DOI: 10.28934/jwee23.pp128-145
JEL: O1,03,04

ORIGINAL SCIENTIFIC PAPER

The Sustainability Analysis of Women-owned Businesses Examined Through the Impact of Selected Variables on Dimensionsof Innovation Capacity

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A B S T R A C T

Innovation is often described as the main driving force of business, which can lead to the company's sustainable growth. Not all innovation dimensions are equally responsible for the sustainability of businesses. Therefore, this study examines the sustainability of women-owned businesses by exploring the influence of selected variables on specific dimensions of companies' innovation capacities. Based on the commonly applied methodologies for assessing the innovation capacity of companies such as IMP³rove and Innovate, the following variables were chosen for the analysis of the impact on innovation in the context of the sustainability of SMEs: 1) annual income and its impact on the decision to invest in innovation 2) the sector of operation and its influence on expectations regarding growth 3) the expectations regarding growth and its impact to a range of innovation dimensions. Different techniques were used, starting with descriptive

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statistics, then Cross-tabulation, Pearson's chi-square test and ANOVA as the most appropriate techniques *to conduct statistical analysis. The research has indicated that annual income does not have a decisive influence on the decision to invest in innovation, as does the sector. However, the sector of operations has a significant influence on expectations regarding growth. Also, there is a statistically significant difference between growth expectations and dimensions such as client base and product development plan, market awareness and perception, innovation strategy, decision-making process, employee training, business networking, and external advice. While exploring the innovation activity of launching new products/services, we came to a finding that is potentially risky for the sustainability of women's businesses, namely that 50% of the companies in the sample offer only one product to one customer. That is why it is important that companies that have a high awareness of the need to innovate diversify their product and client portfolio and thus ensure greater independence on the market and, therefore, sustainability.*

KEYWORDS: *sustainability, women entrepreneurs, innovation capacity*

Introduction

Innovation is considered to be a crucial factor for sustainable development, and the previous study results have shown that sustainability-oriented innovation requires different conditions in different contexts (Salamzadeh et al., 2022). In economies driven by innovation, innovativeness and competitiveness are interdependent, which is why programs supporting SMEs are often named as programs supporting competitiveness and innovation. Indeed, if a company is highly competitive in the market, it is very likely to have a well-developed innovation management system with standards that are largely aligned with European standards. The previous research results have shown that, when it comes to innovation capacity, there are differences between Serbian companies (Vučetić & Kirin, 2022). Various methodologies exist for assessing companies' innovation capacities, and for the purpose of researching the interdependence between sustainability in women-owned small and medium enterprises in Serbia and innovation, a questionnaire was constructed based on a combination of two commonly applied methodologies for assessing innovation potential: the IMP³rove methodology and the Innovate methodology.

IMP³rove is a widely accepted methodology for evaluating innovation potential in small and medium-sized enterprises, which uses benchmarking and/or comparison with ideal values in five dimensions known as the

"House of Innovation," as described by the consultancy company A.T. Kearney (Popović-Pantić, 2013). In this paper, some questions were adapted from the IMP³rove questionnaire and contextualized for women-owned businesses. For example, in the IMP³rove methodology, the time from idea conception to prototype development and market launch, as well as the time when the new product or service starts generating profit, is measured. Since this aspect is important for both sustainability and further innovation-driven business development, it is a subject of investigation in this research.

Ten years ago, the closure rate of women-owned companies was around 47%, while for male-owned companies, it was 38%. One of the main reasons for this difference was the motivation for establishing a company, with necessity being a significant factor (Popović-Pantić, 2020). Women who found themselves unemployed in their middle age, ten or more years ago, had limited options in the job market, leading them to start their own businesses to secure their livelihoods. Although they often had prior work experience, it was not sufficient for long-term success in their new entrepreneurial ventures. Only a small number of them introduced new or significantly improved products and services, approximately one-fifth. However, regarding processes, half of them implemented new or improved processes (Popović-Pantić, 2020). At that time, external experts were rarely utilized in innovation development. However, this new research, conducted on a sample of 104 respondents, revealed that as many as 86 of them occasionally or continuously seek external advisors for business improvement, and a quarter of them specifically seek expert support for enhancing technological aspects of their operations. This latest finding confirms some previous ones, according to which sustainability-oriented innovations (SOI) push companies to introduce changes to their core business, often requiring them to use external partners' expertise (Salamzadeh et al., 2021). A prerequisite for a successful SOI partnership is that companies acquire specific capabilities and strengthen and expand partnerships (ibid).

Digitalization is often perceived as a trigger for the introduction of new business models and innovations in business. Some research indicated that there is a significant relationship between digital technology and business innovation, especially in emerging markets, since digital technologies can provide new ways to organize economic activities and reduce time and costs (Dana et al., 2022). This was especially pronounced with the outbreak of the COVID-19 pandemic when digitalization helped numerous small and

medium-sized companies to remain sustainable. While two decades ago, the innovation activities of the company were related to the purchase of equipment, employee training and internal R&D (Popović-Pantić, 2020), since the outbreak of the Covid-19 pandemic until today, digitalization has been primary and is the main driver of the introduction of new products and services, as well as other innovation activities.

Female-owned companies face challenges related to access to and use of digital technologies, often seen as a key factor contributing to the development gap between female and male-owned companies, as overall utilization of digital technologies is crucial for prosperity (Popović-Pantić et al., 2019) and innovation capacity nowadays. Information and communication technologies (ICT) such as social media, mobile telecommunications, the Internet of Things (IoT), big data, and 3D printing, as well as digital transformation in general, empower women to overcome gender bias in their path to development and growth. Adopting ICT and digitally transforming businesses are important factors in developing business strategies, fostering creativity and innovation, and enhancing competitiveness (Ongori & Migiro, 2010), ultimately leading to a stronger position in the global market and improved financial performance. The connectivity that the Internet provides is of great importance for networking and promotion, which contributes to sustainable entrepreneurship (Yakubu et al., 2022). As digital technologies are increasingly affordable and user-friendly, they enable women, who often operate micro and small-sized businesses in traditional sectors, to elevate their businesses relatively easily (Popović-Pantić et al., 2020).

A study conducted in 2019, just before the COVID-19 pandemic, showed that one-third of women-owned companies managed to innovate their business models comprehensively through the extensive use of digital technologies to meet customer needs (Popović-Pantić et al., 2019). This innovation included offering a basic product/service for free and selling additional products/services, shifting from sales to rental, selling advertising space, licensing, selling data, and utilizing excess capacity. Additionally, 45.5% of companies reported generating additional benefits for customers through digitalization, such as easier access to products, location independence, and a wider range of choices. Crises have shown that innovation activities decrease during such periods. Therefore, during the pandemic, only 17% of the 87 women-owned businesses in the sample introduced new products/services primarily related to digitalization, and

merely 7% mentioned that the pandemic enabled them to enter new markets (Popović-Pantić et al., 2020).

When it comes to differences between male and female entrepreneurs, it has been stated that women often have different attitudes to power than men, and more *communal characteristics*, which, in an entrepreneurial environment, implies efficiency in solving relational problems in companies (Radović-Marković & Salamzadeh, 2022). As far as innovation is concerned, studies have indicated that women excel in key innovation activities and lead transformative changes within companies (Díaz-García et al., 2013). While some authors argue that women, whether entrepreneurs or managers, face less support in implementing their ideas within organizations, gender diversity is considered a driver of creativity and innovation (Danilda & Thorslund, 2011). Furthermore, research suggests that women score as well as or higher than men in key innovation capacities, such as "championing change," and that prevailing organizational culture plays a crucial role in enabling women's participation in the innovation process (Zenger & Folkman, 2015).

Investment decisions regarding innovation are often linked to a company's financial performance. Studies by Hitt and Brynjolfsson (1996), Velcu (2005), Aral and Weill (2007), Koski (2010), and Benavente et al. (2011) have found no direct relationship between financial performance and digital transformation. However, if digital technologies are used innovatively, they have a positive impact on a company's financial performance (Popović-Pantić, 2020), as observed in the sample of women-owned businesses. In this research, innovation was observed through five dimensions of the "House of Innovation", which is the core of the IMP³rove methodology.

Methodology

The research was conducted from January to March 2023, using an online survey on a sample of 104 companies owned and managed by women. The data were statistically analyzed using descriptive statistics to analyze various dimensions of innovation capacity. Cross-tabulation was employed to examine the data distribution and identify relationships between variables. This technique was chosen to investigate the behavior of one variable in relation to another. The chi-square test for independence,

also called Pearson's chi-square test, was applied to determine whether two categorical variables are related.

Since multiple answers were offered by the questionnaire, Analysis of Variance (ANOVA) as the most appropriate technique to conduct statistical analysis was applied. The aim of the method was to establish whether there are statistically significant differences between the sector of operation and growth expectations. The aim of this method is to determine the existence of statistical significance between the sector of operation and dimensions of innovation capacity in women-owned companies. Welch's test was applied in cases where the assumption of Levene's test for ANOVA analysis was not met.

The following hypotheses were formulated:

H1: Annual income significantly influences the decision to invest in innovations.

H2: The sector of operation significantly affects the dimensions of innovative capacity.

H3: Expectations regarding growth significantly influence the dimensions of innovative capacity.

ANOVA test was conducted to examine the relationship between the sector of operation and specific dimensions of innovation capacities, such as: expectations regarding growth, external advice, approach to product development, client base and product development plan, employee training, collaboration with the academic sector, and business networking. We also examined the impact of certain dimensions of innovation capacity, such as business networking, utilization of external advice, and the time from product launch on the market to market profitability, on the overall annual income. Additionally, the existence of a relationship between growth expectations and investment in employee training was measured.

Sample Description

The sample consists of 104 companies predominantly managed by women. In terms of their educational background, it is as follows: 17 (16%) have a Vocational high school/gymnasium education, 19 (17.9%) have completed College of vocational studies, 36 (34%) have a faculty education, while 32 (30.2%) female entrepreneurs have completed Postgraduate studies.

The sample comprises women from different regions of Serbia: Belgrade (51 or 48.1%), Vojvodina (15 or 14.2%), Western Serbia (18 or 17%), Central Serbia (7 or 6.6%), and South Serbia (13 or 12.3%). It can be seen that the region of Belgrade is the most represented region in the sample. Regarding the rural-urban ratio, the sample mostly consists of companies from urban areas, with 98 companies (92.5%), while only 6 companies (5.7%) are located in rural areas.

As for the number of employees, the majority of companies had up to ten employees, 82 out of 104, as shown in Table 1.

Table 1: Number of employees

	Frequency	Percent	Valid percent	Cumulative percent
Up to 10	82	77.4	78.7	78.8
11-50	16	15.1	15.4	94.2
51-250	6	5.7	5.8	100.0
Total	104	98.1	100.0	

Source: authors

Results of the Research and Discussion

Table 2 presents the cross-tabulation of Annual income and the value of the company's assets related to Internal investment in innovation. We used the Pearson Chi-Square test to examine the relationship between Annual income and the value of the company's assets and Internal investment in innovation. The obtained results are as follows: $\chi(6) = 4.818$, $p = 0.567$, ($p>0.05$), indicating that there is no statistically significant causality between annual income and value of the company's assets and the decision to internally invest in innovation. Thus, the first hypothesis that annual income significantly influences the internal decision to invest in innovation has been refuted, suggesting that the decision is likely more influenced by the innovation culture within the company.

Furthermore, it can be observed that 28.84% of female entrepreneurs do not have a budget for innovation, which poses a risk to the sustainability of their businesses. On the other hand, 71.16% of female entrepreneurs are investing in innovation, which is an encouraging finding.

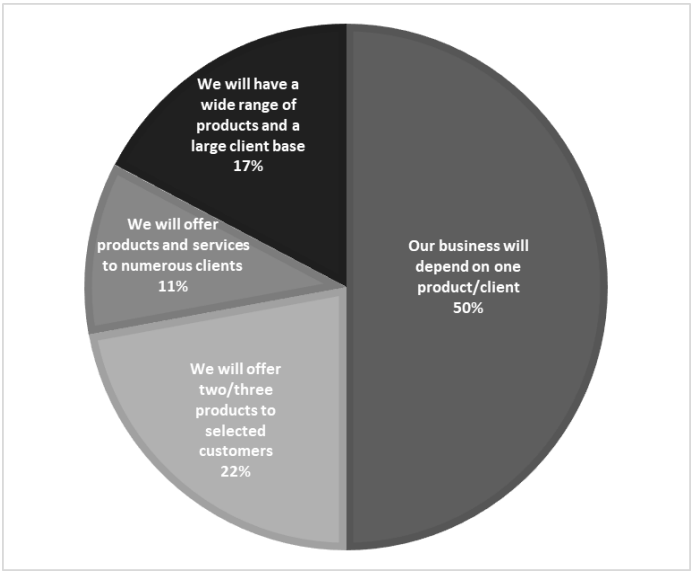
Table 2: Annual income and value of the company's assets related to Internal investment in innovation - Cross-tabulation

		Annual income and value of the company's assets		
		Less than 2 million EUR	**2-10 million EUR**	**11-50 million EUR**
Internal investment in innovation	We don't have a budget for innovation	21	7	2
	We work on the development of new products/services based on commercial contracts	13	1	2
	We regularly co-finance development projects	20	10	4
	Every year we invest in certain innovative activities	17	6	1
Total		71	24	9

Source: authors

Among female entrepreneurs who have a budget for innovation, whether they co-finance development projects regularly, allocate a specific amount of money for innovation each year, or work on developing new products/services based on commercial contracts, as much as 50% rely solely on one product/service, while 22% offer 2-3 products to specific clients. This makes them vulnerable despite their investment in innovation (Figure 1).

Figure 1: Breadth of product range and client base in women-led businesses



Source: authors

We also examined the extent to which female entrepreneurs who invest internally in innovation measure the time from idea to product introduction in the market. We found that among women who internally invest in innovation, 93.1% of them measure the time until the market launch of new products/services or measure the time to market and start making a profit for new products/services (Table 3).

Table 3: Time to develop a new product

	Frequency	**Percent**	**Valid percent**	**Cumulative percent**
We do not measure the development time of a new product/service	1	1.7	1.7	1.7
We monitor the development time of a new product or service against the plan	3	5.2	5.2	6.9
We measure the time until the market release of new products/services	40	69.0	69.0	75.9

	Frequency	Percent	Valid percent	Cumulative percent
We measure the time to market and the beginning of making a profit for new products/services	14	24.1	24.1	100.0
Total	58	100.0	100.0	

Source: authors

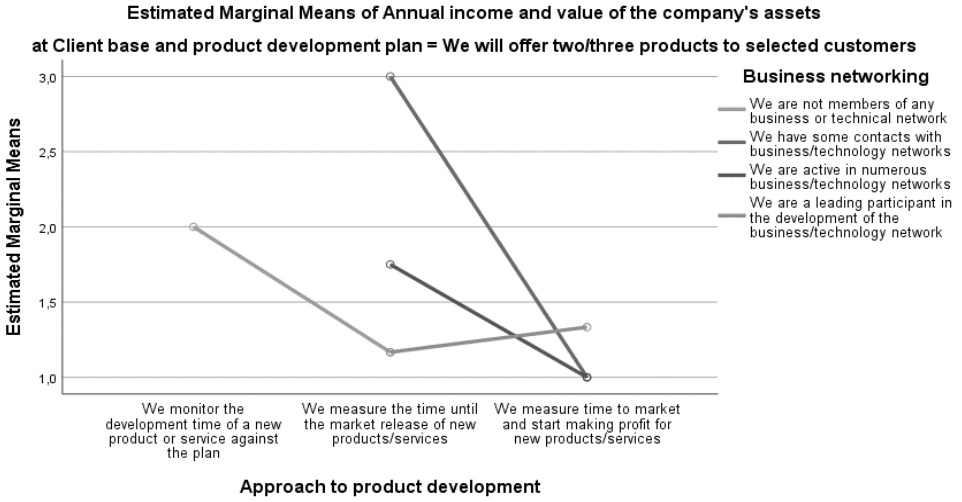
The obtained results show that a significant percentage of respondents who invest internally in innovation (79.3% of those who invest internally in innovation) have clients from Europe and the rest of the world (Table 4). They represent 44.23% of the total sample. Additionally, we found that entrepreneurs who offer two/three products to selected customers, actively participate in business/technological networks, and measure the time from product launch to market and profitability, have the highest annual income (Figure 2).

Table 4: Market horizon development plan

	Frequency	Percent	Valid percent	Cumulative percent
The market for our products/services will cover Serbia	12	20.7	20.7	20.7
The market will include clients from Europe	31	53.4	53.4	74.1
The clients will be from developed countries from all over the world	15	25.9	25.9	100.0
Total	58	100.0	100.0	

Source: authors

Figure 2: The influence of product portfolio, business networking, and product development approach on the annual income of companies that offer 2-3 products to a select group of clients



Source: authors

When testing the second hypothesis, which states that the business sector significantly influences innovation dimensions, such as the use of external consulting services, we found a significant statistical difference in the impact of sectors on the utilization of external consulting services (advice). The statistical significance was tested using Levene's Test of Homogeneity of Variances (Levene Statistic (12.91) = 1.960, p-value is $p = 0.037$, ($p < 0.05$)). By applying Welch's test (Welch's $F(12, 28.887) = 5.226$, $p = 0.000$), we determined that the statistical significance of the sector's influence on accepting external consulting services is most pronounced in the IT and Trade sectors (Table 5).

Table 5: Multiple Comparisons; Tukey HSD, Dependent Variable: External advice

(I) Type of business		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
IT	Trade	2.119*	0.574	0.021	0.17	4.07

Source: authors

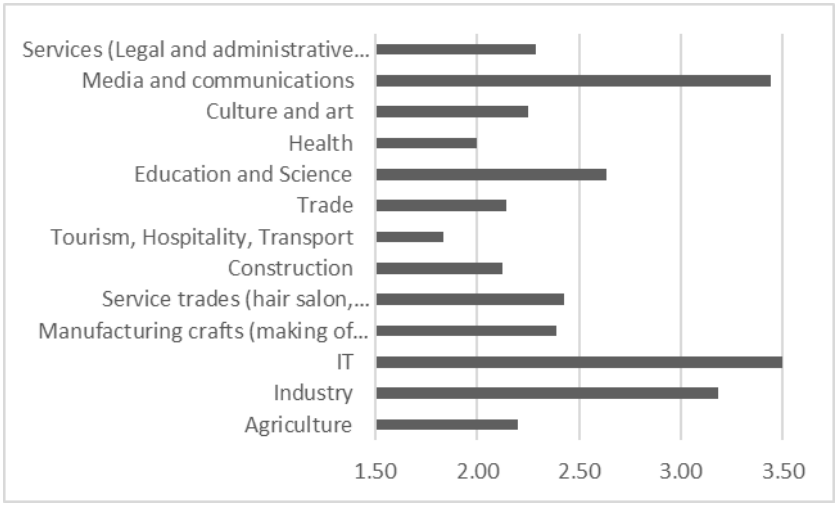
Regarding the impact of the business sector on growth expectations as a dimension of innovation, it was found to be statistically significant (Levene's test (12.91) = 0.994, p = 0.461), F(12) = 2.392, p = 0.01 (p < 0.05), Table 6 and Figure 3. This means that the sector in which the company operates significantly influences growth expectations.

Table 6: Growth expectations and business sector

		Sum of Squares	df	Mean Square	F	Sig.
Expectations regarding growth	Between Groups	26,319	12	2,193	2,392	0,010
	Within Groups	83,440	91	0,917		
	Total	109,760	103			

Source: authors

Figure 3: Growth expectations and business sector



Source: authors

The results indicate that the highest growth expectations are observed in the IT, media and communications, industry, education, and science sectors, while the lowest expectations are found in the tourism, hospitality, transport, health, and construction sectors. Overall, regardless of the sector, 13% of female entrepreneurs have no growth expectations, while 44.3% have modest expectations (Table 7).

Table 7: Growth expectations

Frequency	Percent	Valid Percent	Cumulative Percent
14	13,2	13,5	13,5
47	44,3	45,2	58,7
15	14,2	14,4	73,1
28	26,4	26,9	100,0
104	98,1	100,0	
2	1,9		
106	100,0		

Source: authors

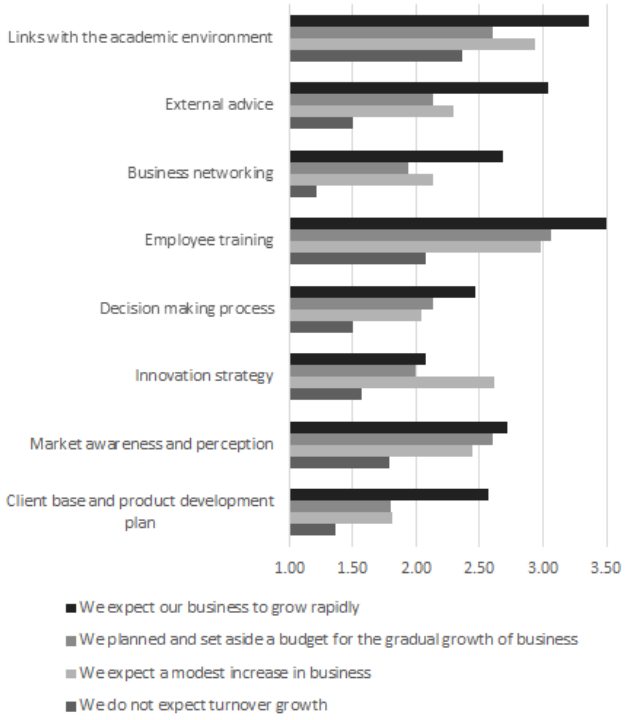
To test the third hypothesis, which states that growth expectations significantly influence certain dimensions of innovation capacity, we conducted an ANOVA analysis. The results showed a statistically significant difference between growth expectations and dimensions such as client base and product development plan, market awareness and perception, innovation strategy, decision-making process, employee training, business networking, and external advice (Table 8).

Table 8: Growth expectations related to other dimensions of innovation capacity

ANOVA						
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Client base and product development	BG	17.012	3	5.671	4.816	0.004
	WG	117.748	100	1.177		
	Total	134.760	103			
Market awareness and perception	BG	8.471	3	2.824	4.929	0.003
	WG	57.228	100	0.573		
	Total	65.760	103			
Innovation strategy	BG	24.899	3	8.300	5.973	0.001
	WG	138.947	100	1.389		
	Total	163.846	103			
Decision making process	BG	8.926	3	2.975	4.641	0.004
	WG	64.113	100	0.641		
	Total	73.038	103			
Employee training	BG	19.150	3	6.383	6.660	0.000
	WG	95.841	100			
	Total	114.990	103			
Business networking	BG	20.743	3	6.914	4.848	0.003
	WG	142.632	100	1.426		
	Total	163.375	103			
External advice	BG	24.088	3	8.029	8.725	0.000
	WG	92.027	100	0.920		
	Total	116.115	103			
Links with the academic environment	BG	11.333	3	3.778	2.950	0.036
	WG	128.051	100	1.281		
	Total	139.385	103			

Source: authors

Figure 4: Growth expectations and dimensions of innovation capacities



Source: authors

It can be observed that among female entrepreneurs with high growth expectations (in the IT, media and communications, industry, education and science sectors), the greatest investments are made in employee training, connecting with the academic community, and seeking external advice. This demonstrates that these entrepreneurs, who anticipate growth, have developed an awareness of the importance of investing in people as a factor of long-term sustainability. This is confirmed by previous research that indicates that technology, combined with organizational culture and employee training, yields greater benefits (Radović-Marković et al., 2022). Furthermore, they show higher values in most other dimensions of innovation capacity, except in the case of innovation strategy (where entrepreneurs with modest growth expectations showed slightly higher values).

On the other hand, female entrepreneurs without growth expectations have low values in business networking, client base, and product

development plan (Figure 4). The third hypothesis that growth expectations significantly influence dimensions of innovation capacity has been proven.

Conclusion

According to the obtained results, annual revenue is not associated with internal investments in innovation, which suggests that investment in innovation is secured independently of annual revenue. This indicates that there is awareness among female entrepreneurs about the importance of investing in innovation for sustainability. Among those who have a budget for innovation, it was found that they produce only one product offered to one client or, at most, 2-3 products to a specific number of clients, which holds a potential risk to their sustainability. Specifically, the sustainability of half of the surveyed female businesses that offer only one product to one client is risky, although it represents better results compared to 18 years ago. Additionally, about half of the companies have managed to develop more than one product and diversify their range, reducing the risk of relying on only one product and one client. This has led to polarization over time, with some businesses being at higher risk and others at lower risk. Encouragingly, 55.7% of businesses invest in innovation. These are the ones that have developed a wider range of products, are better networked, and have a diversified customer base, thus having a higher chance of sustainable operation. The research showed that companies, which measure time to market and time to profit are involved in business networks and offer 2-3 products to a few clients, generate higher income.

The decision to invest in innovation is not significantly influenced by the sector or annual revenue, indicating that the mindset and overall innovation culture within the company can have the greatest impact. The sector in which businesses operate significantly affects the willingness to seek external advice, as well as growth expectations.

The structure of growth expectations shows that around 57.5% of female entrepreneurs have low growth expectations. The obtained results also indicate that companies with different growth expectations differ in most other components of innovation capacity. The highest growth expectations are found in the most profitable sectors, such as IT and media and communications, where female entrepreneurs invest the most in employee training, academic networking, and seeking external advice. It is

highly likely that these sectors hold the greatest potential for business sustainability.

Acknowledgments

The research was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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Article history: Received: June 5th, 2023

Accepted: July 17th, 2023