

ICT-enabled organisational flexibility to support sustainable growth in Europe amidst a pandemic

ICT-enabled
organisational
flexibility

489

Renata Slabe-Erker and Kaja Primc
Institute for Economic Research, Ljubljana, Slovenia

Received 29 December 2020
Revised 18 January 2021
13 June 2021
Accepted 5 July 2021

Abstract

Purpose – Information and communications technology (ICT) is helping to create a sustainable information society and foster development. This study aims to investigate the interdependencies of organisational flexibility enabled by ICT, demographics and containment measures in the ever more dismal economic performances seen during COVID-19 with a view to preparing socio-economic systems for similar future shocks.

Design/methodology/approach – Using non-classical fuzzy-set qualitative comparative analysis, the authors are able to capture the asymmetric relationships and complexities found in real life.

Findings – Analysing data acquired from the Oxford COVID-19 Government Response Tracker and Eurostat, the authors find these conditions give mixed results depending on how they are combined. The results imply that countries under strict containment measures might only be able to survive when fully equipped with ICT solutions. E-commerce also plays an important role in countries with a below-average decrease in their growth rate. Put differently, the presence and absence of telework produces mixed results. If the population is old, telework seems to generate the desired outcomes. Yet, when the population is young, it might be more beneficial to avoid this practice.

Originality/value – Unlike studies that mainly assumed symmetrical effects and linear relationships, this study investigates the interdependencies of organisational and macro-level factors. On the micro level, this study is useful for managers allocating IT investments for any future occurrence of a general disaster/pandemic. On the macro level, the study can act as an example for the rest of the world regarding the appropriateness of assorted COVID-19 pandemic responses as witnessed in European countries.

Keywords E-commerce, Economic growth, Telework, Qualitative comparative analysis, Information and communication technologies, COVID-19 pandemic

Paper type Research paper

1. Introduction

One question being asked these days by managers, business owners and policymakers is: How can information and communications technology (ICTs) help to survive the sudden

© Renata Slabe-Erker and Kaja Primc. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

This paper forms part of a special section “Digital innovation, entrepreneurship and research: accelerating solutions to deal with COVID 19 pandemic and the future for global economies”, guest edited by Patricia Ordoñez De Pablos and Florinda Matos.

The authors acknowledge the financial support received from the Slovenian Research Agency (research funding no. P5-0096).



Journal of Science and Technology
Policy Management
Vol. 15 No. 3, 2024
pp. 489-505
Emerald Publishing Limited
2053-4620
DOI: 10.1108/JSTPM-12-2020-0180

market failure currently visible during the COVID-19 pandemic? Scholars wishing to answer this question must *inter alia* identify and analyse the drivers and inhibitors of specific outcomes such as economic performance and employee and customer satisfaction with the aim to secure organisational development, especially in terms of the workforce's financial stability and health (Zurovac *et al.*, 2011). Managers are also burdened by the need for greater agility and flexibility and to be able to quickly identify opportunities and threats. Studies show that ICT individually plays a positive role in economic growth (Chatterjee, 2020; Niebel, 2018). Still, the same combination of operational practices that firms develop and engage in, including the use of ICT, might not always bring positive outcomes when applied in different business environments and cultural settings. In particular, some firms rely on telework, giving employees opportunities to reduce the work–life conflict while, in exchange, they see improved organisational commitment, work motivation and engagement among their staff (Peters *et al.*, 2014). Comparative studies on workplace flexibility reveal substantial differences across Europe. Southern and Eastern European countries such as Italy, Spain, Greece, Portugal, Poland and the Czech Republic are, compared to the Nordic countries, characterised by less workplace flexibility (Messenger, 2019). Whether telework is a viable option for a certain employer located in a specific country depends largely on that country's cultural values, regulatory framework, ICT infrastructure, employee profiles and the type of work the employees perform (Peters *et al.*, 2016; von Gaudecker *et al.*, 2020). This makes it critical to examine the interdependences in organisational operation patterns linked to digitalisation that mirror managerial practices with a view to building a more flexible, forward-looking and sustainable organisation (Leischnig *et al.*, 2016).

The manager's strategic and every-day decisions constantly entail the making of trade-offs where they typically must consider the interrelationships among several organisational and external aspects to reach a decision. Accordingly, to properly mimic managerial decisions, researchers should consider the complexity arising from multiple, not single factors (Meyer *et al.*, 1993). Although representing a major methodological challenge, complex causation reflects this need and considers that the outcome of a given situation may be the product of several different combinations of causal conditions (Ragin, 2008). Unlike existing studies that rely on standard mainstream statistical techniques to help understand organisational flexibility and economic performance in turbulent business environments (Liu, 2013; Saleh and Watson, 2017), much less is known about the complex causation between the ICT and macro-level characteristics within national contexts during a time of (unpredictable) turmoil.

Fuzzy-set qualitative comparative analysis (fsQCA) allows the often-ignored asymmetric relationships and complexities found in real life to be captured. Given that so little is known about the role of organisational flexibility in enhancing economic growth during major disruptions such as supply-chain failures, pandemics, attacks or natural disasters, the research presented here looks to answer the following question:

How can ICT-enabled organisational flexibility reduce the COVID-19 pandemic's economic impact?

Our research, therefore, sought to address a dual knowledge gap: the relative lack of knowledge about organisational flexibility amidst a pandemic; and the absence of comparative European-level analysis to show how ICT-enabled organisational flexibility depends on the context in which firms operate.

The paper is organised as follows. Section 2 outlines the theoretical framework of the study. This is followed by a description of the data sample, the methodology and conditions used, before the results are presented in Section 3 along with a discussion and the

implications of the research in the final section. The terminology used is explained in Table IA in the [Appendix](#).

2. Theoretical framework

The fact that a pandemic can have a devastating impact on the private sector means organisations must prepare a continuity plan and be active in protecting their stakeholders' health and safety. In designing our conceptual model, we adapted Koonin's model for business pandemic planning (2020), i.e. the "Four Cs" of preparing a business for a pandemic: planning for Continuity, protecting Crew (workforce), protecting Customers and engagement with the Community. Access to timely information and planning strategies for the core business planning domains are vital for securing an organisation's long-term viability. Therefore, consistent with prior studies (Koonin, 2020; Craven *et al.*, 2020), we examined the interrelationships between telework (continuity), e-commerce (customers), older population (crew) and a stringency index (containment measures) in European countries with below- and above-average drops in GDP growth rates in the first quarter of 2020. The approaches taken to addressing the high levels of absenteeism, stakeholder communication and supply chain disruption should all form part of a contingency plan based on elements of telework, e-commerce, containment measures, etc.

Our conceptual model is shown in [Figure 1](#). The outcome, conditions and their relationship with the economic growth rate are described below.

2.1 Economic growth (outcome)

The recent health crisis of the COVID-19 pandemic is having a huge direct impact on economic performances around the world. European statistics report drops in GDP for the entire Europe region. Eurostat estimates for the first quarter of 2020 show that GDP plummeted by 3.8% in the euro area and by 3.5% in the European Union (EU-28) over the previous quarter. The biggest decreases in GDP were suffered by Slovakia (−5.4%) and Spain (−5.2%). Other world regions are also impacted; for instance, GDP in the USA fell by 1.2% in the first quarter of 2020 over the previous quarter (Eurostat, 2020b). While the

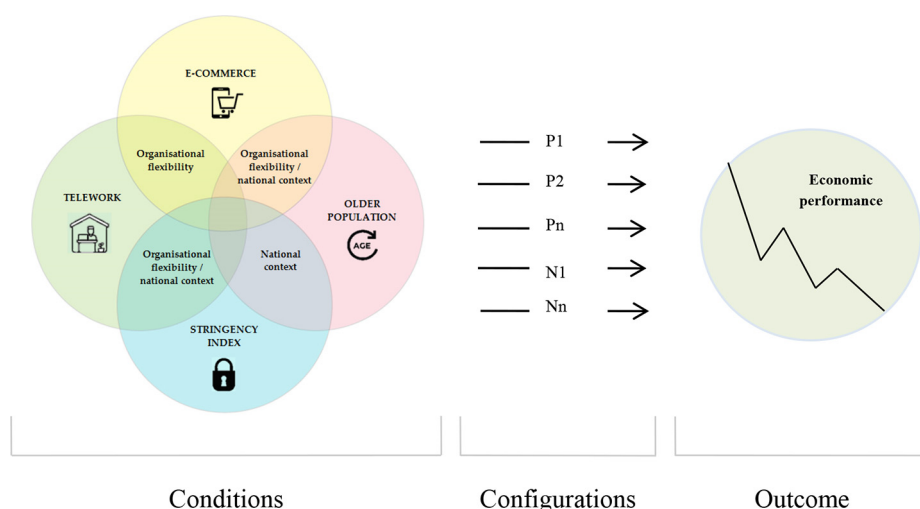


Figure 1.
Conceptual model

growth rate is positively related to entrepreneurial opportunities (Audretsch *et al.*, 2006), one might expect the alarming drop in economic growth to hinder organisations' performances. To ensure future preparedness, it is crucial to explore the impact of the rapidly changing situation, which has disturbed the steady pace of the economy. The business sector finds itself in an extremely tough position because of the poor health conditions of the population together with the measures imposed by the state to prevent the pandemic's spread.

2.2 Telework (continuity)

The continuity domain refers to ensuring that essential organisational processes still occur and interferences that may disrupt such processes during a pandemic are reduced. To avoid absenteeism because of illness, quarantine, school closures, travel restrictions, etc., firms have adopted strategies and mechanisms to lower the negative impacts on their operations (Koonin, 2020). Mobility in the workplace, i.e. the extent to which organisations and workers can continue to operate by way of teleworking or work-from-home, is key to maintaining the continuity of business functions and limiting the decline of economic growth in a pandemic. Simultaneously, governments are encouraging work-from-home to slow the virus' spread (Kydländ and Martínez-García, 2020). Some companies have even made teleworking mandatory (Raišienė *et al.*, 2020).

The development of telework has been facilitated by widespread ICT use in home and work environments (Bayrak, 2012). Yet, studies are contradictory with regard to whether working from home is efficient (Aguilera *et al.*, 2016). People who work from home office with adapted working hours report working longer each day because of interruptions and distractions (Spurk and Straub, 2020), whereas Bloom (2014) shows that at-home workers are more productive. Opportunities for remote work also vary across economic sectors. For example, public services, the education sector and business services hold greater potential for teleworking. In contrast, telework in sectors with a large share of essential workers, like health care, construction and catering, is largely infeasible and impractical (von Gaudecker *et al.*, 2020). Along with this finding, von Gaudecker and colleagues (2020) reveal that those sectors with a bigger share of home office hours before COVID-19 also experienced a bigger share of home-office hours during the pandemic.

2.3 Older employees (crew)

Demographics is another important factor that may help explain cross-country differences in economic performance during the pandemic. Population ageing is a phenomenon of modern developed societies and associated with the provision of health care (Howdon and Rice, 2018). During the pandemic, having a large proportion of elderly essentially translates to a health problem because of stronger demand for critical care (Gardner *et al.*, 2020). However, firms themselves also have health and safety responsibilities towards their employees while seeking to ensure the uninterrupted continuation of business. Social and physical distancing is an important protective measure, particularly for older workers (Koonin, 2020). The most effective form of distancing is to work from home, which significantly reduces the chances of being exposed to the virus. Older workers tend to want to work from home because their social lives are already established (Bloom, 2014). Some workers find it difficult to be present in the workplace for reasons such as a physical handicap, making a telework arrangement a desirable option for them in quality-of-life terms (Shamir and Salomon, 1985). James *et al.* (2007) state that older employees generally wish to work less or at different hours and seek greater flexibility. However, it is here that the question arises of whether one possesses all of the technical skills and technology infrastructure needed to successfully perform remote work. These considerations are

valuable because previous studies show the effect of old workers on business-level productivity is equivocal, sometimes even negative (Malmberg *et al.*, 2008; Feyrer, 2007). Older workers tend to find it harder to keep up with the rapid development of ICT and cope with the constant learning and adaptation needed to efficiently work from home (Korsakienė *et al.*, 2019). On the other hand, a large share of workers in firms aged between 40 and 49 is associated with productivity growth (Feyrer, 2007).

2.4 E-Commerce (customers)

E-commerce is a practice developed with help of the internet that fosters sustainable development. Namely, e-commerce affects organisational performance (the economic dimension of sustainability), facilitates access to products (the social dimension of sustainability) and reduces environmental impacts through less documents, waste and emissions (the environmental dimension of sustainability) (Ingaldi and Ulewicz, 2019; Ulucak and Khan, 2020). During the pandemic, economic activities that entail close physical contact have been restricted or prohibited. Firms and customers face several challenges in supplying goods and services. E-commerce, the online sale of goods or services, is especially critical in such circumstances, not only for lowering the risk of infection and keeping the population in supply, but for ensuring that firms remain liquid and jobs are retained. Many stores have already moved online, while customers are ever more inclined to shop online (Brem *et al.*, 2020; Ungerer *et al.*, 2020). According to an IBM study on the retail industry in the USA, e-commerce is projected to grow by nearly 20% in 2020, while the turnover of department stores is expected to plummet by over 60% in the same year (Retail and Hospitality Hub, 2020). The benefits of digitisation are clear for both parties, particularly when economic circumstances suddenly change, like when a pandemic starts. Firms with well-developed e-sales systems are finding it easier to adapt to this state of considerably increased digital business than those forced to set up an e-commerce system anew. E-business is generally demanding in terms of the ability to create, process, store and exchange information and data, to integrate into e-networks, and adapt to changes and problems by working with customers and partners (Choshin and Ghaffari, 2017; Sharma and Aggarwal, 2019). One should also not overlook that differences in internet access exist among EU member states (Statista, 2020). In addition, the challenges of security and payment systems might discourage prospective buyers from shopping online (Laudon and Traver, 2016). Nonetheless, given that e-commerce is a vital element in the uninterrupted supply of goods and services, we may conclude that countries in which e-commerce practices and the “mobile culture” are more widespread are likely to suffer less of a hit to their GDP growth.

2.5 Stringency index (containment measures)

The COVID-19 stringency index was developed during the pandemic to gauge the strictness of lockdown policies, which chiefly restrict people’s behaviour (Blavatnik School of Government and University of Oxford, 2020). It is a composite measure based on nine policy-response indicators to the pandemic outbreak, including school, workplace and public transport closures, cancelation of public events, restrictions on gathering, stay-at-home requirements, internal movement restrictions, international travel controls and public information campaigns (Hale *et al.*, 2020). While a stringent lockdown is necessary condition to contain the spread of the virus (Primc and Slabe-Erker, 2020), it might also cause economic losses. As a result, many governments delayed imposing any containment measures at the start of the COVID-19 shock. There was and has been a constant fear that

the disruptions on the supply side of the economy combined with the containment measures will trigger a massive drop in economic growth (Barrero *et al.*, 2020).

3. Methodology

The current study conducts fsQCA (Ragin, 1987, 2000), a powerful theory-centred analytic technique, to explore the combined effect of stringency; ICT-enabled e-commerce and telework; and age on economic performance measured in terms of GDP growth. fsQCA allows complex relationships to be examined in which an outcome is the product of various combinations of conditions using samples that are small and medium in size. Four steps are involved: choosing the cases and attributing membership scores; building a truth table; considering both what is necessary and sufficient; and construing the results. fsQCA is the result of work entailing Boolean logic, fuzzy-set theory and Quine–McCluskey’s algorithm for making complex set-theoretic statements simpler. The idea underlying fuzzy sets is “set relations”, with each condition determining an independent set.

The method of fsQCA is, unlike correlation-based regression analysis or structural equation modelling, particularly suited to studying complex causation where different combinations of conditions (i.e. configurations) are equifinal rather than competing alternatives for explaining variation in the outcome. Another important feature of the method is “asymmetry”, namely, the combinations of conditions that explain the presence of an outcome may vary from those that explain its absence (Schneider and Wagemann, 2012).

There are several advantages of using QCA over regression (Fiss *et al.*, 2013; Ragin, 2008), yet only a paucity of studies in the IT and development literature (Delgosha *et al.*, 2020; Larios-Hernández and Reyes-Mercado, 2018) use this method. Therefore, this paper intends to present a potentially useful method for researchers working in the areas of ICT and development that allows causal complexity to be studied on a small sample.

3.1 Data

Data on the conditions *ECOMMERCE*, *AGE* and *TELEWORK*, all for 2019, were obtained from Eurostat (Eurostat, 2020a), the statistical office of the European Union, which provides high-quality statistics for Europe pursuant to the European Statistics Code of Practice. Data on *stringency* were acquired from the Oxford COVID-19 Government Response Tracker (Blavatnik School of Government and University of Oxford, 2020) and refer to the date an individual member state reached the peak values of the strictness of its government’s responses to the COVID-19 pandemic. For the outcome variable (*GROWTHRATE*), we took Eurostat’s preliminary flash estimate data for GDP growth in the first quarter of 2020 (Eurostat, 2020b). The combined effects of the four conditions on the outcome (GDP growth rate) were explored in 19 European Union member states (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden), Norway and the UK.

3.2 Calibration

The data were transformed into fuzzy sets using a direct calibration method based on three anchor points (Ragin, 2008): full membership (1), full non-membership (0) and a crossover point (0.5). The crossover points were determined based on the EU-28 for the outcome and the conditions *AGE* and *TELEWORK*; the EU-28 (Member States: Eurostat fixed country composition) without missing values for Latvia and Malta for the *STRINGENCY* condition; and the EA-19 (euro area: Eurostat fixed country composition) instead of the EU-28 for the condition *ECOMMERCE* to avoid one case having exactly a value of 0.5. The other two anchor points were determined based on the gap in the values (Table 1).

3.3 Selection of cases and construction of a truth table

After the calibration, we generated a truth table (Table 2) that lists all combinations of conditions for which empirical evidence exists. Of the 16 configurations, 12 configurations are associated with the cases. For example, inspection of the extreme configurations reveals that the configuration with membership scores of >0.50 across all four conditions is associated with the case in Row 1, coded AT (Austria). Conversely, the configuration in Row 3 highlights the cases of Bulgaria (BG) and Hungary (HU), characterised by the absence of *STRINGENCY*, *ECOMMERCE*, *AGE* and *TELEWORK*.

4. Results

With a view to examining the data in terms of assigned membership scores, Boolean algebra with three basic operations is relied on by fsQCA: intersection, logical OR; union, logical AND; and negation, logical NOT. The various patterns obtained are then considered with regard to “necessity” and “sufficiency”. A condition is necessary if it always exists for a given outcome, while a condition is sufficient if it leads to the outcome (Ragin, 2008).

Table 1.
Calibration and
codification of the
conditions and
outcomes

Outcome/condition	Detailed description	Code name	Calibration anchor points*
Growth rates of GDP	% Change in the first quarter of 2020 over the previous quarter	GROWTHRATE	100, 96.7, 95
Stringency index	Composite measure of nine policy-response indicators to the pandemic	STRINGENCY	90, 81.7, 70
E-commerce sales	Share of enterprises selling online	ECOMMERCE	30, 17, 11
Older employees	Population aged 50–64	AGE	21, 20.5, 19
Work-from-home	Share of employed persons usually working from home	TELEWORK	8, 5.3, 2

Note: *Full membership, crossover point, full non-membership

Row	Conditions STRINGENCY	ECOMMERCE	AGE	TELEWORK	No. of cases	Case	Raw consistency (outcome)
1	1	1	1	1	2	AT*	100% (1)
2	0	1	0	1	4	BE, DK, FI, SE	75% (1)
3	0	0	0	0	2	BG, HU	100% (1)
4	1	0	0	0	4	CY, PL, RO, SK	75% (1)
5	1	0	0	1	1	FR	100% (0)
6	0	1	1	0	1	DE	100% (1)
7	1	0	1	0	1	IT	100% (0)
8	1	1	1	0	2	ES, LT	50%
9	0	1	1	1	1	NL	100% (1)
10	0	1	0	0	2	NO, UK	100% (1)
11	1	1	0	0	1	CZ	100% (0)
12	1	0	1	1	1	PT	100% (0)

Notes: The rows use the following labelling system: 1 = set membership, 0 = no set membership; because they do not add empirical evidence, Rows 2¹ – 12 are not shown in the table; *country codes: AT, Austria; BE, Belgium; BG, Bulgaria; CY, Cyprus; CZ, Czech Rep.; DK, Denmark; FI, Finland; FR, France; DE, Germany; HU, Hungary; IT, Italy; LT, Lithuania; NL, The Netherlands; NO, Norway; PL, Poland; PT, Portugal; RO, Romania; SK, Slovakia; ES, Spain; SE, Sweden; UK, United Kingdom

Table 2.
Truth table

4.1 Analysis of necessity

The first part of the analysis examines the existence of necessary conditions. With a restrictive consistency level of 0.9 (Schneider and Wagemann, 2012), the test of necessity presented in Table 3 reveals the presence of *STRINGENCY* is close to the threshold (0.86) required for *growthrate* (i.e. a large drop in the growth rate).

The logical reduction of complex configurations into simpler statements is achieved using the Quine–McCluskey algorithm implemented in the fsQCA 2.5 software package developed by Ragin and Davey (2009). To illustrate the combined effects of organisational flexibility on the growth rate, we adopted the notation suggested by Ragin and Fiss (2008), where full circles indicate the presence of a causal condition and circles with white hatching indicate its absence. To evaluate a solution for a certain outcome, fsQCA reports parameters of fit to assess how perfect (i.e. consistency) and empirically relevant (i.e. coverage) the set relation is. If the consistency score is high, the empirical evidence supports the existence of the given combination of conditions. In contrast, coverage measures the proportion of membership in the outcome explained by the solution. Apart from solution consistency and solution coverage, fsQCA reports consistency for the term, as well as raw and unique coverage scores for each configuration separately.

4.2 Analysis of sufficiency

The first configuration from the complex solution indicates a more *ECOMMERCE*-driven economy and less stringent measures imposed are related to a below-average drop in the GDP growth rate (*GROWTHRATE*) (Figure 2). *ECOMMERCE* is included in two patterns of a below-average fall in GDP growth rates: in combination with negated *stringency* (*P1*) or with *AGE* and *TELEWORK* (*P3*). When combined with *STRINGENCY* (*N4*), *ECOMMERCE* leads to an above-average drop in the growth rate (*growthrate*) (Figure 3). *ECOMMERCE* was not relevant in combination *P2* where the absence of *stringency*, absence of *age* and absence of *telework* are sufficient for a below-average decrease in GDP growth rates but, when combined with the presence of *STRINGENCY*, *AGE* and *TELEWORK*, the result is linked to an above-average decrease in such growth rates (*N3*). The absence of *eCommerce* was present in two paths, leading to an above-average drop in GDP growth rates: the first path is characterised by the mutual dependencies of the *STRINGENCY* and *AGE* conditions (*N1*), while the second one is the product of *STRINGENCY* and *TELEWORK* (*N2*). The configurational analysis also reveals that *STRINGENCY* is present in all four configurations leading to an above-average decrease in GDP growth rates and *stringency* is found in two configurations (*P1* and *P2*) linked to a below-average drop in such

Table 3.
Test of necessity for
individual conditions

Condition	Consistency for GROWTHRATE	Consistency for growthrate
STRINGENCY	0.47	0.86 (cov.: 0.63)
ECOMMERCE	0.64	0.60
AGE	0.41	0.55
TELEWORK	0.51	0.65
stringency	0.69	0.39
ecommerce	0.50	0.65
age	0.67	0.58
telework	0.63	0.58

Notes: Capital letters denote a condition’s presence; lower-case ones denote a condition’s absence

Condition	Configurations for GROWTHRATE		
	P1	P2	P3
 STRINGENCY	⊗	⊗	
 ECOMMERCE	•		•
 AGE		⊗	•
 TELEWORK		⊗	•
Consistency	0.90	0.91	0.84
Raw coverage	0.52	0.32	0.25
Unique coverage	0.18	0.11	0.06
Solution consistency	0.89		
Solution coverage	0.69		

Notes: •condition (present); ⊗ condition (absent); blank spaces mean “do not care”

Figure 2.
Configurations for a
below-average
decrease in GDP
growth rates
(consistency cut-off:
0.78)

rates. However, the other conditions have mixed influences on the outcomes, depending on the presence/absence of other combinations of conditions. For instance, the absence of *telework* is beneficial for the outcome of a below-average decrease in GDP growth rates when combined with the absence of *age* and the absence of *stringency* (P2), but in a pattern with *STRINGENCY* and *ECOMMERCE*, the same condition leads to the opposite outcome of an above-average drop in GDP growth rates.

5. Discussion

Along with the current global situation, firms must focus on ICT-enabled organisational flexibility as a core value. A firm's agility and ability to rapidly transform means the firm holds the potential to be more powerful than ever and to simultaneously operate in a more sustainable way.

Earlier research works revealed the importance of pandemic organisational planning, employee education on occupational infection prevention and control (Smith *et al.*, 2007), sufficient ICT support (Koh and Maguire, 2009) and organisational characteristics while pursuing continuity planning during a pandemic (Burton *et al.*, 2011). In this study, we addressed the question of the necessary flexibility mix for organisational continuity to reduce the impact of major disruptions such as supply-chain failures, pandemics, attacks or natural disasters and to support a sustainable growth path. Overall, the results indicate that economic performance is a product of the complexity and considerable interdependence of conditions referring to ICT-related organisational flexibility, the containment measures imposed by the state and demographics. Further, some conditions may lead to opposite effects for economic performance when combined with other conditions.

Figure 3.
Configurations for an
above-average
decrease in GDP
growth rates
(consistency cut-off:
0.77)

Condition	Configurations for growthrate			
	N1	N2	N3	N4
 STRINGENCY	•	•	•	•
 ECOMMERCE	⊗	⊗		•
 AGE	•		•	⊗
 TELEWORK		•	•	⊗
Consistency	0.85	0.89	0.77	0.89
Raw coverage	0.42	0.40	0.37	0.25
Unique coverage	0.10	0.07	0.04	0.09
Solution consistency	0.78			
Solution coverage	0.66			

Notes: • condition (present); ⊗ condition (absent); blank spaces mean “do not care”

To avoid the virus spreading in the workplace, many employers have relied on ICT-enabled telework arrangements since the outbreak of COVID-19. Still, telework is not always beneficial as it can either boost or hinder the development of social and economic sustainability (Gálvez *et al.*, 2020). In the solutions associated with a below-average decrease in GDP growth rates (*P2* and *P3*), there is either the presence of telework in combination with the elderly (The Netherlands, Austria) or the absence of telework in combination with a younger population (Bulgaria and Hungary). According to previous studies (Messenger, 2019; Peters *et al.*, 2016), experienced and older workers tend to be better suited to telework. In addition to being associated with seniority, telework is prevalent among highly qualified workers and in sectors with high ICT dependence, as shown in the case of The Netherlands (Gschwind and Vargas, 2019). Koski *et al.* (2002) state that ICT was originally spatially concentrated in the larger central European bloc, including the UK and Germany, and in the smaller Scandinavian bloc, including Sweden and Finland. Currently, Eurostat (2019) statistics show that Eastern European countries with a younger population are also lagging behind in firms’ provision of training to develop and upgrade the ICT skills of their personnel.

The most eagerly anticipated finding to emerge from this study is that the stringency of the containment measures is indeed related to the economic downturn. The only exception is Solution *P3*, where the stringency condition is not relevant. In this case, countries with an older population (The Netherlands, Austria), with widespread pre-crisis use of e-commerce and telework, appear to be successfully benefitting from the mix of experience and digitalisation. On the contrary, the presence of telework in combination with an older population and stringent containment measures (Solution *N3*) led to an above-average drop in growth rates in Portugal. One explanation may be that telework is not a viable option for countries that hold specific cultural values (Peters *et al.*, 2016). People in a collectivist society

such as Portugal ([Hofstede Insights, 2020](#)) assume considerable responsibility for all members of their group, usually the extended family. This observation suggests that, in the circumstances of highly restrictive pandemic containment measures, in-group loyalty may be seen as more important and might lower the efficiency of work-related behaviour. Our solution here appears to support the claim that an opportunistic attitude to telework leads to lower productivity and thereby a worse economic performance ([Peters et al., 2016](#)). In contrast to solution N3, the absence of telework combined with a high stringency index and a younger population (Solution N4) in the Czech Republic leads to an above-average drop in growth rates. This configuration is similar to the one obtained in *P2*, except that the stringency of the containment measures adopted is high in Configuration N4 but low in *P2*. These two examples reveal both the powerful influence of containment measures on economic performance and avenues for future research.

Another significant aspect of ICT-related organisational flexibility in a pandemic scenario is e-commerce. Moreover, e-commerce is key to achieving future sustainable development in all three sustainability domains – economic, social and environmental. E-commerce was mainly in operation in countries showing a small drop in the growth rate even before the COVID-19 outbreak, where firms nevertheless did not respond by reorienting their businesses online and informing/educating customers about new sales channels. On the other hand, e-commerce was largely lacking in countries with an above-average decrease in growth rates, except in N4 (Czech Rep.), where apparently the younger population was not accustomed to working from home and was short in the skills needed in this area.

6. Contribution

The findings of this study help advance the disaster prevention and sustainable development field and respond to the urgent need for more research in this area. The study thus addresses the gap in identifying the combinations of micro- and macro-level patterns that prevent a sharp decline in economic performance. The study makes four theoretical contributions: It shows that securing organisational continuity in exceptional circumstances through a specific mix of ICT-related organisational flexibility, people and policy responses is fundamental to the survival of economies. The use of fsQCA on the European level yields insights showing that the examined factors do not always behave in the desired directions. Accordingly, the study corroborates earlier findings on the connection between the age of the population and telework ([Messenger, 2019](#); [Peters et al., 2016](#)) and the effectiveness of e-commerce in specific circumstances ([Kwun et al., 2010](#); [Oláh et al., 2018](#)). Likewise, we also demonstrate the practical applicability of [Koonin's \(2020\)](#) “Four Cs” model for business pandemic preparedness. Further, we recognise that government policy response in terms of containment measures is a critical element of economic success. Comparing the similarities/differences in countries' responses makes a valuable contribution to evaluating various micro- and macro-level situations and informing future policymaking. Similarly, we provide evidence that several causal recipes exist for economic success/failure during COVID-19, suggesting not only greater complexity but a stronger possibility of identifying the right combination of conditions to suit the specifics of a country/economy. Finally, we present an unconventional method to researchers working in the areas of ICT and development. We believe that use of QCA has exposed promising research opportunities in the search for the optimal combination of solutions to ensure that economic activity continues during a pandemic. This is particularly important in the face of the pandemic's already seen lasting effects and its controlling impact on people's lives and work. As the fear of

ICT is easing and ICT-based solutions for smoother life and work are becoming more widespread, the potential held by ICT is more obvious than ever. This is also shown in our research findings that imply ICT is invaluable in specific circumstances, while in others its use is questionable.

7. Implications for practitioners and lessons for developing countries

Practitioners may benefit from our results on how to manage critical factors in terms of identifying and adopting a specific combination of conditions so as to be able to make more effective macro- and micro-level decisions. Recognising the important impact of the different conditions examined on economic activity during the unpredictable occurrence of a pandemic and highlighting how their roles vary while combined with other conditions is an important step towards reducing the future risk of economic turmoil.

On the micro level, the ICT-related organisational flexibility should be carefully implemented in contingency plans to ensure the right fit between employees' profiles (their age, knowledge and skills) and work organisation to ensure future development. Staff training is particularly important for ensuring that employees have the resources, skills and competencies they need to perform more complex problem-solving tasks. Use of ICT by older workers might be further stimulated by an appropriate user-interface design that caters to their capabilities and limitations. Other important aspects include proper workspace arrangements and work practices to minimise ergonomic workspace issues and assure workplace safety. Still, our results suggest that when the population is young, it is better to avoid this form of work. While older workers might be more reliable, dedicated and loyal, younger ones are perhaps more prone to distractions at home arising from social networking, hobbies, housekeeping, childcare, etc. To prevent such behaviour, other procedures for demonstrating the successful completion of work tasks are required (e.g. through e-mail or video conferencing).

On the macro level, the current comparative study of organisational flexibility within national contexts may indicate to the rest of the world the appropriateness of the assorted COVID-19 pandemic responses seen across Europe. While developing countries are especially at risk, this evidence-based study might help them anticipate the likely potential impact of a pandemic on their economic performance according to the plans they formulate. Specifically, we show that strict containment measures seriously paralyse economies. Hence, such measures might have to be combined with high levels of organisational flexibility to offset the negative impacts (configuration *P3*). The need for the significant digital transformation of organisations must therefore be accompanied by economic stimulus packages focused on improved and affordable ICT infrastructure (including stable and fast internet access) and upskilling the workforce's digital skills. Cyber security systems and national digital policies for protecting personal data are also essential for the digitalisation of emerging economies.

8. Limitations and conclusion

The nature of this work is exploratory and concerned with providing timely evidence based on a cross-country comparison during the current global health crisis. This means it has several limitations that should be addressed in future studies. First, a similar study using micro-level data and taking sectoral differences into account could provide further evidence or explanations for the results obtained. Second, new conditions added to the outcome would further enrich the study. Considering the organisational climate and marketing strategies might bring to the surface exciting new evidence relevant to governments and firms. Finally, the research question could also be examined using quantitative research techniques to further validate the results. All in all, we are confident that this preliminary study's findings can motivate future studies concerned with the topic of economic activity and performance during regional/global shocks.

In a nutshell, the current study serves to enrich the debate on ensuring organisational development with ICT in the exceptional circumstances of a general disaster or pandemic. The study also draws attention to the fact that economic success and future development rely crucially on the response of government policy. It is hoped the findings will help manage the risks that emerge during a pandemic and thereby reduce the ensuing economic pain.

References

- Aguilera, A., Lethiais, V., Rallet, A. and Proulhac, L. (2016), "Home-based telework in France: characteristics, barriers and perspective", *Transportation Research Part A: Policy and Practice*, Vol. 92, pp. 1-11.
- Audretsch, D.B., Keilbach, M.C. and Lehmann, E.E. (2006), *Entrepreneurship and Economic Growth*, Oxford University Press, Oxford.
- Barrero, J.M., Bloom, N. and Davis, S.J. (2020), "COVID-19 is also a reallocation shock", NBER Working Paper, Vol. 27137.
- Bayrak, T. (2012), "IT support for telecommuting workforce", *Telematics and Informatics*, Vol. 29 No. 3, pp. 286-293.
- Blavatnik School of Government and University of Oxford (2020), "COVID-19 government response tracker", available at: www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker (accessed 20 August 2020).
- Bloom, N. (2014), "To raise productivity, let more employees work from home", *Harvard Business Review*, Vol. 92 Nos 1/2, pp. 28-29.
- Brem, A., Viardot, E. and Nylund, P.A. (2020), "Implications of the coronavirus (COVID-19) outbreak for innovation: which technologies will improve our lives?", *Technological Forecasting and Social Change*, Vol. 163, p. 120451.
- Burton, D., Confield, E., Gasner, M.R. and Weisfuse, I. (2011), "A qualitative study of pandemic influenza preparedness among small and medium-sized businesses in New York city", *Journal of Business Continuity and Emergency Planning*, Vol. 5 No. 3, pp. 267-279.
- Chatterjee, A. (2020), "Financial inclusion, information and communication technology diffusion, and economic growth: a panel data analysis", *Information Technology for Development*, Vol. 26 No. 3, pp. 607-635.
- Choshin, M. and Ghaffari, A. (2017), "An investigation of the impact of effective factors on the success of e-commerce in small- and medium-sized companies", *Computers in Human Behavior*, Vol. 66, pp. 67-74.
- Craven, M., Liu, L., Mysore, M. and Wilson, M. (2020), "COVID-19: implications for business", available at: www.parking-mobility.org/2020/04/06/mckinsey-company-covid-19-implications-for-business/ (accessed 20 August 2020).
- Delgosha, M.S., Saheb, T. and Hajiheydari, N. (2020), "Modelling the asymmetrical relationships between digitalisation and sustainable competitiveness: a Cross-Country configurational analysis", *Information Systems Frontiers*, pp. 1-21, doi: 10.1007/s10796-020-10029-0.
- Eurostat (2019), "Enterprises that provided training to develop/upgrade ICT skills of their personnel", available at: <https://ec.europa.eu/eurostat/web/digital-economy-and-society/data/database> (accessed 20 August 2020).
- Eurostat (2020a), "Data on e-commerce, population age and telework", available at: <https://ec.europa.eu/eurostat/data/database> (accessed 20 August 2020).
- Eurostat (2020b), "News release euro indicators", available at: <https://ec.europa.eu/eurostat/documents/2995521/10294708/2-30042020-BP-EN.pdf/526405c5-289c-30f5-068a-d907b7d663e6> (accessed 20 August 2020).
- Feyrer, J. (2007), "Demographics and productivity", *Review of Economics and Statistics*, Vol. 89 No. 1, pp. 100-109.

- Fiss, P.C. (2011), "Building better causal theories: a fuzzy set approach to typologies in organization research", *Academy of Management Journal*, Vol. 54 No. 2, pp. 393-420.
- Fiss, P.C., Sharapov, D. and Cronqvist, L. (2013), "Opposites attract? Opportunities and challenges for integrating large-N QCA and econometric analysis", *Political Research Quarterly*, Vol. 66 No. 1, pp. 191-198, available at: www.jstor.org/stable/23563602
- Gálvez, A., Tirado, F. and Martínez, M.J. (2020), "Work-life balance, organizations and social sustainability: Analyzing female telework in Spain", *Sustainability*, Vol. 12 No. 9, p. 3567.
- Gardner, W., States, D. and Bagley, N. (2020), "The coronavirus and the risks to the elderly in long-term care", *Journal of Aging and Social Policy*, Vol. 32 Nos 4/5, pp. 1-6.
- Gschwind, L. and Vargas, O. (2019), "Telework and its effects in Europe", in: Messenger, J.C. (Ed.), *Telework in the 21st Century*, Edward Elgar Publishing, Cheltenham, pp. 36-75, doi: [10.4337/9781789903751.00007](https://doi.org/10.4337/9781789903751.00007)
- Hale, T., Petherick, A., Phillips, T. and Webster, S. (2020), "Variation in government responses to COVID-19", Blavatnik School of Government Working Paper, Vol. 31.
- Hofstede Insights (2020), "Country comparisons", available at: www.hofstede-insights.com/country-comparison/ (accessed 20 August 2020).
- Howdon, D. and Rice, N. (2018), "Health care expenditures, age, proximity to death and morbidity: Implications for an ageing population", *Journal of Health Economics*, Vol. 57, pp. 60-74.
- Ingaldi, M. and Ulewicz, R. (2019), "How to make e-commerce more successful by use of kano's model to assess customer satisfaction in terms of sustainable development", *Sustainability*, Vol. 11 No. 18, p. 4830.
- James, J.B., Swanberg, J.E. and McKechnie, S.P. (2007), "Responsive workplaces for older workers: Job quality, flexibility and employee engagement", *An Issue in Brief*, Vol. 11, pp. 1-11, available at: <http://hdl.handle.net/2345/3535>
- Koh, S.C. and Maguire, S. (2009), *Information and Communication Technologies Management in Turbulent Business Environments*, IGI Global, Hershey, London.
- Koonin, L.M. (2020), "Novel coronavirus disease (COVID-19) outbreak: Now is the time to refresh pandemic plans", *Journal of Business Continuity and Emergency Planning*, Vol. 13 No. 4, pp. 1-15.
- Korsakienė, R., Raišienė, A.G. and Bužavaitė, M. (2019), "Work engagement of older employees: do employee and work-related factors matter?", *Economics and Sociology*, Vol. 10 No. 4, pp. 151-161, available at: <https://repository.mruni.eu/handle/007/15584>
- Koski, H., Rouvinen, P. and Ylä-Anttila, P. (2002), "ICT clusters in Europe the great Central banana and the small nordic potato", *Information Economics and Policy*, Vol. 14 No. 2, pp. 145-165.
- Kwun, O., Nickels, D., Alijani, G.S. and Omar, A. (2010), "The perceived strategic value of e-commerce in the face of natural disaster: E-commerce adoption by small businesses in post-Katrina new orleans", *International Journal of Entrepreneurship*, Vol. 14, pp. 71-84.
- Kydland, F.E. and Martínez-García, E. (2020), "Checking the path towards recovery from the COVID-19 isolation response", available at: <https://ssrn.com/abstract=3599525> (accessed 20 August 2020).
- Larios-Hernández, G.J. and Reyes-Mercado, P. (2018), "Market influencers for ICT advancement in small states – a comparative analysis", *Information Technology for Development*, Vol. 24 No. 3, pp. 612-631.
- Laudon, K.C. and Traver, C.G. (2016), *E-Commerce: Business, Technology, Society*, Pearson Education Limited, Boston, MA.
- Leischnig, A., Henneberg, S.C. and Thornton, S.C. (2016), "Net versus combinatory effects of firm and industry antecedents of sales growth", *Journal of Business Research*, Vol. 69 No. 9, pp. 3576-3583.
- Liu, Y. (2013), "Sustainable competitive advantage in turbulent business environments", *International Journal of Production Research*, Vol. 51 No. 10, pp. 2821-2841.

- Malmberg, B., Lindh, T. and Halvarsson, M. (2008), "Productivity consequences of workforce aging: stagnation or horndal effect?", *Population and Development Review*, Vol. 34, pp. 238-256, available at: www.jstor.org/stable/25434766
- Messenger, J.C. (2019), "Introduction: Telework in the 21st century—an evolutionary perspective", in: Messenger, J.C. (Ed.), *Telework in the 21st Century*, Edward Elgar Publishing, Cheltenham, pp. 36-75.
- Meyer, A.D., Tsui, A.S. and Hinings, C.R. (1993), "Configurational approaches to organizational analysis", *Academy of Management Journal*, Vol. 36 No. 6, pp. 1175-1195.
- Niebel, T. (2018), "ICT and economic growth – comparing developing, emerging and developed countries", *World Development*, Vol. 104, pp. 197-211.
- Oláh, J., Zéman, Z., Balogh, I. and Popp, J. (2018), "Future challenges and areas of development for supply chain management", *Logforum*, Vol. 14 No. 1, doi: [10.17270/J.LOG.2018.238](https://doi.org/10.17270/J.LOG.2018.238).
- Peters, P., Ligthart, P.E., Bardoeel, A. and Poutsma, E. (2016), "Fit'for telework? Cross-cultural variance and task-control explanations in organizations' formal telework practices", *The International Journal of Human Resource Management*, Vol. 27 No. 21, pp. 2582-2603.
- Peters, P., Poutsma, E., Van der Heijden, B.I., Bakker, A.B. and Bruijn, T.D. (2014), "Enjoying new ways to work: an HRM-process approach to study flow", *Human Resource Management*, Vol. 53 No. 2, pp. 271-290.
- Primc, K. and Slabe-Erker, R. (2020), "The success of public health measures in Europe during the COVID-19 pandemic", *Sustainability*, Vol. 12 No. 10, p. 4321, doi: [10.3390/su12104321](https://doi.org/10.3390/su12104321).
- Ragin, C.C. (1987), *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*, University of Chicago Press, Berkeley.
- Ragin, C.C. (2000), *Fuzzy-Set Social Science*, University of Chicago Press, Chicago.
- Ragin, C.C. (2008), *Redesigning Social Inquiry: Fuzzy Sets and Beyond*, University of Chicago Press, Chicago.
- Ragin, C.C. and Fiss, P.C. (2008), *Redesigning Social Inquiry: Fuzzy Sets and Beyond Net Effects Analysis Versus Configurational Analysis: An Empirical Demonstration*, Ragin, C.C. (Ed.), University of Chicago Press, Chicago, IL, pp. 190-212.
- Ragin, C.C. and Davey, S. (2009), *fs/QCA [Computer Program]*, Version 2.5. Tucson, University of Arizona, AR.
- Raišienė, A.G., Rapuano, V., Varkulevičiūtė, K. and Stachová, K. (2020), "Working from home—who is happy? A survey of Lithuania's employees during the COVID-19 quarantine period", *Sustainability*, Vol. 12 No. 13, p. 5332.
- Retail and Hospitality Hub (2020), "Coronavirus has sped up retail E-Commerce by about 5 years", available at: <https://retailandhospitalityhub.com/retail/retail-industry-updates/coronavirus-has-sped-up-retail-e-commerce-about-five-years/> (accessed 20 August 2020).
- Saleh, A. and Watson, R. (2017), "Business excellence in a volatile, uncertain, complex and ambiguous environment (BEVUCA)", *The TQM Journal*, Vol. 29 No. 5, pp. 705-724.
- Schneider, C.Q. and Wagemann, C. (2012), *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis*, Cambridge University Press, Cambridge.
- Shamir, B. and Salomon, I. (1985), "Work-at-home and the quality of working life", *Academy of Management Review*, Vol. 10 No. 3, pp. 455-464.
- Sharma, H. and Aggarwal, A.G. (2019), "Finding determinants of e-commerce success: a PLS-SEM approach", *Journal of Advances in Management Research*, Vol. 16 No. 4, pp. 453-471.
- Smith, P.W., Hansen, K., Spanbauer, L. and Shell, D.F. (2007), "Pandemic influenza preparedness: a survey of businesses", *American Journal of Infection Control*, Vol. 35 No. 7, pp. 484-485.
- Sopelana, A., Kunc, M. and Hernáez, O.R. (2014), "Towards a dynamic model of organisational flexibility", *Systemic Practice and Action Research*, Vol. 27 No. 2, pp. 165-183.

- Spurk, D. and Straub, C. (2020), "Flexible employment relationships and careers in times of the COVID-19 pandemic", *Journal of Vocational Behavior*, Vol. 119, p. 103435.
- Statista (2020), "Share of households in selected European countries with internet access in 2019", available at: www.statista.com/statistics/185663/internet-usage-at-home-european-countries/ (accessed 20 August 2020).
- Ulucak, R. and Khan, S.U.D. (2020), "Does information and communication technology affect CO2 mitigation under the pathway of sustainable development during the mode of globalization?", *Sustainable Development*, Vol. 28 No. 4, pp. 857-867.
- Ungerer, C., Portugal, A., Molinuevo, M. and Rofo, N. (2020), "Recommendations to leverage E-Commerce during the COVID-19 crisis", *Trade and COVID-19 Guidance Note*, World Bank Group.
- von Gaudecker, H.M., Holler, R., Janys, L., Siflinger, B. and Zimpelmann, C. (2020), "Labour supply in the early stages of the CoViD-19 pandemic: empirical evidence on hours, home office, and expectations", *IZA Discussion Papers*, 13158, pp.1-22.
- WHO (2020), "Health topics – coronavirus", available at: www.who.int/health-topics/coronavirus#tab=tab_1 (accessed 20 August 2020).
- Zurovac, D., Sudoi, R.K., Akhwale, W.S., Ndiritu, M., Hamer, D.H., Rowe, A.K. and Snow, R.W. (2011), "The effect of mobile phone text-message reminders on kenyan health workers' adherence to malaria treatment guidelines: a cluster randomised trial", *The Lancet*, Vol. 378 No. 9793, pp. 795-803.

Further reading

- Blavatnik School of Government, University of Oxford "[database], oxford COVID-19 government response tracker", available at: www.bsg.ox.ac.uk/research/research-projects/oxford-covid-19-government-response-tracker (accessed 20 August 2020).
- Göbel, C. and Zwick, T. (2013), "Are personnel measures effective in increasing productivity of old workers?", *Labour Economics*, Vol. 22, pp. 80-93.
- Schneider, C.Q. and Wagemann, C. (2010), "Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets", *Comparative Sociology*, Vol. 9 No. 3, pp. 397-418.
- Schneider, C.Q. (2016), "Real differences and overlooked similarities: set-methods in comparative perspective", *Comparative Political Studies*, Vol. 49 No. 6, pp. 781-792.

Term	Definition of the term	Source
Organisational flexibility	The ability to adapt quickly to new or changing environments	Sopelana <i>et al.</i> (2014)
fsQCA	A set-theoretic technique for causal-oriented investigation	Ragin (2000, 2008)
Pandemic	A pandemic is the worldwide spread of a new disease	WHO (2020)
COVID-19	The infectious disease caused by the novel coronavirus SARS-CoV-2	WHO (2020)
Stringency index	An index that records the strictness of “lockdown-style” policies that primarily restrict people’s behaviour	Blavatnik School of Government and University of Oxford (2020)
Configuration	A combination of conditions	Ragin (2000, 2008)
Truth table	A table that organises different configurations which lead to a particular outcome	Fiss (2011)
Necessary condition	A condition that is required to produce the outcome	Ragin (2000, 2008)
Sufficient condition	A condition that always leads to the outcome	Ragin (2000, 2008)
Solution consistency	The extent to which a combination of conditions leads to an outcome	Ragin (2000, 2008)
Solution coverage	A proportion of membership in the outcome that can be explained by membership in the configurations	Ragin (2000, 2008)

Table A1.
Key terms used

Corresponding author

Kaja Primc can be contacted at: primck@ier.si

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com