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Impact of strategic alliance on the innovation of women-owned enterprises in Nigeria

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Women-owned enterprises are rapidly expanding across Africa and have significantly contributed to job growth and wealth development. These enterprises, however, find it challenging to pursue innovation, because of their size and their financial base. Women-owned enterprises, however, can access various resources, talents, and techniques through effective strategic alliances. Being in alliance with other market participants allows these enterprises to overcome the hurdles limiting their performance and innovativeness. This research analyses the impact of strategic alliances on the innovation of women-owned enterprises in Nigeria. The study adopts a quantitative survey approach. It selected 109 women-owned enterprises from five manufacturing subsectors in the study area, using a purposive random sample technique. Regression analysis is used to analyze the data, while tables are utilized to show results. The results reveal that different strategic alliance characteristics had different effects on the innovation of women-owned enterprises. The finding in process innovation showed that increased new opportunities and cost reduction led to 0.76 and 0.62 increases in process innovation, respectively. In comparison, an increase in cost reduction led to a 0.63 increase in product innovation in the enterprises. These results signified that strategic alliances enabled women-owned enterprises to achieve product and process innovation. This study recommends that policymakers should encourage the use of strategic alliances by women-owned enterprises. This will allow them to innovate by introducing new products and processes in their enterprises.

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Introduction

Nigeria, according to the World Bank report, was on the verge of having more than 95.1 million persons of her population in extreme poverty by 2022. This was caused by sluggish economic growth, low human capital, and labor market weakness, which the country has suffered over the years. This situation, coupled with the worldwide economic slowdown exacerbated by the outbreak of Corona Virus Disease 2019 (COVID-19), has decimated many businesses, leading to a severe loss of jobs and the livelihood of many (Nwokocha et al., 2021). In general, such loss of jobs and livelihoods has made women in impoverished countries take up the burden of keeping their families afloat by setting up micro and small enterprises (Ali et al., 2023; Bouzari et al., 2021; Kan and Mukhopadhyay, 2022; Salamzadeh et al., 2022; Nwokocha, 2022). By so doing, they have proven wrong the common misconception that women cannot own, manage, or run businesses—they have consistently shown they can (Nwosu et al., 2019). The importance of women's enterprises in poverty reduction cannot be overemphasized. This makes it a crucial instrument for achieving Sustainable Development Goals 5 and 7 (SDGs 5 and 7) targets.

According to data, about 30–35% of Nigeria's female business owners are responsible for the small- and medium-sized firms that comprise the nation's industrial sector (Iyiola and Azuh, 2014). These firms are engaged in the small-scale production of plastic and rubber products, publishing and printing products, food and sachet water products, hair breeding and dressing, cloth making and sewing, brooms, baskets, etc. These enterprises have provided decent work to women and empowered them towards the economic well-being of their families and communities in Nigeria (Nwosu et al., 2019; Nwokocha, 2022). Regardless of the growing significance of women-owned businesses, many obstacles still stand in the way of their success in Nigeria. These challenges are sociocultural factors such as religious and male-dominated family structures, discrimination and gender inequalities, financial constraints, high interest rates, and inaccessibility of collateral requirements (Roomi, 2013; Roomi et al., 2018; Nwokocha et al., 2019; Nwokocha and Nwankwo, 2019; Khan et al., 2021). For instance, the participation of women in entrepreneurial activities has contributed significantly to the sustainable economic development of Nigeria (Sajuyigbe and Fadeyibi, 2017), while women entrepreneurs have significantly improved the status of women in society and their family life (Alozie and Ekumankama, 2022); and the migration of men in search of greener pastures has also encouraged women to start their businesses and contribute to the economic growth of societies (Kan and Mukhopadhyay, 2022). These achievements, however, have been scuttled by a lack of access to finance (Batrancea et al., 2022; Yao and Liu, 2023), and other factors like work/home conflict, as well as a lack of moral support from family members. This situation has forced most of these enterprises to collapse and go under, leaving behind a legion of jobless people. These enterprises also have innovation challenges. This is because an enterprise's capacity to compete in the global market is determined by its access to these resources finances, family moral support, tax holiday loans, and credit facilities.

Innovation, by and large, is the act of making changes to products, processes, and services, large and small, radical and incremental, which could lead to the launch of something novel for the firm, adding to its knowledge base and adding value for consumers (OECD, 2015 cited in Ndesaulwal and Kikula, 2016; Marczewska et al., 2023). Enterprises with better access to finances, loans, and credit facilities among others demonstrate higher innovative capacity. Therefore, discovering and utilizing opportunities to develop novel products, services, or techniques for operation is at the heart of innovation. Women-owned enterprises can access various resources, talents, and techniques through effective strategic alliances with other market participants, allowing them to overcome the hurdles limiting their innovativeness. Significantly, the strategic alliance between enterprises, especially between large, medium, and large-scale enterprises (SMEs), helps small enterprises to achieve flexibility in terms of innovation and resource accessibility (Nwokocha and Madu, 2020; Ferreira et al., 2022; Muthoka et al., 2022; Prabhudesai et al., 2022). It helps enterprises to pursue strategic objectives jointly with other firms. This can be in the area of new market penetration, creation of new products, knowledge acquisition, cost reduction, stabilization of business ventures and competition, as well as the management of business uncertainty and unpredictability (Gundolf et al., 2018; Nwokocha and Madu, 2020; Muthoka et al., 2022). According to the relational view perspective (Dyer and Singh, 1998), much of a firm's innovation now occurs in collaboration with outside suppliers rather than within the organization.

Nevertheless, many studies have shown the significance of strategic alliance in the attainment of innovation by small-scale enterprises (Zhao, 2014; Shakeel et al., 2017; Sajuyigbe and Fadeyibi, 2017; Salisu and Abu Bakar, 2018; Zeb and Ihsan, 2020; Khan et al., 2021; Lu et al., 2023), many of which include women entrepreneurship in Nigeria (Babalola, 2009; Lee et al., 2015; Aliyu et al., 2019), as well as Women entrepreneurship and Networking (Adim et al., 2018; Onoshakpor et al., 2020; Ademola et al., 2020). For instance, while the work of Lu et al. (2023) demonstrates that one of the most crucial and effective ways for SMEs to obtain external resources and improve their performance is through open innovation (OI), Zeb and Ihsan (2020) show that there is a fundamental and essential relationship between entrepreneurship, enterprises, and innovation performance in small and medium-sized businesses with female ownership. The work of Khan et al. (2021) also shows that internal factors and extrinsic factors (economic and sociocultural factors) have a considerable impact on the performance of women-owned businesses, as do the need for accomplishments, risk-taking, and self-confidence.

As important as these findings are, they have not been able to show the impact of strategic alliances on the innovation of women-owned enterprises. The few studies that have examined women's entrepreneurship and networking needed to be more specific about the forms of networking strategy that women-owned enterprises use. This also applies to studies on women's entrepreneurship and innovation. These studies did not show the place/influence of strategic alliances on women's entrepreneurship and innovation. Consequently, the results from these studies cannot be used to assess the impact of strategic alliances on the innovation of women-owned enterprises. In view of this, the objective of this study is to examine strategic alliance and the impact of innovation on women-owned enterprises in Nigeria through the following hypotheses:

H0: There is no statistically significant relationship between strategic alliance and the innovation of women-owned enterprises in Nigeria.

H1: There is a statistically significant relationship between strategic alliance and the innovation of women-owned enterprises in Nigeria.

Relevant literature on women and entrepreneurship in Africa

Women have contributed immensely to entrepreneurship in Nigeria and Africa as a whole. This entrepreneurial demography rapidly expands across Africa and significantly contributes to innovation, job growth, and wealth development. Women have not only assumed significant responsibilities in the socioeconomic development of their civilizations throughout Africa, but they have also made an enormous contribution to providing social and economic amenities (Abimbola, 2011 cited in Giwa and Babakatun, 2019). According to Agenssa and Premanandam (2021), micro and small-scale enterprises played a crucial role in increasing the socio-economic conditions of women in Ethiopia even though their engagement in this activity is limited compared to men.

Similarly, the work of Alozie and Ekumankama (2022) reveals that, among other reasons: financial need, self-reliance, becoming employers of labor, serving as role models for their kids, and being able to help in the spouse's or family's business were the main drivers of women's involvement in entrepreneurship in Nigeria. The study also shows that women who own their businesses can raise the level of their family's income by engaging in more ventures, such as farming, supporting their partners' businesses, developing their skills, and offering necessary services. Halkias et al. (2011) exhibit, that there are no apparent disparities between male and female managers or owners once a business is established. The study reveals that microfinance and family factors play a significant role in shaping and influencing the emergence of women's enterprises in Nigeria. This signifies Africa's women have significant and untapped growth potential.

In view of this, Chatterjee et al. (2022) demonstrate that women's businesses, usually at the bottom of the pyramid, can help families escape poverty, promote community growth, and pave the path for nations to modernize. The study reveals that despite the formation of profitable ventures, the women's well-being experiences varied, with some thriving and others lagging. In particular, the study discovers that struggling female businesses have challenges of family support and work experience outside the home, which was connected to abstract ambitions and exaggerated expectations from the business. Contrarily, successful women business owners typically set specific goals for their ventures and have reasonable expectations due to their prior work experience and family support. In light of the above, Hallward-Driemeier (2013) noted that the difficulty in increasing opportunities is not in enabling more women to become business owners but rather in enabling them to switch to better return occupations. For instance, Etim and Iwu (2019) discovered in their studies that women in Africa, specifically in the sub-Saharan region, who own and manage small and medium-sized businesses face several obstacles significantly more frequently than their male counterparts. According to the study, they are viewed as non-citizens due to their economic and social standing. Women have never been seen as citizens since citizenship has always been constructed in masculine terms.

Furthermore, the work of Raman et al. (2022) also found that Women's lower self-efficacy and self-perception about their skills, when compared to their male counterparts may prevent them from engaging in entrepreneurship or applying for finance. While Shallangwa and Wilson (2022) found sociological, religious (underage marriage), inadequate educational exposure, and restricted access to capital as challenges for women entrepreneurs in Adula and Kant (2022) showed that challenges militating against the progress of female businesses in the horn of Africa were inadequate funding, work environment, training, and social–cultural facilities. These challenges, however, can be addressed with an effective policy strategy to enhance women's entrepreneurship. To lay credence to this, Fieve and Chrysostome (2022), in their study, which examined the effect of credit cooperative loans on women entrepreneurship in Ghana, found that giving interest-free loans to women businesses aids the growth of their businesses. This was also supported by credit cooperative lending groups, which gave interest-free loans to women-owned enterprises to assist and promote women's entrepreneurship in Ghana. In the same vein, Idoghori and Agwu (2022), in their study in Nigeria, revealed that there has been a steady divergence in the allocation of resources among females and males despite concerted efforts by the government to change the situation. The study, however, suggested that a plausible statutory environment for female entrepreneurship would be developed in Nigeria if there is compatibility between the laws guiding the sector and its practice.

Strategic alliance, women-owned enterprises/entrepreneurs and innovation in Nigeria

Strategic alliance is a long-term inter-organizational partnership where two or more parties share knowledge, resources, and skills to increase each party's position in the market (Kiprotich et al., 2015). In other words, strategic alliances enable firms to access assets, technologies, capabilities, information, and knowledge that enhance their market performance and competitive position. For instance, Emami et al. (2022) revealed that strategic partnerships and partners' performance have a substantial and favorable relationship. According to the study, this can be seen in small enterprises' organizational, financial, and operational success in telecommunications. This also corroborates the findings of Nwokocha and Madu (2020), that strategic alliance influences performance in small and medium-scale enterprises. Much research has been done on the concept and importance of networking in entrepreneurship. Thus, the importance of social, business, and inter-organizational strategic networks in entrepreneurship is now widely acknowledged (Slotte-Kock and Coviello, 2010). These networks, which can come in strategic alliances, joint ventures, subcontracting, or long-term contracts, are the connections or alliances entrepreneurs form around their businesses. To buttress this, Adim et al. (2018) have shown in their work that there is a positive relationship between women entrepreneurs and employment based on entrepreneurial networking. In their studies, Abdual and Mohammed (2023) also found a strong correlation between business development and the entrepreneurial network in Borno State, Nigeria. The study also demonstrates that entrepreneurial networking positively and significantly influences women entrepreneurs' contributions to the growth of small businesses.

In relation to this, Ademola et al. (2020) found that social networks have a favorable and considerable impact on the productivity of women entrepreneurs as well as a favorable and substantial association between social network factors such as network size, diversity, as well as resources, and the success of women entrepreneurs. Adam et al. (2021) found that a firm's entrepreneurial orientation has a positive impact on social networking, resource acquisition, and firm performance. The findings also show that strong networking relationships with government organizations facilitate the procurement of resources by women-owned tourism firms more than business relationships with suppliers. Onoshakpor et al. (2020) also affirm that Stronger networks, relationships with stakeholders, and emphasis on information technology improve organizational options and give women entrepreneurs several benefits in terms of information access, funding, support (social and financial), and knowledge sharing, according to supporting evidence. Similarly, Ghauri et al. (2023) reveal that cooperatives provide networking opportunities for women SMEs to share information and knowledge through social/community events. The study shows that SMEs can see themselves as communities towards a common objective rather than competitors. This enabled networking to be more purposeful in building long-lasting relationships while simultaneously being collective owners of the cooperative.

Innovation, is the skill of developing and implementing new processes, procedures, and products within a cluster, an organization, or a larger society to improve performance (Bakar and Ahmad, 2010). In today's dynamic environment, value creation, innovation, and creativity are essential elements affecting a firm's success (Welbourne and Pardo-del-Val, 2009; Minhas and Sindakis, 2022; Laidoune et al., 2022). It is necessary for global competitiveness (Chen and Wen, 2007). In general, innovation has been differentiated by some authors. While OECD/Eurostat (2005) views innovation strategy from the point of process, product, organization, and marketing innovation, Ndubisi et al. (2015) viewed innovation as a process, product, and administrative innovation. Access to innovation by women entrepreneurs is critical to the success of their businesses. This is because it increases the quantity and quality of services and products, lowers costs, prevents resource loss, boosts efficiency and productivity, and increases employee driving forces and fulfillment at work (Farrokhian and Soleimani, 2015). For instance, according to Adetiloye et al. (2020), access to capital and innovation are critical for the success of women-owned MSMEs in Nigeria. The study, however, discovered that innovation acts as a mediator between women entrepreneurs' access to capital and professional success.

According to Audretsch et al. (2023), collaboration with domestic and foreign suppliers, customers, universities, and domestic and foreign competitors promotes innovation in SMEs. Despite this, innovation and technical limitations are women entrepreneurs' most pressing issues. Women-owned SMEs that aim to pursue innovation and new technology development have increased hurdles. The difficulties, according to Gnyawali and Park (2009), are frequently linked to the acceptance of new IT infrastructure, as well as managers' and employees' knowledge and abilities in innovation and technology adoption (O'Dwyer and O'Flynn, 2005; Zhao, 2006 cited in Zhao, 2014). The limitations of SMEs in financial and technological capacities place them in a vulnerable position of failing to achieve innovation. However, the work of Ferreira et al. (2020) shows that strategic alliances directly and positively impact the creation of new products and innovations. Zahoor et al. (2022), also found that more financial resources and adequate assistance from formal institutions make it easier for SMEs in emerging markets to access resources. The study showed that strategic alliance learning is more significant in empowering these enterprises to create responsible innovation through their absorptive capacity and sense-making competency. The study also showed that innovation and new product development can be achieved by managing strategic alliances like a chessboard to fill up the firm's gaps in tangible and intangible resources from other firms.

Consequently, through a case study approach, O'Dwyer et al. (2011), found that by collaborating with other industries, SMEs can access a broader range of resources such as experience, capital, and networks across a large geographic area. According to the study, these ties help them get a competitive advantage and have a more innovative and imaginative marketing impact. Similarly, using data from 171 automotive component suppliers, Omid et al. (2022) found that economies under austere economic sanctions pursue foreign knowledge search, significantly contributing to process innovation. In the area of open innovation, the work of Carrasco-Carvajal et al. (2022) reveals that small and medium-sized businesses (SMEs) benefit from open innovation because it enables them to adapt and survive in more chaotic and dynamic competitive settings. *Open innovation* is a technique that industries use to innovate by incorporating knowledge from both inside and outside their domain, using their expertise, and researching their environment's knowledge. This was also corroborated by Sungjoo et al. (2010), who showed that networking among SMEs effectively facilitates open innovation in small and medium-scale enterprises. Similarly, Zeb and Ihsan (2020) found an epochal relationship in entrepreneurship, innovation, and performance. The study showed that the tendency to take risks and the motivation for success have an essential impact on creativity and entrepreneurial performance.

Similarly, Madison et al. (2022) found that the number of females engaged in SMEs enhances the transactive memory (TM) system in transitional economies, where women-owned enterprises take up more female employees than male-run enterprises to offer higher innovative outputs. The study discovered that different arrangements of women in ownership and workforce composition could lead to emerging-market SMEs being creative, highlighting the significance of gendered and contextual factors in innovation research. As women's representation in small and medium-scale enterprises increases, they are sceptered to use their resources for innovation. However, their work needed to demonstrate how women can share and use their endowed resources for creativity. Again, Ruiz-Palomo et al. (2022) showed that removing financial restraints influences enterprises run by women, and gender has a moderating effect on management and technological innovation. The study also showed how easing financial restrictions encourages SMEs to innovate in management and technological areas; assessing innovation from the point of product and process innovation. While process innovation is the use or introduction of new technology or ways to accomplish something that helps a business stay competitive and meet customer demands, product innovation involves developing new products or improving existing ones to increase their utility (Murray et al., 2011). This innovation can come from new technology or the product's functioning. Shu et al. (2012) found that process innovation is linked to improving or creating tools and expanding operations. Process innovation in the manufacturing sector can be referred to as using improved or new techniques. According to Muharam et al. (2020), there is a positive relationship between process innovation, market innovation, and the financial performance of firms. In their studies, Haudi et al. (2021) discovered that product innovation substantially affects purchase decisions. This means that product innovation and marketing strategy have a substantial impact on purchasing decisions at the same time. Nazzaro et al. (2019) discovered that consumers are open to product innovation. This was based on the findings, which showed that peoples' "willingness to pay" (WTP) for products that went through innovation was considerably more than the traditional products. Product innovation has a favorable and considerable impact on competitive advantage. On the other hand, Zhang et al. (2018) discovered that absorptive capacity—the recognition of the value of new information and its application to commercial purposes—fully mediates the impacts of trust and information systems on product creativity. The study also found that absorptive capacity boosts product creativity and that this effect is boosted by trust and information systems. Similarly, Jiang et al. (2020) showed that certain elements, such as network breadth and depth, drive dynamic capacities mediating between business networks and practical product innovation. This means that a firm's business network and strategic orientation impact dynamic capabilities development and effective product creation. Caner and Tyler (2013) also discovered that partnerships in research and development positively impacted the pharmaceutical industry's ability to introduce new products.

Again, Aloini et al. (2015) opined that strategic alliances mediate the relationship between technology strategy and innovation performance. Furthermore, Jiang et al. (2021) noted that alliances with only domestic partners, alliances that operate for a short period, or alliances that operate in highly competitive industries positively affect product innovation. From the preceding, it is evident that many studies have been done on innovation and women-owned SMEs. These studies, however, did not show how

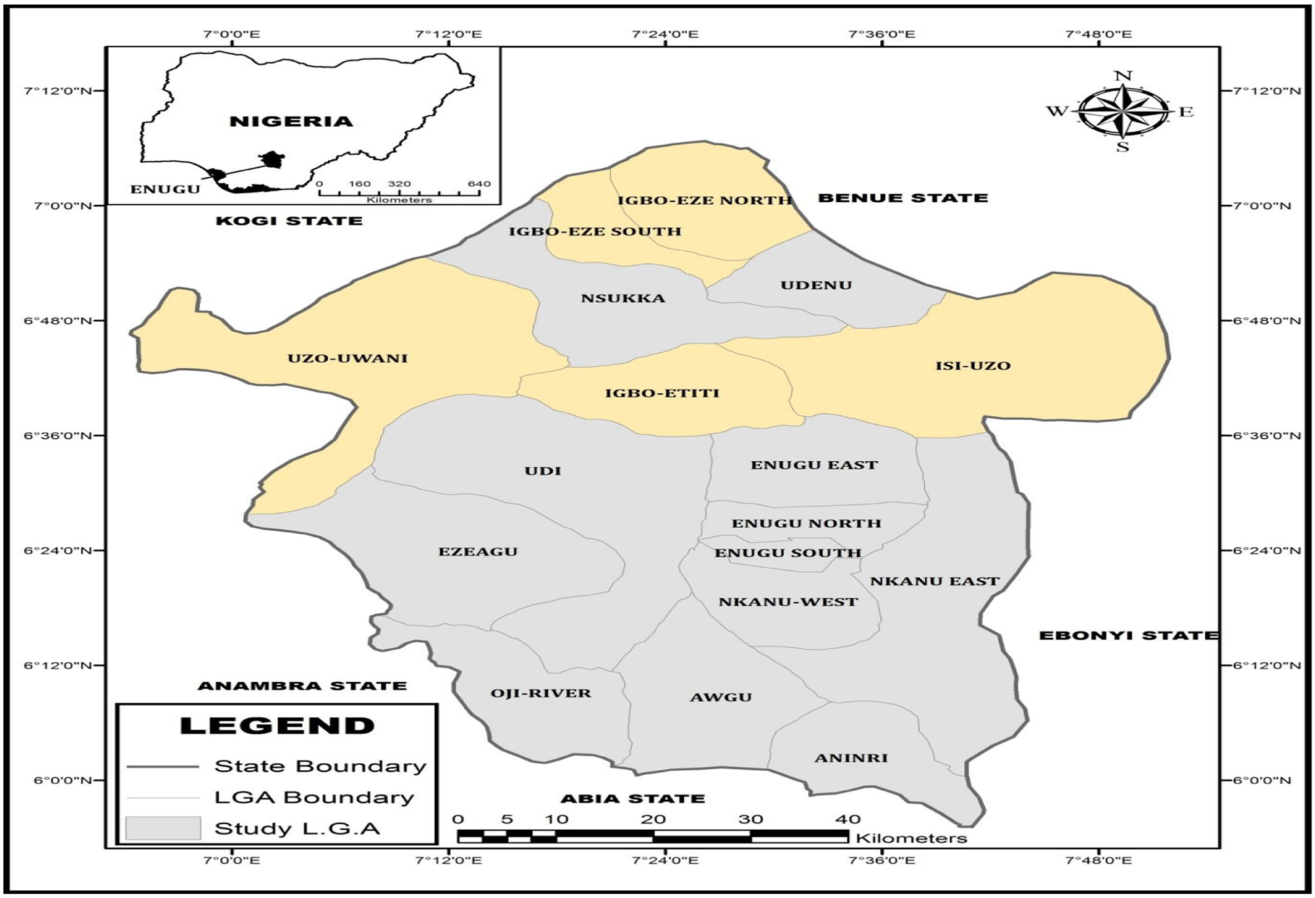

Fig. 1 Enugu state Nigeria. Source: Adopted from Nwokocha (2019).

women utilize their massive innovation potential. This study aims to close this information gap by analyzing the impact of strategic alliances on the innovation of women-owned businesses.

Theoretical explication

Women entrepreneurs' challenges in creating innovation in their businesses range from poor funding, high interest rates, and inaccessible collateral requirements to institutional and social exclusion. This means that women-owned enterprises must cooperate and partner with each other through strategic alliances to create innovation and survive the global economic downturn. Thus, strategic alliances in women's enterprises present a chance for women's social and economic inclusion. This study will be based on four theoretical foundations of strategic alliance. They are:

1. *Transaction cost reduction*: According to this theory, enterprises engage in strategic alliances to lower production and administration costs. Strategic alliances aid businesses in balancing out their flaws and weaknesses, enhance the partnering companies' comparative advantages, and promote their products or services to sustain a competitive market.

2. *Strategic perspective*: This theory stipulates that strategic alliances are formed to gain competitive and synergistic advantages, such as risk mitigation and scale economies that increase the resource pool of the enterprises (Dunning, 1995). A strategic alliance is a way to build a shared resource pool that can boost the member companies' capacity in a climate of high economic unpredictability and volatility. In order to minimize costs and benefit from economies of scale, female entrepreneurs can take advantage of the synergistic potentials of other businesses.

3. *Knowledge-based Theory*: According to this theory, strategic alliances are formed so businesses can obtain specialized and vital knowledge from other businesses without sacrificing their capabilities and expertise. Therefore, for knowledge-based theory, strategic alliances foster original business learning opportunities and processes.

4. *Resource-based view*: In keeping with the Resource-based View, companies primarily use alliances to access another company's resources. These resources may be material (such as machinery, tools, and equipment) or immaterial (such as skills, knowledge, and expertise). Based on the theory, organizations join alliances to access particular resources that can be hard for other organizations to replicate.

These four theories are applied here to study the impact of strategic alliance on the innovation of women entrepreneurs and how they can innovate and progress in their activities if they align and partner.

Study area

Enugu State, Nigeria, served as the location for this study as shown in Fig. 1. This area was selected because it is gradually becoming an emerging market economy following the expansion and strong operations of SMEs. This was discussed elsewhere in Nwokocha and Madu (2020).

Methods

Sample selection and sample size. A total of 1089 SMEs were found in the research area's industrial directory. Consequently, this study adopted a sample size using the Yaro Yamane formula for population size. This formula was adopted to establish an

Table 1 Industrial group in the study area.

S/N	Industrial group	Surveyed enterprises
1	Fashion designing/cloth making	22
2	Nylon and paper bag	22
3	Food and catering services	22
4	Printing and publishing	22
5	Miscellaneous assembly (decoration)	21
	Total	109

Source: Author's computation 2023.

appropriate sample size for the study. The formula is rendered as

$$n = \frac{N}{1 + Ne^2} \tag{1}$$

Based on this formula, two hundred and ninety-three (293) enterprises were adopted for this study. Given this number (293), 109 (one hundred and nine) women-owned enterprises were purposefully selected for this study. This was because they were found to be managed and operated by women. These enterprises were selected from five industrial categories, as displayed in Table 1.

This sample size was selected to provide a geographical and equitable representation of women-owned enterprises in the paper. This was also done to effectively analyze the impact of strategic alliances on innovation in the sampled enterprises.

Data collection. Data used for this study were obtained from both primary and secondary sources. While the primary data were sourced from a questionnaire survey, unpublished data served as a secondary data source for the research. Primary data was collected from women entrepreneurs through a questionnaire instrument. It was shared through the direct distribution method. This was done to guarantee participation, increase the response rate, and lessen any potential linguistic issues with the survey. The study population was women entrepreneurs or their managers. The questionnaire had a five-point Likert-type scale question and was structured in an open-ended form. The respondents were allowed to evaluate the items on the questionnaire by establishing their level of agreement on a scale of 1–5, where 5—significantly increased, 4—increased, 3—slightly increased, 2—relatively decreased, and 1— significantly decreased. On the other hand, Innovation and strategic alliance were measured by the variables stated in Table 2.

These variables were measured based on the degree of satisfaction the women entrepreneurs have experienced in their enterprises for 2 years (2020–2022). The 2-year model was adopted because of the need to show the observation/experience of the enterprises on the use of strategic alliances over time. This was also strengthened by the fact that strategic alliances helped small-scale industries achieve varied success during the COVID-19 pandemic (Nwokocha et al., 2021). Innovation and strategic alliance were treated as ordinal scale variables, assuming that their status has a five-point ordering of 5—significantly increased, 4— increased, 3—slightly increased, 2—relatively decreased, and 1—significantly decreased. The regression analysis was based on these variables and their input values.

Instrument validation and reliability. Three professionals examined and validated the instrument. These professionals were chosen from the field of economics and geography. These experts were selected based on their knowledge and understanding of the field. The questionnaire was also tested in a pilot research with ten businesses to determine the instrument's dependability. While the researcher collected the data for the reliability test, the instrument's internal consistency was evaluated using the Cronbach alpha reliability coefficient. The Cronbach's alpha coefficient for the study was 0.72. This is considered statistically significant for the study and follows the Cronbach alpha reliability principles.

Table 2 Innovation and strategic alliance variables.

Innovation (dependent variables *Y*)	Strategic alliance (independent variables *X*)
Process innovation	Reduction in transaction cost
Product innovation	Risk reduction
	Resource accessibility
	Knowledge accessibility
	Technological advancement
	Improve quality of service
	New opportunity

Source: Author's 2023.

Data analysis. Regression analysis was adopted in the analysis of the study data. This statistic was utilized in analyzing the relationship between strategic alliance and innovation. In the paper, percentages, and tables were used to present the results. The analysis was conducted using SPSS version 28.0.

Results

The regression result showed that strategic alliances had different impacts on the innovation of women-owned businesses. The study reveals that an increase of 0.76 and 0.62 in process innovation was achieved by a decrease in cost reduction and new opportunities, as shown in Table 3. The result also revealed that process innovation increased by 0.07 and 0.23 for every unit increase in risk reduction and improved quality. This showed that women-owned enterprises used strategic alliances to reduce risk and improve the standard of their services. These businesses reduce risk and increase the quality of their services by outsourcing their production processes, focusing on their core competencies, and utilizing the resources and capabilities of other businesses to fill up their weaknesses. This can also be shown by the R^2 and F values of 0.54 and 0.00, which reveal that the relationship between process innovation and strategic alliance is favorable and significant. This also showed that strategic alliance contributed to a 54% change in women-owned enterprises' process innovation. The significance of this is that women-owned enterprises develop alliances with one another in order to accomplish process innovation. This is important because they lower business production costs while opening new markets.

As shown in Table 4, the study found that an increase in new opportunities was associated with a 0.56 rise in product innovation. In contrast, an increase in cost reduction was associated with a 0.63 increase in product innovation. The study's results also indicated that strategic alliance and product innovation had a strong and significant relationship with R^2 and F values of 0.57 and 0.00, respectively. This shows that 57% of the change in product innovation was due to strategic alliances. It also suggests that strategic alliance helps women-owned enterprises to achieve product innovation. These enterprises develop innovative and competitive products by utilizing the skills and knowledge of others through strategic alliances.

Table 3 Summary of process innovation.

Multiple *R*	***R*²**	**Adjusted *R*²**	**Standard error**	**Observation**	
0.74	0.54	0.50	0.76	300	
	DF	**SS**	**MS**	***F***	**Sig *F***
Regression	7	174.48	24.93	235.97	0.00
Residual	129	13.62	0.11		
Total	136	188.62			
Variables	**Coefficient**	***T* statistics**		***P* value**	
Intercept/constant	1.63	6.18		0.00	
Cost reduction	0.76	10.38		0.00	
Risk reduction	0.07	1.13		0.00	
Knowledge acquisition	0.01	0.17		0.87	
Resource accessibility	0.09	1.35		0.18	
Technology advancement	0.02	0.32		0.75	
Improved quality of services	0.23	2.65		0.01	
New opportunities	0.62	2.67		0.01	

Source: Author's computation 2023.

Table 4 Summary of product innovation.

Multiple *R*	***R*²**	**Adjusted *R*²**	**Standard error**	**Observation**	
0.75	0.57	0.53	0.73	136	
Product innovation	**DF**	**SS**	**MS**	***F***	**Sig *F***
Regression	7	146.03	20.86	80.54	0.00
Residual	129	33.41	0.26		
Total	136	179.45			
Variables	**Coefficient**	***T* statistics**		***P* value**	
Intercept/constant	2.48	0.68		0.00	
Cost reduction	0.63	0.68		0.03	
Reduction in risk	0.21	0.11		0.47	
Knowledge acquisition	0.10	0.10		0.90	
Resource accessibility	0.10	0.06		0.51	
Technology advancement	0.25	0.09		0.64	
Improved quality of services	0.04	0.10		0.25	
New opportunities	0.56	0.48		0.05	

Source: Author's computation 2023.

Test of hypothesis. The regression study results showed a strong and positive relationship between the innovation of women-owned enterprises in Nigeria and strategic alliances. The relationship was tested using a null hypothesis (H0). The regression analysis revealed that, at a 95% confidence level, the innovation variables had calculated values smaller than the table value of 2.01. This simply explains the fact that the creativity of women-owned enterprises in Nigeria has a positive relationship with strategic alliances—consequently, the alternative hypothesis H1 is accepted, and the research hypothesis H0 is rejected.

Discussion

The findings of this study demonstrate that strategic alliances help women-owned businesses cut costs and open up new markets that drive process innovation. This is because these partnerships allow businesses to focus on their core competencies while outsourcing production tacks in their value chain where they lack capacity. For instance, women-owned businesses subcontract production tasks to acquire access to methods, tools, and parts that are either unavailable in their enterprises or not utilized because of a lack of capacity. This can be found in nylon and paper bag production, which require cutting-edge product production techniques. This enables women-owned enterprises to rely on their alliance partners with these competencies to create these products. In other words, women-owned enterprises could concentrate on their areas of strength while creating competitive products in the market. This ensures that both the cost and risk of their operations are reduced while improving the quality of their services. An R^2 and F value of 0.54 and 0.00 revealed that the relationship between process innovation and strategic alliance is favorable and significant, and it also signified that strategic alliance contributed to a 54% change in the process innovation of women-owned enterprises.

The result of product innovation indicated that women-owned enterprises achieve product innovation through the use of strategic alliances. This is because strategic alliance allows these enterprises to share and access external resources such as expertise, machines, and technologies, which give rise to new products. For instance, women-owned enterprises in the fashion designing sector (cloth making) utilize electric-powered weaving and cutting machines due to their preciseness and quality. Enterprises that lack these abilities form alliances with those that have them to be in business. Compared with products produced with manual technology, products produced with this innovation are valued more in the market. Therefore, women-owned businesses form alliances to gain access to these technologies, especially when they lack internal resources. This corroborates the work of Zahoor et al. (2022), who found that innovation and new product development can be achieved through strategic alliance, which fills up the firm's gaps in tangible and intangible resources from other firms. This was also corroborated by Sungjoo et al. (2010), networking among enterprises is an effective way to facilitate open innovation in SMEs.

Limitation of study. This study has a few limitations and potential places for further research. First, there needed to be a significant barrier between the surveyed enterprises and the geographical coverage of the study. The findings based on these limitations may only partially account for the impact of strategic alliances on innovation across Nigeria. Secondly, the research relied on specific methodologies (survey research design), and it is possible that using alternative methodologies would produce entirely different results. Therefore, this research deserves to be repeated in other parts of Nigeria using other methodologies and a bigger sample size. This is to confirm or compare the results of this study.

Conclusion

This paper examined the impact of strategic alliances on the innovation of women-owned enterprises in Nigeria. Theoretically, the study shows that while strategic alliance enables women-owned enterprises to focus on their primary competencies by partnering with other enterprises where they fall short, it allows them to share resources, which reduces their cost of production and risk reduction and increases economies. It also upholds that strategic alliance helps women-owned enterprises acquire specialized knowledge/skills from other firms, which is crucial for innovation. The study demonstrates how crucial strategic alliances are to the innovation of women-owned enterprises. It discloses how strategic alliance enables women-owned enterprises to achieve process and product innovation. These forms of innovation propel cost reduction and new market opportunities in women's enterprises.

Because of this, strategic alliance holds a tremendous economic policy implication for the Nigerian industrial sector. By means of this, the flaws and failings of the numerous industrial policies adopted by successive governments in Nigeria could be mitigated to change the dwindling fortunes of the Nigerian industrial sector. Strategic alliance would be crucial not only for the success of this sector but also for encouraging cooperation and inter-firm linkages among the players (large-scale, medium-scale, and small-scale industries) in the sector. It would also allow women-owned enterprises to innovate, have access to scarce resources, build capacity, and maintain competitiveness in their businesses. Therefore, given the structural constraints of women-owned enterprises in finance, size, and capacity, the use of strategic alliance allows these enterprises to innovate by radically and incrementally introducing new products and processes in these enterprises.

Data availability

Materials and data used in this study are in a supplementary file.

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References

Abdual, Mohammed (2023) Women entrepreneurial networks and small business development: a study of the informal sector in Borno, Nigeria. Int J Bus Entrep Res 14(1):87–96. www.arcnjournals.org

Adam I, Ribeiro MA, Kimbu, Afenyo-Agbe AN, Adeola E, O.Figueroa-Domecq C, de Jong A (2021) Women entrepreneurship orientation, networks and firm performance in the tourism industry in resource-scarce contexts. Tour Manag 86:1–14. https://doi.org/10.1016/j.tourman.2021.104343

Adim CV, Adelaiye MBO, Adubasim IE (2018) Entrepreneurial networking and women entrepreneurs' contribution to employment creation in Rivers state, Nigeria. Int J Bus Econ Manag 5(3):56–67

Ademola AO, Adegboyegun AE, Adegoke KA (2020) Does social networking enhance the performance of women entrepreneurs in Nigeria? Asian J Econ Financ Manag 2(1):174–184

Adetiloye KA, Adegboye FB, Akinjare VA (2020) Sustainable financial access for female entrepreneurs in the micro, small and medium enterprises sector in Nigeria. Cogent Soc Sci 6(1):29–38. https://doi.org/10.1080/23311886.2020.1823600

Adula M, Kant S (2022) Interpretative phenomenological perceptional study of women entrepreneurs facing challenges in entrepreneurial activity in the Horn of Africa. J Entrep Manag Innov 4(2):321–335. https://doi.org/10.52633/jemi.v4i2.154

Agenssa WA, Premanandam P (2021) Impact of micro and small-scale enterprises on improving socio-economic status of women in Ethiopia: the case of Hawassa City. Gend Manag Int J 8(2):1342–1354

Ali M, Ali I, Badghish S, Soomro YA (2023) Determinants of financial empowerment among women in Saudi Arabia. Front Psychol 12. https://doi.org/10.3389/fpsyg.2021.747255

Aliyu RM, Ahmad TSBT, Nordin NB (2019) The mediating role of innovation on access to finance and business performance of women entrepreneurs. Int J Acad Res Bus Soc Sci 9(3):147–159

Aloini D, Pellegrini L, Lazzarotti V, Manzini R (2015) Technological strategy, open innovation and innovation performance: evidences on the basis of a structural-equation-model approach. Meas Bus Excell 19(3):22–41

Alozie EN, Ekumankama IO (2022) Women's entrepreneurship and improved family lifestyle in Abia State, Nigeria. Int J Home Econ Hosp Allied Res 1(1):117–127

Audretsch DB, Belitski M, Caiazza R, Phan P (2023) Collaboration strategies and SME innovation performance. J Bus Res 164. https://doi.org/10.1016/j.jbusres.2023.114018

Babalola SS (2009) Women entrepreneurial innovative behaviour: the role of psychological capital. Int J Bus Manag Sunday 4(11):184–192

Bakar LJ, Ahmad H (2010) Small medium enterprises' resources and the development of innovation in Malaysia. J Innov Manag 2010:1–10

Batrancea LM, Balc MA, Chermezan L, Akgüller Ö, Masca ES, Gaban L (2022) Sources of SMEs financing and their impact on economic growth across the European Union: insights from a panel data study spanning sixteen years. Sustainability 14(22). https://doi.org/10.3390/su142215318

Bouzari P, Salamzadeh A, Soleimani M, Ebrahimi P (2021) Online social networks and women's entrepreneurship: a comparative study between Iran and Hungary. J Women's Entrep Educ 14(3–4):61–75

Carrasco-Carvajal O, Castillo-Vergara M, García-Pérez-de-Lema D (2022) Review of managerial science. https://doi.org/10.1007/s11846-022-00533-9

Caner T, Tyler BB (2013) Alliance portfolio R&D intensity and new product introduction. Am J Bus 28(1):38–63

Chatterjee I, Shepherd DA, Wincent J (2022) Women's entrepreneurship and well-being at the base of the pyramid. J Bus Ventur 37(4). https://doi.org/10.1016/j.jbusvent.2022.106222

Chen S, Wen PP (2007) Globalization and innovation: the changing economic geography across the Taiwan Strait. Macalester Int 18(13):126–145

Dunning J. H (1995) Reappraising the Eclectic Paradigm in an Age of Alliance Capitalism. J Int Bus Stud 26(3):461–491. http://www.jstor.org/stable/155557

Dyer JH, Singh H (1998) The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage. Acad Manage Rev 23(7):660–679

Emami A, Welsh DHB, Davari A (2022) Examining the relationship between strategic alliances and the performance of small entrepreneurial firms in telecommunications. Int Entrep Manag J 18:637–662. https://doi.org/10.1007/s11365-021-00781-3

Etim E, Iwu CG (2019) A descriptive literature review of the continued marginalisation of female entrepreneurs in sub-Saharan Africa. Int J Gend Stud Dev Soc 3(1):1–19

Farrokhian R, Soleimani F (2015) Assessing capabilities for innovation—the case of Iranian Kalleh meat product company. In: International conference on operation excellence and service engineering. pp. 23–32

Ferreira J, Coelho A, Moutinho L (2020) The influence of strategic alliances on innovation and new product development through the effects of exploration and exploitation. Manag Decision. https://doi.org/10.1108/md-09-2019-1239

Ferreira A, Franco M, Haase H (2022) Strategic alliances and development of intellectual capital: a study of technology-based SMEs. Int J Organ Anal 30(6):1644–1671. https://doi.org/10.1108/IJOA-10-2020-2440

Fieve JKD, Chrysostome EV (2022) Credit cooperative lending loans as challenges and opportunities for women entrepreneurship in Africa: evidence from Ghana. J Afr Bus. https://doi.org/10.1080/15228916.2022.2078937

Giwa AH, Babakatun AB (2019) Effect of socio-cultural factors on women entrepreneurship development in Kaduna State. J Hum Resour Manag 7(3):57–65. https://doi.org/10.11648/j.jhrm.20190703.11

Ghauri S, Mazzarol T, Soutar G (2023) Networking benefits for SMEs via co-operative membership. 1–26 Accessed from SSRN. https://doi.org/10.2139/ssrn.4274689
Gnyawali DR, Park BJ (2009) Co-opetition and technological innovation in small and medium-sized enterprises: a multilevel conceptual model. J Small Bus Manag 47(3):308–331
Gundolf K, Jaouen A, Gast J (2018) Motives for strategic alliances in cultural and creative industries. Creative Innov Manag 1(13):1–13
Halkias D, Nwajiuba C, Harkiolakis N, Caracatsanis SM (2011) Challenges facing women entrepreneurs in Nigeria. Manag Res Rev 34(2):221–235. https://doi.org/10.1108/01409171111102821
Hallward-Driemeier M (2013) Enterprising women: expanding economic opportunities in Africa. World Bank publications—books, The World Bank Group, number 13785
Haudi H, Wijoyo H, Cahyono Y (2021) Effect of product innovation and marketing strategy on consumer purchase decisions in Indonesia's Lightweight Roof Steel Industry. J Crit Rev 7(13):78–87. https://ssrn.com/abstract=3873704
Idoghori U, Agwu CO (2022) Towards a favourable legal climate: educating women entrepreneurs in Nigeria. Int J Soc Sci Educ Res Stud 2(5):104–106
Iyiola OO, Azuh D (2014) Women entrepreneurs as small medium enterprise (SME) operators and their roles in socio-economic development in Ota, Nigeria. Int J Econ Bus Financ 2(1):1–10
Jiang W, Mavondo F, Zhao W (2020) The impact of business networks on dynamic capabilities and product innovation: the moderating role of strategic orientation. Asia Pac J Manag 37(5):1239–1266. https://doi.org/10.1007/s10490-018-9628-2
Jiang W, Shu C, Zhou Z, Guo (2021) When more is better: a contingent view of alliance partner multiplicity and a focal firm's product innovation performance in China. Organ Manag 23(4):507–533
Kan V, Mukhopadhyay B (2022) The role of migration in women entrepreneurship and empowerment: evidence from Nigeria. J Women's Entrep Educ 1(2):187–212
Khan RU, Salamzadeh Y, Shah SZA, Hussain M (2021) Factors affecting women entrepreneurs' success: a study of small- and medium-sized enterprises in emerging market of Pakistan. J Innov Entrep 10(11):1–29. https://doi.org/10.1186/s13731-021-00145-9. pp
Kiprotich S, Kemboi A, Kiprop P (2015) Moderating effect of social networking on the relationship between entreprenual orientation and performance of small and medium enterprise in Nakuru County, Kenya. Eur J Small Bus Entrep Res 3(2):38–52
Lee N, Sameen H, Cowling M (2015) Access to finance for innovative SMEs since the financial crisis. Res Policy 44(2):370–380
Laidoune A, Zid C, Sahraoui N (2022) Innovate and overcome resistance to change to improve the resilience of systems and organizations. J Knowl Econ 13:2986–3001. https://doi.org/10.1007/s13132-021-00840-8
Lu C, Qi Y, Hao S (2023) Enhancing innovation performance of SMEs through open innovation and absorptive capacity: the moderating effect of business model. Technol Anal Strateg Manag. https://doi.org/10.1080/09537325.2023.2177827
Madison K, Moore CB, Daspit JJ (2022) The influence of women on SME innovation in emerging markets. Strateg Entrep J 16(2):281–313
Marczewska M, Weresa MA, Lachowicz M (2023) Towards creativity and innovation in universities: study on central and eastern Europe. J Knowl Econ. https://doi.org/10.1007/s13132-023-01139-6
Minhas J, Sindakis S (2022) Implications of social cohesion in entrepreneurial collaboration: a systematic literature review. J Knowl Econ 13:2760–2791. https://doi.org/10.1007/s13132-021-00810-0
Muharam H, Andria F, Tosida ET (2020) Effect of process and market innovation on financial performance with moderating role of disruptive technology. Syst Rev Pharm 11(1):223–232
Murray JY, Gao GY, Kotabe M (2011) Market orientation and performance of export ventures: the process through marketing capabilities and competitive advantages. J Acad Mark Sci 39(2):252–269
Muthoka R, Kilika J, Muathe S (2022) What sustains performance in a strategic alliance? The role of level of collaboration. J Bus Manag Sci 10(3):113–123. https://doi.org/10.12691/jbms-10-3-2
Nazzaro C, Lerro M, Stanco M, Marotta G (2019) Do consumers like food product innovation? An analysis of willingness to pay for innovative food attributes. Br Food J 121(6):1413–1427. https://doi.org/10.1108/BFJ-06-2018-0389
Ndesaulwal AP, Kikula J (2016) The impact of innovation on performance of small and medium enterprises (SMEs) in Tanzania: A review of empirical evidence. Int J Bus Manag Sci 4(1):1–6
Ndubisi NO, Capel CM, Ndubisi GC (2015) Innovation strategy and performance of international technology services ventures: The moderating effect of structural autonomy. J Serv Manag 26(4):548–564
Nwokocha VC (2019) The influence of strategic alliance on the performance of small and medium-scale enterprises in Enugu State, Nigeria (Unpublished doctoral dissertation). University of Nigeria, Enugu, Nigeria
Nwokocha VC, Nwankwo C, Madu IA (2019) The role of subcontracting on innovation: an assessment of small and medium enterprises in Nigeria. Prod Manuf Res 7(1):88–108. pp
Nwokocha VC, Nwankwo CE (2019) The effects of subcontracting forms on the sustenance of SMEs: a panacea for sustainable development goals (SDGs) in Nigeria. World J Entrep Manag Sustain Dev. https://doi.org/10.1108/WJEMSD-01-2019-0006
Nwokocha VC, Madu IA (2020) Strategic Alliance and its influence on the performance of small- and medium scale enterprises in Enugu State, Nigeria. Glob J Emerg Mark Econ 12:199–216. https://doi.org/10.1177/0974910119896634
Nwokocha VC, Anyanwu OC, Madu IA, Nwankwo CE (2021) Covid-19 pandemic and small-scale-industries in a local geographic space of Nigeria: an assessment of the impact of strategic inter-firm alliance. SAGE Open. https://doi.org/10.1177/21582440211022676
Nwokocha VC (2022) Do industries' structural attributes/characteristics influence their decision to utilize strategic alliances. Int J Soc Sci Educ Res 8(4):332–339. https://doi.org/10.24289/ijsser.1129393
Nwosu II, Onoyima RO, Madu IA, Nwokocha VC (2019). The socioeconomic effects of small-scale women businesses in broom production and marketing industry: a panacea for sustainable development. J Enterprising Communities https://doi.org/10.1108/JEC-11-2018-0080
O'Dwyer M, O'Flynn E (2005) "MNC—SME strategic alliances—a model framing knowledge value as the primary predictor of governance modal choice. J Int Manag 11(3):397–416
O'Dwyer M, Gilmore A, Carson D (2011) Strategic alliances as an element of innovative marketing in SMEs. J Strateg Mark 19(1):91–104. https://doi.org/10.1080/0965254x.2010.537765
OECD/Eurostat (2005) The measurement of scientific and technological activities: guidelines for collecting and interpreting innovation data. OECD
Omid A, Elizabeth LR, Kazuhiro A (2022) Sources of knowledge and process innovation: the moderating role of perceived competitive intensity. Int Bus Rev 31(2):1–19
Onoshakpor C, Etuknwa A, Karamalla-gaiballa N (2020) Strategic flexibility and organizational resilience of women entrepreneurs' in Africa during the Covid-19 pandemic. Res J Bus Manag 7(4):277–287. https://doi.org/10.17261/Pressacademia.2020.1324
Prabhudesai R, Pangarkar N, Prasad CVVSNV, Sinha AK (2022) Performance impact of behavioural factors in alliances by SMEs: an empirical analysis. Int J Product Perform Manag. https://doi.org/10.1108/IJPPM-06-2021-0341
Sungjoo L, Gwangman P, Byungun Y, Jinwoo P (2010) Open innovation in SMEs: an intermediated network model. Res Policy 39(2):290–300
Raman R, Subramaniam N, Nair VK, Shivdas A, Achuthan K, Nedungadi P (2022) Women entrepreneurship and sustainable development: bibliometric analysis and emerging research trends. Sustainability 14(15):60–91. https://doi.org/10.3390/su14159160. Retrieved from
Roomi MA (2013) Entrepreneurial capital, social values and Islamic traditions: exploring the growth of women-owned enterprises in Pakistan. Int Small Bus J 31(2):175–191
Roomi MA, Rehman S, Henry C (2018) Exploring the normative context for women's entrepreneurship in Pakistan: a critical analysis. Int J Gend Entrep 10(2):158–180
Ruiz-Palomo D, Fernández-Gámez AM, León-Gómez A (2022) Analyzing the effect of financial constraints on technological and management innovation in SMEs: a gender perspective. SAGE Open. https://doi.org/10.1177/21582440221079925
Sajuyigbe AS, Fadeyibi IO (2017) Women entrepreneurship and sustainable economic development: evidence from Nigeria. J Entrep Bus Econ 5(2):19–46
Salamzadeh A, Radović-Marković M, Ghiat B (2022) "Women entrepreneurs in Algeria," World Scientific book chapters. In: Women entrepreneurs in North Africa historical frameworks, ecosystems and new perspectives for the region. World Scientific Publishing Co. Pte, pp. 87–102
Salisu Y, Abu Bakar LJ (2018) Strategic alliance and the performance of SMEs in developing economies: the mediating role of innovation strategy. Asian. J Multidiscip Stud 6(2):47–55
Shallangwa GM, Wilson B (2022) Meeting the challenges of sustainable women entrepreneurship development in North Eastern Nigeria. J Econ Financ Manag Stud 5(5):1281–1288. https://doi.org/10.47191/jefms/v5-i5-09
Shakeel MJS, Kannan VR, Brah SA, Hassan SZ (2017) Linkages between firm innovation strategy, suppliers, product innovation, and business performance: insights from resource dependence theory. Int J Oper Prod Manag 37(8):1054–1075
Shu C, Page AL, Gao S, Jiang X (2012) Managerial ties and firm innovation: is knowledge creation a missing link? J Prod Innov Manag 29(1):125–143

Slotte-Kock S, Coviello N (2010) Entrepreneurship research on network processes: a review and ways forward. Entrep Theory Pract 34(1):31–57. https://doi.org/10.1111/j.1540-6520.2009.00311.x

Welbourne TM, Pardo-del-Val M (2009) Relational capital: strategic advantage for small and medium size enterprises (SMEs) through negotiation and collaboration. Group Decis Negot 18(5):483–497

Yao Z, Liu Y (2023) How Covid-19 impacts the financing in SMEs: evidence from private firms. Econ Anal Policy. https://doi.org/10.1016/j.eap.2023.06.036

Zahoor N, Khan H, Khan Z, Akhtar P (2022). Responsible innovation in emerging markets' SMEs: the role of alliance learning and absorptive capacity. Asia Pac J Manag. https://doi.org/10.1007/s10490-022-09843-8

Zeb A, Ihsan A (2020) Innovation and the entrepreneurial performance in women-owned small and medium-sized enterprises in Pakistan, Women's. Stud Int Forum 79(1):1–8. pp

Zhang M, Zhao X, Lyles M (2018) Effects of absorptive capacity, trust and information systems on product innovation. Int J Oper Prod Manag 38(2):493–512. https://doi.org/10.1108/IJOPM-11-2015-0687

Zhao F (2006) Maximize business profits through e-partnerships. IDEA Group Publishing, Hershey, PA

Zhao F (2014) A holistic and integrated approach to theorizing strategic alliances of small and medium-sized enterprises. Bus Process Manag J 20(6):887–905. https://doi.org/10.1108/bpmj-01-2013-0004

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Author contributions
OCA handled the revisions in the methodology, results, and discussion sections of the study while SEO and VCN handled the revisions in the background of the study, literature review, and theoretical framework of the study, respectively.

Competing interests
The authors declare no competing interests.

Ethical approval
This study upheld the highest ethical standards in all the stages leading to the preparation of this paper. It was not a study involving human participants and had no direct contact with people. Information/Data used in this study were supplied by small and medium enterprises, firms, and industries. The data used in this study were basically market data which were used to assess innovation in businesses.

Informed consent
This study had no need for informed consent because it did not involve human participants.

Additional information
Supplementary information The online version contains supplementary material available at https://doi.org/10.1057/s41599-023-02463-7.

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