic allies. The festival provides a platform for cooperatives to showcase their work and connect with the community, while the latter actively contributes to the organization of the event and the dissemination of free software.

3. Objectives and scope

A brief, multi-vocal review will serve to present perspectives on knowledge management in cooperative software development companies in Argentina. It synthesizes themes and practices that can clarify the

[1] www.usuaria.org.ar
[2] P2P Foundation http://bit.ly/2gG8Ow6

reasoning used by the various stakeholders. The analysis is limited to twelve pages. The methods and findings aim to move the conversation about the adoption of ideas from theory to practice.

Further details are provided on the design, execution, and results. The design involves establishing the research question and systematically searching the selected platforms. The execution involves qualitatively screening and examining industry and academic articles/publications. Finally, the results extract key concepts related to explainability motivations from the examined sources.

The research question is:

"What obstacles, barriers, or difficulties are detected in knowledge management within free software cooperatives in Argentina?"

4. Study Design

The research question was addressed using a Rapid Multivocal Review, a combination of Rapid Review [4] and Multivocal Review [5]. Rapid reviews consist of simplified literature reviews, conducted within a shorter timeframe, and are suitable for providing timely evidence for decision-making. Multivocal reviews consist of the synthesis of formal academic literature and informal sources, such as blogs and industry reports, and are suitable for obtaining a comprehensive view of a topic. The combination of both techniques was employed to address this research problem, as it allows for a comprehensive and timely synthesis of diverse sources of evidence, ensuring depth and breadth of findings.

The review sought documents from various data sources. Sources were obtained from (1) video platforms (YouTube), which host interviews, conference presentations, and discussions on emerging trends; (3) blogs (4) and Twitter accounts or X (18) of cooperative members with direct experience and diverse perspectives from professionals and official accounts of cooperative development companies; documentation from cooperative plenary sessions and annual assemblies; various forums belonging to the cooperative network, where challenges and possible solutions are discussed based on testimonies and experiences; and other community portals for the general public such as Reddit, Medium, LinkedIn, and Substack.

The search strategy was divided into two stages. The initial search used the exact terms "software development cooperatives" and several synonyms (association/mutual, services/development, technology/technological), limiting the results to companies in Argentina. Since this search yielded few directly relevant results, the scope was expanded to capture indirect references to related concepts across several sources. The relevance criteria for filtering results were chosen to capture discussions across all platforms, as the exact terms "development" or "software" may not be widely used in industry sources.

During the initial search, it was identified that the exact term "software development cooperative" was not used as frequently as expected, so the search was adapted to "technology, innovation, and knowledge," a term used by FACCTIC [6] to encompass the various companies that make up the federation of cooperatives specialized in the field. Table 1 explains the specific relevance filters established to identify relevant discussions within each source/engine.

Table 1
Relevance criteria.

Filter	Description
1F: Platform	Youtube, forums, social networks (X)
2F: Publication date	2019 onwards
3F: Relevance	YouTube: Views, Reactions/Views, Other Platforms: Likes used to measure relevance, Shares
4: Quality	A quality assessment checklist proposed by [3] to filter the dataset, considering producer authority, methodology, objectivity, novelty, and impact.

5. Study Execution

The process began with a systematic search, applying relevance criteria such as publication date, platform specificity, and the relevance of the publication/article. This approach ensures a thorough exploration of the intersection between the notions of cooperative enterprise and software development/technology/innovation.

The next step (data analysis) consisted of a targeted screening, selecting the three most promising candidates using subjective criteria established based on personal experiences and previous publications [3].

The initial search of various sources yielded more than 2000 results (videos and articles), of which 4 were selected because they met the relevance criteria for a detailed qualitative analysis.

The second, more refined search yielded 67 results (Figure 1). The resulting documents and videos were filtered using the filters detailed above (1F, 2F, 3F, and F4), yielding a total of 20 from the seven selected sources (summarized in Table 2).

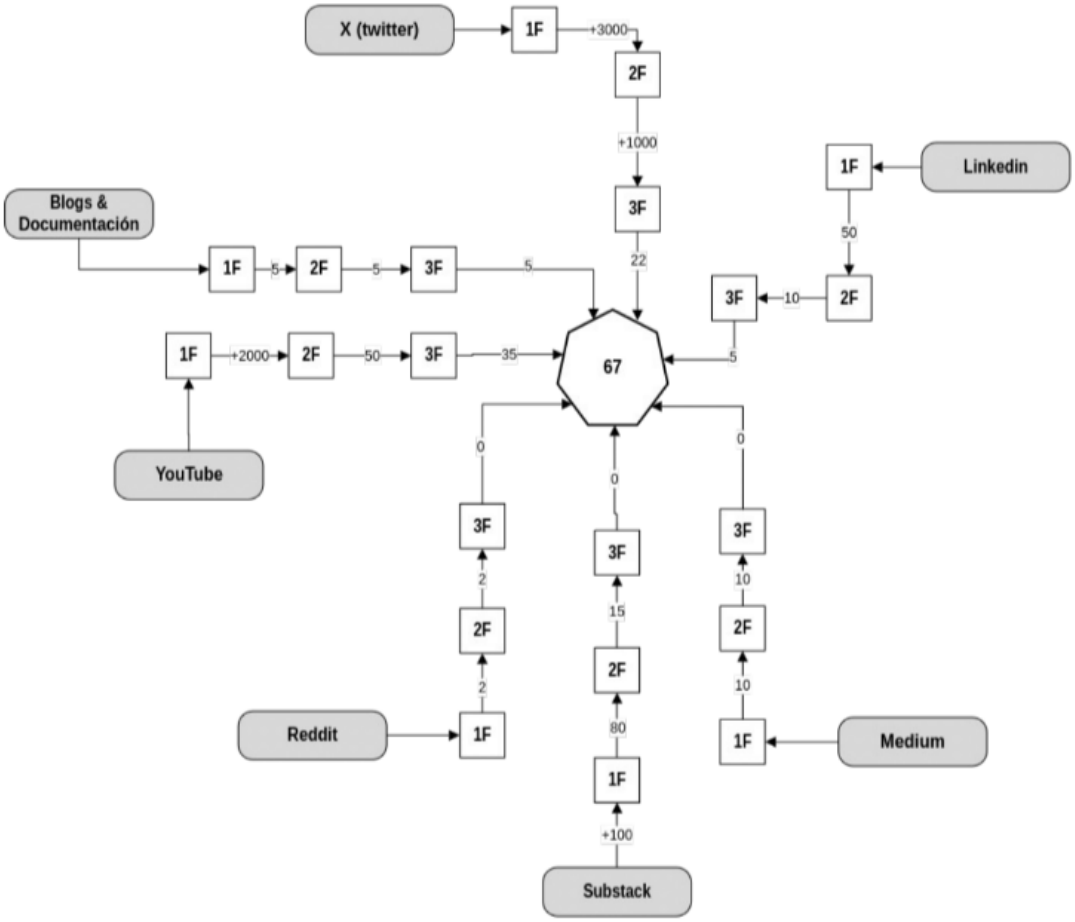

Figure 1: Search Execution.

6. Data Analysis

Table 2 provides an overview of the details of the sources examined.

Results R1 and R2 highlight the current status of two software development cooperatives (10 Pines and gcoop), mentioning the challenges they faced in their early days and how they overcame them. They also discuss their current clients and their aspirations for the future. R3, on the other hand, summarizes the 10 years of the Argentine Federation of Worker Cooperatives for Technology, Innovation, and

Table 2
Selected videos and articles

Ref	Title	Year	Source
R1	Jorge Silva, cofundador de 10 Pines, empresa de software argentina con estructura horizontal	2024	YouTube
R2	Entrevista a Leandro Monk | Fundador de gcoop	2020	YouTube
R3	[Global Coop Show & Tell] [Agosto 2022] - 10 años FACTTIC	2023	YouTube
R4	Alternativa Entrevista a Manuel Leiva, Pte de la Fed. de Cooperativas Tecnológicas de Argentina	2025	YouTube
R5	FLISoL CABA 2023: Modelos de negocios en el software libre. Una mirada desde el cooperativismo	2023	YouTube
R6	VALOR ARGENTINO, Cooperativas y Mutuales por el País - Cap. 9: Telecomunicaciones, Medios y TIC.	2024	YouTube
R7	Panel de Apertura: El rol del cooperativismo en la revolución digital	2022	YouTube
R8	gcoop cooperative's post	2025	X
R9	gcoop cooperative's post	2024	X
R10	gcoop cooperative's post	2024	X
R11	FACCTIC's post	2025	X
R12	FACCTIC's post	2024	X
R13	FACCTIC's post	2024	X
R14	FACCTIC's post	2024	X
R15	Innova's post	2024	X
R16	La nota tucuman's post	2024	X
R17	Fiqus Coop's post	2023	X
R18	Fiqus Coop's post	2019	X
R19	Fiqus Coop's post	2023	X
R20	Neto Licursi - Facctic - día del software libre	2022	archive.org
R21	Osiris Gomez's personal blog	2021	osiux.gitlab.io
R22	Cooperative's post	2020	Reddit
R23	Devsarg's post	2025	Reddit
R24	Tecso's post	2025	Linkedin
R25	Redjar's post	2025	Linkedin
R26	FACCTIC's post	2025	Linkedin
R27	Gcoop's post	2025	Linkedin
R28	Davecoop's post	2025	Linkedin
R29	FACCTIC's post	2025	Linkedin
R30	Manuel Leiva's post	2025	Linkedin
R31	Manuel Leiva's post	2025	Linkedin
R32	FACCTIC's post	2025	Linkedin

Knowledge (FACCTIC), while also mentioning how the company has evolved over the years, along with the growth and challenges it has faced.

In R4, the president of FACCTIC presents a diagnosis of the current situation of software cooperatives in our country and poses the challenge of reflecting on technological sovereignty and the young cooperatives, along with the existence of significant technological capacity. R5 provides an analysis of business models proposed by open source software, particularly the crisis of some open source projects and the commercial companies that have emerged around them. It also proposes exploring the experiences of technology cooperatives as an alternative to other modules.

R6 is a dissemination segment of the Cooperative Confederation of the Argentine Republic (Cooperar), which reports on how access to information, connectivity, and the democratization of speech are made possible in every corner of our country, thanks to the efforts of hundreds of cooperatives and mutuals that provide telecommunications services or manage media outlets in their communities.

I personally found R7 very interesting, as it corresponds to one of the public activities within the

FACTTIC Plenary held in 2022 in Villa La Angostura. In this video, representatives from FACTTIC, COPADE, and INAES, Denise Kasparian (from UBA), Eleonora Feser, and Valeria Mutuberria Lazarini, share their perspectives on the current state of the cooperatives.

In R8, the gcoop cooperative, on the occasion of its 18th anniversary, presents its commitment and responsibility to using free software, as well as stories of successes and failures, the birth, growth, and consolidation of cooperative projects. R9, also belonging to the same cooperative, discusses what happened in October 2024, when the company gave a talk for Guido Spano's Social Economy Program and talks about Free Software and the experience of Technological Cooperatives. The debate concludes by commenting on the activities carried out the following month, such as an event organized by the Tecso cooperative and the release of a new podcast about the innovation projects they led. In R10, gcoop presents a 2024 review, which once again illustrates the work and projects carried out during that year, along with its expansion plans.

R11 is another result that sparked my interest. It's a post made from the FACCTIC institutional account where the various stories of the cooperatives that make up the federation are summarized in the thread, told through the voices of their protagonists.

Similar to R10, R12 also includes a 2024 review, but this time from the perspective of FACTTIC. Along with this reference, R13 also provides a summary, but in honor of the federation's 13th anniversary. Concluding this analysis with R14 seemed the most appropriate, since that post includes a review of the monetary expenditures that cooperative companies must make, but also analyzes in numbers the percentage that these types of companies represent in the GDP and market, among other things.

Innova Cooperativas is a cooperative innovation and incubation project led by the Gcoop Cooperative. Unlike other projects, this one has its own account within the X network. R15 is a post created in 2024 to invite the public to learn about innovation projects, either by reading the summarized content within the thread or by being mentioned in the podcast.

While R16 does not feature such an extensive discussion within the social network's environment, the post contains a link to a news article of great interest to the research topic. It reports on the current situation of cooperative companies (specifically technology ones) in honor of International Cooperative Day.

R17, R18, and R19 are part of a kind of "travel diary" of the cooperative company Fiqus, which recounts the various activities carried out on their tour of Europe, as well as the testimonies exchanged between members of the cooperative and those of cooperatives in the surrounding areas.

R20 contains a valuable and informative interview with Neto Licursi, former director of FACCTIC. This podcast discusses the social role of technology, the challenges of using digital technologies, the need to consider technological sovereignty, and the exercise of rights in the field of applications and programs.

R21 is another result that particularly caught my attention: it's a section on the personal blog of Osiris Gomez, a GNU/Linux Administrator programmer belonging to the gcoop cooperative. Topics frequently discussed within the cooperative were published there, as well as a call for meditation.

R22 and R23 are the only results found on the Reddit social network. Despite their small number of results, their content is not insignificant; on the contrary, I believe it to be one of the most interesting in terms of findings. The first post is in English, posing the question of why there are so few software development cooperatives, giving rise to a debate with interesting results worth analyzing. R23, on the other hand, is based on collecting various testimonies from members of software cooperatives under the banner of experiences in software cooperatives.

R24 and R25 are based on sharing experiences at cooperative events with the community. The first post presents a brief video summary of the results of the Tecso cooperative's participation in the "Innovation, Science, and Technology" panel at the International Congress of Cooperatives organized by the Secretariat of Cooperatives, Mutuals, and Entrepreneurship of the Province of Santa Fe. The second post reports on the Redjar cooperative's participation in ASETT, the world's most important cooperative forum, sharing the space with more than 400 leaders of the global social economy. R26, similar to what happened in R10 on social network X, is a post (longer, as it does not have the 280-character limit like Elon Musk's social network) containing the balance sheet of gcoop for the year 2024. Along with this

result, R27 and R28 also serve as an introduction to the company's current situation; in the case of R28, the post was made to mark its 18th anniversary.

Just as gcoop has been repeatedly analyzed, R29 provides information about Davecoop, another of the companies belonging to FACTTIC.

R30, R31, and R32 provide a little more information about the current situation of technology cooperatives in Argentina. In the case of R31, it was in the context of the 18th Software Industry Business Meeting through the personal account of Manuel Leiva, president of FACCTIC, while R32 was thanks to the participation of the Redjar cooperative in the World Cooperative Conference in New Delhi with the presentation "Cooperatives, and Digital and New Technologies" and the "coding" event.

Finally, R33 helped me understand the context of the various organizations that make up FACCTIC through a video showing the Cooperativa Obrera facilities with a team composed of Hernán Gigena, Martín Silva (Cooperativa Lawal), Leandro Monk (gcoop), and Agustina Silombra (El Maizal - Communication Cooperative).

7. Results

A synthesis of the analysis reveals diverse perspectives on the rationale for the challenges and obstacles presented in knowledge management in Argentine technology cooperatives in the various industry debates examined. While explicit terminology of challenges and the terms "technology, innovation, and knowledge" are rarely used, insights emerge from companies that develop and market software under the regulations required by cooperative enterprises.

Documenting the challenges and growth experienced by a free software cooperative is a vital practice, as in R21, which emphasizes context-specific solutions. Transparency in management is also common in cooperative enterprises, as in R7, R10, R12, and R13, ensuring that each member not only participates in the organization as an employee, but also fully understands and trusts the decisions and use of resources.

While the precise language varies, the selected sources combine the value of collective understanding of the system, which resonates with the motivations for managing and establishing a software development cooperative.

The results of the study reveal a rich overview of knowledge management and the trajectories of software cooperative enterprises in Argentina. Articles such as R1 and R2 provide valuable case studies of 10 Pines and gcoop, detailing their initial challenges, overcoming strategies, and future aspirations, underscoring the importance of practical experience in building organizational knowledge. The evolution and consolidation of the Argentine Federation of Technology, Innovation, and Knowledge Worker Cooperatives (FACTTIC), highlighted in R3, R12, and R13, demonstrates the central role of federations in articulating knowledge and promoting a collaborative environment. The perspectives on technological sovereignty and the potential of young cooperators, presented in R4 by the president of FACTTIC and in R20 by Neto Licursi, highlight the need for a strategic approach to capacity building and the transfer of collective knowledge. Likewise, R5 emphasizes the exploration of alternative business models and the capitalization of cooperative experiences as solutions to the crises of commercial free software projects, suggesting that collaboration and knowledge sharing are fundamental for sustainability. Participation in key events such as the FACTTIC Plenary (R7) and dissemination through platforms such as Osiris Gomez's blog (R21) or the "Innova Cooperativas" project (R15), together with the reflection on the scarcity of software cooperatives in R22 and the shared experiences in R23, R24 and R25, demonstrate the importance of internal and external communication, as well as continuous learning from collective successes and failures, as essential tools for knowledge management. Finally, the annual balance sheets of cooperatives such as Gcoop (R10, R26, R27, R28) and FACTTIC, together with the economic analysis in R14, reflect the organizational maturity and the capacity of these entities to document and learn from their own performance.

We conclude that knowledge management in Argentine software cooperatives manifests itself as a dynamic and multifaceted process, anchored in federative collaboration, the exchange of experiences,

strategic reflection on the social role of technology, and the systematic documentation of its evolution and challenges. This allows them not only to grow but also to influence the construction of collective technological sovereignty. There are significant opportunities to connect initiatives developed within organizations with professionals' priorities regarding proper knowledge management.

Effective knowledge management in open source cooperatives could be achieved through the implementation of collaborative software tools that integrate diverse functionalities. These tools, based on wiki platforms or content management systems (CMS) such as WordPress, would allow information to be centralized, organized, and shared in a structured manner. For example, a corporate intranet with a well-documented code repository and discussion forums would facilitate the transfer of tacit knowledge among members. The adoption of these technological solutions would not only improve operational efficiency but also strengthen the culture of collaboration and transparency, fundamental principles of cooperatives and open source software.

8. Future Studies

The rapid review methodology employed in this study has certain inherent limitations. The findings constitute a preliminary approximation, derived from a subset of the existing literature and debates. It is plausible that a more exhaustive selection of data sources, beyond those considered in this research, may reveal additional themes linked to the obstacles identified in knowledge management in the context of cooperative software development companies in Argentina, or in a broader societal context.

While the approach adopted sought to identify and analyze influential sources, other relevant contributions may have been inadvertently omitted. In future research, it is recommended that popularity-based selection strategies be complemented with additional methodologies that allow for more comprehensive coverage.

Another relevant limitation lies in the absence of a systematic quantitative analysis of the frequency of terminology associated with theoretical foundations in the reviewed sources. Although the concepts presented emerged in multiple references, their precise occurrence was not systematically quantified.

The current analysis is based primarily on a qualitative interpretation derived from a manual review. Despite efforts to mitigate bias through the implementation of a systematic process, the possibility that personal perspectives may have influenced the findings cannot be completely ruled out.

Despite the limitations outlined above, the data reviewed provide valuable information and emerging perspectives in the field of cooperative enterprises and knowledge management. Furthermore, it is recommended that a future review include not only the networks used in this work, but also podcast platforms such as Spotify, iVoox, Applepod, and Soundcloud, among others.

9. Conclusions

This article analyzes the current use of the term "knowledge management" among practitioners and researchers through an exploratory review of various sources to gather initial impressions. A central finding reveals that, while the term "knowledge management" is not widely used, associated concepts such as transfer, training, and adaptation are frequently used in specialized debates.

This review lays the groundwork for future research at the intersection of knowledge management and cooperative software development companies in Argentina. The sources examined present diverse perspectives on practices, including training documentation, emerging assumptions, and improving training agility and timeliness. All of these dimensions are intrinsically linked to optimizing the understanding of organizational decisions made at various meetings. Strategies and recommendations are currently being investigated to achieve adequate knowledge management, avoiding the implementation of monotonous or repetitive procedures and the underestimation of knowledge inherent to the industry (specifically, documentation processes). This seeks to prevent poor management, which could become an obstacle for the company, while also facilitating a proper visualization and understanding of this knowledge.

Finally, the current trend of constant market growth, coupled with the ongoing migration to new technologies, underscores the urgent need to clarify the decisions made in various meetings throughout the evolutionary cycles of each cooperative. Additional research is recommended to examine the experiences of uncertainty, trust, and transparency in long-term software development projects.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

References

[1] I. Tuomi, Networks of Innovation: Change and Meaning in the Age of the Internet, volume 249, OUP Oxford, 2002.
[2] H. W. Chesbrough, Open innovation: The new imperative for creating and profiting from technology, Harvard Business School (2003).
[3] F. Brest, Analysis of the current state of knowledge management methods and techniques applied in argentinian work cooperatives, 2024.
[4] B. Cartaxo, G. Pinto, S. Soares, Rapid reviews in software engineering, in: Contemporary Empirical Methods in Software Engineering, Springer, 2020, pp. 357–384.
[5] I. Garousi, M. Felderer, M. Mäntylä, Directrices para la inclusión de literatura gris y la realización de revisiones bibliográficas multivocales en ingeniería de software, 2019.
[6] Federación Argentina de Cooperativas de Trabajo de Tecnología, Innovación y conocimiento. facctic, 2025.