Gender differences in management styles during crisis and the effect on firm performance

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Gender differences in management styles during crisis and the effect on firm performance

Abstract

This paper aims to shed light on gender differences in firm performance in a period that entails an unprecedented crisis with specific effects on gender roles, i.e., COVID-19. The analysis focuses on Croatian high-tech manufacturing and knowledge-intensive service sector SMEs. Previous literature indicates that the obstacles the SMEs face may be even more significant for women-owned firms. Specifically, women entrepreneurs find it more challenging to secure social and financial capital. Women often face restrictions on their working hours due to societal pressure and family obligations, and they are rarely well-connected because they are often not members of influential business networks. Literature also suggests that the usual pressures on female working hours have disproportionally increased during the COVID-19 imposed lockdowns, so the general expectation is that women entrepreneurs were not able to cope equally with the changed market circumstances. In this study, we consider a causation-effectuation management framework to investigate how women- and men-owned SMEs used these management styles to address the business challenges in the COVID-19 crisis. Our contribution aims explicitly to answer the invitation made in recent literature to explore how gender influences the effects of the four dimensions of effectuation on firm performance.

Keywords: women entrepreneurship; firm performance; management styles; COVID-19

JEL classification: B54, J16, L26

Rodne razlike u stilovima upravljanja tijekom krize i učinak na poslovni uspjeh

Sažetak

Cilj je rada rasvijetliti rodne razlike u uspješnosti poslovanja tijekom razdoblja koje podrazumijeva dosad nezabilježenu krizu sa specifičnim učincima na rodne uloge, tj. COVID-19. Analiza je usmjerena na hrvatska mala i srednja poduzeća (MSP) u visokotehnološkom proizvodnom i uslužnom sektoru temeljenom na znanju. Prethodna literatura pokazuje da bi prepreke s kojima se suočavaju MSP-ovi mogle biti još značajnije za poduzeća u vlasništvu žena. Naime, poduzetnicama je izazovnije osigurati socijalni i financijski kapital. Žene se često suočavaju s ograničenjima raspoloživog radnog vremena zbog društvenih pritisaka i obiteljskih obveza, a rijetko su dobro umrežene jer često nisu članice utjecajnih poslovnih mreža. Literatura također sugerira da su se uobičajeni pritisci na raspoloživo radno vrijeme žena nerazmjerno povećali tijekom ograničenja uvedenih zbog pandemije bolesti COVID-19, pa je očekivanje šire javnosti da se poduzetnice nisu mogle ravnopravno nositi s promijenjenim tržišnim okolnostima. U ovoj studiji razmatramo okvir 'uzročnog' odnosno 'posljedičnog' stila upravljanja poduzećem, kako bi se istražilo kako su MSP-ovi u vlasništvu žena i oni u vlasništvu muškaraca koristili te stilove upravljanja za rješavanje poslovnih izazova tijekom COVID-19 krize. Temeljni se doprinos sastoji u ispitivanju načina na koji rod utječe na učinke četiriju dimenzija 'posljedičnog' stila upravljanja na uspješnost poduzeća.

Ključne riječi: žensko poduzetništvo, uspješnost poslovanja, stilovi upravljanja, COVID-19

JEL klasifikacija: B54, J16, L26

1 Introduction

One of the challenges that small and medium sized enterprises (SMEs) face is limited resources, both financial and human. Compared to large companies, they find it harder to get access to financing (Rao et al., 2021), and they more often have difficulties in attracting skilled employees. In times of crises, most SMEs find their resources even more strained as they operate under larger insecurity and uncertainty and, although crises are potentially damaging to all firms, SMEs are usually more affected than large companies (Latham, 2009). This was also evident in the last COVID-19 crisis, when small enterprises were one of the most affected business groups (Baker & Judge, 2020; Eggers, 2020).

The obstacles that SMEs face may be even greater for those firms that are owned by women. The literature already showed that women entrepreneurs find it more difficult to secure human, social and financial capital (Fairlie & Robb, 2009). Additionally, women often face restrictions on their working hours due to societal pressure and family obligations, and they are rarely well connected because they are often not members of influential business networks.

Research shows that firms change management practices to adapt to crises (Krammer, 2022). However, considering that women-owned firms face more severe resource limitations, it is intriguing that there are very few studies that address the different ways that gender affects strategic choice in crises times (Cesaroni et al., 2015; Krammer, 2022).

Our study attempts to fill this gap by considering causation-effectuation management framework to investigate how women- and men-owned SMEs used these management styles during the period that entails COVID-19 crisis. For example, since women entrepreneurs find it harder to obtain external financing and, thus, often cannot make up-front investments, they may naturally be pushed toward strategy which is more fluid and flexible, such as effectuation.

Research into female use of effectuation versus causation as a deliberate management strategy presents a new and under-researched area. The aim of this paper is to shed light on gender differences in firm performance during the period that entails an unprecedented crisis with specific effects on gender roles, i.e., COVID-19. Our contribution specifically aims to answer the invitation made in recent literature (Ruiz-Jiménez et al., 2021; Cowden et al., 2023) to

explore how gender influences the effects of the four dimensions of effectuation on firm performance.

The paper adopts the following structure. The next section briefly summarizes relevant literature. Section 3 discusses data and methodology. Section 4 presents results and provides a discussion, while the last section offers conclusions.

2 Theoretical background

In the periods of crises, such as COVID-19 pandemic characterised by the global supply chain frictions, firms face many adversities and efficient use of the available resources comes into entrepreneurs' spotlight even more than during periods of economic boom. Nascent and small entrepreneurs seldom have abundance of resources and are under greater pressure to use them efficiently.

The resource limitations are evident in the lack of available finance, obstacles to obtaining cutting age technology and deficiencies in human capital (Del Vecchio et al., 2018). In addition to resource limitations, SMEs seldom have developed in-place mechanisms to deal with adverse also been known as inadequately prepared for reacting to complex changes in business environment. They tend not to sufficiently develop planning processes, devote resources to staff training or possess organizational and marketing capabilities like those of larger firms (Van de Vrande et al., 2009; Figueiredo et al., 2020). On the other hand, SMEs are disproportionally more agile and flexible, less prone to internal bureaucratic procedures and taking advantage of easier internal communication (Sullivan-Taylor & Branicki, 2011), which enables them to sustain their innovation ability even during adverse economic conditions (Juergensen et al., 2020). Through maintaining innovation activities, SMEs ensure swifter adaptation to economic changes. This latter characteristic makes them a vital segment of the economic ecosystem, the struggle of which to weather the economic storms remains a valid research object.

When facing adverse economic situations, entrepreneurs can adopt different management styles to navigate the bumpy road to success. Effectuation and causation are two alternatives, but non-exclusive approaches entrepreneurs use in the entrepreneurial process (Chandler et al., 2011; Yang et al., 2021). Effectuation and causation refer to a specific way an entrepreneur is pursuing

a specific business action, at the same time considering the context in which entrepreneurs conduct their business, the available resources and constraints. To quote Sarasvathy (2001, p. 245), "causation processes take a particular effect as given and focus on selecting between means to create that effect. Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means." In other words, the causation approach entails up-front planning to achieve specific goals, followed by the execution of those plans. Causation assumes that the future is predictable, requiring high up-front resource commitments (Sarasvathy, 2001; Smolka et al. 2018). Effectuation processes, on the other side, assume that the future is highly uncertain (so it is not possible to envisage the clear goal), and only through an experimentation and iteration can resources be combined to gather information and create meaningful outcome. The effectuation process does not assume limitless possibilities for experimentation, but rather assumes that a decision maker considers affordable loss, which means that activities are chosen so that they never generate losses greater than the set threshold (Sarasvathy, 2001). Thus, effectuation processes also present decision-making logic in a resource scarce environment.

Resource limitation is one of the key determinants of different management styles applied by the entrepreneur. Previous studies have stated that small enterprises frequently lack adequate resources, particularly when they are starting a new venture, and are, thus, more inclined to rely on effectuation logic (Alsos et al., 2020). In case of limited resources, such as in a period of crisis, an entrepreneur will rely on effectuation principles to build partnerships that will enable overcoming the initially disadvantaged position (Alsos et al., 2020). On the other hand, studies argue that relative abundance of resources may encourage entrepreneurs to rely more on causation (Read & Sarasvathy, 2005). This suggest that the choice of management style is not exclusive, and can coexist within the same enterprise, so that the entrepreneur can adapt management style in the face of economic circumstances.

McKelvie et al. (2020) suggest that there are only two factors supported by the current literature as main forces of the entrepreneurs' choice to rely on causation or effectuation - uncertainty and entrepreneurs' expertise. However, it remains unclear whether each of these factors favours causation or effectuation. While uncertainty, which is particularly present in a crisis period, is at the core of the effectuation-causation framework, there is still no consensus in the literature whether entrepreneur's dominant response to such situation will rely on adopting processes related to effectuation or causation. Arend et al. (2016) suggest that expert entrepreneurs might

have developed different mechanisms to deal with uncertainty and, because of their experience, are less likely to rely on effectuation during such periods. On the other hand, some authors argue that all entrepreneurs might engage in some degree of effectuation (Arend et al., 2015; Engel et al., 2014) in periods of uncertainty.

The literature is not decisive when it comes to the effects of causation or offered a conclusive answer on whether decision-making processes based on effectuation principles are more likely to lead to increased firm performance. However, recent studies frequently argue that causation and effectuation are not exclusively practiced. Smolka et al. (2018) suggest that using both effectuation and causation improves the performance, while Laskovaia et al. (2017) emphasize cultural differences as a mediating factor explaining different results across social groups. Yu et al. (2018) emphasize practicing both principles as a sign of organisational ambidexterity and conclude that while causation generally is beneficial for firm performance, effectuation also has a positive effect when the firm is facing a situation of high uncertainty.

Alsos et al. (2020) suggest that the choice and the intensity of the implementation of the effectual or causation principles in the firm are strongly connected to the entrepreneur as an individual. Furthermore, entrepreneurs' human capital is considered crucial for firm performance, especially in SMEs. Studies have confirmed that entrepreneurs' general education, specific knowledge about the industry and previous experience enable them to better position the firm on the market and easily navigate business obstacles (Chandler & Hanks, 1998; Kato et al., 2015). Some studies argue that human capital helps entrepreneurs develop social capital (Mosey & Wright, 2007) and social skills (Baron & Markman, 2000). Being a part of the social network of entrepreneurs, either through parents, friends or peers, exposes entrepreneurs to a particular decision-making process (Aldrich & Cliff, 2003; Chlosta et al., 2012), provides additional access to resources or information on more efficient ways to acquire or use resources and explore business opportunities. Family social capital is particularly important for the survival of family-owned businesses because external resources can be secured through the family contacts' network (Salvato & Melin, 2008). Subsequently, entrepreneur's individual characteristics in the form of specific human capital result in specific behaviour (Falck et al., 2010), which subsequently affects the business performance (Semrau & Werner, 2014).

In the case of micro and small firms, the owner's personal experience and their behavioural characteristics are associated with their leadership role more directly. Their decision-making

styles are more important to maintain the business activities in the adverse economic conditions (Werner et al., 2018) and contribute to firms' resilience (Branicki et al., 2018). In that respect, owner's gender is also expected to influence his/her role as an entrepreneur (Fischer et al., 1993). Due to the findings in the literature that women are generally more risk adverse (Palvia et al., 2015), this is more likely to be demonstrated during the periods of increased economic uncertainty. Krammer (2022), for example, argues that firms with female managers are less likely to adapt successfully to the COVID-19 crisis. The COVID-19 crisis has brought lockdown periods, during which parents were expected to tackle education, childcare and work-related tasks at the same time (Derndorfer et al., 2021). Previous studies have confirmed that the average time spent on childcare and household chores has increased more for women than it has for men during the COVID-19 crisis (Hupkau & Petrongolo, 2020; Dang & Nguyen, 2021). Subsequently, it can be expected that female managers were put under more pressure (Manolova et al., 2020) in these specific circumstances, which could have directed their focus away from conducting business activities. A question of various strategies that small business owners of different genders employ in times of economic shocks is an under-researched topic. So far, there is only one published study comparing performances of women and men SME owners in specific adverse economic conditions created during a recession (Cesaroni et al., 2015), which indicates better survival for female-owned firms during the financial crisis in Italy. However, due to the above-mentioned reasons, the COVID-19 crisis was significantly different than the financial crisis of 2008–2009, and the results of the analysis related to previous crisis periods cannot be generalized to all recessions.

Additionally, previous research has documented that women usually adopt different management styles than men, which can be described as more emphatic, democratic or participative (Eagly & Johnson, 1990). They are also better than their male peers at helping others develop (Cavallo & Brienza, 2006), at motivating and inspiring them, at building relationships, and at collaboration and teamwork (Zenger & Folkman, 2012). Women entrepreneurs often have fewer resources and make conscious decisions to keep their companies small. But, as Watson (2002), Robb and Watson (2012) and Zolin et al. (2013) show, when performance is measured as output conditional on assets which a firm employs to create it, female-owned and male-owned businesses perform equally well. Thus, the question that remains open is whether potentially different management styles adopted by genders alleviated the more adverse conditions faced by women during the COVID-19 crisis and enabled business-owners of small and micro enterprises to maintain successful business operations.

While causation is frequently envisaged as a single-dimensional construct, it is assumed that effectuation consists of four dimensions: experimentation, affordable loss, flexibility and pre-commitments (Chandler et al., 2011; Perry et al., 2012; Fisher, 2012). Cai et al. (2017) offer explanation for the link between practicing each of the effectuation dimensions and firm performance. Experimentation enables that firms create and modify their goals considering the new economic circumstances. Experimentation principle is particularly evident in the case of technologically innovative firms, where firms, through extensive experimentation, acquire deep knowledge about viable new products (Andries et al., 2013). Experimentation does not suggest that firms are not prone to keeping the operations lean. Through the principle of affordable loss, firms maintain only the most efficient options related to their experiments, and carefully use of the limited resources to control the risk of uncertainty. Read at al. (2009) explain that application of affordable loss principal entails considering the worst-case scenario, enabling firms to carefully assess the potential disadvantages of a specific business opportunity. Flexibility implies the use of limited resources in creative combinations, thus having ability to reach the same goal with different combinations of means. By developing capabilities to react more quickly to environmental changes, including those in the availability of specific resources, firms potentially develop their dynamic capabilities, thus enabling the long-run firm performance (Teece, 2007). Finally, pre-commitment realised through partnership with clients or suppliers enables firms to envisage the future with the inclusion of important stakeholders into the business development, which can reduce uncertainties to an extent. Pre-agreements in the form of strategic alliances that effectual entrepreneurs tend to establish to a greater extent (Read et al., 2009) enable firms to obtain valuable additional resources from potential customers, suppliers, and competitors prior to having fully developed products (Chandler et al., 2011). Empirical evidence on the link between different dimensions of effectuation and firm performance is still largely missing, while the gender dimension of different management styles is completely absent from current literature. The next section explains the empirical strategy used to tackle this issue in more details.

3 Data and methodology

3.1 Data

Empirical analysis rests on data from Croatian SMEs in high-tech manufacturing and knowledge-intensive service sector[1]. The SMEs were chosen for this exercise because firm owners and key managers' decision-making processes has a more straightforward effect on the business performance, than is the case in larger firms. High-tech manufacturing and knowledge-intensive service sector has been chosen because they were potentially less constrained by the obstacles correlated with the COVID-19 crisis and could have responded with agility to the adverse economic environment conditions. This research utilized two datasets: (1) financial and structural data on the population of enterprises for the 2018 – 2021 period for Croatia, obtained from the Croatian Financial Agency (hereinafter: FINANCIALS dataset); and (2) data on management styles, resilience, and owners' demographics, obtained from the survey questionnaire (hereinafter: SURVEY dataset).

The FINANCIALS dataset includes balance sheet and profit and loss statement data, as well as firm characteristics such as region, size, industry sector, firm ID and year of the financial report. SURVEY database was created by conducting a survey in the form of an online questionnaire from April to June 2022. The questionnaire was created by the authors and was based on a review of relevant literature. Specifically, firms' resilience was measured using and adapting the scales by Kantur and Iseri-Say (2015), while firms' management style was measured by using scales developed by Melo et al. (2019). The English version of the questionnaire was translated into Croatian by the authors and then back translated into English by the professional translators to ensure the conceptual equivalence of the measures used. Furthermore, pre-tests of the questionnaire were made with academic colleagues, followed by a pilot on a sample of SMEs owners in related, but not the same industry as the sample. We requested from the pilot participants to complete the questionnaire and offer feedback on the design and wording of the items. According to their feedback, we modified the questionnaire and enhanced its clarity. The responses in the pilot study were not included in the sample used for empirical analysis. The

[1] Definitions of these technology sectors are available at https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf.

survey itself offered complete anonymity, and it was clearly communicated to all the participants that individual answers will not be disclosed.

The questionnaire relates to the period 2018 – 2021 and contains six parts: (1) basic information about the firm, (2) innovation potential, (3) measure of resilience, (4) management styles, (5) owners' information, and (6) design of ideal measure to help firms in times of high uncertainty. Our analysis is based on SMEs in private ownership, concentrated in the high-technology manufacturing sector and respondents were owners or the main decision-makers in the firm. An online questionnaire was sent to 3,295 firms within these sectors for which we had contact information and information about their gender ownership structure, which is about 40 percent of all firms in these sectors. We obtained 134 responses, giving us a response rate of 4.1 percent[2]. After merging the FINANCIALS and SURVEY datasets we excluded outliers, defined as top and bottom 1 percent observations according to turnover, value added, and total assets. Following this data cleaning process, the sample was reduced to 127 firms. Socio-demographic characteristics of respondents in the final sample are presented in Table 1, and representativeness of our sample in terms of region and firm size within analysed sectors is presented in Figure A1 in the Appendix.

Table 1 Socio-demographic characteristics of respondents in the final sample

Variable	**N**	**Mean**	**St. Dev.**	**Min**	**Max**
Gender					
Female	39	0.31	0.46	0	1
Male	88	0.69	0.46	0	1
Age	127	49.65	10.48	30	80
Education					
Primary	1	0.01	0.09	0	1
Secondary	45	0.35	0.48	0	1
Tertiary	68	0.54	0.5	0	1
Post-graduate	13	0.1	0.3	0	1
Education (parents)					
Primary	15	0.12	0.32	0	1
Secondary	60	0.47	0.5	0	1
Tertiary	48	0.38	0.49	0	1
Post-graduate	4	0.03	0.18	0	1

[2] Although response rate seems relatively small, it is highly expected in surveys of small business owners/executives (Ryman & Roach, 2022).

Marital status					
Married	98	0.77	0.42	0	1
Single	12	0.09	0.29	0	1
Divorced / Widowed	17	0.13	0.34	0	1
Number of children	127	1.55	1.04	0	4
Household size	127	3.1	1.31	1	8
Household income [a]					
Up to 863 EUR	9	0.07	0.26	0	1
864 – 1,327 EUR	25	0.2	0.4	0	1
1,328 – 1,991 EUR	27	0.21	0.41	0	1
1,992 – 2,654 EUR	31	0.24	0.43	0	1
2,655 – 3,318 EUR	16	0.13	0.33	0	1
3,319 – 3,982 EUR	12	0.09	0.29	0	1
More than 3,982 EUR	7	0.06	0.23	0	1
Work in the sector before opening a business					
No	61	0.48	0.5	0	1
Yes	66	0.52	0.5	0	1
Entrepreneur among close family members					
No	89	0.7	0.46	0	1
Yes	38	0.3	0.46	0	1
Entrepreneur among relatives					
No	76	0.6	0.49	0	1
Yes	51	0.4	0.49	0	1
Entrepreneur among friends					
No	44	0.35	0.48	0	1
Yes	83	0.65	0.48	0	1
Owner of other businesses					
No	104	0.82	0.39	0	1
Yes	23	0.18	0.39	0	1

Note: [a] At the time of conducting the survey, Croatia was still using kuna (HRK) as its official currency, so this variable was initially expressed in HRK. 1 EUR = 7.53450 HRK (Croatian kuna).

Source: Authors' calculations.

As expected, most of the firms in the sample have male owners (69 percent). Consistent with the high-tech manufacturing and knowledge-intensive service sector, owners have mostly obtained tertiary education (54 percent) and on average belong to the prime working age group (50 years old). Most of the owners in the sample are focused on a single business endeavour, yet there is a smaller percentage (18 percent) that has diversified their business activities. It is also interesting to note that just under half of the sample (48 percent) did not have experience

in the sector they opened their business in, suggesting that they probably had to immerse themselves into new business networks to enhance the chances of success. The most likely channels of these business networks are group of friends who are also entrepreneurs (65 percent). Since, in general, entrepreneurship is male dominated, female entrepreneurs are expected to be able to rely on their female counterparts to a smaller extent.

A large percentage of the business owners in the sample is currently married (77 percent) and the average household size (3.1) implicates high probability of having at least one dependent member, thereby suggesting the increased family obligations during the pandemic, and in particular during the lockdown period. Precisely these increased family obligations potentially had disruptive effect on the previously established business routines, calling for the need to modify business owners' decision-making strategies. The rest of the paper is devoted to exploring this issue in more detail.

3.2 Method and variables

Our goal is not to assess which form of decision-making style is more likely to be adopted by the genders. We also do not claim that a single decision-making necessarily dominates in a firm[3], neither that they cannot coexist nor be equally effective[4]. The question that we are interested in is whether there are differences in performance when two genders practice different styles.

Our empirical methodology is organized into two stages. The first stage of data analysis included techniques for scale reliability and validity assessment of latent constructs used in our study. These latent constructs include two dimensions of firms' resilience: (1) robustness, and (2) agility; and five dimensions of firms' management style: (1) causation, (2) experimentation, (3) losses, (4) flexibility, and (5) agreement. Within this stage, we used Cronbach's alpha (CA)

[3] This implies that we allow for both causation and all four dimensions of effectuation to be fully developed at any point in time in firm, depending on the self-reflection of the owner.

[4] For example, practicing both causation and flexibility can positively contribute to a firm performance. This could happen if, for example, an entrepreneur had an experience of preparing a careful business plan for the purpose of obtaining a loan (and thus practiced causation), but in the wake of the crisis had to be flexible and modify the resources (due to global chain frictions) to maintain business operations (thus practicing effectuation). If practicing both logics, i.e. securing funding and flexible use of resources, contributed to increased business performance, both are judge effective.

and exploratory and confirmatory factor analysis techniques (EFA and CFA, respectively). CA coefficient is used as a measure of scale reliability because it measures internal consistency, that is, how closely related a set of items is as a group. The dimensionality of the scale is tested by exploratory and confirmatory factor analysis. Description and descriptive statistics of items used to estimate latent variables are presented in Table A1 in the Appendix.

In the second stage, once the latent constructs (variables) were estimated and tested, our model was estimated using the pooled ordinary least squares technique. Performance indicators[5] in this research also include turnover divided by total assets, and value added divided by total assets[6]. These two indicators measure how efficiently firms can convert resources into outputs, and since they are adjusted for firm resources, they do not favour larger firms[7], and as such are more objective measures of firm success. For example, traditional indicators such as turnover and value added in their nominal form would favour a larger but inefficient firm over a small and efficient one. Total assets include both tangible and intangible assets, so with this approach we can capture both "hard" factors of production and specific intellectual property. Furthermore, our descriptive statistics (Table 2 below) indicated that within our sample, there is a significant difference in scaled performance indicators between male and female-owned firms, even though for only for a single year.

We choose not to consider output per employee as an indicator, as many micro and small firms are family-owned, where it is customary that family members contribute with unrecorded and unpaid work (Philipps, 2008). Thus, the number of employees may not be an accurate measure of labour input.

Our empirical strategy entails using the following model:

[5] It is worth noting that most of the literature related to the effectuation-causation decision-making framework uses subjective performance indicators (for example, Cowden et al., 2023; Ruiz-Jiménez et al., 2021; Yu et al., 2018).

[6] We chose to consider value added rather than profits because value added is a much broader performance measure than net income, as it also provides information about output which goes to other participants of the production process, for example labor, taxes, etc. (Haller & Stolowy, 1998).

[7] The descriptive statistics reveals that this is not an issue in our sample (Table 2 below).

$$
\begin{aligned}
OutputTa_{isct} &= \alpha + \beta_1 l_{isct} + \beta_2 DebtRatio_{isct} + \beta_3 AverageWage_{isct} \\
&+ \beta_4 FirmAge_{isct} + \beta_5 Exporter_{isct} + \beta_6 CovidGrant_{isct} \\
&+ Female_{isc} + \boldsymbol{\theta Resilience_{isc}} + \boldsymbol{\Gamma ManStyle_{isc}} \\
&+ \boldsymbol{\gamma ManStyle_{isc}} \times Female_{isc} + \boldsymbol{\Gamma ManStyle_{isc}} \times Covid_t \\
&+ \boldsymbol{\delta Demographics_{isc}} + \psi_s + \rho_c + \phi_t + \kappa Covid_t + \varepsilon_{isct}
\end{aligned} \tag{1}
$$

$OutputTa_{ist}$ is a generic name which stands for output divided by total assets – turnover ($TurnTa_{ist}$), and value added ($ValueTa_{ist}$). More precisely, for a firm i in NACE 2-digit sector s in county c in year t, variable $TurnTa_{isct}$ represents the (ln) turnover over total assets, and $ValueTa_{isct}$ represents the (ln) value added over total assets.

As for independent variables, l represents (ln) the number of employees, a proxy for firm size; $DebtRatio$ represents (ln) the value of total liabilities divided by total assets; $AverageWage$ is the (ln) average cost of labour in each firm; $FirmAge$ is the number of years a certain firm is on the market; $Exporter$ is a dummy for exporting firms; $Covid$ is a dummy variable indicating two years in our dataset (2020 and 2021) when Croatian economy was influenced by the COVID-19 pandemic; $Female$ is a dummy variable indicating a woman ownership of the firm; $Resilience$ represents a matrix of latent variables (*Robustness* and *Agility*) indicating firms' resilience to hostile economic environment; $ManStyle$ represents a matrix of latent variables[8] (*Causation*, *Experimentation*, *Losses*, *Flexibility*, and *Agreement*) capturing management style of a certain firm; $Demographics$ represents a matrix of variables (*OwnerEducation*, *ParentsEducation*, *WorkSector*, *EntrepreneursInFamily*, *EntrepreneursInRelatives*, *EntrepreneursInFriends*, and *OwnerOfAnotherFirm*) capturing socio-demographic characteristics of firms' owner; ψ_s is the NACE 2-digit sector fixed effect; ρ_c is the county fixed effect; ϕ_t is the year fixed effect; and ε_{isct} is the error term of the model assumed to follow normal distribution with zero mean and a constant variance. Since the set of latent variables regarding firms' resilience and management style are without measurement unit, they are standardized and enter our model in units of standard deviations. Description of

[8] We neither assume that causation and effectuation are mutually exclusive nor that necessarily one type of decision-making logic dominates the other. Yu et al. (2018) focus on exploring the effects of 'organizational ambidexterity' on firm performance and conclude that the effect of the reliance on one predominant or both combined decision-making logics has different impact on firm performance, depending on the overall level of uncertainty in the business environment.

all variables used in this research is presented in Table A2 in the Appendix. The model is estimated for the 2018-2021 period.

Our inclusion of the number of employees (a proxy for firm size) and firm age is common in this type of analysis, as firm performance measures can be affected by the number of employees as well as familiarity with market and industry that comes with firm age. We included average personnel costs (average wages) as a proxy for human capital. The justification for including the debt ratio is to approximate the financial constraints of the firm, since more financially constrained (vulnerable) firms may perform worse (Stucki, 2014). Firms that are exporters tend to be more productive (Costa et al., 2017) and to have specific entrepreneurial skills and human capital (Brambilla et al., 2012) that can affect firm outcomes. Therefore, we use an exporting dummy to control for such effects. To control for the effects of the COVID-19 pandemic we included a dummy for the two years (in our sample) Croatian economy was influenced by the effects of the pandemics. Related to this, we also include an indicator if a firm received any of the COVID-related government aid[9]. Female firm ownership is indicated by a dummy.

In addition, we use industry sector and regional dummies to account for specificities arising from belonging to different industrial sectors and for specificities of a certain region (for example operating in a depressed region as opposed to a more prosperous one). Finally, we also included a dummy for each year in our sample to account for year specific effects.

4 Results and discussion

4.1 Descriptive statistics

Table 2 provides detailed descriptive statistics of the performance variables in the analysed period. Judging from the average number of employees[10], as well as the data depicted in Figure

[9] Notwithstanding the wide availability of public funds allocated to enterprises to alleviate the effects of the COVID-19 crisis in Croatia, we have established that 41.7 percent of firms in 2020 and only 13.4 percent of firms in 2021 in our sample received COVID grants.

[10] Initially, in the Survey, we also included firms who did not have employees in the sample. The questionnaire for these firms has been modified in a sense that they were not asked the questions in the resilience scale that were related to employees. However, causation/effectuation scales questions are not related to the number of employees (Appendix Table A1). The final sample does contain firms without employees (approximately 13-15% of the sample, depending on the year).

A1 in the Appendix, our sample is concentrated on the microenterprises, which makes it an interesting contribution to the literature[11]. A close-up reveals a highly expected picture. Women-owned firms throughout the analysed period have smaller average number of employees, and on average achieve lower turnover and value added. The difference is not statistically significant, but still indicative. Somewhat surprisingly, although they have lower average total assets in the pre-pandemic period, women-owned firms have increased their average total assets in 2021 to the value higher than the one for the male-owned firms. This is an early sign that women entrepreneurs behaved differently in the crisis period.

Table 2 Descriptive statistics of performance variables (averages)

Year	Variables	Men-owned		Women-owned	
		N	Mean (S. d.)	N	Mean (S. d.)
2018	No. of employees	89	4.51 (7.08)	34	3.85 (4.33)
	Turnover	89	244.18 (390.57)	34	204.32 (310.84)
	Value added	89	241.2 (383.1)	34	179.13 (272.82)
	Total assets	89	206.5 (297.62)	34	169.59 (266.44)
	Labour productivity	89	45.21 (72.92)	34	31.31 (36.87)
	Debt ratio	89	0.06 (0.04)	34	0.06 (0.05)
	Turnover/total assets	89	0.25 (0.21)	34	0.23 (0.18)
	Value added/total assets	89	0.23 (0.2)	34	0.22 (0.18)
2019	No. of employees	87	4.99 (7.46)	34	3.91 (4.65)
	Turnover	87	259.46 (410.34)	34	230.28 (362.24)
	Value added	87	238.45 (373.47)	34	204.73 (328.05)
	Total assets	87	214.68 (309.5)	34	207.63 (327.42)
	Labour productivity	87	46.36 (79.01)	34	52.91 (138.49)
	Debt ratio	87	0.06 (0.04)	34	0.06 (0.05)
	Turnover/total assets	87	0.26 (0.28)	34	0.22 (0.16)
	Value added/total assets	87	0.24 (0.27)	34	0.21 (0.16)
2020	No. of employees	93	4.86 (7.86)	34	4.03 (4.46)
	Turnover	93	239.66 (388.9)	34	189.05 (301.74)
	Value added	93	226.58 (347.74)	34	165.97 (269.78)
	Total assets	93	199.14 (286.27)	34	210.37 (316.53)
	Labour productivity	93	41.75 (66.06)	34	26.02 (25.68)*
	Debt ratio	93	0.07 (0.06)	34	0.07 (0.06)
	Turnover/total assets	93	0.23 (0.30)	34	0.16 (0.11)*

[11] Arslan et al. (2022) suggest that microenterprises in the high-tech manufacturing sector are seldom the object of analysis, because it is assumed that the sector is dominated by large or medium-sized enterprises. Yu et al. (2018) claim that technology-oriented firms face more uncertainty and that they are more sensitive to uncertainty originating in their business environment, which makes them excellent subjects of the analysis for the concepts so deeply connected with the uncertainty, such as effectuation and causation.

	Value added/total assets	93	0.23 (0.30)	34	0.16 (0.11)**
2021	No. of employees	93	5.25 (9.21)	34	4.29 (5.15)
	Turnover	93	242.97 (380.49)	34	241.21 (381.36)
	Value added	93	232.57 (356.38)	34	209.3 (325.29)
	Total assets	93	213.8 (286.07)	34	226.12 (319.56)
	Labour productivity	93	44.64 (68.64)	34	60.85 (204.63)
	Debt ratio	93	0.07 (0.05)	34	0.07 (0.06)
	Turnover/total assets	93	0.21 (0.23)	34	0.17 (0.09)
	Value added/total assets	93	0.2 (0.23)	34	0.17 (0.09)

Notes: Turnover, value added, total assets, and labour productivity are expressed in thousands euros (EUR). "S. d." stands for standard deviation. * $p < 0.1$; ** $p < 0.05$, two-sided p values.

Source: FINA database and authors' calculations.

4.2 Latent constructs estimation

First, reliability of items and psychometric properties of estimated latent constructs is analysed (Table 3). All the item loadings are observed to be more than 0.5 and statistically significant up to 1 percent significance level. Dillon–Goldstein's rho (DG) was used to assess internal consistency because of the limitations Cronbach's alpha (CA), such as assumptions of uncorrelated errors and normality (Yang & Green, 2011). As most of the authors, however, report internal consistency based on CA, we also calculated this indicator for comparison. DG, CA and composite reliability (CR) were interpreted as acceptable internal consistency at 0.6 – 0.7, and as good internal consistency when greater than 0.7. Convergent validity is ensured by average variance extracted (AVE), which is more than 0.5 for all the constructs.

Table 3 Estimation of latent constructs

Latent construct	Items	Loading	CA	DG	CR	AVE
Robustness (ROB)	resil3	0.851***	0.937	0.947	0.938	0.665
	resil4	0.792***				
	resil5	0.801***				
	resil7	0.827***				
	resil9	0.808***				
	resil10	0.809***				

	resil15	0.802***				
	resil18	0.802***				
	resil22	0.845***				
Agility (AGI)	resil11	0.875***	0.909	0.936	0.913	0.786
	resil19	0.867***				
	resil21	0.904***				
	resil23	0.898***				
Causation (CAU)	style1	0.779***	0.811	0.862	0.822	0.512
	style2	0.755***				
	style3	0.729***				
	style4	0.748***				
	style5	0.603***				
	style6	0.662***				
Experimentation (EXP)	style8	0.783***	0.612	0.791	0.652	0.561
	style10	0.615***				
	style11	0.831***				
Losses (LOS)	style12	0.925***	0.879	0.924	0.921	0.802
	style13	0.865***				
	style14	0.896***				
Flexibility (FLEX)	style15	0.789***	0.754	0.844	0.787	0.578
	style16	0.603***				
	style17	0.845***				
	style18	0.782***				
Agreement (AGR)	style19	0.893***	0.705	0.871	0.711	0.772
	style20	0.864***				

Notes: (***) denotes significance level at p<0.01. Abbreviations: CA – Cronbach's alpha, DG – Dillon–Goldstein's rho, CR – composite reliability, AVE – average variance extracted.

The discriminant validity of the measurement model represents the extent to which a construct is truly distinct from other constructs by empirical standards (Hair et al., 2021), which can be examined through cross loadings and Fornell–Larcker criterion. By looking at the cross loadings (Table 4), all indicators' outer loadings on the associated constructs are larger than all their loadings on other constructs, thus establishing discriminant validity. Fornell–Larcker criterion, which compares the square root of AVE with correlations between latent variables, also shows that square root of AVE is larger than the largest correlation with any other construct in all cases (Table 5). Therefore, constructs considered in this study possess adequate discriminant validity.

Table 4 Cross-loadings

Latent construct	Items	ROB	AGI	CAU	EXP	LOS	FLEX	AGR
Robustness (ROB)	resil3	**0.848**	0.657	0.491	0.322	0.436	0.468	0.208
	resil4	**0.792**	0.571	0.471	0.305	0.271	0.478	0.196
	resil5	**0.801**	0.574	0.494	0.403	0.374	0.48	0.209
	resil7	**0.832**	0.597	0.551	0.459	0.345	0.603	0.308
	resil9	**0.808**	0.571	0.461	0.269	0.325	0.512	0.111
	resil10	**0.809**	0.597	0.407	0.299	0.225	0.507	0.274
	resil15	**0.806**	0.559	0.459	0.338	0.298	0.556	0.198
	resil18	**0.799**	0.571	0.486	0.343	0.378	0.447	0.259
	resil22	**0.842**	0.632	0.461	0.228	0.231	0.453	0.122
Agility (AGI)	resil11	0.651	**0.875**	0.481	0.288	0.303	0.428	0.191
	resil19	0.658	**0.867**	0.384	0.368	0.284	0.383	0.252
	resil21	0.696	**0.904**	0.447	0.451	0.227	0.485	0.231
	resil23	0.554	**0.898**	0.392	0.349	0.187	0.341	0.133
Causation (CAU)	style1	0.529	0.347	**0.808**	0.466	0.41	0.642	0.34
	style2	0.463	0.331	**0.757**	0.469	0.401	0.591	0.332
	style3	0.421	0.333	**0.781**	0.505	0.315	0.541	0.405
	style4	0.326	0.386	**0.745**	0.244	0.229	0.426	0.23
	style5	0.342	0.431	**0.677**	0.417	0.212	0.446	0.21
	style6	0.441	0.343	**0.649**	0.269	0.336	0.535	0.303
Experimentation (EXP)	style8	0.373	0.359	0.461	**0.856**	0.321	0.503	0.551
	style10	0.182	0.291	0.266	**0.614**	0.228	0.335	0.221
	style11	0.348	0.325	0.505	**0.847**	0.351	0.508	0.557
Losses (LOS)	style12	0.433	0.322	0.477	0.394	**0.924**	0.589	0.196
	style13	0.163	0.181	0.262	0.311	**0.821**	0.407	0.162
	style14	0.341	0.204	0.362	0.311	**0.892**	0.528	0.154
Flexibility (FLEX)	style15	0.541	0.378	0.609	0.466	0.407	**0.836**	0.241
	style16	0.365	0.214	0.424	0.321	0.558	**0.599**	0.164
	style17	0.534	0.435	0.684	0.541	0.422	**0.841**	0.372
	style18	0.403	0.368	0.479	0.436	0.502	**0.748**	0.345
Agreement (AGR)	style19	0.279	0.214	0.391	0.615	0.224	0.389	**0.977**
	style20	0.083	0.197	0.357	0.336	0.025	0.164	**0.688**

Note: The bolded figures indicate that the corresponding cells have the highest values in the corresponding rows, and load onto the intended constructs.

Table 5 Fornell–Larcker criterion for assessing discriminant validity

	ROB	AGI	CAU	EXP	LOS	FLEX	AGR
ROB	(0.665)						
AGI	0.528	(0.786)					

CAU	0.341	0.233	(0.545)				
EXP	0.164	0.171	0.297	(0.609)			
LOS	0.155	0.081	0.198	0.152	(0.774)		
FLEX	0.377	0.217	0.537	0.343	0.358	(0.582)	
AGR	0.066	0.053	0.176	0.366	0.038	(0.137)	(0.714)

Note: Square roots of average variance extracted (AVE), as discriminant value indicators, are shown on a diagonal line in parentheses.

4.3 Model estimation

Our results for the period 2018-2021 are presented in Table 6. For each performance indicator, we estimated two different models: the nominal performance indicator is considered first, followed by the performance indicator scaled by total assets.

Our results clearly indicate that being a female business owner *per se* does not affect performance, regardless of the performance measure applied. This corroborates the general overlook provided by the descriptive statistics (Table 2).

However, when we focus on management styles, there are some interesting findings. On average for the whole sample, practicing causation is negatively associated with firm performance. However, when women-owners practice causation, they are able to yield higher turnover. We can attribute this result to stricter rules of conduct imposed on female entrepreneurs by, for example, financial institutions. Practicing causation principle is associated with traditional business planning, in a sense that a goal is set and resources chosen and aligned to reach that goal. This type of decision-making is frequently expected in loan applications[12]. Subsequently, female owners might be expected to present 'a bullet-proof business plan' to secure the necessary funding. Ensuring the stakeholders' support, thus, entails gentle persuasion that the entrepreneur will be able to reach nominated goals.

[12] The most recent example can be found on the Croatian Bank for Reconstruction and Development (HBOR) website. HBOR is the development and export bank and export credit agency of the Republic of Croatia whose main task is to promote the development of the Croatian economy. Among other programmes, it currently offers ´Youth, Female and Start-up Entrepreneurship´ loans (Youth, Female and Start-Up Entrepreneurship | HBOR), where the conditions clearly stipulate that the applicant should supply „Business plan or investment study" in the application documentation.

Management styles related to adopting effectuation principle also reveal interesting decision-making differences. It seems that, on average, adopting experimentation and affordable loss principles is negatively associated with performance of the firms in our sample. The first result is somewhat puzzling, because it is highly expected that entrepreneurs in high-tech manufacturing and knowledge-intensive service sector would be more prone to experimentation and would be able to reap the benefits of such strategic choice. However, the sample persistently reveals that a relatively small proportion of firms has R&D expenses (up to 30 percent in the period since 2010), regardless of the owner's gender. Thus, it is somewhat encouraging that our results suggest that women-owned firms achieve higher performance when their owners engage in experimentation, i.e., redefine their business goals in the face of a changing business environment. Furthermore, we also find that women owners achieve higher turnover when controlling the risk and adopting affordable loss decision-making process. This corresponds strongly with the literature claiming that female entrepreneurs are generally more risk-averse (Palvia et al., 2015). It does not seem, however, that assessing the affordable loss leads to universal increases in performance. This could be related to the specific period under analysis, when sudden changes in the global chains pushed firms to adopt various survival strategies, not necessarily having the luxury to keep the rising costs under control.

We further establish that, while flexibility and pre-agreement are on average positively related to firm performance, when practiced by women-owners, they exert negative influence. We suggest that while female entrepreneurs are praised by the stakeholders for their risk-averse strategies and careful planning, they are at the same time less supported if they decide to use existing resources in creative combinations. Furthermore, the circumstances of the COVID-19 crisis might further impede women-owner's chances of pursuing flexibility, because of the societal expectations that women will disproportionally share the increased household managing burden.

Table 6 Estimation results

	Dependent variable/regressors	**Turnover**	**Value added**	**Turnover /assets**	**Value added/assets**
		(1)	**(2)**	**(3)**	**(4)**
Firm financials	Total assets	-0.135	0.489***		
	Employees	1.322***	0.518***	0.174*	0.078
	Debt ratio	-0.056	0.067*	0.042	0.073*

	Average wage	0.435***	0.273***	0.105	0.092
	Firm age	0.010	-0.007*	-0.011	-0.010**
	Exporter	0.806***	0.207**	0.267*	0.137
	Covid-19 grant×Year 2020	-0.217	-0.247***	-0.030	-0.207
	Covid-19 grant×Year 2021	-0.556	-0.223	-0.231	-0.125
	Female	0.002	-0.051	0.051	-0.014
	COVID-19	-0.106	0.221	0.266	0.231
Resilience	Robustness	0.413	0.280***	0.279*	0.231*
	Agility	-0.006	-0.220***	-0.187	-0.250**
Management styles	Causation	-2.726***	-0.273*	-1.228**	-0.407*
	Experimentation	-3.461***	-0.310	-1.713**	-0.586*
	Losses	-1.002**	-0.135	-0.238	0.031
	Flexibility	5.061***	0.517*	2.150**	0.682
	Agreement	2.258***	0.234	0.977**	0.303
Management styles interactions	Female×Causation	3.190**	-0.271	0.966	-0.287
	COVID-19×Causation	-0.372	0.078	-0.288	-0.053
	Female×Experimentation	7.029***	1.200***	2.314**	0.614
	COVID-19×Experimentation	-0.820	-0.151	-0.521	-0.157
	Female×Losses	1.356**	0.228	0.419	0.075
	COVID-19×Losses	-0.354	0.140	-0.178	0.071
	Female×Flexibility	-8.770***	-1.131**	-2.335*	-0.067
	COVID-19×Flexibility	1.077	-0.143	0.635	0.049
	Female×Agreement	-3.234***	-0.327	-1.574**	-0.582
	COVID-19×Agreement	0.626	0.168	0.428	0.157
Owner demographics	Education: benchmark primary				
	Secondary	-0.026	1.012	-0.692	0.841
	Tertiary	0.093	0.882	-1.035	0.593
	Post-graduate	1.004	1.037	-0.986	0.426
	Parents' education: benchmark primary				
	Secondary	0.237	0.778***	0.303	0.412*
	Tertiary	0.674	0.728***	0.285	0.338
	Post-graduate	0.698	0.725**	0.621	0.487
	Work in the same sector prior to opening buss.	-0.931***	-0.037	-0.123	0.121
	(Co-)Owner of another firm	-0.894***	-0.162	-0.548***	-0.421***
	Entrepreneurial envir.: family	0.327	0.116	0.418**	0.234**
	Entrepreneurial envir.: relatives	0.458*	-0.003	0.018	-0.022
	Entrepreneurial envir.: friends	-0.142	0.035	-0.009	-0.005
	N	447	445	447	447
	R-squared	0.699	0.906	0.461	0.493

Adjusted R-squared	0.633	0.885	0.343	0.382

Notes: * p < 0.1; ** p < 0.05; *** p < 0.01, two-sided p values.

[a] In these models we also control for effects of years, NACE 2-digit sectors and region. However, for the sake of brevity and presentation purposes, these results are available on request.

Source: Authors' calculations.

Since the main purposes of other variables in equation (1) are mostly to control for related factors, they will not be discussed in detail. Few results are, however, interesting to note.

Contrary to previous studies that find small business performance positively associated with education level of the business owner (Astebro & Bernhardt 2003; Headd 2003), our findings suggest that education level of parents could be more important. Since our sample is focused on high-technology manufacturing and knowledge-intensive service sectors, we speculate that highly educated parents are more likely to be able to provide additional network to support business endeavours of their offspring. Part of this support is also visible through the positive effect of parents' entrepreneurial experience on the scaled firm performance indicators. Although literature in general suggests the importance of family social capital (Salvato & Melin, 2008), the specific context of the sector analysed in this paper suggests that business network creation might be more successful when parents are highly educated. Thus, business network creation important for the small business success could be an effort of more than one generation in the Croatian case.

Contrary to Fairlie and Robb (2009), who found that prior work experience in a similar business provided important head-start for business success, our results imply negative effect, although solely in the case of turnover. What is more intriguing, our results suggest that if the owners have more than one line of business, this would impede the performance of their (potentially main) firm. Thus, important implication of our results is that it seems it does not pay off 'to not put all the eggs in one basket' when it comes to small business entrepreneurs in Croatian high-technology manufacturing and knowledge-intensive service sectors.

4.4 Discussion

Previous empirical research documents ambiguous effects of effectuation or causation on firm performance. For example, Smolka et al. (2018) find positive effects of both effectuation and causation on performance. Ruiz-Jiménez et al. (2021) find support for positive relationship between effectuation and performance in new technology-based firms. Thus, some argue that one size does not fit all. Berends et al. (2014) suggest that effectuation logic is in general more adapted to small enterprises. However, An et al. (2020) find evidence that different paths can lead to enhanced firm performance, and so effectuation, causation or their combination could enhance performance, depending on the stage of firm development. Thus, prior research was not conclusive on whether either decision-making logic or their combination leads to superior performance across the board.

The focus of this paper is on the differences in performance stemming from gender of firm owners. Previous effectuation-causation literature focused on the question whether male or female entrepreneurs were more likely to practice either of the decision-making logics, with opposing results. For example, Frigotto and Valle (2018) suggested that men rely more on effectuation logic, while Cowden et al. (2023) suggested the opposite. Cowden et al. (2023) further suggest that, as the core mechanisms of effectuation are more related to female characteristics, it is more likely that female entrepreneurs will have more benefits when relying on effectuation logic. Only few studies so far have empirically explored gender differences in practicing effectuation or causation on firm performance. Yang et al. (2020) and Cowden et al. (2023) have both showed women to be more effective in practicing effectuation compared to men.

However, Cowden et al. (2023), while providing empirical estimates only for the global relationship between effectuation and performance, emphasize the female co-creative approaches and engagement with stakeholders as the main mechanisms. The explanation is that women value relations and communication as a very important component of the decision-making process (Burke & Collins, 2001), which is part of the effectuation strategy. However, our results show that female entrepreneurs who engage in pre-agreement are less likely to yield higher performance, suggesting that this decision-making strategy does not yield beneficial results in our case.

We explain these findings with the increased difficulties of female entrepreneurs to enter business networks and to maintain the necessary business connections. The effectuation process is heavily based on network and networking, so that it is both a network-dependent and a network-driving phenomenon (Kerr & Coviello, 2020). That is, effectuation process starts with existing social ties (as well as personal means) that have been potentially more difficult to maintain during the COVID-19 crisis for female entrepreneurs, because of the increased time restrictions.

Societal circumstances are the likely explanation for the negative correlation between women-owners forming partnerships and the performance of their enterprises, contrary to the 'normal' positive relationship established on the general level. Female entrepreneurs may find it difficult to approach established business networks. Additionally, specific COVID-19 circumstances might distance women-owners from traditional business networks due to the difficulties in maintaining business relationships in general. Specifically, large market disturbances and increased costs associated with keeping the business networks could have pressured the stakeholders to be more particular when making decisions about the business partners with whom to keep contact. Women-owners, as traditionally less visible in business networks, might have been the ones to be omitted from the register more easily, possibly also because of the societal expectations that they should be more devoted to household chores in these special circumstances. In that case, even if they made efforts to secure pre-sales agreements, they could have been the ones more readily dismissed.

Such practices can potentially extend to the successful use of flexibility by women-owners in the period of the COVID-19 crisis. Specifically, in the circumstances related to global supply chains fringes, female entrepreneurs could have been disproportionally disadvantaged. Their male peers, by relying on their superior positions in the business networks, could have manoeuvred through the supply chain more swiftly and secured the products demanded on the market. The women-owners intention to rely on flexibility and combine even scarcer than usual resources could have been viewed as a less favourable option by the stakeholders.

We have established that, when female entrepreneurs practice experimentation, positive performance effects can be expected. This is particularly encouraging for the economic sector we analyse in this paper, i.e., high-tech manufacturing and knowledge-intensive service enterprises, traditionally dominated by male entrepreneurs. Namely, experimentation practices are closely related to innovation activity, another segment of the economic landscape seldom

populated by women. However, if female entrepreneurs practicing experimentation are rewarded by higher performance, they could be persuaded (by appropriate economic policy measures) to pursue innovation activity, which could have long-lasting effects on the overall economy.

Due to perceptions of female entrepreneurs as being risk adverse, it is highly expected that they will embrace the affordable loss principle. However, periods of crisis might entail different behaviour. Alonso-Almeida and Bremser (2014) showed that the cost-reduction actions of women-entrepreneurs are less likely to include drastic measures, at least not to the extent of their male peers. They also document that in the crisis women-entrepreneurs tend to take more neutral actions, while men tend to apply more proactive measures, which is attributed to the increased focus on growth by male entrepreneurs. So, it could be the case that women perceive themselves to adopt affordable loss principles (as they usually do in the periods of economic prosperity), but the effects of their actions have relatively smaller financial consequences in comparison to their male counterparts. Thus, our results suggest that when women practice affordable loss principles, it has a positive impact only in the case of turnover, and the impact on other considered measures is not significant.

5 Conclusion

Drivers of the gender gaps in entrepreneurial performance remain relatively unexplored. When studied, the traditional topics (access to finance, property rights) prevail, leaving topics such as the role of training and skills, especially non-cognitive skills, unexplored. Sudden emergence of COVID-19 related economic difficulties (lockdowns, global supply chains disruptions) disproportionally affected women and potentially impeded their abilities to successfully lead their businesses, thus presenting the possibility to widen the gender gap additionally.

Uncertainty increases in every crisis, disproportionally affecting the segments of the economy inferior in available resources, such as SMEs and women entrepreneurs. To tackle the uncertainty, entrepreneurs can adopt two decision-making processes, effectuation and causation. The interplay of these processes with firm performance has been the focus of this paper. Specific contribution lies in the fact that we have untangled the effectuation principle

into its four formative components: experimentation, affordable losses, flexibility and pre-agreement.

By combining the results of the field survey implemented on a sample of high-tech manufacturing and knowledge-intensive service firms and their financial statements, we have established that adopting the principles of causation and effectuation exerts significant influence on the firm performance. Furthermore, when women-entrepreneurs practice these decision-making styles, the effect on their enterprises is different. For example, although relying on causation exerts negative effect on firm performance, female entrepreneurs practicing causation increase their turnover. Our results also reveal that when female entrepreneurs practice experimentation, their firms have higher performance. Since experimentation practices are closely related to innovation activity, if female entrepreneurs practicing experimentation are rewarded for higher performance, a positive innovation-growth nexus can be foreseen by supporting female entrepreneurs in effectuation practices. Thus, our study suggests considerable differences in effectiveness of practicing management styles by the genders. Although we have offered some explanations for our results, further research efforts are needed to support our findings.

There are few limitations to our study. In line with previous literature, the effectuation and causation measures used in the analysis are not objective, but as Grégoire and Cherchem (2020) claim have self-reflective and retrospective nature. However, developing objective measures is beyond the scope of this paper. Furthermore, our empirical analysis rests on a relatively small sample of firms in a specific economic sector and in a highly turbulent time. Decision-making processes might significantly differ in accordance with global market circumstances, and subsequently time dimension should be further explored in future research endeavours. Furthermore, the economic sector we have analysed was able to mitigate the adverse pandemic conditions with relatively more success than some other sectors. Thus, the question whether the results would be similar in other sectors of the economy remains unanswered.

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Appendix

Table A1 Descriptive statistics of items used to estimate latent variables

Latent construct	Items	Description	Mean	St. dev.	Min.	Max.
Robustness (ROB)	resil3	My firm stands straight and preserves its position.	3.93	0.74	2	5
	resil4	My firm is successful in generating diverse solutions.	3.91	0.67	2	5
	resil5	My firm is a place where team/department members share their responsibilities.	4.11	0.69	2	5
	resil7	My firm rapidly takes action.	3.9	0.72	2	5
	resil9	My firm does not easily give up.	4.11	0.73	2	5
	resil10	My firm is agile in taking required action when needed.	3.98	0.69	2	5
	resil15	My firm takes action quickly.	3.91	0.79	2	5
	resil18	My firm is successful in having all of its employees act as a whole.	4.09	0.66	2	5
	resil22	My firm does not give up and continues its path.	4.02	0.69	2	5
Agility (AGI)	resil11	My firm always has ready alternatives against possible scenarios.	3.52	0.91	1	5
	resil19	My firm is a powerful organization and not easily affected by outside factors	3.3	1.06	1	5
	resil21	My firm is powerful to overcome everything.	3.46	0.94	2	5
	resil23	My firm easily overcomes everything.	3.26	0.9	1	5
Causation (CAU)	style1	I analyzed the long-term opportunities and selected those on which I thought to offer the best return.	3.67	0.88	1	5
	style2	I developed a strategy to take better advantage of available resources and capabilities.	3.65	0.78	1	5
	style3	I developed a business plan.	3.51	0.9	1	5
	style4	I organized and implemented control processes to make sure that the pre-established objectives are met.	3.14	0.97	1	5
	style5	I researched and selected the target markets and conducted a significant competitive analysis.	3.23	0.95	1	5

	style6	I had a clear and consistent view of where I would like to go.	3.73	0.81	1	5
Experimentation (EXP)	style8	Before setting up my current business, I tried different products and business models.	3.12	1.04	1	5
	style10	The product/service offered now is quite different from the one first imagined.	2.93	0.99	1	5
	style11	I tried a number of different paths until I found a business model that worked.	3.49	0.88	1	5
Losses (LOS)	style12	I was careful not to commit resources beyond what I was willing to lose (calculated risks).	3.8	0.81	1	5
	style13	I was careful not to risk more money than I was willing to lose with the initial idea.	3.83	0.84	1	5
	style14	I was careful not to risk so much money as to put the company in financial trouble if things did not work out.	4.06	0.76	1	5
Flexibility (FLEX)	style15	I allowed the business to develop emerging opportunities (new ideas) beyond what was planned.	3.7	0.82	1	5
	style16	I adapted what we were going to do to the resources that I had available.	3.94	0.73	1	5
	style17	I was flexible and took advantage of opportunities as they arose.	3.87	0.76	1	5
	style18	I avoided actions that restricted the flexibility and adaptability of the business.	3.74	0.83	1	5
Agreement (AGR)	style19	I have used various agreements with clients, suppliers and other organizations and individuals to reduce the chance of my business going wrong.	3.38	1	1	5
	style20	I have used pre-agreements for customers and suppliers whenever possible.	3.09	1.11	1	5

Table A2 Description of variables used in the analysis

Variable	Description
Dependent variables	
Turnover/Total assets	ln(revenue from sales/total assets)
Value added/Total assets	ln(value added/total assets)
Firm characteristics and performance [a]	
Firm Age	Age of the firm
Labor	ln(number of employees)
Average wage	ln(average personnel costs)
Debt ratio	ln(real total liabilities/real total assets)
Latent variables	
Robustness	Measure of firms' resilience – robustness to hostile environment
Agility	Measure of firms' resilience – agility to overcome hostile environment
Causation	Firms' management style – causation
Experimentation	Firms' management style – experimentation
Losses	Firms' management style – losses
Flexibility	Firms' management style – flexibility
Agreement	Firms' management style – agreement
Owners' demographics	
Education	1 – Primary, 2 – Secondary, 3 – Tertiary, 4 – Post-graduate
Parents education	1 – Primary, 2 – Secondary, 3 – Tertiary, 4 – Post-graduate
Work in sector	Dummy for having worked in the same sector prior to opening a business
Entrepreneurs in family	Dummy for having entrepreneurs among your close family members
Entrepreneurs in relatives	Dummy for having entrepreneurs among your relatives
Entrepreneurs in friends	Dummy for having entrepreneurs among your close friends
Other firms	Dummy for being a (co-)owner of another firm
Binary variables	
Sector	Set of dummies for each NACE Rev. 2 2-digit sector[b]
County	Set of dummies for each county (NUTS3 region)[c]
Covid	Dummy for the period when Croatian economy was influenced by the COVID-19 pandemic
Covid Grant	Dummy for receiving a Covid grant
Exporter	Dummy for exporting firms
Year	Set of dummies for each year
Female	Dummy for female-ownership of a particular firm

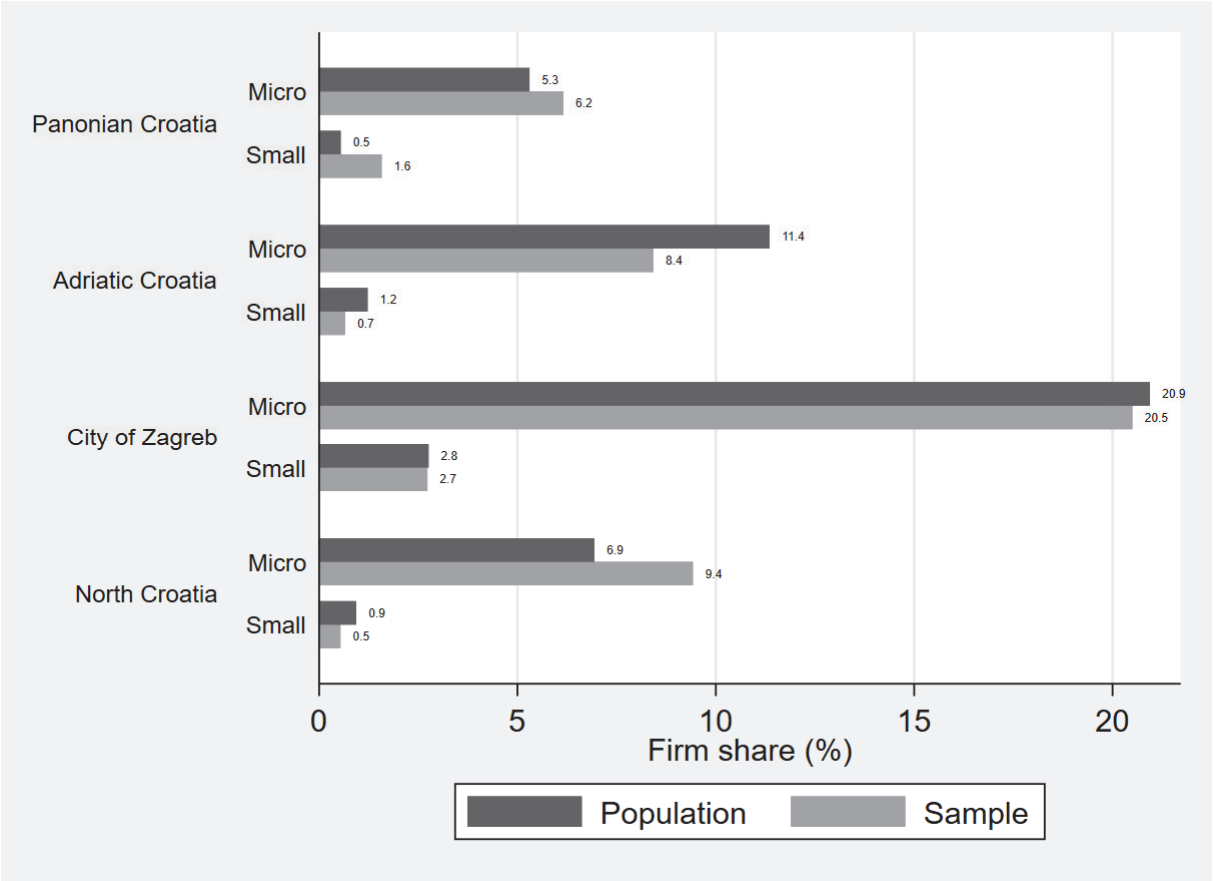
Notes: [a] All monetary variables are expressed in EUR and were deflated using year- and sector- (NACE 2-digit) specific Eurostat output deflators with base in 2010.

[b] Definitions of these sectors are available at https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF.

[c] Definitions of Croatian counties (NUTS3 regions) are available at https://ec.europa.eu/eurostat/web/nuts/nuts-maps

Source: Authors' calculations

Figure A1 Final sample representativeness



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