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Role of Trust in the Relationship between Absorptive Capacity and Innovation Ambidexterity: The Importance of Living Labs and Coworking Spaces

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Abstract:

Strategic management research emphasizes the importance of absorptive capacity and innovation ambidexterity as key levers for enhancing corporate competitiveness in the context of digital transformation and the "Smart Life" paradigm. These capabilities enable firms to combine the exploration of new opportunities with the exploitation of existing resources. However, the interactions between these two concepts remain ambiguous. This paper, titled "Role of Trust in the Relationship between Absorptive Capacity and Innovation Ambidexterity," investigates the moderating role of trust within this dynamic. It draws on a literature review and three exploratory studies to develop an explanatory model, tested on a sample of 258 entrepreneurs and start-up/SME incubators in the ICT sector in Tunisia, within the framework of the "Smart City" initiative. The findings highlight the significant impact of absorptive capacity on innovation ambidexterity, with a pivotal role played by inter-organizational trust. The inclusion of Living Labs and Coworking Spaces in the study underscores their growing importance as collaborative platforms that enhance absorptive capacity and ambidextrous innovation through real-time knowledge exchange and an environment conducive to experimentation and co-creation.

Keywords: Absorptive capacity, ambidexterity, innovation, Living Labs, Coworking Spaces, inter-organizational trust.

1. Introduction

In a world where innovation serves as a key driver of competitiveness and growth, businesses must continually evolve and adapt to remain relevant. The rapid pace of technological advancements, market globalization, and pervasive digitization make innovation not merely necessary, but also increasingly complex. However, this capacity alone is not sufficient. Companies must also master innovation ambidexterity, the capability to effectively leverage existing resources while exploring new opportunities, thereby balancing incremental and radical innovation.

Simultaneously, collaborative environments such as Living Labs and Coworking Spaces have become increasingly central in enabling these capabilities. These open innovation platforms provide businesses and entrepreneurs with spaces for experimentation and co- creation, facilitating real-time knowledge exchange and collaborative learning. Through continuous interaction among diverse stakeholders, Living Labs and Coworking Spaces enhance firms' absorptive capacities and enable them to explore innovations more flexibly and rapidly.

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While the significance of absorptive capacity, innovation ambidexterity, and collaborative spaces has been extensively studied, a crucial factor often remains underestimated: trust. Whether interpersonal or inter-organizational, trust plays a fundamental role in the seamless exchange of knowledge and cooperation within these innovative ecosystems. It acts as a catalyst, facilitating the integration of new information and enabling organizational ambidexterity. In contexts where internal and external collaboration is vital for innovation, the absence of trust can hinder these efforts, thereby limiting the impact of absorptive capacity and the effectiveness of collaborative spaces such as Living Labs.

The central research question of this paper is therefore: To what extent does trust moderate the relationship between absorptive capacity and innovation ambidexterity? How can trust, amplified through interactions within Living Labs and Coworking Spaces, strengthen this relationship and support ambidextrous innovation? Drawing on theories of innovation management and organizational resources, this paper seeks to explore this link in depth, highlighting the role of collaborative environments and trust as critical levers in the innovation process. This research aims to contribute to the literature and provide concrete avenues for maximizing firms' innovative performance in an increasingly uncertain and competitive environment.

2. Conceptual Framework And Literature Review

2.1 Absorptive Capacity

Absorptive capacity (AC) refers to the processes by which firms identify, assimilate, transform, and exploit external knowledge, thereby fostering organizational dynamism. Zahra and George (2002) break it down into two dimensions: potential absorptive capacity (PAC) and realized absorptive capacity (RAC), with the latter being essential for knowledge transfer. Recent studies suggest that absorptive capacity plays a crucial role in developing organizational ambidexterity, facilitating the acquisition and dissemination of knowledge in constantly evolving environments. Exploratory research conducted within "Smart City" contexts indicates that interactions between knowledge brokers significantly enhance AC.

2.2 Innovation Ambidexterity

Innovation ambidexterity revolves around firms' ability to balance exploring new opportunities (radical innovation) and exploiting existing resources (incremental innovation). The concept of the ambidextrous organization, introduced by Duncan (1976), emphasizes the need to reconcile these often conflicting activities. According to this study's findings, Tunisian firms stand out through increased collaboration that enhances both the creation and exploitation of knowledge. By incorporating a proactive entrepreneurial orientation, these firms succeed in maintaining a balance between exploration and exploitation, thus meeting increasing innovation demands while optimizing current performance.

Entrepreneurial orientation, characterized by innovation, proactivity, and risk-taking (Covin, 1991; Miller, 1983), is recognized for its positive impact on organizational performance. It is essential for overcoming organizational inertia and fostering a culture of innovation. Ahmad's (2016) work shows that absorptive capacity directly influences innovation ambidexterity, both in terms of exploration and exploitation, a dynamic further strengthened by entrepreneurial orientation and inter-organizational trust. This synergy allows firms to effectively reconcile the dual logics of exploration and exploitation, a key element in responding to contemporary innovation challenges.

2.3 Ambidextrous Capability in Innovation

Ambidexterity refers to organizations' ability to simultaneously pursue exploratory and exploitative activities (Gupta et al., 2006). It is perceived as a critical success factor, enabling firms to address immediate needs while preparing for future challenges. According to the

literature, ambidexterity can be considered a state, an organizational mode, or a capability. Ambidextrous organizations successfully blend the exploration of new opportunities with the exploitation of existing resources, leading to more diverse and strategic innovations. The literature emphasizes that balancing these two innovation logics is vital for organizational success.

Inter-organizational trust plays a fundamental role in knowledge sharing and collaboration among firms. It is defined as a shared belief among partners that they will act predictably and benevolently, with mutual interest in mind. This trust facilitates information exchanges, encourages communication, and reduces coordination costs, all of which are essential for maximizing knowledge utilization within innovation. By strengthening inter- organizational relationships, trust creates an environment conducive to stakeholder engagement in collaborative innovation projects.

2.4 Impact of Trust on Absorptive Capacity and Innovation Ambidexterity

Inter-organizational trust positively influences absorptive capacity and innovation ambidexterity. By reducing fears of opportunism, it encourages organizations to share knowledge and resources, thereby facilitating the exploitation of existing expertise while exploring new opportunities. Studies have shown that high levels of trust contribute to more effective knowledge exchange, enhancing both absorptive capacity and innovation dynamics within organizations.

2.5 Living Labs and Coworking Spaces

Living Labs and coworking spaces are examples of collaborative platforms that promote innovation through stakeholder engagement. Living Labs are user-centered innovation ecosystems that bring together researchers, businesses, and citizens to co-create solutions in real-life settings. Coworking spaces, meanwhile, are shared workspaces that encourage collaboration among individuals and companies of various sizes, creating a dynamic environment conducive to innovation.

These platforms play a crucial role in facilitating knowledge exchange, experimentation, and innovation. Living Labs encourage active user engagement from the early stages of the innovation process, enabling exploration and validation of real needs. Similarly, coworking spaces foster co- creation by bringing together individuals with diverse skills, stimulating creativity and the emergence of new ideas. These shared environments are essential for navigating contemporary innovation challenges, offering opportunities for experimentation and collaboration.

2.6 Contribution of Living Labs to Innovation Ambidexterity: A Review of Current Literature

Living Labs are innovative frameworks that promote ambidexterity in innovation, allowing organizations to reconcile exploration and exploitation. Recent literature suggests that these collaborative environments facilitate stakeholder engagement, experimentation, and co-creation, all of which are key elements in driving innovation.

Living Labs are user-centered innovation ecosystems where researchers, businesses, and citizens collaborate to develop and test solutions in real-world contexts (Bergvall- Kåreborn et al., 2009). They involve end-users from the early stages of innovation, fostering an approach that explores user needs and preferences (Schumacher et al., 2017). This approach generates new ideas while validating and refining innovations before market launch. Ambidexterity involves organizations' capacity to juggle exploration of new opportunities and exploitation of existing capabilities. Living Labs play a critical role in this dynamic: **Facilitating Exploration**: They encourage

experimentation and iteration, enabling R&D teams to explore new ideas without the typical constraints of traditional organizational settings (Söderberg et al., 2019). This process fosters radical innovation, essential for addressing contemporary challenges. **Optimizing Exploitation**: These environments offer opportunities for the exploitation of existing knowledge and technologies. Feedback from end-users helps refine products under development, enabling incremental innovations tailored to market needs (Vallance et al., 2019).

2.7 The Role of Coworking Spaces in Innovation Ambidexterity: A Current Literature Review

Coworking spaces are increasingly perceived as environments conducive to innovation, promoting ambidexterity within organizations. By facilitating the exploration of new ideas and the exploitation of existing resources, these shared workspaces contribute to creating a dynamic innovation ecosystem. Coworking spaces are collaborative work environments where individuals and companies of various sizes and sectors share a physical space and resources (Spinuzzi, 2012). They are designed to encourage interaction and collaboration among members, fostering a culture of open innovation. Key features include flexible infrastructures, shared resources, and a diverse community that stimulates exchanges and creativity (Bouncken and Reuschl, 2018).

2.8 Ambidexterity in Coworking Spaces

Organizational ambidexterity is defined as a company's ability to exploit existing capabilities while exploring new opportunities (O'Reilly and Tushman, 2004). Coworking spaces facilitate this dynamic by offering: **Exploration**: These spaces allow members to exchange ideas and collaborate on innovative projects, thereby promoting the emergence of new ideas (Fayard and Weeks, 2007). Events such as workshops and seminars encourage experimentation and creativity (Bouncken and Reuschl, 2018). **Exploitation**: Coworking spaces facilitate the exploitation of existing resources and skills. By providing tailored infrastructures and shared tools, these spaces enable companies to maximize their strengths while reducing costs (Waber et al., 2014).

2.9 Collaboration and Co-Creation

Collaboration is central to the functioning of coworking spaces, where members share resources, ideas, and expertise. This interaction is particularly beneficial for small businesses and start-ups, providing access to networks and knowledge that would otherwise be out of reach (Bouncken and Reuschl, 2018). **Networking**: Coworking spaces offer networking opportunities, allowing members to form fruitful partnerships. Informal interactions foster a continuous innovation dynamic (Dahl and Pedersen, 2004). **Learning Community**: These spaces cultivate a collective learning culture, essential for enhancing ambidexterity as it enables companies to learn from both exploration and exploitation activities (Katz and Allen, 1982). Despite their numerous advantages, coworking spaces also present challenges. Managing interpersonal relationships and resolving conflicts can hinder collaboration (Gandini, 2015). Additionally, the informal nature of these spaces can complicate the structuring of long-term projects (Waber et al., 2014).

3. Hypotheses and Theoretical Model

3.1 Interactions Between Absorptive Capacity and Innovation Ambidexterity

Proposition of a Direct Effect: Absorptive capacity is a determining factor in innovation ambidexterity. Indeed, organizations capable of identifying, assimilating, and exploiting external knowledge can not only innovate continuously but also adapt their internal processes to leverage this new information. This is crucial in a constantly evolving environment where the ability to quickly adapt is essential for maintaining a competitive advantage.

Importance of Exploration and Exploitation: In an innovation context, both dimensions the exploration of new ideas and the exploitation of existing ones—must be balanced. Companies that succeed in integrating these two dimensions into their innovation strategy are often better

positioned to meet market challenges and anticipate future consumer needs.

3.2 Moderating Role of Trust

Moderation Hypothesis: We hypothesize that inter-organizational trust moderates the relationship between absorptive capacity and innovation ambidexterity. When partners in a collaboration trust one another, they are more likely to share crucial information and engage in joint initiatives, which amplifies the effects of absorptive capacity on innovation ambidexterity.

Theoretical Justification: The literature in management and organizational behavior suggests that trust facilitates communication, reduces tensions, and encourages proactive behaviors in inter-organizational collaborations (Dirks & Ferrin, 2022; Gulati & Sytch, 2008). In uncertain environments, trust plays a key role in reducing perceived risks associated with knowledge exchange, which is particularly relevant in shared innovation projects (Sydow & Braun, 2018).

3.3 The Importance of Living Labs and Coworking Spaces in the Model

Facilitators of Trust and Collaboration: Living Labs and Coworking Spaces are environments conducive to collaborative innovation. By bringing together diverse stakeholders—businesses, researchers, entrepreneurs—these spaces foster the exchange of ideas and expertise, thus strengthening inter-organizational trust. Their role is critical in creating a dynamic innovation ecosystem, facilitating interaction and knowledge sharing among participants.

Amplifying Role Hypothesis: We propose that the existence of Living Labs and Coworking Spaces amplifies the link between absorptive capacity and innovation ambidexterity. These environments, by providing platforms for high-quality exchanges, allow organizations to more easily access new ideas and collaborate more effectively, which can enhance their ability to innovate both exploratively and exploitatively.

3.4 The Impact of Absorptive Capacity on Innovation Ambidexterity: The Moderating Role of Inter-Organizational Trust

Recent studies have highlighted that inter-organizational trust is a critical factor for the success of collaborations in complex and uncertain environments. By facilitating knowledge sharing, resource coordination, and joint innovation, trust reduces monitoring costs and improves the fluidity of exchanges (Dirks & Ferrin, 2022; Gulati & Sytch, 2008). It also helps mitigate perceived risks in partnerships, offering greater flexibility in managing uncertainties (Sydow & Braun, 2018). In the context of innovation, inter- organizational trust proves particularly essential as it encourages the exchange of tacit knowledge and facilitates the exploration of new opportunities. These elements are fundamental in ambidextrous innovation environments (Li, Poppo & Zhou, 2020). Recent research shows that organizations that cultivate trust are better prepared to share sensitive information and collaborate effectively, thereby increasing their innovation capacity (Adler & Heckscher, 2018). In summary, inter-organizational trust is a key dimension of cooperation in dynamic and uncertain ecosystems, playing a central role in the development of innovation strategies, governance, and resource allocation.

Hypothesis: Trust acts as a moderator in the positive relationship between knowledge absorption capacity and innovation ambidexterity, amplifying this relationship when trust levels are high.

Preliminary results from our exploratory study reveal significant theoretical insights. We found that inter-organizational trust acts as a crucial catalyst for the knowledge absorption process, both for the exploration of new knowledge and the exploitation of existing knowledge. This dynamic is reinforced by a feedback loop between exploration and exploitation, facilitated by mutual trust within knowledge communities, which promotes knowledge transfer. Competence, as a tangible and measurable element, forms the foundation of this trust (Boughanbouz, 2015). Numerous studies conducted in various contexts have confirmed the link between competence and knowledge sharing (Collins & Smith, 2006; Ozlati, 2012; Whisnant & Khasawneh, 2014). In

this regard, Levin and Cross (2004) showed that competence is a lever facilitating knowledge sharing (Rahman, 2014). Collins (2006) examined the relationship between competence and knowledge sharing in the high-tech sector, particularly at the intra-organizational level. His analysis reveals that credibility plays a central role in knowledge sharing, both explicit and tacit, with a notable impact on the latter. Ozlati (2012) also studied this link, but his empirical results within organizations did not always confirm this relationship. Therefore, while theoretical conclusions converge, empirical results diverge.

Building on this research, we consider that competence, as an indicator of mastery of the expertise required for network functioning, encourages partners to engage in knowledge exchanges and sharing. This collaboration creates value through synergy and complementarity. Whisnant and Khasawneh (2014) highlighted a significant link between trust and tacit knowledge sharing, while Rego et al. (2013) demonstrated that competence positively influences the willingness to share this knowledge. In a network, when partners recognize each other's competence, they become more invested in joint projects, sometimes going beyond formal exchanges to develop new initiatives, thus increasing tacit knowledge sharing. Competence-based trust relies on belief in the partner's expertise (Rajaobelina, 2011; Ozlati, 2012), encompassing dimensions such as technical skills, abilities, knowledge, and results achieved. Companies often entrust their projects to the most competent individuals, partnering with those perceived as capable of carrying out complementary activities (Boughanbouz, 2015). Furthermore, reputation can also reflect this professional competence (Barber, 1983; Dobing, 1993; McKnight et al., 1995).

In a constantly changing economic environment, innovation, which is a source of prosperity, relies on a knowledge base that determines a company's ability to learn and explore. The company places its trust when it recognizes the strategic competencies of its partners, perceived as qualities of honesty, reliability, and discretion. This underscores that inter-organizational relationships facilitate access to information. According to Jansen (2005) and Data (2009-2010), realized absorptive capacity strengthens knowledge ambidexterity. This learning process, both exploratory and exploitative, is a sub- phase of absorptive capacity. Trust, like absorptive capacity, fosters innovation ambidexterity. Based on these theoretical and empirical considerations, we propose that inter- organizational trust fosters the simultaneous coexistence of exploration and exploitation of innovations, thus contributing to bidimensional ambidexterity. Therefore, entrepreneurial orientation plays a mediating role between absorptive capacity and innovation ambidexterity, both at the exploration and exploitation levels.

4. METHODOLOGY

4.1 Research Design

Our approach is based on a positivist methodology, combining a thorough analysis of existing literature with exploratory studies. This approach allows us to build a solid theoretical framework and assess the relationships between absorptive capacity, innovation ambidexterity, and the moderating role of trust. The choice of this methodology is driven by the need to explore causal relationships and obtain rigorous empirical data to validate the hypotheses formulated in our conceptual model. We adopted a mixed- methods approach, primarily quantitative, but preceded by an exploratory qualitative phase. This approach is justified by the complexity of the interactions between the studied variables, which require both a contextual understanding (through interviews) and statistical verification (through quantitative analysis). The model was tested using structural equation modeling (AMOS), ensuring rigor in the analysis of the relationships between variables.

4.2 Sample and Data Collection

The sample for our study consists of 258 entrepreneurs and incubators of startups and SMEs

operating in the Information and Communication Technology (ICT) sector in Tunisia, with a particular focus on companies located within the "Smart City" framework. This sample choice is motivated by the key role these companies play in the innovation ecosystem, particularly in a rapidly changing environment like the ICT sector. Data collection was carried out through several channels. First, structured questionnaires were distributed to the sample, allowing us to obtain standardized and quantifiable responses. At the same time, we conducted in-depth interviews with fifteen key stakeholders, including innovation experts, project leaders, and startup representatives, to enrich our understanding of organizational dynamics and inter-organizational relationships. Finally, observations were made in collaborative environments such as Living Labs and Coworking Spaces, where innovation is facilitated by continuous interactions among actors.

4.3 Measured Variables and Analytical Tools

The variables in our conceptual model are divided into three categories:

Independent Variables: Absorptive capacity (AC), measured through dimensions such as acquisition, assimilation, transformation, and exploitation of knowledge.

Dependent Variables: Innovation ambidexterity, which encompasses both the exploration of new opportunities (exploratory innovation) and the exploitation of existing resources (exploitative innovation).

Moderating Variables: Inter-organizational trust, assessed in terms of perceived competence, integrity, and benevolence in partner relationships. Data analysis was performed using robust statistical tools to validate the model's hypotheses. The quantitative data collected were analyzed using the AMOS tool (version 25.0), a specialized platform for structural equation modeling (SEM). This type of analysis allows for the simultaneous testing of multiple causal relationships and the evaluation of the overall model fit. Regression tests, mediation, and moderation analyses were used to determine the impact of absorptive capacity on innovation ambidexterity while accounting for the moderating role of trust.

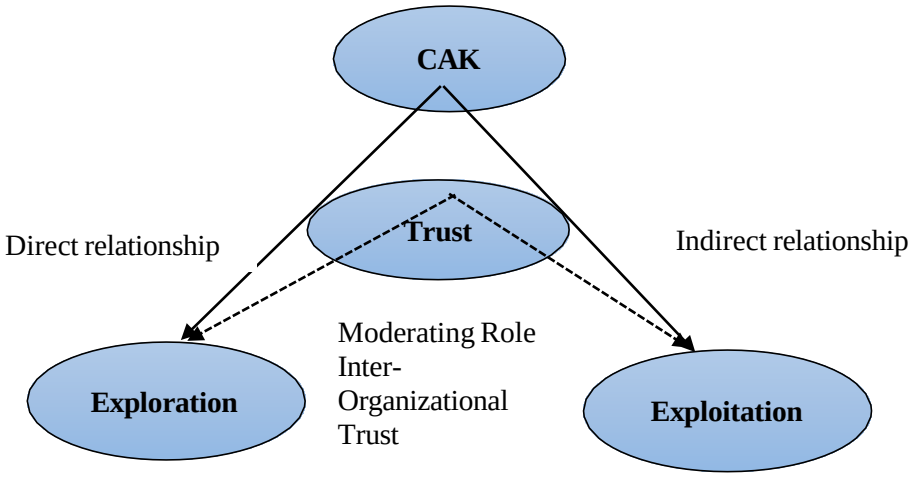

Fig. Conceptual Model: The Link Between Knowledge Absorptive Capacity and Exploration and Exploitation Innovation Ambidexterity Through the Moderating Role of Inter-Organizational Trust

This conceptual model establishes a link between knowledge absorptive capacity and innovation ambidexterity, both in terms of exploration and exploitation, highlighting the moderating role of inter-organizational trust.

5. RESULTS

5.1 Effect of Knowledge Absorptive Capacity (KAC) on Innovation Ambidexterity (IA)

The study confirms a positive and significant relationship between knowledge absorptive capacity (KAC) and innovation ambidexterity (IA). Companies with a strong ability to acquire, assimilate, transform, and exploit knowledge are better equipped to balance exploration and exploitation, enabling them to develop ambidextrous innovation capacity. These findings validate the hypothesis that KAC is a critical lever for reconciling the two dimensions of innovation in Tunisian ICT companies.

Tab1: Summary of Factorial Analyses and Scale Reliability

Variable (KAC)	Explained Variance (%)	Correlations (min-max)	Cronbach's Alpha	Overall Reliability
Knowledge Acquisition	64.03	0.328 - 0.691	0.882	Good internal consistency
Knowledge Assimilation	58.85	0.425 - 0.581	0.881	Excellent reliability
Knowledge Transformation	71.27	0.453 - 0.874	0.919	Exceptional consistency
Knowledge Application	64.82	0.475 - 0.663	0.882	Excellent stability

The analyses indicate that the scales effectively measure a single dominant factor. Cronbach's Alpha coefficients exceed 0.80, demonstrating strong internal consistency and high reliability.

Tab2: Key Results of Confirmatory Factor Analysis (CFA)

Variable (KAC)	CMIN / DF	RMSEA	NFI	CFI	TLI	Rh o VC	Joresko g Rho
Knowledge Acquisition	1.333	0.036	0.994	0.998	0.994	0.565	0.884
Knowledge Assimilation	2.156	0.067	0.963	0.980	0.969	0.521	0.884
Knowledge Transformation	1.731	0.053	0.989	0.995	0.990	0.642	0.914
Knowledge Application	1.107	0.020	0.994	0.999	0.998	0.622	0.914

Fit indices such as CMIN/DF, RMSEA, NFI, and CFI show highly satisfactory values, confirming the models' good fit. Additionally, Rho VC and Joreskog Rho coefficients exceed the minimum thresholds, verifying the internal reliability of the measures.

Tab3: Summary of Results for the Ambidexterity Dimension – Exploratory Innovation

Step	Key Indicators	Values/Observations
Factor analysis before purification	KMO Index and Bartlett's test: KMO = 0.929; Bartlett: $p < 0.001$	The sample is suitable for factor analysis; significant test.
	Correlations: Strong correlations among items (e.g., IEXPR2-IEXPR3: 0.701; IEXPR5-IEXPR6: 0.677).	Good internal consistency of items.
	Representation quality: Mean extractions = 0.682.	Variables contribute adequately to principal components.
	Total explained variance: 2 principal components (69.29% cumulative	High explained variance, two main components identified.

	variance).	
Factor analysis after purification	Cronbach's Alpha: 0.922.	Excellent item reliability.
	KMO Index and Bartlett's test: KMO = 0.923; Bartlett: $p < 0.001$	Indicators remain significant after purification.
	Representation quality: Mean extractions = 0.664.	Slight decrease after purification but remains acceptable.
	Total explained variance: One principal component (61.63% cumulative variance).	Simplified structure, slightly reduced variance explained.
	Cronbach's Alpha: 0.922.	Reliability maintained despite item removal.

Exploratory factor analysis was conducted to explore the underlying structure of the variable "Exploratory Innovation." Pre-purification, the KMO index of 0.929 and Bartlett's test ($p < 0.001$) confirmed data suitability. Moderate to strong correlations among items (e.g., IEXPR5-IEXPR6: 0.677) indicated good internal consistency. The analysis revealed two main components explaining 69.29% of the cumulative variance. Post-purification, the KMO index remained high (0.923), with a single principal component emerging, explaining 61.63% of the cumulative variance. Representation quality slightly decreased but remained acceptable. Cronbach's Alpha remained excellent (0.922), validating the scale's robustness after item removal.

Tab 4: Summary of Fit Indices for Confirmatory Factor Analysis (CFA) – "Exploratory Innovation" Variable

Indicators	Key Values	Interpretation
CMIN/DF (Normalized χ^2)	1.513 ($p = 0.080$)	Well-fitted model, as the value is below 3 and $p > 0.05$.
Comparison Indices (NFI, IFI, CFI, TLI)	NFI = 0.983; IFI = 0.994; CFI = 0.994; TLI = 0.987	Excellent fit; values near 1 indicate a good model.
RMSEA (Root Mean Square Error of Approximation)	0.045 (90% CI: [0.000 – 0.078], PCLOSE = 0.562)	Very good fit; RMSEA < 0.05 and PCLOSE > 0.05.
AIC (Akaike Information Criterion)	99.727	Low relative value, suggesting an economically efficient model.
ECVI (Expected Cross-Validation Index)	0.388 (90% CI: [0.354 – 0.457])	Good model stability according to the ECVI index.
HOELTER (Critical Sample Size)	$p < 0.05$: 276; $p < 0.01$: 334	Sample size sufficient to ensure result robustness.
Internal Consistency (λi and Rho)	Standardized loadings λi: 0.676 to 0.828; Rho vc = 0.550; Joreskog Rho = 0.916	Good internal consistency. Average Variance Extracted (Rho vc) > 0.5 and composite reliability (Joreskog Rho) > 0.7.

The CFA conducted using AMOS 25 for the "Exploratory Innovation" variable indicates a well-fitted model. The CMIN/DF ratio of 1.513, with a non-significant p-value ($p = 0.080$), suggests the data aligns adequately with the hypothesized model. Comparison indices (NFI = 0.983; IFI = 0.994; CFI = 0.994; TLI = 0.987) exceed the recommended threshold of 0.9, confirming excellent model fit. The RMSEA of 0.045 (90% CI: [0.000 – 0.078]) and PCLOSE of 0.562 indicate a near-perfect fit, as RMSEA is well below 0.05. AIC (99.727) and ECVI (0.388) values suggest that the model is parsimonious and stable. HOELTER indices confirm that the sample size (276 for $p < 0.05$) is sufficient for robust results. Factor loadings (λi) ranging from 0.676 to 0.828, along with Rho coefficients, further confirm the model's high reliability.

Tab 5: Summary of Results for the Ambidexterity Dimension – Exploitative Innovation

Step	Key Indicators	Values/Observations
Factor analysis before purification	KMO Index and Bartlett's test: KMO = 0.852; Bartlett: $p < 0.001$	The sample is suitable for factor analysis; significant test.
	Correlations: Moderate to strong correlations (e.g., IEXPT3-IEXPT4: 0.718; IEXPT5-IEXPT6: 0.783).	Good internal consistency of items.
	Representation quality: Mean extractions = 0.780.	Variables contribute adequately to principal components.
	Total explained variance: 2 principal components (78.02% cumulative variance).	High explained variance, coherent factor structure.
	Cronbach's Alpha: Not calculated at this stage.	Reliability evaluated post- purification.
Factor analysis after purification	KMO Index and Bartlett's test: KMO = 0.843; Bartlett: $p < 0.001$	Indicators remain significant after removing less relevant variables.
	Correlations: Strong correlations among retained items (e.g., IEXPT5-IEXPT6: 0.783).	Good consistency among remaining variables.
	Representation quality: Mean extractions = 0.738.	Contribute adequately to the main component.
	Total explained variance: One principal component (71.21% cumulative variance).	Simplified yet relevant structure.
	Cronbach's Alpha: 0.899 (5 items).	Excellent item reliability.

Exploratory factor analysis for the "Exploitative Innovation" variable revealed a strong factor structure. Pre-purification, the KMO index of 0.852 and Bartlett's test ($p < 0.001$) confirmed suitability for analysis. Two main components emerged, explaining 78.02% of cumulative variance, with moderate to strong correlations among items (e.g., IEXPT3- IEXPT4: 0.718). Post-purification, five items were retained (IEXPT3 to IEXPT7), enhancing model consistency. The KMO index remained high (0.843), and a single main component explained 71.21% of cumulative variance. Factor loadings ranged from 0.802 (IEXPT3) to 0.877 (IEXPT5), indicating strong variable contributions. Overall reliability, measured by Cronbach's Alpha, was excellent (0.899), confirming item homogeneity and scale validity.

Tab 6: Summary of Results for CFA – "Exploitative Innovation" Variable

Indicators	Key Values	Interpretation
CMIN/DF (Normalized χ^2)	1.944 ($p = 0.100$)	Well-fitted model: value below 3 and $p > 0.05$.
Comparison Indices (NFI, IFI, CFI)	NFI = 0.990; IFI = 0.995; CFI = 0.995	Excellent model fit; values near 1 confirm good correspondence.
RMSEA (Root Mean Square Error of Approximation)	0.061 (90% CI: [0.000 – 0.124], PCLOSE = 0.321)	Acceptable fit: RMSEA slightly > 0.05, but CI includes 0 and PCLOSE > 0.05, which is satisfactory.
AIC (Akaike Information Criterion)	39.777	Low value: the model is parsimonious and efficient.

ECVI (Expected Cross- Validation Index)	0.155 (90% CI: [0.140 – 0.202])	Good model stability and generalizability.
HOELTER (Critical Sample Size)	HOELTER ($p < 0.05$) = 314; HOELTER ($p < 0.01$) = 439	Sample size sufficient to ensure result robustness.
Internal Consistency (λi and Rho)	Factor loadings λi: 0.654 to 0.894; Rho vc = 0.621; Joreskog Rho = 0.890	Solid reliability: Rho vc > 0.6 and Joreskog Rho > 0.7 indicate high internal consistency.

The confirmatory factor analysis (CFA) for the variable **"Exploitation Innovation"**, performed using AMOS, demonstrates a good model fit. The CMIN/DF ratio is **1.944**, with a non-significant p-value (**p = 0.100**), indicating that the model aligns well with the data. The comparative indices (NFI = 0.990; IFI = 0.995; CFI = 0.995) are excellent, with values close to 1, validating the model's overall fit. The RMSEA is **0.061**, which is within acceptable limits, albeit slightly higher than the threshold of 0.05. The confidence interval includes 0, and the probability of close fit (PCLOSE = **0.321**) is high, enhancing the credibility of the results. The AIC (**39.777**) and ECVI (**0.155**) indices confirm the model's parsimony and stability. Regarding internal consistency, the factor loadings (λi) of the items range from **0.654 (IEXPT3)** to **0.894 (IEXPT5)**, showing strong contributions of the items to the latent factor. Internal reliability indicators are satisfactory, with an extracted variance (Rho vc) of **0.621** and Jöreskog's rho of **0.890**, demonstrating the scale's strong homogeneity. These findings highlight that the model is robust, reliable, and well-suited for measuring exploitation innovation.

5.2 The Moderating Role of Inter-Organizational Trust (IOT)

The results underline the crucial role of **inter-organizational trust (IOT)** in the relationship between knowledge absorption capacity (KAC) and innovation ambidexterity (IA). Trust facilitates high-quality exchanges among collaborative actors, promoting information sharing and the co-creation of new knowledge. Analyses reveal that in collaborative environments such as **Living Labs** and coworking spaces, IOT enhances knowledge integration and strengthens the synergy between exploration and exploitation activities. Specifically, high interpersonal trust boosts the engagement and autonomy of stakeholders, both critical elements for successful innovation projects. In coworking spaces, this trust encourages open sharing of cognitive resources and fosters diverse perspectives, catalyzing the co-creation of innovations. Furthermore, IOT helps establish a stable and cooperative environment conducive to generating innovative and disruptive solutions. These dynamics significantly improve exploratory and exploitative innovation performance.

5.3 Summary of Exploratory Factor Analyses and Scale Reliability

The scales measuring the variables **"Competence," "Benevolence," and "Integrity"** were validated through exploratory and confirmatory factor analyses.

Table 7: Results of Exploratory Analyses

Variable	Variance Explained (%)	Correlations (Max)	KMO Index	Bartlett's Test (χ^2)	Cronbach's Alpha	Interpretation
Competence	70.48	0.775	0.783	χ^2 = 508.275, $p < 0.001$	0.855	High internal consistency
Benevolence	73.52	0.649	0.758	-	0.819	Solid reliability

Integrity	65.73	0.752	0.904	χ^2 = 1056.002, $p < 0.001$	0.907	Exceptional reliability

These analyses confirm the robustness of the scales used to measure the variables. For "Competence", the variance explained is 70.48%, with a maximum correlation of 0.775, a KMO index of 0.783, and a significant Bartlett's test ($\chi^2 = 508.275$, $p < 0.001$). Cronbach's alpha is 0.855, indicating high internal consistency. The "Benevolence" scale explains 73.52% of variance, with a maximum correlation of 0.649, a KMO index of 0.758, and a Cronbach's alpha of 0.819, reflecting solid reliability. For "Integrity", the variance explained is 65.73%, with a maximum correlation of 0.752, an exceptional KMO index of 0.904, and a Cronbach's alpha of 0.907, confirming exceptional reliability.

Tab 8: Summary of Confirmatory Factor Analysis (CFA) Results

Variable	CMIN/DF	RMSEA	NFI	CFI	TLI	Rho VC	Jöreskog's Rho
Competence	0.643	0.000	0.999	1.000	1.004	0.601	0.854
Benevolence	3.472	0.067	0.970	0.960	0.950	0.605	0.821
Integrity	1.233	0.030	0.991	0.998	0.997	0.571	0.888

The models for the variables demonstrate excellent fit and internal consistency, as evidenced by the fit indices (e.g., CFI and RMSEA) and reliability metrics (e.g., λi, Rho vc, Jöreskog's rho). The models effectively measure **"Competence," "Benevolence," "Integrity," "Exploration Innovation,"** and **"Exploitation Innovation"**.

Tab9: Summary of Relationships Studied Between IOT and KAC

Hypothesis/Relation	Estimate	S.E.	C.R.	P	Label
CAR → Ambidexterity (Realized KAC)	0.486	0.055	8.906	***	and significant relationship
CAP → Ambidexterity (Potential KAC)	0.261	0.060	4.343	***	Moderate significant effect
CA → Ambidexterity (Overall KAC)	0.178	0.048	3.711	***	Positive but low impact
Trust → Ambidexterity	0.301	0.062	4.869	***	Significant and direct influence
Trust_X_OrgDeterminan t → Ambidexterity	0.154	-	-	-	Confirmed moderating effect

The findings confirm that **knowledge absorption capacity (KAC)**, across its different dimensions, is a key predictor of **innovation ambidexterity (IA)**. **Realized KAC (CAR)** has the strongest impact (**0.486**), indicating a strong positive correlation with the balance between exploration and exploitation. **Potential KAC (CAP)** also shows a significant relationship (**0.261**), emphasizing the importance of assimilation and transformation processes. Overall KAC (CA) has a positive but weaker effect (**0.178**), suggesting that organizations with strong KAC are better equipped to innovate. Additionally, **inter- organizational trust (IOT)** plays a central role, with a significant direct influence (**0.301**) on IA, enhancing collaborative interactions and fostering an innovation- conducive environment. Its moderating role (**0.154**) amplifies KAC's effect on IA by improving the interaction between exploration and exploitation processes.

These results demonstrate that knowledge absorption capacity, in both its realized and potential components, is essential for achieving innovation ambidexterity. They also highlight the importance of inter-organizational trust as both a direct factor and a strategic lever to maximize

KAC's impact. Collaborative environments based on trust significantly enhance innovation performance.

5.4 Impact of Living Labs and Coworking Spaces

Living Labs and Coworking Spaces play a key role in enhancing absorptive capacity and promoting innovation ambidexterity. These environments, designed to encourage co- creation and experimentation, allow companies to better integrate external and internal knowledge, thus creating a conducive framework for innovation. Field observations revealed that these spaces facilitate interdisciplinary interactions, an essential element for overcoming innovation barriers. Our results demonstrate that socio-cognitive interactions in these collaborative workspaces are strongly influenced by trust among members. This climate of trust enables coworkers to share their experiences, co-create new ideas, and collaborate closely on innovative projects. The analysis also shows that Tunisian startups operating in these environments successfully leverage these dynamics to develop innovative products, despite the financial and regulatory challenges they face. Moreover, the multidisciplinary nature of teams in Living Labs contributes to enriching innovation processes, and members are encouraged to adopt an open collaboration approach to solve complex problems and design innovative solutions. In summary, Coworking Spaces provide an environment that fosters not only mutual learning but also networked innovation, thus increasing the absorptive capacity and innovation ambidexterity of the involved actors.

6 Discussion

The results of our study highlight that trust plays a significant moderating role in the relationship between absorptive capacity (AC) and innovation ambidexterity (IA). More specifically, trust amplifies the positive effect of entrepreneurial orientation (EO) on ambidexterity, whether in exploring new opportunities or exploiting existing resources. These findings align with the work of various authors (Ozlati, 2012; Rego et al., 2013; Hernandez-Linares et al., 2019), who demonstrate that inter-organizational trust (IOT) strengthens the direct relationship between EO and ambidexterity. Regarding the role of Living Labs and Coworking Spaces, these spaces emerge as essential catalysts in this process. By fostering collaboration and knowledge sharing, they help to build trust among actors, thereby facilitating innovation ambidexterity. Our results also confirm the crucial role of trust in intra- and inter-organizational exchanges, especially in technology- intensive sectors, where trust helps to overcome the risks of opportunism and uncertainty. However, the results concerning the effect of trust on certain dimensions of the indirect relationship between EO and ambidexterity, mediated by factors such as innovativeness, risk- taking, and competitive aggressiveness, are more nuanced. For example, the hypothesis that trust would improve this indirect relationship through innovativeness was not validated. These results contrast with some earlier studies (Aliouat, 2010; Coeurderoy & Ingham, 2010), suggesting that trust can sometimes limit innovation when overestimated within innovation networks.

6.1 Theoretical Implications

This study contributes to the literature on innovation, absorptive capacity, and inter-organizational trust by showing that trust is not merely a facilitating factor but a key moderator in the relationship between EO and innovation ambidexterity. Our results reinforce the idea that inter-organizational trust, through collaborative spaces such as Living Labs and Coworking Spaces, plays a central role in enhancing organizations' ability to balance exploration and exploitation. Furthermore, our findings provide nuance to existing works on the role of trust in innovation processes. While trust can indeed act as a lever in certain contexts, it may also prove counterproductive if not accompanied by risk management mechanisms and sufficient transparency. This opens interesting perspectives for future research, particularly on the impact of

different dimensions of trust (competence, benevolence, honesty) in ambidextrous innovation contexts.

6.2 Managerial Implications

For practitioners, our findings suggest several recommendations. First, organizations should pay particular attention to developing trust among stakeholders, as it amplifies the positive effects of EO on innovation ambidexterity. It is crucial to create a collaborative environment, such as through spaces like Living Labs or Coworking Spaces, where trust can be strengthened through regular and open interactions. Second, leaders must be aware of the potential limits of trust, especially in highly competitive or uncertain environments. Excessive trust can slow decision-making or limit an organization's ability to innovate due to a fear of taking risks. A balanced management of trust, accompanied by a rigorous performance management framework, is therefore necessary to maximize innovation benefits. Finally, our results underscore the importance of autonomy and proactivity in maximizing innovation ambidexterity. Managers should encourage these behaviors by providing greater leeway for their employees while maintaining a strong trust climate. This not only fosters the exploration of new opportunities but also better exploits existing resources and capabilities. Overall, our study highlights the central role of trust in an organization's ability to effectively navigate between exploration and exploitation. By fostering collaborative environments and strengthening risk and autonomy management, organizations can maximize their innovation potential.

6.3 Limitations of the Study and Future Research Directions

Although this research has provided insightful findings, it presents certain methodological limitations. Our cross-sectional approach, based on a specific sample of startups and SMEs in the ICT sector in Tunisia, limits the generalizability of the results to other sectors or regions. Future studies should incorporate longitudinal analyses to better understand the evolution of collaborative dynamics and innovation over time. Expanding the sample to include other industries or international contexts would also be pertinent to explore whether the observed conclusions hold true elsewhere. Furthermore, future research could explore how emerging technological tools, such as artificial intelligence or digital collaboration platforms, impact the effectiveness of collaborative spaces like Living Labs and coworking spaces in promoting sustainable innovation.

Our research emphasizes the growing importance of collaborative spaces within the framework of digital transformation and "Smart Life." Living Labs, where diverse actors (businesses, researchers, users) converge, and coworking spaces play a crucial role in the emergence of collaborative practices based on trust and shared innovation. These environments, grounded in a co-creation logic, encourage experimentation and collective learning, enabling companies to better capture and leverage knowledge from various sectors. In this context, innovation ambidexterity this ability to reconcile the exploration of new ideas with the exploitation of available resources emerges as a fundamental lever for ensuring sustainable innovation.

7. Conclusion

This study revealed profound links between absorptive capacity, innovation ambidexterity, inter-organizational trust, and collaborative spaces within the ICT ecosystem in Tunisia, particularly in "Smart Cities." Companies that excel at navigating between the exploration of new ideas and the exploitation of existing resources (innovation ambidexterity), while maximizing their absorptive capacity, stand out for their superior performance. Trust among inter-organizational partners, catalyzed by the use of collaborative spaces such as Living Labs and coworking spaces, strengthens collective innovation. These work environments foster not only the creation of new ideas but also the seamless exchange of tacit knowledge, which is crucial for the competitiveness

of companies in a dynamic and digitized market. The integration of these spaces within "Smart Life" ecosystems enables companies to better address the challenges posed by digital transformation. Living Labs, in particular, represent environments where new technologies and social practices intersect, stimulating innovation both locally and globally. Similarly, coworking spaces provide entrepreneurs and startups with access to multidisciplinary networks and resources that would otherwise be inaccessible, facilitating the emergence of innovative ideas and the creation of inter-organizational synergies.

In an increasingly globalized and interconnected world, companies must adapt quickly to technological and societal changes. By encouraging the use of collaborative spaces such as Living Labs and coworking spaces, and fostering a climate of trust, businesses can better integrate the principles of sustainable innovation. This collaborative approach is essential for addressing contemporary innovation challenges, combining technological advancements with practical and sustainable solutions for communities. "Smart Life" thus represents an ideal framework for responsible innovation, where co-creation and the cross-disciplinary exchange of knowledge can meet economic, social, and environmental

challenges. In conclusion, the transition to a "Smart Life" environment relies not only on technology but, more importantly, on human collaboration and knowledge exchange. Living Labs and coworking spaces, as platforms for collective innovation, have become essential pillars for building a more sustainable and inclusive future. They offer companies the opportunity to anchor themselves in an ecosystem where innovation is no longer a matter of competition, but of co-creation, thereby ensuring a competitive advantage in an ever-evolving world.

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