

The Role of Demographics and Entrepreneurial Motives in Digital Sales Adoption

Samuel Plecko^{*+}

Barbara Bradač Hojnik^{**}

Polona Tominc^{***}

Abstract: *Digital transformation gradually changes businesses, which is also connected with sales. Despite these advancements, the motives to accept digitalization in sales are undiscovered. In our study, we examine demographic factors (gender, age, education), entrepreneurial motives, and the developmental stage of entrepreneurs using data from the Global Entrepreneurship Monitor (GEM), encompassing 25,633 entrepreneurs from 47 countries. Logistic regression and subsequently Cramer's V were employed for a more precise determination of the relevant influences of the explanatory variables. The findings indicate that younger and early-stage entrepreneurs more often accept digital technologies in sales. This also applies to entrepreneurs who are motivated by higher income and wealth and the desire to make changes in the world. These results suggest that digital technologies can contribute to reducing the divergence between profitable and sustainable goals, as entrepreneurs perceive their utility in achieving both sets of objectives.*

Keywords: digital technologies in sales; demographics; entrepreneurs' motives; early-stage entrepreneurs

JEL Classification: L26, O33, M15

^{*} University of Maribor, Faculty of Economics and Business, Maribor, Slovenia.

⁺ Samuel Plecko is corresponding author. E-mail: samuel.plecko@um.si

^{**} University of Maribor, Faculty of Economics and Business, Maribor, Slovenia.

^{***} University of Maribor, Faculty of Economics and Business, Maribor, Slovenia.

Introduction

Businesses today encounter many challenges in the modern business landscape, including grappling with digital technologies. The advent of digitalization, propelled by advancements in different digital technological breakthroughs, has fundamentally transformed firms. The constant development of digital technologies leads to the incorporation of digital innovations in workflow, which have also supplanted non-digital processes (Gavrila Gavrila & De Lucas Ancillo, 2022; K. Zhou et al., 2015).

The wide effect of digitalization on entrepreneurship spans all business processes, and because of that, entrepreneurs should strategically decide about it within the firm to sustain a competitive edge. Digitalization enables optimized business processes and expense decline. It also fosters innovation, which requires adjustments to evolving purchasers' behaviors (Hinkelmann, 2022; Verhoef et al., 2021). Additionally, digitalization assumes particular significance in entrepreneurship by generating novel entrepreneurial ideas that signify valuable market opportunities, thereby reinforcing entrepreneurial activity (Heirman & Clarysse, 2007; Hinkelmann, 2022).

Entrepreneurs' familiarity with digitalization enables a thorough assessment of the relative advantages of it compared to existing processes (Chen et al., 2020), affecting the decision to digitalize the company (Dy et al., 2017). Nevertheless, decisions regarding digitalizing are also shaped by financial and human resources and the imperative to keep a competitive advantage. Entrepreneurs' personal characteristics, their knowledge about digital technologies (Barrera Verdugo, 2019; Jaafar et al., 2007), and attitudes towards digitalization are also important (Parasuraman, 2000).

While the effect of diverse demographic characteristics on the adoption of digital technologies has been extensively studied (Astuti & Nasution, 2014; Barrera Verdugo, 2019; Ferreira et al., 2019; Ramayah et al., 2004), studies focused on digital technologies in sales are limited, with Barrera Verdugo's study (2019) being an exception. Additionally, there is limited research on the impact of entrepreneurs' motives on the adoption of digital technologies. The most frequently studied motives are associated with wealth and family tradition (Barrera Verdugo, 2019; Chilipenok et al., 2023). Therefore, further exploration in this field is warranted. Moreover, the effect of the entrepreneur's development stage on the adoption of digital technologies remains unexplored. Consequently, the aim of our study is to analyze the impact of mentioned factors on adopting digital technologies in sales. Our research is based on research Plečko et al. (2023) and the research model developed in it, which we supplemented in such a way that it can be used on a global sample, while the mentioned research is focused on Slovenian and Croatian entrepreneurs.

The article begins by presenting a literature review, which discusses the integration of digitalization within sales processes. It further elaborates on demographic influences, entrepreneurial incentives, and the developmental phase of entrepreneurs, examining their respective roles in the adoption of digital tools for sales purposes. From these

deliberations, hypotheses are formulated for empirical examination. Following this, the third section delineates the research methodology and the procedures involved in data collection. Subsequently, the fourth section presents the outcomes of the statistical analysis, followed by a discourse on the findings and their implications, emphasizing the relevant factors. Concluding remarks address the encountered limitations and propose avenues for future research about leveraging digital technologies.

Literature review

Online sales encompass a broad spectrum of activities, including distribution, sales, procurement, marketing, and product service, all of which occur electronically via the internet (Udayana et al., 2024). However, our research primarily focuses on two predominant components of online sales: sales and marketing. These components are fundamental to business-to-consumer (B2C) transactions and are more adaptable to new digital technologies compared to business-to-business (B2B) operations (Biclesanu et al., 2021).

In contrast to the traditional purchasing process, which involves face-to-face interactions between buyers and sellers, online sales enable contactless purchasing 24 hours a day, every day of the year (Popkova & Sergi, 2020; Udayana et al., 2024). This approach accelerates the sales process, reduces transaction costs, and facilitates quicker and more transparent product and service searches for customers (Udayana et al., 2024). There are several methods for implementing online stores. One approach is through the utilization of a proprietary web store, typically integrated into the company's website. This endeavour can be undertaken by the company's personnel or implemented through the acquisition of a software solution. However, acquiring such software solutions may pose financial challenges for small businesses (Seyal & Abdrahman, 2014). Alternatively, companies can opt to leverage existing online marketplaces provided by various entities (Rahman et al., 2012). Regardless of the chosen approach, various payment systems integrated into the online store facilitate swift purchases (Udayana et al., 2024). The adoption of online sales has been shown to positively contribute to a company's business success (Setyaningrum & Muafi, 2023).

Another aspect of online sales is digital marketing, which encompasses marketing activities conducted through websites, social media platforms, blogs, electronic correspondence, advertisements, and other digital channels (American Marketing Association, 2022; Udayana et al., 2024). However, digital marketing also encompasses other digital technologies that contribute to brand recognition, sales promotion, and the identification of potential customers (Udayana et al., 2024). This includes, for example, the collection and processing of large datasets to tailor offers to distinct customer segments (Simmons et al., 2015). Digital technologies facilitate easier and more cost-effective data collection on website visits and the demographic characteristics

of visitors (Udayana et al., 2024). Artificial intelligence plays a crucial role in this process by identifying patterns within the accumulated data, thereby enhancing the precision of targeting potential customers (Ma & Sun, 2020). Consequently, digital marketing enables companies to reach a broader (global) and more targeted audience, allowing for direct connection to the advertised product or service, resulting in greater company success and increased exports (Lee & Falahat, 2019; F. Wang, 2020).

With the proliferation of social networks, which are widely utilized by a large number of individuals, they have become integral elements of online sales from both marketing and sales perspectives. Social networks gather extensive data about individuals, enabling precise targeting of specific groups on these platforms. Moreover, social networks provide avenues for publishing photos, videos, and customer reviews, thereby promoting products (Lepkowska-White et al., 2019). Subsequently, users engage with these posts by commenting and liking them, leading to the dissemination of promotions to a larger audience of social media users (X. Wang & Cao, 2024). This approach is termed social commerce, which relies on the dissemination of assessments, feedback, and recommendations by users or customers across various social media platforms (Parise & Guinan, 2008). Leveraging social networks can contribute to increased brand recognition, the acquisition of new customers, and a reduction in marketing costs, all of which can significantly impact a company's business success (Ahmad et al., 2018).

Demographics

The decision to digitalize business, including e-commerce, is influenced by personal beliefs and comprehension of digital technologies (Barrera Verdugo, 2019). Additionally, the societal roles of specific groups of people play a crucial role in shaping these decisions (Hofstede et al., 2004; Kelly & McAdam, 2022; Luo & Chan, 2021). Consequently, there is a compelling need to examine the significance of demographics in the adoption of digital technologies.

Age

The association between age and the acceptance of digital technologies can be elucidated by the observation that, on average, the degree of digitalization implemented tends to diminish with higher age of the entrepreneur (Barrera Verdugo, 2019; Ferreira et al., 2019). As individuals age, they may experience discomfort with embracing new technologies (Astuti & Nasution, 2014; Ramayah et al., 2004), coupled with a decline in optimism and innovativeness regarding technology adoption (Ramayah et al., 2004). However, as entrepreneurs accumulate more experience with age, they are inclined to integrate more digital technologies into their business processes (Ferreira et al., 2019). This is supported by findings indicating that entrepreneurs aged

between 41 and 50 years exhibit a higher propensity to use artificial intelligence in sales compared to other age brackets (Fonseka et al., 2022), possibly due to younger entrepreneurs not having accumulated enough capital to invest in the digitalization of their businesses (Barrera Verdugo, 2019). Nonetheless, alongside artificial intelligence, a myriad of other digital technologies is accessible, often more affordable due to their prevalence, making them feasible for enterprises with more limited capital accumulation. Consequently, we propose the hypothesis:

H1: *Sales planning by the support of digital technology is a tendency more likely to be observed among younger entrepreneurs.*

Gender

Studies have indicated that men tend to digitalize their businesses more often compared to women (Orser & Riding, 2018). This finding can be extended to the specific context of digitalizing sales (Barrera Verdugo, 2019). However, Fonseka et al. (2022) offered an alternate interpretation, finding no differences between male and female entrepreneurs in the overall use of e-commerce. Instead, they observed that artificial intelligence is more frequently integrated by male entrepreneurs compared to female entrepreneurs. This aligns with the perspective suggesting that male entrepreneurs tend to be more innovative and readily accept new technologies (Astuti & Nasution, 2014). Conversely, Ferreira et al. (2019) discovered that female entrepreneurs more often incorporate e-commerce into their enterprises. These findings are supported by Ramayah et al. (2004), who explained that female entrepreneurs are generally more innovative, experiencing less discomfort and insecurity in adopting new technologies. In light of this, we posit the hypothesis:

H2: *Sales planning by the support of digital technology is a tendency more likely to be observed among male entrepreneurs.*

Education

Recurring findings regarding the connection between education and digital adoption suggest that entrepreneurs with better educational backgrounds are more likely to utilize digital tools (Ferreira et al., 2019) and engage in online sales (Barrera Verdugo, 2019). Higher-educated individuals tend to exhibit greater levels of optimism and innovativeness, although they may also experience some insecurity and unease with new technology. However, the positive sentiments generally outweigh the negative ones (Astuti & Nasution, 2014; Ramayah et al., 2004). Similarly, Jaafar et al. (2007) explain that higher education diminishes uncertainty in the adoption of novel technologies. Thus, we propose the hypothesis:

H3: *Sales planning by the support of digital technology is a tendency more likely to be observed among entrepreneurs with higher education.*

Entrepreneurial Development Stage

Global Entrepreneurship Monitor (GEM) categorizes entrepreneurs into early-stage and established entrepreneurs. The latter are individuals who have been in business for more than three and a half years. In contrast, early-stage entrepreneurs are individuals with less than three and a half years in business or those who plan to become entrepreneurs. In the case of planning, the person must have proactively developed a business in the past 12 months. Additionally, a third condition is that the person is or will be at least a partial owner of the company (GEM, 2017).

As digital technologies continue to advance, they offer an expanding array of opportunities for implementation in business processes and innovations. These opportunities provide early-stage entrepreneurs with the chance to formulate business ideas connected with digital technologies (Verhoef et al., 2021). In the context of early-stage enterprises, lack of resources can act as a hindrance to digitalization (Gopi & Subramoniam, 2023). Moreover, the adoption of digital technologies requires particular expertise that early-stage entrepreneurs may lack, as their educational background may be rooted in the field of the company's operation. Acquiring knowledge related to digitization can be time-consuming. An alternative is to hire employees with this knowledge, which incurs additional costs (Dy et al., 2017; Gopi & Subramoniam, 2023). Conversely, established entrepreneurs have already accumulated knowledge and capital for investing in digitalization. Their skills and a clearer view of the market situation empower them to make better decisions about digitalization investments. Following this reasoning, we introduce the hypothesis:

H4: *Sales planning by the support of digital technology is a tendency more likely to be observed among established entrepreneurs as compared to early-stage entrepreneurs.*

Entrepreneurial Motivational Factors

The motives for individuals to engage in entrepreneurship are varied and numerous, depending on personal preferences. Several elements may impact this decision, with these factors being interlinked and having different effects on individuals. Risk-taking is an important motivator, as individuals who are more prone to taking risks are more likely to choose entrepreneurship (Hvide & Panos, 2014). Within motivational factors, innovation and proactivity are essential personal traits that, together with risk perception, contribute to entrepreneurial orientation (Rauch et al., 2009). This orientation encapsulates entrepreneurial preferences, beliefs, and behaviors (Covin et al., 2017), thereby shaping motives for entrepreneurship. In addition to personal characteristics, which have a prominent impact on entrepreneurial motivation, the economic environment (including factors like unemployment and income), cultural norms and encouragement, as well as the position of entrepreneurship within a

specific situation, also play substantial roles in motivating individuals (Giannetti & Simonov, 2004).

There is a plethora of motivations for starting a business, and they can be classified and amalgamated in various ways. For this research, utilizing GEM data, we will specifically center our attention on the motives as outlined in the database. These motives encompass: the wish to make a difference in the world by pursuing altruistic goals (motive 1), the wish for higher income and wealth accumulation (motive 2), the continuation of a family tradition (motive 3), and the need for survival (motive 4).

Digitalization plays a pivotal role in enhancing market access outside one's home country for social entrepreneurship. Additionally, digital communication not only amplifies the recognition of sustainable practices but also helps integrate sustainability in interactions (Holzmann & Gregori, 2023). Nonetheless, female entrepreneurs, who frequently prioritize altruism in business over profitability and expansion, encounter obstacles in obtaining capital for investments in digitizing their businesses (Solesvik et al., 2019). Also, in general, the findings suggest that a company's greater social orientation may pose difficulties in financing investments in digitalization, especially during poor company performance (Stevens et al., 2015). Moreover, the unique traits of social entrepreneurship may impede the implementation of digitalization to the same extent as achievable in for-profit enterprises (Popkova & Sergi, 2020). Accordingly, we advance the hypothesis:

H5: *A diminished motivational focus on making a difference in the world tends to correlate with a decreased likelihood of sales planning by the support of digital technology.*

Utilizing digital technologies enhances competitive advantages and consequently increases revenues (Ferreira et al., 2019). Similar positive impacts were observed regarding the implementation of online sales (Fonseka et al., 2022), as well as in logistics where the attainment of success is positively impacted by digitalization and digital entrepreneurship (Niyawanont & Wanarat, 2021). The use of digital marketing has also been shown to positively affect various financial indicators (F. Wang, 2020). Consequently, our hypothesis is:

H6: *An increased motivational focus on higher income and wealth tends to correlate with an increased likelihood of sales planning by the support of digital technology.*

Within a family business environment, tradition can significantly influence an individual's decision to pursue entrepreneurship. This influence can manifest in two distinct ways: individuals may choose to enter entrepreneurship with the intention of assuming leadership of the family business, or familial tradition may inspire individuals to establish a new venture (Escolar-Llamazares et al., 2019; Robinson & Stubberud, 2012). Men from families with an entrepreneurial tradition often express

business ambitions connected with implementing their own ideas and seeking autonomy (Escolar-Llamazares et al., 2019). The pursuit of one's own ideas is related to innovative nature and self-initiative, which may not have a significant effect on business profitability (Soininen et al., 2012). As a result, the motive of family tradition could impact the lower willingness of entrepreneurs to digitize sales compared to entrepreneurs who prioritize earning a higher income, as using digital technologies in sales has been found to increase business profitability (Fonseka et al., 2022). This is corroborated by Barrero Verdugo (2019), indicating that businesses with a family tradition exhibit a decreased propensity to embrace e-commerce, market themselves on digital platforms, and participate in digital interactions with both customers and suppliers. Given these considerations, we present the hypothesis:

H7: *A diminished motivational focus on family tradition tends to correlate with a decreased likelihood of sales planning by the support of digital technology.*

People with lower educational qualifications, facing difficulties in securing employment, often resort to self-employment, engaging in simple and low-paying tasks that offer little opportunity to accumulate savings for business development (Orser & Riding, 2018) and for investment in digital technologies. This viewpoint contrasts with the conclusions drawn by Barrero Verdugo (2019), who implies that the necessity-driven motivation to establish a business positively affects the acceptance of e-commerce. Considering the aforementioned discussion, we add that people forced into entrepreneurship for survival often accept low-paying assignments from an existing client base. This position may result in diminished need for the incorporation of diverse digital technologies in sales. Based on this, our hypothesis is:

H8: *A diminished motivational focus on the survival motive tends to correlate with a decreased likelihood of sales planning by the support of digital technology.*

Methodology

Data

In this research, we utilized the GEM dataset acquired in 2021, comprising 25,633 entrepreneurs from 47 countries, with ages ranging from 18 to 64 years. From the data, we created 8 categorical variables. The education variable was binary, where a value of 0 represents secondary school or lower education, and a value of 1 represents education beyond secondary school. Additionally, we created a dichotomous variable for age, with category 0 encompassing entrepreneurs aged up to and including 34 years, and category 1 including entrepreneurs aged 35 years or older. The reference categories for the entrepreneur's gender and development stage (EDS) are men and established entrepreneurs.

Entrepreneurs expressed their intentions to become entrepreneurs with 4 different motives, which were described in the previous chapter. Motive variables were dichotomous, where a value of 0 denotes the motive as unimportant for the entrepreneur, and a value of 1 signifies that the motive is important.

Since we analyzed personality factors of entrepreneurs worldwide, we included the control variable “national income level” in the research model. With this variable, we aimed to control for regional impacts connected with the development of countries. We used three categorical income variables (low, middle, high income), where low income serves as the reference category.

The dependent variable (dig-tech) was measured by asking whether entrepreneurs plan to use more digital technologies in sales. A negative response is denoted by 0, while a positive response is denoted by 1.

Data Analysis

To evaluate the proposed hypotheses, we employed binary logistic regression, which was used to estimate the following regression:

$$\widehat{dig-teh} = \beta_0 + \beta_1 \cdot gender + \beta_2 \cdot age + \beta_3 \cdot education + \beta_4 \cdot EDS + \beta_5 \cdot motive\ 1 + \beta_6 \cdot motive\ 2 + \beta_7 \cdot motive\ 3 + \beta_8 \cdot motive\ 4 \quad (1)$$

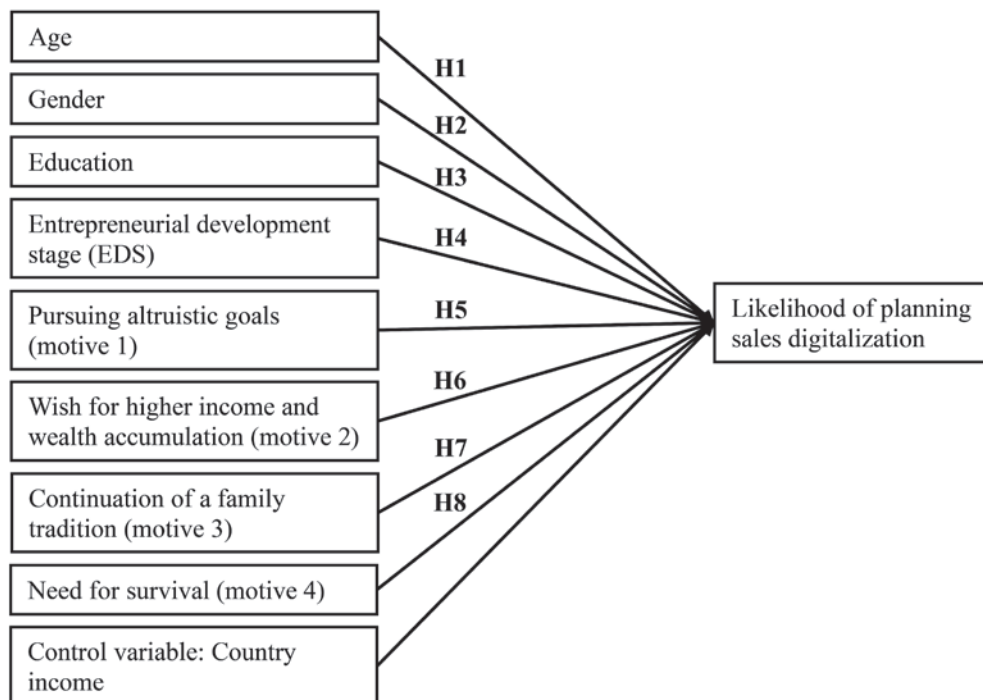
Interpreting coefficients in logistic regression can indeed be challenging. Consequently, odds ratios are utilized. They represent the ratio of the probability of events where the dependent variable has a value of 1 to the probability of events where the dependent variable has a value of 0. The estimated value of the odds ratio is calculated as the natural logarithm of the odds ratio (Gujarati, 1995):

$$\ln \left(\frac{1 + e^{\widehat{dig-teh}}}{1 + e^{-\widehat{dig-teh}}} \right) = \ln \left(\frac{P_i}{1 - P_i} \right) = \widehat{dig-teh} \quad (2)$$

As the individual explanatory variable increases, so does the value of the natural logarithm, leading to an increase in the odds ratio and, consequently, the probability that the entrepreneur will plan to digitize sales (Gujarati, 1995).

Figure 1 displays the complete research model.

Figure 1: Research model



In research, especially when dealing with very large samples, such as the one in our study comprising 25,633 entrepreneurs, a challenge arises concerning the high number of statistically significant variables. The issue stems from the substantial sample size, allowing for the identification of statistically significant effects that, in practice, might be trivial or unimportant. This phenomenon occurs because the standard error diminishes in large samples, leading to an increased likelihood of finding statistically significant relationships (Lin et al., 2013). To discern which explanatory variables exert a meaningful impact on the association with the dependent variable, we employ Cramer's V, elucidating the strength of the relationship between two categorical variables. The calculation is as follows:

$$V = \sqrt{\frac{\chi^2}{n \cdot (k - 1)}} \quad (3)$$

Where χ^2 represents the chi-square statistic for the analyzed variables, n is the number of units in the sample, and k is the number of categories of the variable with fewer categories (Agresti, 2019). The interpretation of Cramer's V values varies, so it's essential to assess the calculated values primarily relative to other Cramer's V

values for variables in the estimated model. In our study, we relied on Cohen's (1988) criteria for interpreting Cramer's V values, establishing a scale based on Cohen's omega and converting it into Cramer's V. This explanation relies on degrees of freedom, defined as the minimum number of categories from both variables minus 1. In our research, we used the degree of freedom thresholds, as shown in Table 1.

Table 1: The critical values of Cramer's V at the degrees of freedom for assessing the strength of the as-sociation.

df	negligible	small	medium	large
1	<0.10	<0.30	<0.50	>0.50
2	<0.07	<0.21	<0.35	>0.35

Source: (Cohen, 1988)

Results

Sample Characteristics

Table 2 reveals that half of the entrepreneurs express intentions to integrate digital technologies into sales. Male entrepreneurs constitute the majority at 59.3%. Approximately one-third of entrepreneurs fall below the age of 35, and slightly over half have completed secondary school or possess lower educational qualifications. Survival emerges as the most prevalent motive for becoming an entrepreneur, garnering a notable 69.9%, while family tradition holds the least significance at 34.9%. The other two motives each hold importance for around half of the entrepreneurs. The sample is predominantly composed of early-stage entrepreneurs, with established entrepreneurs constituting only a third. Three-quarters of entrepreneurs come from high-income countries, while only 10% come from low-income countries.

Table 2: Sample characteristics

Digitalization	Intention to use digital technologies in sales	49.9%
Demographic factors	Men	59.3%
	Entrepreneurs under 35 years of age	35.7%
	Entrepreneurs with more than secondary school	44.4%
Motives	Motive to make difference in the world is important for entrepreneur	45.8%
	Motive for higher income and wealth is important for entrepreneur	55.9%
	Motive of continuing the family tradition is important for entrepreneur	34.9%
	Motive of the need for survival is important for entrepreneur	69.9%
Entrepreneur's development stage	Early-stage entrepreneurs	62.2%
County income	Low income	9.8%
	Middle income	16.1%
	High income	74.1%

Source: authors' work

Evaluation of Model

A chi-square test was used to evaluate the model's specification. It examines how well the data fit the model and tests if all coefficients are zero (null hypothesis) (Pulkstenis & Robinson, 2002). The value of the chi-square statistic for our model is 2539.897 with 8 degrees of freedom, which rejects the null hypothesis at the level $p < 0.001$. Consequently, the model is appropriately defined.

Table 3 presents the Variance Inflation Factor (VIF) and Cramer's V. The highest VIF value, at 1.12, is notably under 5, thus showing the nonexistence of multicollinearity. Moreover, considering the threshold values, the associations between individual explanatory variables, as indicated by Cramer's V, are weak. A stronger association is observed between age and EDS, where Cramer's V is 0.29, indicating an almost medium-strength connection. This finding aligns with expectations, given that younger entrepreneurs are typically at the initial stages of their entrepreneurial career.

Table 3: Associations between explanatory variables shown by VIF (bold) and Cramer's V

	1	2	3	4	5	6	7	8	9
Gender – 1	1.01								
Age – 2	0.01	1.12							
Education – 3	0.02*	0.02**	1.05						
Motive 1 – 4	0.02*	0.12*	0.01	1.14					
Motive 2 – 5	0.06*	0.15*	0.03*	0.22*	1.12				
Motive 3 – 6	0.03*	0.05*	0.11*	0.24*	0.13*	1.11			
Motive 4 – 7	0.04*	0.00	0.15*	0.08*	0.11*	0.17*	1.07		
EDS – 8	0.05*	0.29*	0.05*	0.17*	0.11*	0.02**	0.00	1.13	
Income – 9	0.05*	0.15*	0.13*	0.15*	0.20*	0.14*	0.15*	0.11*	1.09

** $p < 0.01$, * $p < 0.001$

Source: authors' work

Main Regression Result

The findings from Table 4 elucidate that older entrepreneurs are less inclined to consider utilizing digital technologies in sales, thereby confirming hypothesis 1. Similarly, men and those with higher education more often plan to use these, confirming hypotheses 2 and 3. This also holds true for early-stage entrepreneurs, where the probability of intending to use digital technologies is 90% higher than for established entrepreneurs, rejecting hypothesis 4.

Even higher odds ratios were identified for motives connected with motive 1, with an odds ratio of 2.12. This means that entrepreneurs for whom motive 1 is important are 108% more likely to plan the adoption of digital technologies, rejecting hypothesis

5. The same conclusion applies to the remaining motives, but the odds ratios are considerably smaller. These results confirm hypothesis 6 and reject hypotheses 7 and 8.

Table 4: Results

Variables	Coefficient	Odds ratio
Intercept	-0.87*	
Age	-0.28*	0.76
Gender	-0.06**	0.94
Education	0.15*	1.16
EDS	0.64*	1.90
Motive 1	0.73*	2.08
Motive 2	0.31*	1.36
Motive 3	0.10*	1.10
Motive 4	0.07**	1.07
Middle income	0.27*	1.31
High income	-0.06	0.95

* $p < 0.001$, ** $p < 0.005$

Source: authors' work

The results regarding the control variable indicate that entrepreneurs do not differ in planning digital technologies in sales between low- and high-income countries. However, entrepreneurs from middle-income countries plan to use digital technologies 31% more frequently compared to entrepreneurs from low-income countries.

Cramer's V illustrates the relevance of the analyzed associations. Despite statistically significant impacts, we find that the impact of gender, education, and motives 3 and 4 is negligible for the acceptance of digital technologies in sales (Table 5). The age of the entrepreneur, the developmental stage of the entrepreneur, and the importance of motives 1 and 2 have a small impact on the dependent variable. The same applies to the control variable, country income.

Table 5: The effect size of explanatory variables on the dependent variable

Variables	Cramer's V	Effect size
Age	0.14*	small
Gender	0.01	negligible
Education	0.03*	negligible
EDS	0.21*	small
Motive 1	0.23*	small
Motive 2	0.15*	small
Motive 3	0.08*	negligible
Motive 4	0.04*	negligible
Income	0.12*	small

* $p < 0.001$

Source: authors' work

Discussion

Despite identifying a statistically significant impact of all explanatory variables, further analysis revealed only four variables with a small but non-negligible impact. This is consistent with expectations since the adoption of digital technologies in entrepreneurship is influenced by numerous factors, making it less likely for any one of them to have a pronounced effect.

As the age of the entrepreneur increases, their interest in incorporating digital technologies into sales decreases, aligning with Barrera Verdugo (2019) and Ferreira et al. (2019). Given that the rapid development of digital technologies began in the last few decades, younger generations are more routinely involved in their education system and use in everyday life. This is reflected in the fact that younger individuals feel less discomfort compared to older generations when adopting digital technologies (Astuti & Nasution, 2014; Ramayah et al., 2004).

Our findings indicate that early-stage entrepreneurs exhibit a greater propensity to plan the integration of digital technologies into their sales. Early-stage entrepreneurs are still establishing their business operations, making them more open to new trends. Established entrepreneurs, on the other hand, already have a functioning operational system, making them less susceptible to changes in the direction of digitalization. Our findings do not support the claim Gopi & Subramoniam (2023) that limited resources hinder early entrepreneurs in digitalization, as evidently, there are digital technologies in sales accessible even with smaller investments. Digitalization facilitates entrepreneurs in efficiently locating customers and improving their competitiveness (Dabbous et al., 2023; Ferreira et al., 2019), a critical aspect for all early-stage entrepreneurs.

The significance of the motive to make changes in the world increases acceptance of digital technologies in sales, suggesting that digital technologies can be a crucial part of sustainable practices. The observed trend can be elucidated by the recognition that digital technologies have injected fresh impetus into sustainable entrepreneurship, particularly through models like the sharing economy. Such models, characterized by increased resource sharing, contribute to a reduction in material consumption and associated energy resources (Hedberg & Šipka, 2021). Additionally, digitalization plays a pivotal role in facilitating the adoption of circular economy business models. Information technology facilitates more seamless and effective monitoring of outputs, thereby allowing repairs and recycling beyond the confines of the originating company (Hedberg & Šipka, 2021; Yang et al., 2018). Furthermore, the advent of digitalization offers social entrepreneurs expanded opportunities to realize their fundamental goals. Not only does it broaden their operational networks, but it also streamlines access to financial resources, empowering them to pursue social objectives on a larger scale (Pankaj & Seetharaman, 2021; Parthiban et al., 2020). The impact of digital technologies extends to environmental benefits, with

innovations contributing to more efficient regulation and a decline in pollution (Feroz et al., 2021). Moreover, these technologies foster efficiency in energy use across various domains, resulting in a subsequent reduction in CO2 emissions (Feroz et al., 2021; Gupta et al., 2023).

Furthermore, the significance of the drive for increased income and wealth elevates the probability of strategizing the utilization of digital technologies in sales. This aligns with the findings of previous research, as digitalization enables more successful internationalization by facilitating cheaper entry into foreign markets and easier operations, including easier acquisition of new customers (Brieger et al., 2022; Lee & Falahat, 2019; Tolba et al., 2022; Zahra, 2021). Additionally, digital technologies enhance the transfer of information within and between companies, enabling greater flexibility and reliability in operations and improving product quality (Gillani et al., 2020). Digital technologies also reduce the costs of information and communication infrastructure, transactional, operational, and distribution costs, as well as labor costs (Fossen & Sorgner, 2021; Ghazy et al., 2022; Sussan & Acs, 2017), the latter manifested through a reduction in the number of employees or an increase in employee efficiency (Fossen & Sorgner, 2021). Digital technologies are also a source of added value, fostering the development of innovative products and services (Ferreira et al., 2019; Tagne, 2020; Verhoef et al., 2021; Wan et al., 2023). Consequently, the integration of digital technologies into entrepreneurship enhances business productivity (Ghazy et al., 2022), reflected in higher company profits (Cenamor et al., 2019; Ferreira et al., 2019; Kusa et al., 2022; F. Wang, 2020).

The presented findings also suggest that digital technologies could facilitate a connection between social and environmental orientation on one side and a profit-oriented approach on the other. The pursuit of environmental and social goals is typically associated with additional costs and lower profits if it is not aligned with customer benefits (Belz & Binder, 2017). Meanwhile, our findings, along with some previous research, indicate that digitalization can positively impact the sustainable development of a company, encompassing economic, social, and environmental aspects of sustainability (Vrontis et al., 2022; Z. Zhou et al., 2022).

Conclusions

In the study, we found that age, the entrepreneurial development stage, and motives 1 and 2 have a statistically significant and relevant impact on the frequency of planning digital technologies in sales. Therefore, younger and early-stage entrepreneurs, who want to make changes in the world and have the desire for higher income, will accept digital technologies more frequently.

A significant limitation in our study is that the digitization variable measures planning rather than actual realization, which is an important factor for explaining

digital transformation in business. Additionally, the dependent variable focuses solely on one business process, limiting the generalizability of findings to the overall digitalization of companies.

The results provide useful information for government decision-makers in promoting digitization in entrepreneurship. Incentives should be aimed at established and older entrepreneurs who demonstrate a lower level of desire to digitize their sales. Furthermore, these findings serve as compelling evidence for governmental stakeholders, emphasizing the imperative need to champion digitalization initiatives in pursuit of sustainable development goals. Simultaneously, they offer an endorsement to entrepreneurs that embracing digitalization represents a pivotal stride towards fostering sustainable business practices.

As digital transformation progressively becomes fundamental to entrepreneurship, it is important that studies support this process with new findings. Furthermore, our study is one of the few that holistically explores entrepreneurial motives and digitalization on a global level, providing a groundwork for exploration of more aspects of motives and their interplay with the acceptance of digital technologies. Additionally, our results emphasize the lack of uniform conclusions in existing studies concerning the influence of demographics on business digitalization, indicating that research in this domain will necessitate alternative methodologies to elucidate the factors impacting the divergent conclusions.

Subsequent studies could incorporate additional variables into the model, with the objective of constructing more robust frameworks. Future research could also focus on comparing the factors that influence the adoption of different digital technologies. Additionally, another promising avenue for research involves elucidating the aspects accounting for the disparity between planned and realized digitalization efforts.

Declarations

Funding

Acknowledge: The authors acknowledge the financial support from the (1) SPIRIT Slovenia, Public Agency for Investment, Entrepreneurship and Internationalization, and (2) Slovenian Research and Innovation Agency (research core funding No. P5-0023).

Availability of Data and materials

In this investigation, we exclusively used secondary data from public source (<https://www.gemconsortium.org/>). Therefore, in this study, no new data is used or produced.

Code Availability

Not applicable.

Competing Interest

The authors declare that they have no conflict of interest.

Authors' Contributions

Samuel Plečko: Conceptualization, Methodology, Formal Analysis, Data Curation, Writing – Original Draft

Barbara Bradač Hojnik: Validation, Writing – Review & Editing, Supervision

Polona Tominc: Conceptualization, Methodology, Writing – Review & Editing, Supervision, Funding acquisition

REFERENCES

- Agresti, A. (2019). *An introduction to categorical data analysis* (3rd ed.). Hoboken: John Wiley & Sons.
- Ahmad, S. Z., Ahmad, N., & Abu Bakar, A. R. (2018). Reflections of entrepreneurs of small and medium-sized enterprises concerning the adoption of social media and its impact on performance outcomes: Evidence from the UAE. *Telematics and Informatics*, 35(1), 6–17. <https://doi.org/10.1016/j.tele.2017.09.006>
- American Marketing Association. (2022). What is Digital Marketing? Retrieved November 29, 2022, from <https://www.ama.org/pages/what-is-digital-marketing/>
- Astuti, N. C., & Nasution, R. A. (2014). Technology readiness and E-commerce adoption among entrepreneurs of SMEs in Bandung city, Indonesia. *Gadjah Mada International Journal of Business*, 16(1), 69–88. <https://doi.org/10.1177/10946705002400>
- Barrera Verdugo, G. (2019). Barriers to the adoption of the internet and selection of e-commerce actions: Incidental motivations of micro-entrepreneurs. *Business: Theory and Practice*, 20, 303–316. <https://doi.org/10.3846/btp.2019.29>
- Belz, F. M., & Binder, J. K. (2017). Sustainable Entrepreneurship: A Convergent Process Model. *Business Strategy and the Environment*, 26(1), 1–17. <https://doi.org/10.1002/bse.1887>
- Biclesanu, I., Anagnoste, S., Branga, O., & Savastano, M. (2021). Digital Entrepreneurship: Public Perception of Barriers, Drivers, and Future. *Administrative Sciences*, 11(4), 125. <https://doi.org/10.3390/admsci11040125>
- Brieger, S. A., Chowdhury, F., Hechavarría, D. M., Muralidharan, E., Pathak, S., & Lam, Y. T. (2022). Digitalization, institutions and new venture internationalization. *Journal of International Management*, 28(4), 100949. <https://doi.org/10.1016/j.intman.2022.100949>
- Cenamor, J., Parida, V., & Wincet, J. (2019). How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity. *Journal of Business Research*, 100, 196–206. <https://doi.org/10.1016/j.jbusres.2019.03.035>

- Chen, H., Li, L., & Chen, Y. (2020). Explore success factors that impact artificial intelligence adoption on telecom industry in China. *Journal of Management Analytics*, 8(1), 36–68. <https://doi.org/10.1080/23270012.2020.1852895>
- Chilipenok, Y. Yu., Gaponova, O. S., & Osipova, O. S. (2023). Women in e-commerce: Motives for choosing marketplaces as a career. *Woman in Russian Society*, 26(1), 63–78. <https://doi.org/10.21064/WinRS.2023.1.5>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). New York: Lawrence Erlbaum Associates.
- Covin, J. G., Green, K. M., & Slevin, D. P. (2017). Strategic Process Effects on the Entrepreneurial Orientation–Sales Growth Rate Relationship. *Entrepreneurship Theory and Practice*, 30(1), 57–81. <https://doi.org/10.1111/j.1540-6520.2006.001>
- Dabbous, A., Barakat, K. A., & Kraus, S. (2023). The impact of digitalization on entrepreneurial activity and sustainable competitiveness: A panel data analysis. *Technology in Society*, 73, 102224. <https://doi.org/10.1016/j.techsoc.2023.102224>
- Dy, A. M., Marlow, S., & Martin, L. (2017). A Web of opportunity or the same old story? Women digital entrepreneurs and intersectionality theory. *Human Relations*, 70(3), 286–311. <https://doi.org/10.1177/0018726716650730>
- Escolar-Llamazares, M. C., Luis-Rico, I., de la Torre-Cruz, T., Herrero, Á., Jiménez, A., Palmero-Cámara, C., & Jiménez-Eguizábal, A. (2019). The socio-educational, psychological and family-related antecedents of entrepreneurial intentions among Spanish Youth. *Sustainability*, 11(5). <https://doi.org/10.3390/su11051252>
- Feroz, A. K., Zo, H., & Chiravuri, A. (2021). Digital Transformation and Environmental Sustainability: A Review and Research Agenda. *Sustainability*, 13(3), 1530. <https://doi.org/10.3390/SU13031530>
- Ferreira, J. J. M., Fernandes, C. I., & Ferreira, F. A. F. (2019). To be or not to be digital, that is the question: Firm innovation and performance. *Journal of Business Research*, 101, 583–590. <https://doi.org/10.1016/j.jbusres.2018.11.013>
- Fonseka, K., Jaharadak, A. A., & Raman, M. (2022). Impact of E-commerce adoption on business performance of SMEs in Sri Lanka; moderating role of artificial intelligence. *International Journal of Social Economics*, 49(10), 1518–1531. <https://doi.org/10.1108/IJSE-12-2021-0752>
- Fossen, F. M., & Sorgner, A. (2021). Digitalization of work and entry into entrepreneurship. *Journal of Business Research*, 125, 548–563. <https://doi.org/10.1016/j.jbusres.2019.09.019>
- Gavrila Gavrilă, S., & De Lucas Ancillo, A. (2022). Entrepreneurship, innovation, digitization and digital transformation toward a sustainable growth within the pandemic environment. *International Journal of Entrepreneurial Behaviour and Research*, 28(1), 45–66. <https://doi.org/10.1108/IJEBr-05-2021-0395>
- GEM. (2017). How GEM defines entrepreneurship. Retrieved August 25, 2023, from <http://gem-consortium.ns-client.xyz/wiki/1149>
- Ghazy, N., Ghoneim, H., & Lang, G. (2022). Entrepreneurship, productivity and digitalization: Evidence from the EU. *Technology in Society*, 70, 102052. <https://doi.org/10.1016/j.techsoc.2022.102052>
- Giannetti, M., & Simonov, A. (2004). On the Determinants of Entrepreneurial Activity: Individual Characteristics, Economic Environment, and Social Norms. *SSRN Electronic Journal*, 11(2). <https://doi.org/10.2139/ssrn.554511>
- Gillani, F., Chatha, K. A., Sadiq Jajja, M. S., & Farooq, S. (2020). Implementation of digital manufacturing technologies: Antecedents and consequences. *International Journal of Production Economics*, 229, 107748. <https://doi.org/10.1016/j.ijpe.2020.107748>

- Gopi, J., & Subramoniam, S. (2023). Establishing the Relative Importance of Challenges in Early-stage Entrepreneurship using Analytical Hierarchy Process. *Business Perspectives and Research*. <https://doi.org/10.1177/22785337221148884>
- Gujarati, D. N. (1995). *Basic econometrics* (3. ed.). New York: McGraw-Hill.
- Gupta, S., Campos Zeballos, J., del Río Castro, G., Tomićić, A., Andrés Morales, S., Mahfouz, M., Osemwegie, I., Phemia Comlan Sessi, V., Schmitz, M., Mahmoud, N., & Inyaregh, M. (2023). Operationalizing Digitainability: Encouraging Mindfulness to Harness the Power of Digitalization for Sustainable Development. *Sustainability*, 15(8), 6844. <https://doi.org/10.3390/SU15086844>
- Hedberg, A., & Šipka, S. (2021). Toward a circular economy: The role of digitalization. *One Earth*, 4(6), 783–785. <https://doi.org/10.1016/J.ONEEAR.2021.05.020>
- Heirman, A., & Clarysse, B. (2007). Which Tangible and Intangible Assets Matter for Innovation Speed in Start-Ups? *Journal of Product Innovation Management*, 24(4), 303–315. <https://doi.org/10.1111/j.1540-5885.2007.00253.x>
- Hinkelmann, J. (2022). Digitalisation: Opportunities and challenges for entrepreneurs. Retrieved November 18, 2022, from <https://www.roedl.com/insights/digitalisation/opportunities-challenges-entrepreneurs>
- Hofstede, G., Noorderhaven, N. G., Thurik, A. R., Uhlaner, L. M., Wennekers, A. R. M., & Wildeman, R. E. (2004). Culture's role in entrepreneurship: Self-employment out of dissatisfaction. In J. Ulijn & T. E. Brown (Eds.), *Innovation, Entrepreneurship and Culture*. Cheltenham: Edward Elgar Publishing, 162–204. <https://doi.org/10.4337/9781845420550.00014>
- Holzmann, P., & Gregori, P. (2023). The promise of digital technologies for sustainable entrepreneurship: A systematic literature review and research agenda. *International Journal of Information Management*, 68, 102593. <https://doi.org/10.1016/j.ijinfomgt.2022.102593>
- Hvide, H. K., & Panos, G. A. (2014). Risk tolerance and entrepreneurship. *Journal of Financial Economics*, 111(1), 200–223. <https://doi.org/10.1016/j.jfineco.2013.06.001>
- Jaafar, M., Ramayah, T., Abdul-Aziz, A. R., & Saad, B. (2007). Technology readiness among managers of Malaysian construction firms. *Engineering, Construction and Architectural Management*, 14(2), 180–191. <https://doi.org/10.1108/09699980710731290>
- Kelly, G., & McAdam, M. (2022). Women Entrepreneurs Negotiating Identities in Liminal Digital Spaces. *Entrepreneurship: Theory and Practice*, 47(5). <https://doi.org/10.1177/10422587221115>
- Kusa, R., Suder, M., Barbosa, B., Glinka, B., & Duda, J. (2022). Entrepreneurial behaviors that shape performance in small family and non-family hotels during times of crisis. *International Entrepreneurship and Management Journal*, 18(4), 1545–1575. <https://doi.org/10.1007/s11365-022-00812-7>
- Lee, Y. Y., & Falahat, M. (2019). The impact of digitalization and resources on gaining competitive advantage in international markets: The mediating role of marketing, innovation and learning capabilities. *Technology Innovation Management Review*, 9(11), 26–38. <https://doi.org/10.22215/timreview/1281>
- Lepkowska-White, E., Parsons, A., & Berg, W. (2019). Social media marketing management: An application to small restaurants in the US. *International Journal of Culture, Tourism and Hospitality Research*, 13(3), 321–345. <https://doi.org/10.1108/IJCTHR-06-2019-0103>
- Lin, M., Lucas, H. C., & Shmueli, G. (2013). Research Commentary: Too Big to Fail: Large Samples and the p-Value Problem. *Information Systems Research*, 24(4), 906–917. <https://doi.org/10.1287/isre.2013.0480>
- Luo, Y., & Chan, R. C. K. (2021). Gendered digital entrepreneurship in gendered coworking spaces: Evidence from Shenzhen, China. *Cities*, 119. <https://doi.org/10.1016/j.cities.2021.103411>
- Ma, L., & Sun, B. (2020). Machine learning and AI in marketing – Connecting computing power to human insights. *International Journal of Research in Marketing*, 37(3), 481–504. <https://doi.org/10.1016/j.ijresmar.2020.04.005>

- Niyawanont, N., & Wanarat, S. (2021). Structural equation modelling of digital entrepreneurship, logistics innovation, and digital transformation influence on logistics performance of logistics entrepreneurs in Thailand. *ABAC Journal*, 41(4), 147–174. <https://doi.org/10.14456/abacj.2021.8>
- Orser, B. J., & Riding, A. (2018). The influence of gender on the adoption of technology among SMEs. *International Journal of Entrepreneurship and Small Business*, 33(4), 531. <https://doi.org/10.1504/IJESB.2018.10011218>
- Pankaj, L., & Seetharaman, P. (2021). The balancing act of social enterprise: An IT emergence perspective. *International Journal of Information Management*, 57, 102302. <https://doi.org/10.1016/j.ijinfomgt.2020.102302>
- Parasuraman, A. (2000). Technology Readiness Index (Tri): A Multiple-Item Scale to Measure Readiness to Embrace New Technologies. *Journal of Service Research*, 2(4), 307–320. <https://doi.org/10.1504/IJESB.2018.10011218>
- Parise, S., & Guinan, P. J. (2008). Marketing Using Web 2.0. In S. Parise & P. J. Guinan (Eds.), *In Proceedings of the 41st Annual Hawaii International Conference on System Sciences*.
- Parthiban, R., Qureshi, I., Bandyopadhyay, S., Bhatt, B., & Jaikumar, S. (2020). Leveraging ICT to Overcome Complementary Institutional Voids: Insights from Institutional Work by a Social Enterprise to Help Marginalized. *Information Systems Frontiers*, 22(3), 633–653. <https://doi.org/10.1007/s10796-020-09991-6>
- Plečko, S., Tominc, P., & Širec, K. (2023). Digitalization in Entrepreneurship: Unveiling the Motivational and Demographic Influences towards Sustainable Digital Sales Strategies. *Sustainability*, 15(23), 16150. <https://doi.org/10.3390/su152316150>
- Popkova, E. G., & Sergi, B. S. (2020). Human capital and AI in industry 4.0. Convergence and divergence in social entrepreneurship in Russia. *Journal of Intellectual Capital*, 21(4), 565–581. <https://doi.org/10.1108/JIC-09-2019-0224>
- Pulkstenis, E., & Robinson, T. J. (2002). Two goodness-of-fit tests for logistic regression models with continuous covariates. *Statistics in Medicine*, 21(1), 79–93. <https://doi.org/10.1002/sim.943>
- Rahman, M. S., Akcura, T., & Ozdemir, Z. D. (2012). Using an Online Intermediary as an Additional Channel for Selling Quality Differentiated Services. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2115956>
- Ramayah, T., Jantan, M., Roslin, R. M., & Siron, R. (2004). Technology Readiness of Owners/Managers of SME's. *The International Journal of Knowledge, Culture, and Change Management: Annual Review*, 3(1), 475–486. <https://doi.org/10.18848/1447-9524/CGP/v03/59061>
- Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial Orientation and Business Performance: An Assessment of past Research and Suggestions for the Future. *Entrepreneurship Theory and Practice*, 33(3), 761–787. <https://doi.org/10.1111/j.1540-6520.2009.00308.x>
- Robinson, S., & Stubberud, H. A. (2012). All in the family: Entrepreneurship as a family tradition. *International Journal of Entrepreneurship*, 16, 19–30.
- Setyaningrum, R. P., & Muafi, M. (2023). Indonesia's successful women entrepreneurs: Servant leadership, E-Commerce Digitalization Adoption, self efficacy as Mediation and Adoption of E-Commerce Digitization as Moderation. *Calitatea*, 24(192), 235–248. <https://doi.org/10.47750/QAS/24.192.28>
- Seyal, A. H., & Abdrahman, M. N. (2014). A Preliminary Investigation of E-Commerce Adoption in Small & Medium Enterprises in Brunei. *Journal of Global Information Technology Management*, 6(2), 6–26. <https://doi.org/10.1080/1097198X.2003.10856347>
- Simmons, G., Donnelly, C., Armstrong, G., & Fearn, A. (2015). Digital loyalty card 'big data' and small business marketing: Formal versus informal or complementary? *International Small Business Journal*, 33(4), 422–442. <https://doi.org/10.1177/0266242613502>

- Soininen, J., Martikainen, M., Puumalainen, K., & Kyläheiko, K. (2012). Entrepreneurial orientation: Growth and profitability of Finnish small- and medium-sized enterprises. *International Journal of Production Economics*, 140(2), 614–621. <https://doi.org/10.1016/j.ijpe.2011.05.029>
- Solesvik, M., Iakovleva, T., & Trifilova, A. (2019). Motivation of female entrepreneurs: A cross-national study. *Journal of Small Business and Enterprise Development*, 26(5), 684–705. <https://doi.org/10.1108/JSBED-10-2018-0306>
- Stevens, R., Moray, N., Bruneel, J., & Clarysse, B. (2015). Attention allocation to multiple goals: The case of for-profit social enterprises. *Strategic Management Journal*, 36(7), 1006–1016. <https://doi.org/10.1002/smj.2265>
- Sussan, F., & Acs, Z. J. (2017). The digital entrepreneurial ecosystem. *Small Business Economics*, 49(1), 55–73. <https://doi.org/10.1007/s11187-017-9867-5>
- Tagne, J. S. (2020). The effects of digitalization on entrepreneurial innovation in Sub-Saharan Africa. In A. Ong'uti Maake, B. Magara Maake, & F. Mzee Awuor (Eds.), *Digital Solutions and the Case for Africa's Sustainable Development*. Hershey: IGI Global, 35–53.
- Tolba, A., Karadeniz, E., Boutaleb, F., Bouhaddioui, C., Menipaz, E., Pereira, F., Bueno, Y., Alsaeed, M., & Schøtt, T. (2022). Exports during the pandemic: Enhanced by digitalization. *Small Enterprise Research*, 29(3), 308–327. <https://doi.org/10.1080/13215906.2022.2141846>
- Udayana, A., Fatmawaty, A., Makbul, Y., Priowirjanto, E., Ani, L., Siswanto, E., Susanti, W., & Andriani, S. (2024). Investigating the role of e-commerce application and digital marketing implementation on the financial and sustainability performance: An empirical study on Indonesian SMEs. *International Journal of Data and Network Science*, 8(1), 167–178. <https://doi.org/10.5267/j.ijdns.2023.10.007>
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Vrontis, D., Chaudhuri, R., & Chatterjee, S. (2022). Adoption of Digital Technologies by SMEs for Sustainability and Value Creation: Moderating Role of Entrepreneurial Orientation. *Sustainability*, 14(13), 7949. <https://doi.org/10.3390/su14137949>
- Wan, Q., Tang, S., & Jiang, Z. (2023). Does the development of digital technology contribute to the innovation performance of China's high-tech industry? *Technovation*, 124, 102738. <https://doi.org/10.1016/j.technovation.2023.102738>
- Wang, F. (2020). Digital marketing capabilities in international firms: A relational perspective. *International Marketing Review*, 37(3), 559–577. <https://doi.org/10.1108/IMR-04-2018-0128>
- Wang, X., & Cao, S. (2024). Harnessing the stream: Algorithmic imaginary and coping strategies for live-streaming e-commerce entrepreneurs on Douyin. *The Journal of Chinese Sociology*, 11(1), 9. <https://doi.org/10.1186/s40711-024-00213-z>
- Yang, S., Raghavendra, M. R. A., Kaminski, J., & Pepin, H. (2018). Opportunities for Industry 4.0 to Support Remanufacturing. *Applied Sciences*, 8(7), 1177. <https://doi.org/10.3390/AP8071177>
- Zahra, S. A. (2021). International entrepreneurship in the post Covid world. *Journal of World Business*, 56(1). <https://doi.org/10.1016/j.jwb.2020.101143>
- Zhou, K., Liu, T., & Zhou, L. (2015). Industry 4.0: Towards future industrial opportunities and challenges. 12th International Conference on Fuzzy Systems and Knowledge Discovery, FSKD, 2147–2152. <https://doi.org/10.1109/FSKD.2015.7382284>
- Zhou, Z., Liu, W., Cheng, P., & Li, Z. (2022). The Impact of the Digital Economy on Enterprise Sustainable Development and Its Spatial-Temporal Evolution: An Empirical Analysis Based on Urban Panel Data in China. *Sustainability*, 14(19), 11948. <https://doi.org/10.3390/SU141911948>

