Article

Network and Business Performance Installed in Coworking Spaces: Evidence and Associations

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Abstract: Space sharing for companies has become a trend in the last decade. Many of the benefits of these spaces go beyond the financial scope, creating real value-added processes from these spaces. This study examines the associations between networks developed in coworking spaces and business performance. This research was quantitative, exploratory, and descriptive ex post facto. A survey was conducted among companies installed in coworking spaces in Recife, Brazil. The sample consisted of 77 valid respondents, and the data were analyzed using descriptive and inferential statistics that measure central tendency, factor analysis, and Spearman (ordinal indicators) and Pearson (resulting factors) correlations, in addition to reliability tests and adequacy of the sample, necessary in the refinement of the scales. This study makes a theoretical contribution by specifying the concept of coworking, a topic still underexplored in the literature, and by defining networks in this context, which allowed for the development of a measurement scale. It also discusses the performance construct and its measurement classes, which showed significant internal consistency. Despite the consistency in the data, only the hypothesis of a positive and significant association between network and market performance was partially accepted, demonstrating that more than the network alone was needed to generate results among coworkers. This lack of association contradicts the literature as it is the most discussed aspect in qualitative studies on coworking and suggests that the network may not be a final resource but rather a means by which users obtain benefits such as benchmarks, creative ideas, and adaptation of business practices.

Keywords: network; performance; coworking; CWS

1. Introduction

Coworking spaces (CWSs) are shared workspaces used by companies, entrepreneurs, and freelancers from different areas and specializations, designed to facilitate collaboration among users with similar professional goals (Spinuzzi 2012; Capdevila 2014; Gandini 2015; Oswald and Zhao 2022; Oliveira Junior and Costa 2023). These spaces have become one of the three most significant transformations in the work environment, particularly in fostering knowledge exchange (Seo et al. 2017). These spaces embody a new production paradigm, which Krause (2019) considers "uberism" (a term related to Uber relationships). This nomenclature refers to the current trend of sharing goods, focusing on the absence of total ownership of assets and the creation of value from the provision of services (Krause 2019). In addition, the COVID-19 pandemic has stimulated remote work, and collaboration places are an alternative to face-to-face meetings (Andrews 2022).

Spinuzzi (2012) states that in CWSs, social hubs are formed, a situation in which coworkers leave isolation and start to interact, facilitating the meeting of complementary skills, knowledge sharing, and combinations of expertise (Milovanovic 2015; Parrino 2015; Lee 2016; Cabral 2021; Howell 2022), unlike when they are located in private or small offices (Clifton et al. 2022). The connections between users are explicit (Waters-Lynch and

Potts 2017) and leveraged by how coworking environments are designed (Spinuzzi 2012; Capdevila 2013, 2014, 2015; Milovanovic 2015; Castilho and Quandt 2017; Seo et al. 2017). The networks make the coworking space a unique workplace (Spinuzzi 2012; Capdevila 2013; Soares and Saltorato 2015).

Coworking spaces (CWSs) have been expanding rapidly both nationally and internationally (Capdevila 2015; Suárez 2016; Riadinska et al. 2018; Howell 2022; Oliveira Junior and Costa 2023; Méndez-Ortega et al. 2024), driven by factors such as improved economic and financial conditions through reduced infrastructure costs, mobility, and access to suitable workspaces (Nakao 2017; Mariotti et al. 2021). Data from the Global Coworking Survey (Foertsch 2019) indicate that the average number of coworkers internationally went from 38 users per space in 2012 to 185 in 2019. In Brazil, the most recent Census, Coworking Brasil (2020), shows a 629% increase in CWSs since 2015, which follows the global trend. The State of Pernambuco stands out for having the most significant number of coworking spaces mapped by the survey in the Northeast region (Coworking Brasil 2020).

Despite this global expansion, most research has focused on developed markets (Fuzi 2015; Waters-Lynch and Potts 2017), leaving a gap in understanding the effects of CWSs on micro and small enterprises (MSEs) in developing countries, where economic and network dynamics may be different. Fai et al. (2024) show that CWSs can contribute to local policy and regional development, especially in developing countries, and suggest that CWSs should be integrated into discussions on local placemaking and policy planning.

Regarding business performance in CWSs, Howell (2022) suggests research on how it interacts with the networks generated in these environments, while Nakao (2017) highlights that coworkers can enhance their performance by leveraging networking opportunities for professional growth and referrals. Despite the global rise in CWSs, empirical studies examining how these networks affect firm performance, especially in emerging economies, remain limited. Uda and Abe (2015) emphasize that a comprehensive understanding of coworking requires surveys of coworkers, the users of these spaces (Spinuzzi 2012; Capdevila 2014; Gandini 2015), and the application of advanced statistical techniques such as correlation, regression, and factor analyses. These methods are crucial for analyzing how coworking arrangements affect business organization and performance (Uda and Abe 2015).

This study therefore seeks to fill the gap presented in the literature (Uda and Abe 2015; Nakao 2017; Howell and Bingham 2019; Howell 2022; Fai et al. 2024) by conducting a quantitative analysis of the association between networks developed in coworking spaces and the business performance of SMEs in Recife, Brazil. Unlike previous research, which tends to focus on subjective perceptions of success, this paper adopts a quantitative approach to measure the real impact of coworking networks on firms' financial and market performance.

In this context, this research aims to analyze the associations between the characteristics of networks developed in coworking spaces and the performance of businesses installed in Recife City, Brazil. Some authors state that the concept of coworking is still little explored academically and needs further studies (Capdevila 2015; Abe and Uda 2016; Nakao and Mussi 2018; Howell and Bingham 2019; Clifton et al. 2022; Oswald and Zhao 2022). In doing so, this article not only expands the literature on coworking by including an empirical, data-driven perspective but also explores the phenomenon in a geographically underrepresented region in academic research, which validates the relevance of the present study.

2. Theoretical Background

2.1. Network in CWSs

Coworking spaces (CWSs) foster professional connections and partnerships that benefit users, leading them to realize the value of being part of the environment (Waters-Lynch and Potts 2017). The networking opportunities and the diversity of ideas existing in these spaces are the main reasons why users choose coworking for their businesses (Fuzi 2015;

Soares and Saltorato 2015; Howell 2022; Oswald and Zhao 2022; Rådman et al. 2022; Méndez-Ortega et al. 2024).

Key characteristics of CWSs increase the value perceived by coworkers and redefine society's understanding of physical boundaries (Yacoub and Haefliger 2024). Spinuzzi (2012) highlights space, professionalism, and design, which provide comfort to its users and possibilities to serve customers, investors, and business partners or even work alone in an organized, professional environment with less informality and social isolation than the home office. This combination of characteristics has the potential to generate innovative results that could increase the possibilities of superior performance and competitiveness for the businesses and professionals involved (Milovanovic 2015; Lee 2016; Castilho and Quandt 2017; Seo et al. 2017; Howell 2022). Furthermore, it could enhance a business's sustainability potential (Bouncken et al. 2023).

In addition, coworking spaces attract professionals from traditional office settings because of the opportunity for networking and collaboration (Bueno et al. 2018; Cheah and Ho 2019). As mentioned, coworking spaces are designed to be open, inclusive, and shared by people from different backgrounds and functions including entrepreneurs, freelancers, artists, researchers, and students (Cheah and Ho 2019; Oswald and Zhao 2022). It is not by chance that the plurality found in coworking spaces and the possibilities for professional connections and networking are some of the main reasons why users choose this space model for their businesses (Fuzi 2015; Soares and Saltorato 2015; Rådman et al. 2022).

Gerdenitsch et al. (2016) emphasize the support and mutual help that develop through spontaneous connections. These interactions often lead to connections between people who did not know each other before but who, by sharing the same space, provide support in terms of feedback, brainstorming, and coaching based on informal relationships. Capdevila (2014) and Fuzi (2015) also support the relevance of informal interactions with collaborations arising from daily interactions.

Uda and Abe (2015) found that 74% of coworkers reported advancements and improvements in new business ideas due to these interactions, and 84% emphasized the importance of maintaining these connections. Therefore, most members can take advantage of collaborative practices and promote changes in the business or look at their careers similarly. Networking based on "unlikely encounters" (Hoendervanger et al. 2018) fosters the exchange of ideas, learning, creativity, and innovation (Soares and Saltorato 2015; Capdevila 2015; Castilho and Quandt 2017; Oswald and Zhao 2022). Table 1 summarizes the discussion about networks in coworking spaces.

Table 1. Summary of networks in CWSs.

General Property	Specific Features	Reason	Theoretical Background
CWSs as a social hub	Social interactions; unlikely encounters	Experience. Development of entrepreneurial activities	Bilandzic and Foth (2014); Fuzi (2015); Seo et al. (2017); Hoendervanger et al. (2018)
		Creativity. Innovation.	Capdevila (2015); Soares and Saltorato (2015); Castilho and Quandt (2017)
CWSs as collaboration	Instrumental support	Feedback, brainstorming, and coaching.	Gerdenitsch et al. (2016)
	Interorganizational learning	Tacit knowledge development and transmission. Competitive advantage. Experience	Bilandzic and Foth (2014); Capdevila (2014)

Source: own elaboration, 2022.

2.2. Organizational Performance and Its Measurement

Although the performance theme is a constant presence in the academic debate in the area (Venkatraman and Ramanujam 1986; Lebas and Euske 2002; Costa et al. 2016; Gomes

and Callado 2017), its definition is multifaceted and divergent. Carneiro et al. (2005) argue that no single measure can fully capture the complexity of performance, as it involves both financial and non-financial indicators that vary depending on stakeholder perspectives.

For small businesses and self-employed professionals, the research object of this paper, "performance" should be measured from the perspective of Santos (2008). The author states that companies with few stakeholders can consider the dimensions most important for their businesses in their performance composition. The construct "organizational performance" should comprehended as the diagnosis obtained by measuring results and their efficiency and effectiveness compared to previously defined objectives. Thus, the organization will be able to measure the effectiveness of the strategies used, guide subsequent decisions, evaluate the scenarios and competitive demands, and project future designs from the conclusions obtained with the diagnosis of performance measurement (Venkatraman and Ramanujam 1986; Kaplan and Norton 1992, 1993; Santos 2008; Barney and Hesterly 2017).

As Santos (2008) suggests, performance measures must be adapted to the specific context of coworking environments. In this sense, for the measurement to be efficient, the following criteria most relevant to indicate the business performance are chosen (El-Sakty 2012): financial performance and market performance.

Financial performance is the most widely used metric, covering aspects such as revenue, profitability, cost control, and sales volume (Venkatraman and Ramanujam 1986; Kaplan and Norton 1993, 2001; Carneiro et al. 2005; Gomes and Callado 2017; Costa 2019). From an entrepreneurial perspective, financial measures reflect the quality of financial management (Carneiro et al. 2005), making it a key indicator for any organization.

Fiegenbaum et al. (1996) propose a framework for assessing performance through the following dimensions: internal, external, and temporal. Initially, the internal measures indicate the comparison of the objectives outlined with the results achieved in strategic areas, such as revenue, profit, sales growth, and attracting new customers. From the same perspective of the internal dimension, the authors mix financial and market results (Carneiro 2007).

When evaluating business results, Haber and Reichel (2005) emphasize the simplicity of using objective methods, such as financial performance data. However, small businesses may be reluctant to share such data (Haber and Reichel 2005; Li and Rama 2015; Costa 2019). In other cases, they do not control it, making objective analysis difficult (Dess and Robinson 1984; Haber and Reichel 2005; Berrone et al. 2014; Costa 2019). In such cases, the solution lies in the search for subjective data as a viable alternative (Gomes and Callado 2017).

Shoham (1998) defines subjective performance measurement as an evaluation based on the entrepreneur's satisfaction compared to their expectations, a characteristic that cannot be measured objectively. In addition to the author reinforcing the equitable importance of objective and subjective measures, other studies such as Haber and Reichel (2005), Berrone et al. (2014), Costa et al. (2016), and Vij and Bedi (2016) corroborate the findings of the seminal work by Dess and Robinson (1984), which aimed to correlate objective and subjective performance measures.

Dess and Robinson (1984) show a strong correlation between objective and subjective measures, consistent with the results of the surveyed entrepreneurs and those verified from the financial indicators. Despite this, the subjective measure does not replace the objective measure, helping measure organizational performance in situations of unavailability of information. Table 2 summarizes the criteria used to measure organizational performance.

Table 2. Organizational performance measurement criteria.

Category	Criterion	Theoretical Background
Financial Performance	Revenue	Shoham (1998), Kaplan and Norton (2001), Carneiro et al. (2005), Oliveira (2015)
	Markup	Venkatraman and Ramanujam (1986), Shoham (1998), Carneiro et al. (2005), Gorgievski et al. (2011), Oliveira (2015)
	Cost reduction	Epstein and Roy (2001), Carneiro et al. (2005)
	Profitability	Kaplan and Norton (2001), Carneiro et al. (2005), Oliveira (2015)
	Volume	Kaplan and Norton (2001), Carneiro et al. (2005), Oliveira (2015)

Table 2. *Cont.*

Category	Criterion	Theoretical Background
Market Performance	Future perspective	Gorgievski et al. (2011), Maciel et al. (2008)
	Performance compared to competitors	Carneiro et al. (2005), Maciel et al. (2008), Oliveira (2015)
	Sales growth	Carneiro et al. (2005), Maciel et al. (2008), Gorgievski et al. (2011)
	Customer acquisition	Venkatraman and Ramanujam (1986), Shoham (1998), Carneiro et al. (2005)

Source: own elaboration, 2022.

2.3. Research Hypotheses

Based on the concepts discussed, we expect a positive correlation between performance and coworker characteristics. These concepts elucidate the motivations behind companies and entrepreneurs opting for coworking spaces.

The literature highlights various aspects of the network that can influence business performance. The existing literature on coworking places significant emphasis on the role of networking as a key differentiating factor in coworking spaces (Spinuzzi 2012; Capdevila 2014; Gandini 2015; Suárez 2016). In contrast to conventional offices, coworking spaces provide open settings for the dissemination of information, resources, and business opportunities, thereby enabling users to optimize their activities (Spinuzzi 2012; Capdevila 2013; Soares and Saltorato 2015). As evidenced by Fuzi (2015) and Gerdenitsch et al. (2016), social interactions and networking practices are pivotal factors in the decision-making process when selecting these environments. They serve to enhance competitiveness and provide solutions for customers. Consequently, the following initial research hypothesis explores the impact of network potential on performance as a research hypothesis, with sub-hypotheses examining its relationship with different categories of organizational performance:

H₁: *The network characteristics existing in coworking are positively associated with business performance.*

Muzzio (2019) argues that users of shared workspaces benefit more from professional networks when they can build relationships with other users. However, for businesses, it is crucial to assess whether these benefits translate into financial value. When companies opt for shared workspaces, their goals typically include strengthening their identities, expanding their networks, reducing operational costs, and increasing profits to better reward employees, investors, or partners (Riadinska et al. 2018). The authors highlight optimizing personnel costs, production, working time regulation, and mainly improving financial and economic indicators, which leads to the following sub-hypotheses:

H₁A: *The network characteristics that exist in coworking are positively associated with the financial performance of a business.*

H₁B: *The network characteristics that exist in coworking are positively associated with the market performance of a business.*

3. Methodology

3.1. Study Design, Source of Data, and Sample Size

This study employed a quantitative, exploratory, and ex post facto descriptive approach (Köche 2011). Based on Minayo (2009), the coworking spaces in Recife served as the research setting, and this study focused on micro and small enterprises (MSEs) operating in these environments. The participants included business owners, partners, and self-employed professionals who fit within the scope of this research.

Data were collected through a self-administered survey. The survey instrument was divided into three sections as follows: two focusing on network and performance characteristics (both assessed using 5-point Likert scales), and one capturing the respondents' sociodemographic details and company information.

This study targeted businesses in coworking spaces, with participants selected through non-probabilistic convenience sampling (Malhotra 2008; Creswell and Creswell 2021). This type of sampling selects individuals based on convenience, with the selection of participants being made by the interviewer based on availability (Malhotra and Dash 2016). It is the least expensive and least time-consuming method, but it has its limitations, such as potential sources of selection bias, in addition to not representing the population, making a study not generalizable. Although this method is not recommended for descriptive or causal research, the authors indicate that it can be used in exploratory research to generate ideas, insights, or hypotheses, which is the purpose of this article (Malhotra and Dash 2016).

A total of 27 coworking spaces were identified, 20 were visited, and 18 were included in the final study. Because of the high turnover and sporadic use of coworking spaces, obtaining an exact number of users was not possible. The Coworking Census Brazil (Coworking Brasil 2020) estimated that 904 users visited coworking spaces monthly in Pernambuco; however, this information was limited and outdated. Given the convenience sampling method and lack of precise population data, it was not possible to define an exact target population.

Creswell and Creswell (2021) state that there are three main things to consider when checking whether a research instrument is valid. These include 1. content, 2. validity related to ratings, and 3. reliability. To meet these recommendations, the questionnaire was developed after a literature review, which specified the design and variables. The results of the SLR led to the identification of 84 potential variables for the questionnaire. Two experts reviewed the initial questionnaire and helped reduce the number of items from 84 to 42.

The researchers tested the questionnaire with five coworkers in one of the research spaces. The participants were asked about their issues, difficulties, time, and problems. This process showed that more items were needed regarding the companies and entrepreneurs involved and that some variations needed to be reworded. These changes were completed at the end of the questionnaire, making it reliable and able to measure what was needed while still providing useful data (Creswell and Creswell 2021). The scale consisted of 23 items.

Out of 153 questionnaires distributed, 77 were returned, yielding a response rate of 50.32%, consistent with the response rates suggested by Malhotra (2008). While the sample size may seem limited, Hair et al. (1998) emphasize the importance of considering both the statistical significance and practical relevance of the data.

Despite limitations in defining a universal population for coworking spaces, the sample of 77 participants offered valuable insights into the associations between coworking networks and business performance, contributing to both theoretical and practical knowledge in this emerging field.

3.2. Variables and Scale Development

A SLR was conducted to identify the most relevant network and performance variables from the recent literature. The PRISMA protocol (Page et al. 2021) guided the review. To develop the measurement scale, we followed the three-step process proposed by DeVellis (2016). The network characteristics were grouped into 13 subcategories, and the performance variables were divided into 10 subgroups. The specific variables are detailed in Table 3.

3.3. Statistical Analysis Methods

The data were analyzed using both descriptive (measures of central tendency) and inferential statistics. To assess the internal consistency in the scale items, we conducted reliability tests using Cronbach's alpha, followed by tests for sample adequacy, including the KMO test and Bartlett's sphericity. Spearman correlations between the scale items were also performed. Next, we carried out factor analysis for each scale, and the factors were saved using the regression method, with support from SPSS v24.0 software (Hair et al. 1998; Malhotra and Dash 2016; Ferreira and Hongyu 2018). Finally, Pearson's correlation

was applied to examine the associations between the distinguishing factors of the network and the performance categories. A total of eleven variables were analyzed in the network category and ten within the two performance categories.

Table 3. Network and performance variable descriptions.

Network	Performance
N1—Formation of professional contacts	D1—Revenue obtained
N2—Support between coworkers	D2—Future perspective
N3—Knowledge exchange	D3—Investment applied
N4—Willingness for business conversations	D4—Performance compared to competitors
N5—Meetings between professionals from different areas	D5—Profit margin
N6—Working with professionals from different areas	D6—Cost reduction
N7—Similarity of values/ideas	D7—Sales growth
N8—Interaction with the same companies/users	D8—Customer acquisition
N9—Exchanges provided by new contacts	D9—Business profitability
N10—Connections with new persons	D10—Business volume
N11—Sharing business ideas	
N12—Interaction between unintroduced users	
N13—Business creation between coworkers	

Source: own elaboration, 2022.

4. Results and Discussion

4.1. Sample Profile

The size of companies operating in coworking spaces was determined based on their revenue (Simples Nacional 2020) and the number of employees (IBGE 2019; SEBRAE 2019). In terms of revenue, 90.91% of the respondents were classified as micro or small businesses, with annual earnings below BRL 4.8 million. Based on employee numbers, 32.47% of the companies were individual businesses, 51.95% had up to 9 employees, and 10.39% had between 10 and 49 employees. No companies reported having more than 50 employees, aligning with the Coworking Brazil Census (Coworking Brasil 2019) and confirming that the sample included no medium or large businesses.

Most coworking businesses operated in the service sector (87.01% of respondents). These data are in line with the Brazilian Coworking Census (Coworking Brasil 2020), which shows that most users work in services, 3.90% work in commerce, 5.19% work in both, and only 1.30% work in industry. These numbers can be explained by the characteristics and the business model of coworking spaces. People share desks, workstations, and time. They also do not have a set structure for selling products. This makes the shared work model more suited to services.

The availability of different service plans for coworking spaces contributes to user turnover (Nakao 2017). However, when analyzing coworker turnover in Recife, the results indicate a notable stability in users' choice of spaces. In the sample, 84.42% reported consistently using the same coworking space, while only 15.58% frequented multiple locations. The main reasons for this stability were location (31.17%), price (25.97%), and infrastructure (24.68%), with networking potential, often cited as the key advantage of coworking (Muzzio 2019), ranking fourth at 16.88%.

Regarding the participants' job positions, 28.57% were self-employed professionals, without a specific formal role. When combined with the number of entrepreneurs, this group made up 51.95% of the sample, indicating that coworking spaces attract a significant number of individuals running their own businesses. Additionally, 29.87% of the respondents held positions in Direction, Coordination, or Management, overseeing departments or teams within their companies. Finally, employees without management roles accounted for 6.49% of the sample, forming the smallest group.

4.2. Network Variables

Regarding the network construct, the primary variable for coworkers (respondents) was the interaction with professionals from different areas (N5), which had the highest average score (on a scale of 1 to 5) and the lowest standard deviation among participants. These numbers show that users have a high level of agreement that co-location with professionals from different areas is beneficial for developing their businesses. On the other hand, support among coworkers showed the lowest average score and the second-highest standard deviation, indicating a wide range of responses. This differs from findings in other studies, such as those by Fuzi (2015), Soares and Saltorato (2015), Abe and Uda (2016), and Muzzio (2019), which highlight networking as one of the main reasons for choosing coworking and a key factor in user satisfaction. Descriptive measures of the construct are shown in Table 4.

Table 4. Descriptive data—network indicators.

	Network	Mean	Median	SD
N1	Formation of professional contacts	4.43	5.00	0.903
N2	Support between coworkers	3.75	4.00	1.160
N3	Knowledge exchange	4.27	5.00	0.995
N4	Willingness for business conversations	4.36	5.00	0.804
N5	Meetings between professionals from different areas	4.72	5.00	0.669
N6	Working with professionals from different areas	4.71	5.00	0.813
N7	Similarity of values/ideas	3.81	4.00	1.004
N8	Interaction with the same companies/users	3.85	4.00	0.982
N9	Exchanges provided by new contacts	3.92	4.00	1.222
N10	Connections with new persons	4.36	5.00	1.067
N11	Sharing business ideas	4.05	4.00	0.992
N12	Interaction between unintroduced users	4.25	4.00	0.940
N13	Business creation between coworkers	4.11	4.50	1.069

Source: own elaboration, 2022.

Next, the bivariate correlation for the network construct variables was analyzed (Table 5). Most variables showed significant associations, with correlations ranging from 0.3 to 0.9 (Field 2009; Oliveira 2015). For example, there is a strong correlation between establishing professional contacts and knowledge exchange (0.632), as well as between sharing business ideas and the willingness to discuss business (0.636). These significant correlations align with findings from Capdevila (2014), Fuzi (2015), Soares and Saltorato (2015), Uda and Abe (2015), Castilho and Quandt (2017), and Bouncken (2018).

However, the variables for value similarities (N_7) and interaction with the same companies and users (N_8) showed little correlation with the others. As a result, these two variables were removed from the analysis to improve the internal consistency of the scale.

4.3. Organizational Performance

The performance construct was analyzed using ten variables based on the theoretical framework discussed. Table 6 indicates a high level of satisfaction regarding the future perspective item (D2), suggesting that coworkers recognize the importance of medium and long-term planning for their businesses. Additionally, the average satisfaction levels for profit margin (D5) and cost reduction (D6) are similar. The ability to reduce costs is highlighted by several authors as a key benefit of coworking spaces (Capdevila 2013, 2014; Soares and Saltorato 2015; Riadinska et al. 2018).

Table 5. Spearman's correlation—network indicators.

		Contacts	Support	Exchange	Willingnes	Meetings	Working	Values/Ideas	Interaction	Exchanges	Connections	Sharing	Unintroduced Users	Business Creation
Professional contacts	C [a]	1.000												
	S [b]	.												
Support	C	0.567 **	1.000											
	S	0.000	.											
Knowledge exchange	C	0.632 **	0.559 **	1.000										
	S	0.000	0.000	.										
Willingness	C	0.335 *	0.395 **	0.522 **	1.000									
	S	0.012	0.003	0.000	.									
Meetings different areas	C	0.360 **	0.262	0.522 **	0.295 *	1.000								
	S	0.007	0.054	0.000	0.029	.								
Working different areas	C	0.404 **	0.244	0.446 **	0.346 **	0.426 **	1.000							
	S	0.002	0.073	0.001	0.010	0.001	.							
Values/ideas	C	−0.010	0.237	−0.028	0.162	−0.062	0.020	1.000						
	S	0.942	0.082	0.837	0.237	0.653	0.882	.						
Interaction with the same	C	−0.012	−0.086	0.049	0.344 *	0.031	0.092	0.403 **	1.000					
	S	0.928	0.531	0.721	0.010	0.820	0.503	0.002	.					
Exchanges by new contacts	C	0.473 **	0.558 **	0.560 **	0.396 **	0.250	0.434 **	0.333 *	0.196	1.000				
	S	0.000	0.000	0.000	0.003	0.066	0.001	0.013	0.152	.				
Connections	C	0.532 **	0.448 **	0.519 **	0.257	0.354 **	0.435 **	0.153	−0.014	0.583 **	1.000			
	S	0.000	0.001	0.000	0.058	0.008	0.001	0.266	0.917	0.000	.			
Sharing business ideas	C	0.374 **	0.536 **	0.575 **	0.636 **	0.296 *	0.354 **	0.340 *	0.191	0.720 **	0.591 **	1.000		
	S	0.005	0.000	0.000	0.000	0.028	0.008	0.011	0.162	0.000	0.000	.		
Unintroduced users	C	0.428 **	0.481 **	0.490 **	0.284 *	0.352 **	0.398 **	0.256	0.022	0.549 **	0.521 **	0.625 **	1.000	
	S	0.001	0.000	0.000	0.036	0.008	0.003	0.059	0.872	0.000	0.000	0.000	.	
Business creation between coworkers	C	0.476 **	0.496 **	0.511 **	0.357 **	0.241	0.328 *	0.376 **	0.191	0.676 **	0.485 **	0.623 **	0.660 **	1.000
	S	0.000	0.000	0.000	0.008	0.076	0.014	0.005	0.162	0.000	0.000	0.000	0.000	.

[a] C from the list if the Spearman's Correlation Coefficient. [b] S from the list is the Significance (or *p*-value). **. The correlation is significant at the 0.01 level (2 ends). *. The correlation is significant at the 0.05 level (2 ends). Source: own elaboration, 2022.

Table 6. Descriptive statistics—organizational performance.

	Performance	Mean	Median	SD
D1	Revenue obtained	3.95	4.00	0.864
D2	Future perspective	4.43	5.00	0.738
D3	Investment applied	4.05	4.00	0.926
D4	Performance compared to competitors	4.04	4.00	0.920
D5	Profit margin	3.94	4.00	0.870
D6	Cost reduction	4.08	4.00	0.975
D7	Sales growth	3.85	4.00	1.057
D8	Customer acquisition	3.83	4.00	1.187
D9	Business profitability	3.97	4.00	0.949
D10	Business volume	3.79	4.00	1.020

Source: own elaboration, 2022.

Table 7 presents the bivariate correlations for the performance construct variables. It shows that user satisfaction regarding personal and professional development has a high correlation (0.752) and significant simultaneous correlations with other items. Notable correlations include future perspective (0.396 and 0.528), performance compared to competitors (0.427 and 0.404), customer acquisition (0.357 and 0.368), and profitability (0.349 and 0.311).

4.4. Psychometric Properties of Variables

Following the factor analysis procedures outlined by Hair et al. (1998) and Malhotra and Dash (2016), Cronbach's alpha reliability test, Kaiser–Meyer–Olkin sample adequacy measures (or KMO Test), and Bartlett's sphericity test were used to determine whether the sample was appropriate for the research objectives.

Cronbach's alpha is a measure used to check how well a set of questions or items in a questionnaire or test relate to each other. A higher value (close to 1) means that the items are more consistent with each other, while a lower value suggests that the items are not as well connected (Hair et al. 1998). In the results, the constructs for network (0.925), financial performance (0.814), and market performance (0.768) all showed strong reliability. Specifically, the network construct displayed a reliability index of 0.925, which was above the ideal 0.6 for exploratory research but below 0.95, meaning the construct was not perfectly identified, allowing the study to proceed (Hair et al. 1998).

The KMO measure of sampling adequacy is used to check if factor analysis is appropriate. Values between 0.5 and 1.0 are good, while values below 0.5 are not (Malhotra and Dash 2016). The results indicated that all constructs met the acceptable threshold, with no values falling below 0.5.

Bartlett's test of sphericity is used to test whether variables in a population are uncorrelated. If they are, the population correlation matrix is an identity matrix, with each variable correlating perfectly with itself but not with the others (Malhotra and Dash 2016). In this case, Bartlett's test showed significance at $p = 0.00$, indicating that the variables were not correlated in the population, and the values were suitable for conducting factor analysis with the sample (Mansano et al. 2017). The results are shown in Table 8.

Table 7. Spearman's correlation—organizational performance indicators.

		Revenue Obtained	Future Perspective	Investment Applied	Performance Compared	Profit Margin	Cost Reduction	Sales Growth	Customer Acquisition	Business Profitability	Business Volume
Revenue obtained	C [a]	1.000									
	S [b]	.									
Future perspective	C	0.539 **	1.000								
	S	0.000	.								
Investment applied	C	0.451 **	0.493 **	1.000							
	S	0.000	0.000	.							
Performance compared	C	0.556 **	0.465 **	0.419 **	1.000						
	S	0.000	0.000	0.000	.						
Profit margin	C	0.487 **	0.462 **	0.556 **	0.506 **	1.000					
	S	0.000	0.000	0.000	0.000	.					
Cost reduction	C	0.375 **	0.324 **	0.273 *	0.234 *	0.408 **	1.000				
	S	0.001	0.005	0.020	0.047	0.000	.				
Sales growth	C	0.413 **	0.473 **	0.549 **	0.323 **	0.647 **	0.299 *	1.000			
	S	0.000	0.000	0.000	0.006	0.000	0.011	.			
Customer acquisition	C	0.430 **	0.476 **	0.454 **	0.414 **	0.419 **	0.224	0.699 **	1.000		
	S	0.000	0.000	0.000	0.000	0.000	0.058	0.000	.		
Business profitability	C	0.507 **	0.382 **	0.391 **	0.385 **	0.624 **	0.546 **	0.471 **	0.508 **	1.000	
	S	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	.	
Business volume	C	0.448 **	0.512 **	0.467 **	0.353 **	0.615 **	0.182	0.743 **	0.713 **	0.563 **	1.000
	S	0.000	0.000	0.000	0.002	0.000	0.126	0.000	0.000	0.000	.

[a] C from the list if the Spearman's Correlation Coefficient. [b] S from the list is the Significance (or p-value). **. The correlation is significant at the 0.01 level (2 ends). *. The correlation is significant at the 0.05 level (2 ends). Source: own elaboration, 2022.

Table 8. Measures of reliability and suitability.

Variable	Cronbach's Alpha		KMO Test		Bartlett's Sphericity	
	Value	Assessment	Value	Assessment	Value *	Assessment
Network	0.925	Acceptable	0.877	Suitable	$X^2 = 410.240$	Satisfactory
Financial performance	0.814	Acceptable	0.780	Suitable	$X^2 = 144.826$	Satisfactory
Market performance	0.768	Acceptable	0.712	Suitable	$X^2 = 77.996$	Satisfactory

* Significance = 0.000. Source: own elaboration, 2022.

4.5. Factor Analysis

While Hair et al. (1998) suggest using factor loadings above 0.65, some variables with lower loadings were retained for academic purposes, following Comrey and Lee (1992) and Stefanini et al. (2012), as the difference was not significant given the sample size (77 respondents). Table 9 shows the factor analysis configuration for the network category.

Table 9. Network-scale factor analysis.

	Variables	Components	
		Support	Training
N1	Formation of professional contacts		0.651
N2	Support between coworkers	0.603	
N3	Knowledge exchange		0.679
N4	Willingness for business conversations	0.686	
N5	Meetings between professionals from different areas		0.851
N6	Working with professionals from different areas		0.695
N9	Exchanges provided by new contacts	0.790	
N10	Connections with new persons	0.570	
N11	Sharing business ideas	0.841	
N12	Interaction between unintroduced users	0.691	
N13	Business creation between coworkers	0.803	

Extraction Method: Principal Component analysis.
Rotation Method: Varimax with Kaiser Normalization. [a]

Source: own elaboration, 2022. [a]. Rotation converged in three iterations.

The network variables were grouped into two latent factors. The first, named the "support network", relates to the physical, instrumental, and intellectual support among users, as noted by Spinuzzi (2012), Capdevila (2014, 2015), Fuzi (2015), Gerdenitsch et al. (2016), and Seo et al. (2017). The second factor, "training network", represents the opportunities for forming new contacts and exchanging information, knowledge, and skills, according to Bilandzic and Foth (2014), Capdevila (2014), Soares and Saltorato (2015), Capdevila (2015), Castilho and Quandt (2017), and Hoendervanger et al. (2018). Together, these factors explained 65.12% of the total variance for the construct, which is acceptable according to the literature, as variances explained above 50% are considered satisfactory (Tinsley and Tinsley 1987; Damásio 2012).

The analysis of financial performance used six variables from the existing literature. Evaluating performance from a financial perspective is common, especially when using objective criteria (Venkatraman and Ramanujam 1986; Costa et al. 2016; Gomes and Callado 2017). However, not all financial performance measures accurately reflect the true state of a business or its management (Kaplan and Norton 2001), particularly for small businesses. This justifies including the entrepreneur's perception as part of a subjective evaluation (Shoham 1998). Table 10 presents the configuration of the "financial performance" component and the factor loadings for each variable. The scale explained 53.06% of the variance, which is acceptable (above 50%), though other sources of influence remain unaccounted for.

Table 10. Factor analysis of the financial performance scale.

	Variables	Component
		Financial Performance
D1	Revenue obtained	0.751
D3	Investment applied	0.663
D5	Profit margin	0.826
D6	Cost reduction	0.534
D9	Business profitability	0.824
D10	Business volume	0.730

Extraction Method: Principal Component analysis.

Source: own elaboration, 2022.

From the perspective of market performance, it is important to consider the following dimensions identified by Fiegenbaum et al. (1996): internal, external, and temporal. The factorial scale of this construct reflected these three dimensions through its variables. D7 and D8 represent the internal dimension and had the highest factor loadings, indicating a strong ability to explain the construct, as shown in Table 11. D4 corresponds to the external dimension, while D2 represents the temporal dimension (Fiegenbaum et al. 1996; Carneiro et al. 2005; Maciel et al. 2008; Carneiro 2007). The market performance construct accounted for 58.69% of the explained variance, which is satisfactory for research purposes, though there are still residual influences not addressed by the scale.

Table 11. Factor analysis of the market performance scale.

	Variables	Components
		Market Performance
D2	Future perspective	0.708
D4	Performance compared to competitors	0.682
D7	Sales growth	0.814
D8	Customer acquisition	0.850

Extraction Method: Principal Component analysis.

Source: own elaboration, 2022.

After refining the scale through internal bivariate correlation, reliability and adequacy tests, and factor analysis (with factors saved in the database as numerical values instead of the original ordinal variables using the regression method), we tested the hypotheses using Pearson's correlation. The results are presented in Table 12.

Table 12. Pearson's correlation—network factors and organizational performance.

		Support Network	Training Network	Financial Performance	Market Performance
Support Network	C [a]	1			
	S [b]				
Training Network	C	0.000	1		
	S	1.000			
Financial Performance	S	0.214	0.069		
	C	0.167	0.173	1	
	S	0.147	0.133		
Market Performance	C	0.271 *	0.087	0.805 **	1
	S	0.017	0.451	0.000	

[a] C from the list if the Spearman's Correlation Coefficient. [b] S from the list is the Significance (or *p*-value). **. The correlation is significant at the 0.01 level (2 ends). *. The correlation is significant at the 0.05 level (2 ends). Source: own elaboration, 2022.

Initially, the significant correlation between the factors from the financial performance scale and market performance (0.805) was highlighted, supporting the concepts discussed in the theoretical framework and in the goals of this study. However, the results for the association between network and performance were below expectations, despite being a widely discussed topic in the literature.

The correlation between the support network and market performance was only marginally moderate at 0.271. This connection was expected because the coworking environment is designed for discussions and exchanges about entrepreneurship and business (Fuzi 2015; Seo et al. 2017). These interactions can enhance learning that may be able to improve future perspectives, according to the exchange of successful experiences in management.

Despite this, the lack of a significant correlation with financial performance suggests a limited influence of the network on costs, profit, and profitability, contradicting the existing literature on the relationship between the constructs. The absence of a strong link between the training network and performance indicates potential directions for future research, suggesting that the desired results with performance may be achieved through different characteristics within coworking spaces.

Table 12 shows the correlations between coworking characteristics and organizational performance factors. It is important to note that only hypothesis H_{1B} was partially accepted; H_{1A} was rejected, as no factors were associated with financial performance.

5. Conclusions

This research aimed to analyze the associations between the characteristics of networks developed in coworking spaces and the performance of businesses in these spaces located in Recife, Brazil. Although networking is a widely discussed aspect of coworking spaces, our findings show that the network construct alone did not generate strong results in terms of business performance. The adherence of the formation of the variables that compose this construct with the literature and how it would be related to performance is highlighted. However, the lack of association with performance was against this literature, as it is the most discussed aspect in studies on coworking.

Regarding the primary hypothesis (H_1), the network construct only had a weak link between the support network and market performance, which means that this hypothesis was rejected.

Regarding the sub-hypotheses, the lack of a link between network characteristics and financial performance meant that hypothesis H1a was rejected. This result may suggest that the network is not an end in itself but rather a tool that users leverage to gain benefits from creativity and innovation, such as benchmarking, generating new ideas, and adapting business practices.

In relation to the sub-hypotheses, the lack of correlation between network characteristics and financial performance indicated that hypothesis H_{1A} was unsubstantiated. This outcome may be due to various factors, including research limitations related to non-probabilistic convenience sampling and the distinct attributes of the participants. Further research could explore this hypothesis in greater depth, addressing the limitations faced in this study. Researchers may even consider the possibility that the coworking sector is transitioning away from its original vision of community and collaboration (Yates et al. 2024, which may explain the diminishing initial impact of networking. Additionally, the maturity phase of businesses in coworking spaces should be considered, as financial performance is less likely to show short-term impacts (Zhang and Chen 2017).

Regarding hypothesis H_{1B}, we partially accepted it because of the observed link between networking and market performance. To explain why networking impacts market performance but not financial performance, we reiterate Yates et al.'s (2024) argument that the coworking sector is shifting towards greater commodification of space, a trend supported by Echeverri et al. (2021). CWSs are increasingly adopting the role of flexible workspace providers, often catering to corporate clients by partitioning spaces or leasing

entire floors to a single client. This contradicts the original coworking value proposition, which emphasized community-building for individuals seeking spontaneous interactions, knowledge sharing, and social capital. This shift away from a collaborative culture may help explain the reduced impact of support networks on financial performance.

In terms of market performance, subjective factors shape the results, which, while consistent with the literature, may arise from various sources. As the research instrument's scale was based on subjective perceptions of market performance (such as customer acquisition, increased sales, and comparison with competitors), the participants' perceived cost–benefit of being in a CWS may have led them to feel better positioned in the market.

Moreover, networking might act as an indirect facilitator rather than a direct determinant of success, enhancing visibility and long-term recognition through referrals, opportunities, and partnerships (Capdevila 2014; Fuzi 2015; Gerdenitsch et al. 2016; Castilho and Quandt 2017; Bouncken 2018; Howell 2022; Bouncken et al. 2023), without necessarily having an immediate financial impact. Access to networking in CWSs can foster creativity, innovation, and idea exchange that enhance long-term business strategies (Capdevila 2013, 2014, 2015; Soares and Saltorato 2015; Castilho and Quandt 2017; Yates et al. 2024; Oliveira Junior and Costa 2023; Yacoub and Haefliger 2024). Although these exchanges may not yield immediate financial returns, they can improve a company's adaptability, help identify new trends, and enhance its value proposition, thereby strengthening competitive positioning and increasing attractiveness to new customers.

Practically, coworking space hosts could focus on cultivating environments that encourage these creative interactions, rather than solely promoting networking for immediate business gains. Instead of relying on spontaneous exchanges, CWSs could establish formal networks of business partnerships among members. Programs designed to facilitate collaborations between complementary businesses can work together to improve revenue growth and facilitate business expansion.

Organizing events and workshops on topics like monetization strategies, revenue generation, cost optimization, and sustainable growth can help coworkers align networking efforts with measurable financial outcomes. Additionally, connecting small businesses and freelancers with larger corporations can open revenue-generating opportunities through collaborative projects, contracts, or access to new markets. Coworking spaces can play a crucial role in fostering these partnerships.

Additionally, as a contribution, the usefulness of the performance scale is highlighted. The significant correlation between financial and market factors makes it valuable and replicable to other studies that associate performance variables with aspects of coworking. Extending the perspective to similar or substitute spaces such as hackerspaces, incubators, coffee shops, or even the home office is possible.

The limitations of this study are the geographically concentrated sample and the use of non-probabilistic sampling, which limits the generalizability of the findings to broader populations. Additionally, the sample size, with approximately four cases per variable, is below the recommended minimum of five cases per variable (Hair et al. 1998), potentially compromising the robustness and reliability of the results. Future research can overcome these issues by incorporating larger, more diverse samples across multiple regions and applying probabilistic sampling methods to enhance representativeness. Expanding the scope in this way would provide a more comprehensive view of the findings' applicability to different coworking spaces and business environments.

In addition to our suggestion for future studies to clarify the theoretical perspective and its empirical representation, it is essential to explore characteristics beyond networking that the literature identifies as key to coworking. Factors such as creativity, innovation, environment, infrastructure, and location should also be examined to expand our understanding of coworking operations and their relationship to business performance. Additionally, expanding the scope to include alternative shared spaces, like hackerspaces, incubators, or even home offices, could offer broader perspectives on how different environments influence entrepreneurial outcomes. Investigating these models, particularly in diverse

contexts like emerging economies, could reveal how local economic and cultural conditions affect coworking outcomes. Such studies would contribute valuable insights into how coworking and similar models might be tailored to maximize performance and adaptability across varied business landscapes.

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