

The Role of Relational Capital in the Innovativeness of Women-Led Startups: Case Studies From Italian Food & Beverage Sector

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Abstract: This research explores the challenges small businesses face, such as limited resources and competitive pressures, emphasizing how intellectual capital (IC) plays a key role in fostering innovation. Intellectual capital is divided into human, structural, and relational capital (RC), with RC being particularly crucial for women-led startups. Open Innovation (OI) plays a vital role in helping small businesses manage external relationships and develop new business models. The Italian government has introduced legislation to promote innovative startups, but women still remain underrepresented in sectors like agri-food, which is deeply traditional and innovation-resistant. The research focuses on women-led innovative startups, highlighting the educational and financial gaps they face compared to male-led businesses. In particular, it explores three key questions: RQ1: Can RC help fill an educational and financial gap in WIS? RQ2: What kind of relationships mainly support WIS? RQ3: How do these relationships affect their innovation process? The study uses a qualitative methodology and multiple case studies, applying the C.A.O.S model, which investigates the influence of personal, environmental, organizational, and startup motivations on entrepreneurial success. By focusing on women in the agri-food sector, the research provides new insights into the role of relational capital and formal relationships in female entrepreneurship. This study's findings highlight the importance of family ties, education, and professional networks in overcoming gender-specific challenges in the entrepreneurial ecosystem. The study fills a gap in existing research by analyzing the qualitative aspects of relational capital in women's innovative startups. It examines how women entrepreneurs leverage networks to navigate challenges and drive innovation, despite systemic barriers. The research can contribute to identify strategies to foster innovation among female entrepreneurs, contributing to economic growth and gender equality.

Keywords: Gender; Food; Innovation; Startup; Relational Capital; Intangibles

1. Introduction

The capacity of corporate leaders to navigate external turbulence has become a critical skill in the wake of events like Brexit, the COVID-19 pandemic, and recent global conflicts (Chen et al., 2022; Del Giudice et al., 2023). In a world marked by VUCA (Volatility, Uncertainty, Complexity, Ambiguity), firms must adopt dynamic strategies to foster innovation, self-organisation, and resilience (Ju, 2023; Ragazou et al., 2022). These demands have led organisations to embrace alternative approaches, such as Open Innovation (OI), a paradigm based on inter-organisational collaboration. OI supports co-creation dynamics, enabling the development of innovative solutions that benefit the organisation, its stakeholders, and society (Patel & Brahmabhatt, 2021; Saputra et al., 2022). OI has become particularly relevant for startups, which face fierce competition, shifting customer expectations, and rapid technological advancements in an unpredictable digital landscape. Digital technologies accelerate this transformation, enhancing knowledge sharing and collaboration (Bharadwaj et al., 2013; Ghezzi et al., 2015; Scuotto et al., 2021b). Intellectual Capital (IC) plays a pivotal role in this process, comprising Human Capital (HC), Structural Capital (SC), and Relational Capital (RC). HC encompasses employees' skills and expertise (Harrison & Sullivan, 2000); SC refers to organisational infrastructures, systems, and policies (Rahman et al., 2021; Bontis et al., 2018); and RC represents the networks connecting internal and external stakeholders (Paoloni & Lombardi, 2017; Song & Berger, 2019). Effectively managing relational capital is pivotal for enhancing open innovation processes, as it facilitates the exchange of knowledge, strengthens collaborations, and creates synergies across organisational boundaries. By fostering meaningful connections with stakeholders, firms can access diverse perspectives and resources that drive innovation and adaptability, particularly in dynamic and competitive markets (Modaffari et al., 2023). RC is especially crucial for women entrepreneurs, as it addresses systemic barriers they face, such as limited access to resources and support systems. These challenges are exacerbated in entrepreneurial ecosystems shaped by historical and cultural factors, often resulting in fewer opportunities for women (Modaffari et al., 2023; Paoloni et al., 2022). In Italy, the dominance of family-owned SMEs, which are traditionally male-dominated, compounds the gender gap in entrepreneurial ecosystems

(Paoloni & Lombardi, 2017; Modaffari et al., 2023). For women entrepreneurs, RC offers pathways to overcome these barriers through formal and informal networks that provide access to financial and human capital while fostering innovation. In sectors like agribusiness, where stakeholder collaboration drives innovation, RC enables women-led businesses to remain competitive and adaptive (Cillo et al., 2019; Agostini et al., 2017). RC also builds trust among stakeholders, facilitating effective collaboration and co-creation processes that enhance adaptive capacity and resilience (Scuotto et al., 2017; Modaffari et al., 2023). Research has highlighted the managerial and financial gaps in women-led businesses (Paoloni & Manzo, 2022; Cesaroni & Sentuti, 2016). This study focuses on women-led innovative startups (WIS), characterised by high innovation and adaptability. It explores three questions: (RQ1) Can RC address educational and financial gaps in WIS? (RQ2) What types of relationships support WIS? (RQ3) How do these relationships impact innovation? Using the C.A.O.S model, the study investigates personal, environmental, organisational, and motivational factors shaping entrepreneurial success, particularly in the agri-food industry. This study employs a qualitative multiple case study methodology to explore the innovation processes of female-led agri-startups, focusing on their use of Open Innovation (OI) to address systemic challenges. Two Italian startups were selected, showcasing distinct approaches to innovation in the agri-food sector, influenced by their unique backgrounds, motivations, and geographic contexts. Semi-structured interviews provided in-depth insights into their strategies, highlighting the role of relational capital in overcoming barriers and fostering collaborative solutions.

2. Literature Review

The contemporary business environment is profoundly shaped by global events and challenges that disrupt traditional operational models, necessitating adaptability and innovation from organizational leaders. Events such as Brexit, the COVID-19 pandemic, and ongoing geopolitical instability (Chen et al., 2022; Del Giudice et al., 2023) have not only caused significant disruptions to supply chains and markets but also redefined customer behavior and expectations. These challenges exacerbate the complexity and uncertainty businesses must navigate, creating a volatile environment characterized by rapid and unpredictable changes.

Ju (2023) defines this landscape as a VUCA environment, an acronym for Volatility, Uncertainty, Complexity, and Ambiguity. Volatility reflects the rapid and unpredictable nature of change; Uncertainty arises from insufficient information about future events; Complexity is driven by the interconnectedness of multifaceted systems; and Ambiguity results from unclear cause-and-effect relationships. These conditions render static management approaches inadequate, compelling organizations to adopt flexible and adaptive strategies to thrive. To succeed in such a VUCA world, organizations must prioritize self-organization and resilience as core strategies. Self-organization entails empowering teams with decentralized decision-making authority, enabling quicker responses to emerging changes. This decentralized approach allows for a more dynamic adaptation to external stimuli. In addressing the demands of a VUCA environment, businesses increasingly adopt Open Innovation (OI) paradigms. Open Innovation (OI), initially conceptualized by Chesbrough (2003), represents a novel approach to the innovation process. Unlike traditional models that rely solely on internal resources, OI advocates for a hybrid approach that integrates internal capabilities with external knowledge flows. This paradigm has gained traction across industries for its ability to enhance organizational adaptability and value creation (Cillo et al., 2019; Del Giudice et al., 2018). These mechanisms are underpinned by critical capacities such as absorptive capacity—the ability to assimilate and utilize external knowledge effectively (Del Giudice et al., 2012).

OI revolutionizes traditional innovation models by shifting the focus from internal R&D silos to collaborative processes that leverage external partnerships and shared expertise. It emphasizes creating ecosystems of interdependence, where firms, stakeholders, and even competitors co-develop solutions that would be unattainable individually and diverse parties contribute resources and expertise to develop innovative solutions (Patel & Brahmbhatt, 2021; Jabeen et al., 2023). This approach not only accelerates the pace of innovation but also generates benefits that extend beyond individual organizations. For instance, coupled knowledge flows in OI directly enhance asset specificity and innovation capacity, as they optimize the integration of internal and external knowledge flows (Zheng et al., 2022). The relevance of OI lies in its ability to address the growing complexity and dynamism of global markets. Rapid technological advancements and changing consumer preferences necessitate innovative approaches to remain competitive. OI provides organizations with access to diverse knowledge ecosystems, enabling faster innovation cycles and enhanced responsiveness to market demands (Dezi et al., 2019). One of the most transformative aspects of OI lies in its ability to democratize the innovation process, breaking down barriers that often limit participation to large, well-funded organizations. By fostering collaborative ecosystems, OI creates platforms where smaller firms, regional clusters, and underserved communities can engage actively in innovation. This inclusivity not only expands the pool of contributors but

also enriches the innovation outcomes with diverse perspectives and expertise (Jiao et al., 2022). In emerging economies, Open Innovation (OI) plays a vital role in addressing systemic gaps by enabling collaborative networks that allow smaller enterprises to access resources, knowledge, and markets that might otherwise remain inaccessible (Cuomo et al., 2024). Startups, often constrained by limited resources and heightened vulnerability to market volatility, benefit significantly from OI in navigating the dynamic and unpredictable digital landscape (Chesbrough, 2003). Unlike traditional closed innovation models, which depend solely on internal resources, OI empowers startups to access external expertise, cutting-edge technologies, and broader markets (Laursen & Salter, 2006). Through participation in collaborative ecosystems, startups can leverage the infrastructure, knowledge, and networks of larger, well-established entities. These ecosystems provide critical resources—such as advanced R&D capabilities, distribution networks, and market intelligence—that enhance startups' ability to compete with established players while adapting to evolving customer expectations and technological advancements (Jabeen et al., 2023; Cammarano et al., 2022). This collaborative framework positions startups as agile participants in innovation, enabling faster prototyping and market entry while reducing costs and risks associated with traditional innovation pathways. These ecosystems provide critical resources that might otherwise be inaccessible to resource-constrained startups, such as advanced research and development (R&D) capabilities, state-of-the-art facilities, and extensive distribution channels (Cammarano et al., 2022). By integrating with these networks, startups can scale their innovations more effectively and bring products to market with reduced lead times and costs. Integral to this innovation-driven landscape is the role of Intellectual Capital (IC), which serves as a cornerstone for fostering innovation. IC is commonly conceptualized as comprising three dimensions: Human Capital (HC), which encompasses the skills, expertise, and creativity of individuals; Structural Capital (SC), representing organizational systems, processes, and intellectual property; and Relational Capital (RC), which refers to the networks, relationships, and partnerships within and beyond the organization (Rahman et al., 2021; Bontis et al., 2018). Each dimension interacts dynamically to support the flow of knowledge and resources critical for innovation. Among these components, RC stands out as particularly pivotal in enabling collaborative innovation. RC's focus on cultivating relationships and leveraging networks allows organizations to access diverse pools of knowledge, expertise, and capabilities. It facilitates inter-organizational partnerships that are vital for addressing complex challenges and sustaining competitiveness in a rapidly evolving marketplace (Paoloni & Lombardi, 2017; Saint-Onge, 2009). Furthermore, RC is instrumental in integrating external insights with internal capabilities, ensuring that innovation processes are not confined within organizational boundaries but are enriched through global collaboration and exchange (Chaudhuri et al., 2023).

Relational Capital (RC) emerges as a fundamental driver of collaborative innovation, serving as a cornerstone for inter-organizational partnerships and knowledge sharing. Its focus on fostering relationships and leveraging networks enables organizations to harness diverse pools of expertise, resources, and capabilities. This capacity to connect with external entities allows firms to navigate complex challenges while sustaining a competitive edge in rapidly changing marketplaces (Paoloni & Lombardi, 2017; Saint-Onge, 2009). RC not only facilitates access to external knowledge but also enhances the internalization of such insights, promoting the integration of external and internal capabilities. This synergy is instrumental in creating innovation that transcends organizational boundaries. The ability of RC to establish trust among stakeholders and facilitate open communication is particularly critical, as it builds a safe environment where collaboration can thrive. In the context of SMEs and startups, this is especially important given their resource constraints and the increasing need to adopt Open Innovation (OI) strategies (Modaffari et al., 2023). The role of RC is further emphasized in the context of innovative startups, particularly in sectors like agri-food, where traditional production processes often require transformative solutions. Studies suggest that RC enables startups to develop unique relationships with stakeholders, including customers, suppliers, and institutions, which in turn provide critical support for overcoming market entry barriers and advancing innovative outcomes (Modaffari et al., 2023; Agostini et al., 2017). Moreover, RC encourages collaborative learning, wherein the interplay of diverse perspectives leads to the development of novel approaches to problem-solving (Wu et al., 2020; Paoloni et al., 2022).

Numerous studies underscore the pivotal role of Relational Capital (RC) as an essential intangible asset for women-owned businesses, offering critical pathways to overcome structural limitations often inherent in entrepreneurial ecosystems. RC comprises the networks, partnerships, and external relationships developed by entrepreneurs, which are particularly vital for women navigating gender-specific barriers to resources, knowledge, and support systems. These barriers, though varying in visibility and impact across different historical and cultural contexts, consistently limit the opportunities available to women entrepreneurs (Modaffari et al., 2023; Paoloni et al., 2022). Over the years, women's increasing participation in the labor market has spurred research into business development models specific to female entrepreneurship, highlighting their

economic and social impact (Paoloni et al., 2022a). Despite progress, women entrepreneurs face persistent challenges, including educational gaps, limited access to credit, and structural barriers, contributing to an entrepreneurial gender gap (Kuschel et al., 2020; Paoloni & Manzo, 2022). Extensive research has consistently highlighted significant managerial and financial gaps faced by women-led enterprises. These gaps not only limit their competitiveness but also impede their ability to scale and innovate effectively. The managerial gap often stems from structural and systemic barriers, including gender biases that restrict access to leadership training and professional development opportunities. This issue is further exacerbated by an educational gap, which impacts entrepreneurial intentions and the overall performance of women-led businesses (Paoloni & Manzo, 2022; Gavurova et al., 2018).

The financial gap is another critical challenge, primarily characterized by limited access to credit and investment opportunities. Women entrepreneurs often encounter greater risk aversion among financial institutions, driven by entrenched stereotypes that undermine their perceived creditworthiness. This constraint forces many women to rely on alternative financing options such as microfinance institutions, family loans, or personal savings, which may not be sufficient to sustain ambitious business ventures (Cesaroni & Sentuti, 2016; Rita et al., 2018).

In Italy, these challenges are particularly pronounced due to the structural composition of the entrepreneurial landscape. Predominantly comprised of small and medium-sized enterprises (SMEs), the Italian economy often lacks the robust financial infrastructure and strategic support systems that could help mitigate these gender-specific barriers. SMEs, especially those in traditional sectors such as agri-food, exhibit limited research and development (R&D) capabilities and innovation absorption capacity, further narrowing the growth prospects for women-led businesses (Modaffari et al., 2023; Scuotto et al., 2017).

Relational Capital (RC) has been identified as a valuable tool for bridging these gaps. RC facilitates the creation of robust networks and partnerships that provide access to knowledge, resources, and market opportunities. By leveraging RC, women entrepreneurs can strengthen their managerial competencies and financial resilience, fostering an ecosystem that supports sustainable innovation and competitiveness. Studies have shown that integrating RC into business strategies enhances trust and collaboration, enabling women-led enterprises to overcome systemic challenges and thrive in competitive markets (Paoloni & Lombardi, 2017; Wu et al., 2020).

3. Methodology

This study employs a qualitative methodology grounded in a multiple case study analysis (Paoloni et al., 2022a; Tyskbo, 2019; Modaffari et al., 2019; Yin, 2009). The case study approach is particularly effective for conducting an in-depth exploration of real-world phenomena and examining contemporary issues within their specific contexts, especially when the boundaries between the phenomenon and its environment are not clearly delineated (Eisenhardt, 1989; Scapens, 2004; Yin, 2009). These methodological characteristics align closely with the focus of this research.

As highlighted in the literature review, female-led start-ups face a notable innovation gap (Kuschel et al., 2020), a challenge that is particularly acute in specific sectors. The agri-food industry exemplifies this issue, with only 15 innovative start-ups in Italy being led by women. A qualitative approach facilitates a deeper understanding of the factors that drive female entrepreneurs toward innovation. Thus, the multiple case study method supports the observation and data collection needed to analyze the phenomenon, with subsequent interpretation carried out through comparative analysis. The selection of case studies was conducted using a database of innovative Italian start-ups from the Chamber of Commerce. The sample was refined to include businesses with substantial female leadership and further narrowed by ATECO codes to focus on the agribusiness sector. OI is particularly relevant to addressing systemic challenges in sectors like agri-food, where resource constraints, environmental sustainability, and evolving consumer preferences demand collaborative solutions (Cillo et al., 2019).

Within the specific context of female-led innovative agri-start-ups, a maximum variation sampling strategy was applied (Patton, 1990). This approach aimed to capture key differences and identify shared patterns among the selected cases. Two start-ups were chosen for their structural and strategic similarities while showcasing notable differences in other dimensions. Both companies are family businesses, each comprising three shareholders (mother, father, and daughter), and share common characteristics in cultivating and delivering their products through interdependent activities.

The first case, “Women’s Agri-Startup 1” (WAS1), focuses on microgreens production using aquaponic

techniques, blending agriculture with aquaculture. Conversely, “Women’s Agri-Startup 2” (WAS2) operates as a winery and recently diversified into fig cultivation and jam production. The two enterprises also differ in the founders’ backgrounds, motivations, and geographic locations. WAS1, situated in northern Italy (Lombardy), is led by a young entrepreneur without prior professional experience and emphasizes R&D investments. WAS2, based in central Italy (Tuscany), is managed by a more experienced entrepreneur who transitioned from a previous career and integrates a broader set of innovation strategies. These contextual differences, including climate, cultural factors, and financial resources, offer a rich comparative basis for analysis.

Data collection primarily relied on semi-structured interviews, enabling a nuanced understanding of the entrepreneurs’ experiences and strategies (Paoloni, 2021; Yin, 2009). The questionnaire framework is shown in Appendix. To collect data for this study, two interviews were conducted for each of the two startups under investigation. All interviews were carried out via Skype to ensure accessibility and convenience for the participants. For the first startup, the initial interview took place in December 2021 and lasted 2 hours and 3 minutes. A follow-up interview, aimed at verifying and refining the data previously collected, was conducted in February 2022 with a duration of 1 hour and 7 minutes. Regarding the second startup, the first interview was held in March 2022 and lasted 1 hour and 57 minutes, followed by a second interview in April 2022, which lasted 49 minutes. This approach allowed for a comprehensive understanding of each startup’s context and the opportunity to validate the findings. The coding process began with a detailed transcription of all interviews, which were then reviewed to identify recurring themes and patterns. A combination of deductive and inductive coding was employed: deductive codes were derived from the literature and the study’s conceptual framework, while inductive codes emerged from the interview data itself.

To facilitate a systematic comparison between the two cases, a cross-case analysis was performed (Yin, 2009). The coded data were organized into categories aligned with the research objectives, such as innovation strategies, resource utilization, and external collaboration. These categories allowed for the identification of shared patterns as well as key differences in the entrepreneurial approaches and contextual influences of the two startups. The comparative analysis focused on both convergent and divergent themes, providing a richer understanding of the dynamics at play in female-led innovative agri-startups.

To interpret findings, C.A.O.S. model was applied. The C.A.O.S. model, an Italian acronym for “Caratteristiche personali, Ambiente, Organizzazione, Startup”, was introduced by Paoloni (2011) to analyze the role of relational capital (RC) in SMEs. Widely utilized in contemporary business research, the model is particularly relevant for examining RC’s strategic role in female-led SMEs, highlighting its importance in fostering innovation and competitive advantage (Cosentino et al., 2020; Dal Mas & Paoloni, 2020). It focuses on the interplay between relationships and innovation, emphasizing how external relationships enhance internal management capabilities, ultimately driving organizational success.

Rooted in strategic management theories, the C.A.O.S. model aligns with perspectives like the Resource-Based View (RBV), which underscores the importance of internal resources, competencies, and relationships in achieving competitive advantage and fostering innovation (Bhattacharyya & Jha, 2015; Wernerfelt, 1984). Over time, the Relational-Based View (RBV) has extended this focus to include the role of external networks in knowledge dissemination and collaborative opportunities (Dyer & Singh, 1998; Paoloni, 2021).

The model evaluates RC through four key dimensions:

1. Entrepreneur’s Personal Characteristics (C): Factors such as the entrepreneur’s role, vision, and ability to build and utilize networks.
2. Environment (A): The socio-economic and cultural context that shapes the enterprise’s external connections.
3. Organizational and Managerial Aspects (O): The entrepreneur’s objectives, roles, and organizational responsibilities.
4. Startup Motivations (S): Temporal elements reflecting the entrepreneur’s focus during the business inception phase.

By analyzing these dimensions, the model identifies the company’s “cardinal bonds,” which are pivotal relationships that influence its growth and adaptability. These are categorized as:

- First-type bonds (S-C): Relationships activated by the entrepreneur’s goals and needs.
- Second-type bonds (S-O): Organizational ties that define roles and responsibilities.
- Third-type bonds (S-A): External connections with the surrounding environment.

Each bond is evaluated for its formality (formal/informal) and duration (temporary/permanent) to provide insights into how RC shapes business opportunities and challenges (Paoloni, 2021). The C.A.O.S. model's comprehensive approach to relational dynamics offers valuable insights into the qualitative aspects of RC, aiding businesses in leveraging networks to enhance innovation and competitive positioning

4. Findings

The entrepreneurial journeys of WAS1 and WAS2 demonstrate the pivotal role of cardinal links (S-C, S-O, S-A) in supporting and shaping women-led innovative startups. These relationships underscore the interplay between familial support, organizational dynamics, and external partnerships in overcoming financial, managerial, and structural barriers.

4.1 First Cardinal Links (S-C)

The first cardinal links (S-C) highlight the foundational role of family in entrepreneurial ventures. In WAS1, the entrepreneur's parents provided critical financial support, technical knowledge, and operational contributions, embedding themselves as key stakeholders. This dynamic formalized familial relationships into permanent and strategic assets. Similarly, WAS2 leveraged family ties, including the entrepreneur's partner and child, for financial and emotional support, which became integral to the startup's initial growth. Both cases underscore how familial relationships fill gaps in funding and managerial expertise, particularly in female entrepreneurship, where external financial access is often limited (Derera et al., 2014; Kwong et al., 2012).

4.2 Second Cardinal Links (S-O)

The second cardinal links (S-O) illustrate the flexible organizational dynamics within these startups. Both WAS1 and WAS2 rely on informal yet permanent family-based structures to manage internal operations. In WAS1, the mother contributes technical expertise in microgreen cultivation, while the father oversees technical infrastructure, ensuring operational efficiency. In WAS2, the entrepreneur's cross-functional management approach integrates administrative and practical skills, supported by family members who assist in key tasks. These flexible structures enable adaptability and innovation, underpinned by shared values and a commitment to sustainability.

The informal management style in both startups reflects a preference for leveraging internal human capital rather than hiring external personnel, a strategy supported by the entrepreneurs' high educational backgrounds. This approach reduces costs while enabling the startups to focus resources on research and development, vital for their innovative product offerings, such as WAS1's aquaponic systems and WAS2's patented fig compote.

4.3 Third Cardinal Links (S-A)

The third cardinal links (S-A) extend to external relationships that enhance innovation and market entry. WAS1 establishes formal yet temporary links with universities, trade associations, and European entities for funding and compliance, despite limited institutional support. Informal, permanent ties, such as collaborations with other microgreen producers, facilitate knowledge-sharing and innovation. In contrast, WAS2 emphasizes formal and permanent relationships, reflecting the entrepreneur's professional background. Partnerships with the University of Florence, business incubators, and trade associations bolster product development and ensure adherence to regulatory standards.

As shown in figure 1, first-type bonds reflect strong familial support, providing emotional and financial resources. Second-type bonds emphasize collaborative management, integrating family and team contributions into daily operations and decision-making. Third-type bonds extend to external partnerships with academic, industry, and public entities, enabling access to funding, expertise, and market opportunities.

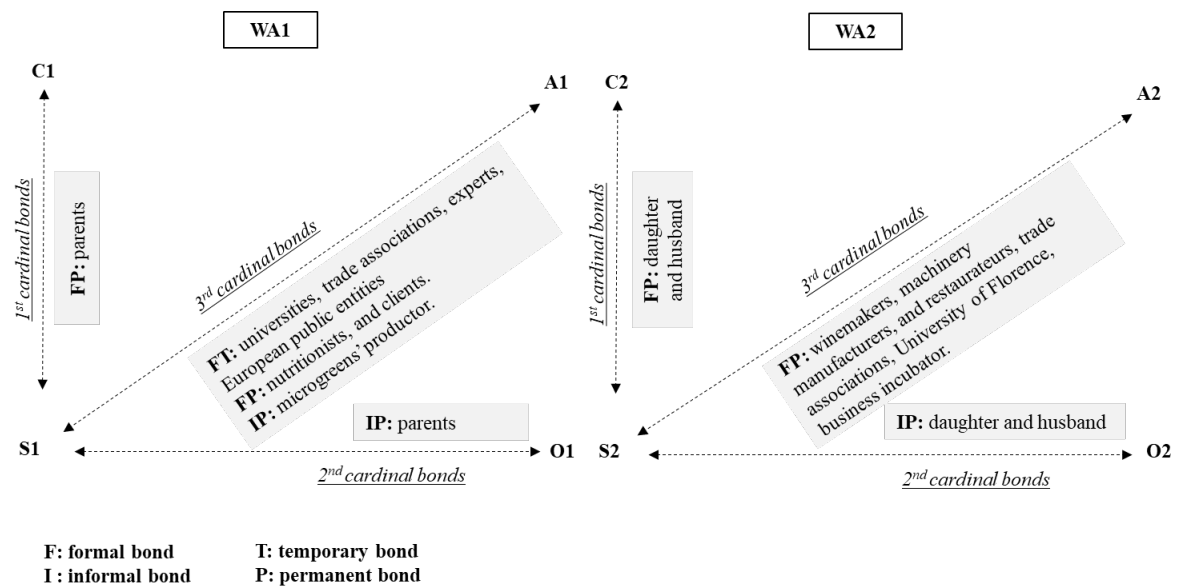


Figure 1: CAOS representation

Source: Authors

5. Discussion and Conclusion

External links in both cases highlight the importance of relational capital in addressing the gender gap in entrepreneurship. By formalizing ties with professional experts, the startups mitigate knowledge gaps and align their innovative products with market and regulatory demands. These relationships exemplify the dynamic capabilities necessary for sustained innovation and competitiveness (Cillo et al., 2019; Zhang et al., 2020).

The cardinal links across S-C, S-O, and S-A reveal a comprehensive support system crucial to the success of women-led innovative startups. Familial ties provide foundational financial and operational support, organizational flexibility fosters adaptability, and external networks enable access to knowledge and resources. These startups exemplify how relational capital and strategic networking drive innovation, resilience, and market integration, offering a model for overcoming barriers in female entrepreneurship.

In conclusion, this research demonstrates that Relational Capital (RC) plays a pivotal role in addressing the educational and financial gaps faced by women-led innovative startups (WIS), affirmatively answering RQ1. RC provides access to critical resources, including knowledge, skills, and funding, which are instrumental in overcoming structural and personal barriers in entrepreneurship. The case studies reveal that RC enriches the startups' human capital through knowledge exchange and enhances structural capital by fostering innovation and operational efficiency, mitigating the gaps in educational background and financing that disproportionately impact women entrepreneurs.

Addressing RQ2, the research identifies that WIS primarily benefit from a combination of formal and informal relationships. Formal relationships, such as collaborations with universities, trade associations, and funding entities, ensure compliance with regulatory demands and access to specialized knowledge and resources. Informal relationships, particularly within family and close networks, provide foundational support for decision-making, resource mobilization, and operational flexibility. These complementary relationships collectively create a robust framework for entrepreneurial success.

Finally, in response to RQ3, the analysis underscores that these relationships significantly enhance the innovation process in WIS. Relational capital facilitates the identification and assimilation of external innovations, accelerates the development and commercialization of novel products, and bolsters the startups' competitiveness in dynamic markets. By fostering trust, collaboration, and access to specialized expertise, RC enables female entrepreneurs to navigate complex challenges and align their ventures with evolving market demands. Consequently, relational capital emerges as both a driver and enabler of innovation, ensuring the sustainability and growth of women-led innovative startups.

The findings of this research offer significant implications for both theory and practice. Theoretically, it expands

the understanding of relational capital (RC) as a critical component of intellectual capital, particularly in addressing the unique challenges faced by women-led innovative startups (WIS). By demonstrating how RC mitigates financial and educational gaps, the study highlights its integral role in fostering resilience and innovation within traditionally male-dominated sectors like agri-food. Practically, the study underscores the need for targeted policy interventions to support women entrepreneurs, including the development of formal and informal relational networks, mentorship programs, and access to specialized knowledge and funding. Organizations, incubators, and trade associations can replicate the relational frameworks explored in this research to enhance innovation capacity and inclusivity. For women entrepreneurs, the strategic management of RC provides a pathway to overcome systemic barriers, foster collaborations, and align their ventures with evolving market needs, ensuring their competitiveness and sustainability in dynamic industries.

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Appendix

ANAGRAPHICAL DATA OF THE ENTREPRENEUR

- What is your name?
- How old are you?
- What is your marital status?
- Do you have children?
- What was your educational background and what degree do you have?
- Had you had previous entrepreneurial experience?
- What are the previous work experiences?

ANAGRAPHICAL DATA OF THE ENTERPRISE

- What is the name of the company?
- When was it founded?
- Under what legal form was it established? Why?
- What industry does the company operate in?
- In what does your characteristic activity consist?
- What is the location where the main activity is carried out?
- How many employees does the company boast?
- What are the innovative elements that characterize your enterprise?

PERSONAL CHARACTERISTICS

- Why and how did you choose to become an entrepreneur?
- What were the motivations that convinced you to acquire or start this company?
- What is your role within the enterprise?
- How are decisions made within your enterprise?
- What is the management style adopted by the entrepreneur?

ENVIRONMENT

- How did you select the location for your company? What development opportunities were seized?

- How is the environment (trade associations customers, suppliers, institutions, lenders) conceived in connection with one's enterprise and what are the exchanges with the outside world?
- How much and in what ways do you think the external environment (understood as the physical territory) affects business dynamics? What threats and opportunities does it offer?
- What relationships have supported the response to these threats and opportunities?
- Does the company belong to trade associations?
- What were the external stimuli that contributed most to the development of innovative elements?
- How and how much did the pandemic crisis impact business performance?

ORGANIZATION

- What were the internal stimuli that most contributed to the development of innovative elements?
- What do you think is the strength of the company?
- How do you try to differentiate yourself in the market?
- What is the corporate vision? How do innovative elements contribute to the pursuit of this vision?
- What is the corporate mission? How do innovative elements contribute to the pursuit of this mission?
- Where does your business idea come from?
- What kind of research was carried out? What kind of investments were made to support this project?
- Do you think the company's innovative elements are helping to limit the impact of the pandemic?

START-UP

- What, on the other hand, are your personal goals to pursue through your entrepreneurial activity?
- Where would you place, among these, the goal of profit?
- How are roles and tasks distributed in your company?
- How does the selection of employees take place in your company?
- How is business performance measured?
- How is inception capital raised?
- What are the major difficulties encountered in the start-up phase of the enterprise and implementation of the innovative elements?
- What is the role of the network of contacts in the start-up phase and implementation of the innovative elements?

INNOVATION

- 1st req: How does the company manage investment in research and development? (how resources are sourced, who is in charge of research)
- 2nd req: What is the educational background of other members of the internal organization?
- 3rd req: Does the company own a patent or license?
- Does the company use digital technologies in its production/organizational process? To what end?