Digital Agility in the Organization as a Response to Technological Changes: Analysis of the IT Sector in Croatia

Maja Vizjak
Migration Research Institute, Croatia
Marina Perić Kaselj
Migration Research Institute, Croatia
Ivan Balabanić
Migration Research Institute, Croatia

Abstract

Digital agility is the answer to understanding and adapting to technological changes in business. Organizations continuously adapt to changes and the successful degree of adaptation to applications is decided for potential prosperity or the very resilience of business. The advantages that bring successful implementation in the form of digital agility through effective digital communication will be reflected in time management, processes will be accelerated and communication will be actively managed for quality. Open change organizations will shape their employees' attitudes towards digital processes and tools. Agile organizations are based on values and principles, which is achieved by taking active roles during working hours and through productive communication. The goal of this paper is to analyze digital agility through the dynamics of communication in IT sector organizations, which by their nature should be the bearer of technological changes. The methodology used in the research is the degree of contact with the business entity in the form of digital communication via e-mail, where the time period of receiving feedback is measured. The scientific contribution of this research is the analysis of the IT sector in Croatia as a strategic leader of change and investment in innovation and defining the development directions of the economy.

Keywords: digital agility, IT sector, digitization, resources in digital business.
JEL classification: O3

Paper type: Research article
Received: 22 May 2024
Accepted: 23 August 2024

DOI: 10.54820/entrenova-2024-0040

Introduction

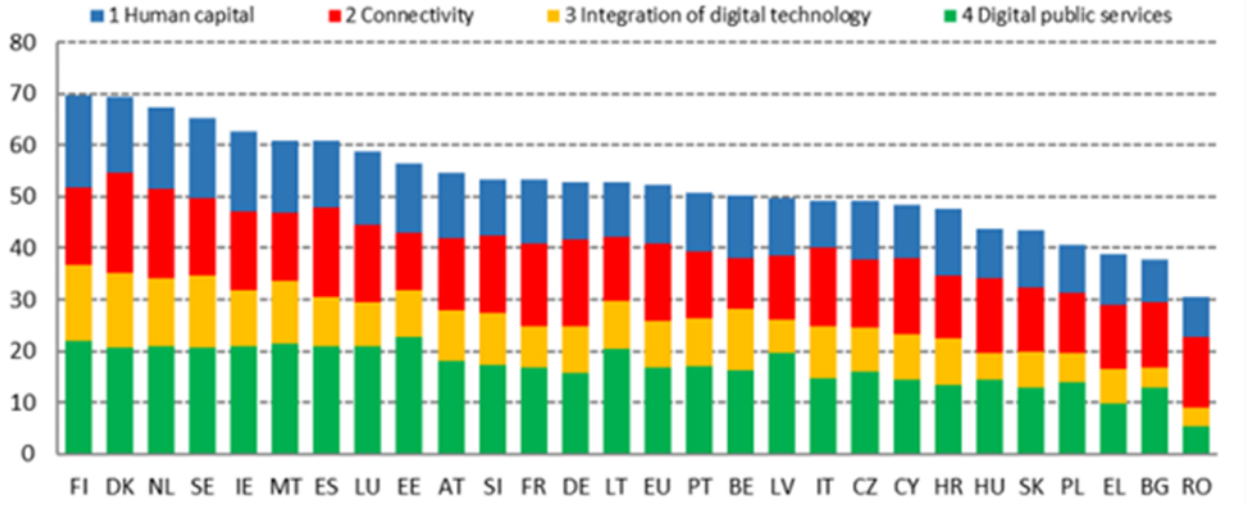
Organizational agility is the art of managing change and innovation. The IT sector is a propulsive branch of the economy, and according to the nature of the work, it should be a leader in changes. The strengthening of this sector has a stimulating effect on the entire economy, as a source of changes in business practices and the development of other activities. Agility is the ability of an organization to respond quickly to changes in demand, both in terms of volume and variety (Christopher, 2000). Agility is a reactive concept that aims to adapt to changes, but not necessarily to disruptive events. Resilience is a combination of concepts - proactive and reactive - aimed at recovery from known and unknown disruptive events (Rahi, Bourgault and Preece, 2021). Organizations rely more and more on the agile management strategy in dynamic business (Jooss et al, 2024). Organizational agility is becoming increasingly important in establishing long-term competitive advantage. Organizational agility has gained importance in the era of the COVID-19 pandemic (Nigam, Purvi and Shirani, 2022). Connectivity and technology provide great advantages to business in the form of agility as a process of using technology to produce accurate and quality information. However, despite the fact that technology continues to advance incredibly fast, not all organizations are still using the latest and greatest technology to their advantage (Zaini. Masrek and Sani, 2017). Agile methods isomorphically aligned with the Emergent Strategy concept significantly reduce the use of strategic planning in organizational development and take on new, more flexible forms (Obydenov, 2021). The ability to network has a positive effect on organizational agility. However, agile management has a significant effect on the organization only when the relationship is moderated by market orientation. The results of studies show that organizational agility has a positive effect on organizational performance (Manurung and Kurniawan, 2022).

The research of this paper aims to analyze the agility of the IT sector in Croatia through the economic capacities and characteristics of the sector, and through empirical research it tests the agility of IT organizations. The structure of this scientific work; the first chapter analyzes the IT sector in Croatia in relation to the EU from the Report on Opportunities in Croatia, while the chapter on the analysis of the IT sector in Croatia lists all the relevant features of the statistical basis of the research.

Comparison of IT sector in Croatia in relation to the EU

Croatia supports and makes a positive contribution to the EU Digital Decade goals of the EU strategic document for the development of digitization and the management of technological applications. Croatia has made significant progress and records continuous development of the sector (table 3 and figure 2). The National Digital Strategy of the Republic of Croatia for the period up to 2032 (DCS 2032) provides a strategic framework for action. Among the 28 EU member states, Croatia ranks 22nd in the Digital Economy and Society Index (DESI) of the European Commission for 2022 (Figure 1).

Figure 1
Graph of the Digital Economy and Society Index (DESI), 2022.



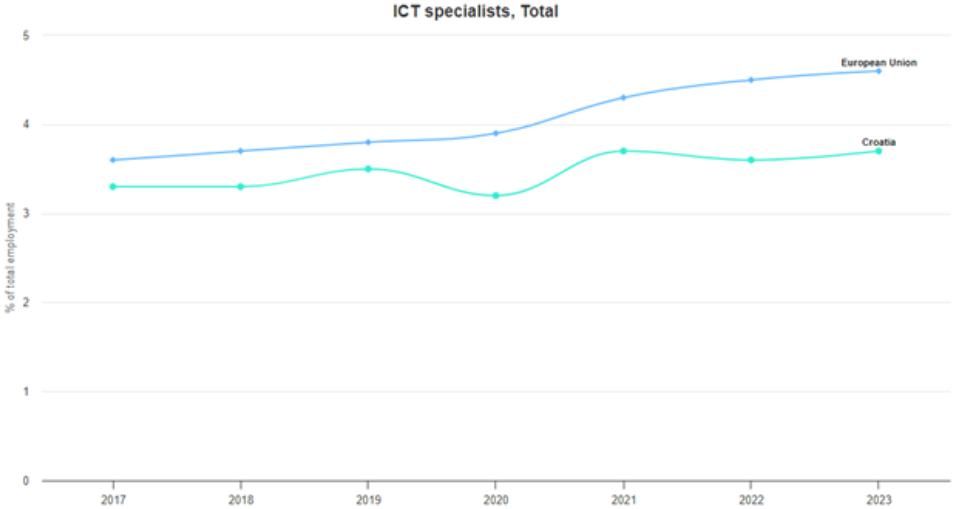
Source: DESI (2022)

Table 3
Presentation of the number of IT specialists in the ratio of the total number of employees in the Republic of Croatia and the EU

Year	2004.		2005.	2006.	2007.	2008.	2009.
EU	3,10 %		3,30 %	3,40 %	3,40 %	3,50 %	3,60 %
Croatia	1,60 %		1,90 %	2,00 %	2,10 %	2,30 %	2,30 %
Year	2010.		2011.	2012.	2013.	2014.	2015.
EU	3,60 %		3,00 %	3,20 %	3,30 %	3,40 %	3,50 %
Croatia	2,20 %		2,40 %	2,50 %	2,60 %	2,70 %	2,70 %
Year	2016.	2017.	2018.	2019.	2020.	2021.	2022.
EU	3,60 %	3,70 %	3,80 %	3,90 %	4,30 %	4,50 %	4,60 %
Croatia	3,30 %	3,30 %	3,50 %	3,20 %	3,70 %	3,60 %	3,70 %

Source: Digital Decade (2024)

Figure 2
Ratio of the number of IT specialists in the Republic of Croatia and the EU by year

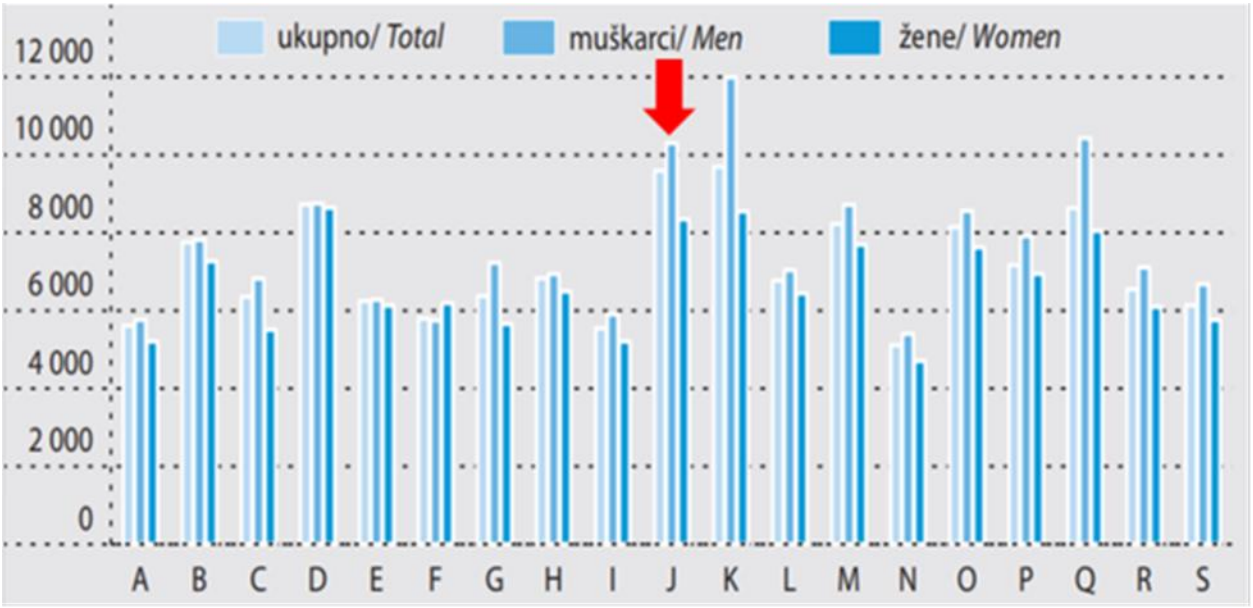


Source: Digital Decade, Annex – Short Report 2024.

Analysis of the IT sector in Croatia

According to data from July 2024, 13,526 business entities were registered in the Fina register in the field of computer programming, consulting and related activities, and information service activities, of which 7,913 are entrepreneurs, 2 budget users and 5,610 craftsmen. J - information and communication activities belongs to the second highest paid sector in the country, right after K - financial and insurance activities (figure 3). It is a constantly growing sector that records continuous growth in the number of entrepreneurs (table 4).

Figure 3
Presentation of the average net salary by activity sector (in kuna)
J - information and communication activities
K - financial and insurance activities



Source: Croatia in numbers (2023)

Table 4
Presentation of the number of entrepreneurs, employees, winners and losers and investors in computer programming, consulting and related activities and information service activities

	2019.	2022.	2021.	2022.	2023.
Number of entrepreneurs	4.961	5.283 +6,49%	5.852 +10,77%	6.674 +14,05%	7.200 +7,88%
Number of employees	23.266	25.208 +8,35%	28.246 +12,05%	35.022 +23,99%	38.156 +8,95%
Number of winners	3.698	3.873 +4,73%	4.465 +15,29%	5.184 +16,10%	5.642 +8,83%
Number of losers	1.263	1.410 +11,64%	1.387 -1,63%	1.490 +7,43%	1.558 +4,56%
Number of investors	698	743 +6,45%	848 +14,13%	931 +9,79%	926 -0,54%

Source: Analysis according to data from Info.Biz

The number of employees of entrepreneurs in sector J - information and communication activities in 2021 was 45,933, while in 2023 it is 50,464, which represents a growth of 5%. Total revenues of HRK 46,303 and expenses of HRK 40,426 million in 2022. Table 5 provides econometric data of the sector for the year 2022.

Table 5
Economic indicators of the field of activity J - information and communication in 2022.

Average net salary (in kuna)	HRK 10,956
Number of entrepreneurs - Continental Croatia	6.648
Number of employees - Continental Croatia	42.614
Total revenues - Continental Croatia	HRK 41,877 million
Number of entrepreneurs - Adriatic Croatia	1.903
Number of employees - Adriatic Croatia	7.850
Total revenues - Adriatic Croatia	HRK 4,426 million
Number and share of entrepreneurs who operated with profit	6,420 – 75.1% of them
The number and share of entrepreneurs who operated at a loss	2,131 – 24.9% of them
Profit for the period	HRK 5,484,387
Loss of period	HRK 550,270
Gross investments in durable mater. and intangible assets	HRK 5,090 million
Gross investments only in new fixed assets	HRK 2,572 min

Source: Analysis based on data from the annual financial report of Fine

Erisccon Nikola Tesla is the most powerful company in the sector, along with Vodnjski Infobip, which employs 1,174 people and generates revenues of 101.76 million euros (tables 6 and 7).

Table 6
Top 10 IT companies by revenue in 2023.

	Business entity	Revenues in 2023.		Business entity	Revenues in 2023.
1.	Erisccon Nikola Tesla d.d.	239,26 mil €	**6.**	Combis d.o.o.	66,32 mil €
2.	King ICT	115,82 mil €	**7.**	Apis IT d.o.o.	59,75 mil €
3.	Nexi Croatia d.o.o.	111,77 mil €	**8.**	Intesa SanPaolo International Value Services d.o.o.	57,04 mil €
4.	InfoBip d.o.o.	101,76 mil €	**9.**	Asbisc-cr d.o.o.	42,27 mil €
5.	Span d.d.	100,88 mil €	**10.**	iStyle d.o.o.	41,99 mil €

Source: Analysis according to data from Info.Biz

Table 7
Top 10 IT companies by number of employees in 2023.

	Business entity	Revenues in 2023.		Business entity	Revenues in 2023.
1.	Erisccon Nikola Tesla d.d.	2 648	6.	mStart plus d.o.o.	377
2.	Infobip d.o.o.	1 174	7.	Combis d.o.o.	333
3.	Span d.d.	540	8.	Happening d.o.o.	329
4.	King Ict d.o.o.	534	9.	Nexi Croatia d.o.o.	295
5.	Apis IT d.o.o.	522	10.	Intesa SanPaolo International Value Services d.o.o.	292

Source: Analysis according to data from Info.Biz

According to the legal form of the business entity, in the field of computer programming, consulting and activities related to them, and information service activities, companies with limited liability d.o.o. dominate. and trades - natural person (table 8). The characteristic of this type of business is its independence and durability, which is related to the craftsman's intention to engage in his craft activities continuously. Since they are specialists in the IT profession, the choice of the form of business is reasonable, and the number of employees is also logical, as the majority of business entities with up to 10 employees total 4,724 - 67%, and those without employees 1,736 - 25% (table 9).

Table 8
Analysis of the number of business entities by legal form or type in the field of computer programming, consulting and related activities, and information service activities by county (July 2024)

County	d.d. stock company	j.d.o.o. simple limited liability company	d.o.o. limited liability company	trades
City of Zagreb	4	546	3421	1996
Zagrebačka		28	117	168
Primorsko-goranska		9	21	49
Splitsko-dalmatinska		31	87	134
Osječko-baranjska		76	282	444
Istarska	1	72	217	269
Krapinsko-zagorska		17	95	106
Sisačko-moslavačka		36	149	390
Karlovačka		18	59	89
Varaždinska	1	10	37	91
Koprivničko-križevačka		15	57	64
Ličko-senjska		2	4	29
Virovitičko-podravska		42	192	205
Požeško-slavonska		9	19	49

Brodsko-posavska		23	38	101
Zadarska		11	44	136
Šibensko-kninska		104	479	509
Vukovarsko-srijemska		3	20	47
Dubrovačko-neretvanska		26	87	128
Međimurska	1	30	122	119
Bjelovarsko-bilogorska		16	47	82
In total	**7**	**1 124**	**5 594**	**5 205**
%	**0 %**	**9 %**	**47 %**	**44 %**

Source: Analysis according to data from Info.Biz

Table 9
Analysis of the number of entrepreneurs by groupings of the number of employees in computer programming, consulting and related activities and information service activities by county (July 2024)
- The analyzed data are for entrepreneurs, not craftsmen

County	Number of entrepreneurs with 0 employees	Number of entrepreneurs with 1-10 employees	Number of entrepreneurs up to 20 employees	Number of entrepreneurs up to 50 employees	Number of entrepreneurs up to 100 employees	Number of entrepreneurs with more than 100 employees
City of Zagreb	910	2 331	169	108	42	40
Zagrebačka	112	332	14	6	1	1
Primorsko-goranska	109	284	20	11	1	1
Splitsko-dalmatinska	128	450	20	10	4	3
Osječko-baranjska	76	238	12	9	4	1
Istarska	100	164	7	5	2	3
Krapinsko-zagorska	23	71	2	1	0	0
Sisačko-moslavačka	19	85	3	1	0	0
Karlovačka	21	57	1	1	0	2
Varaždinska	51	151	10	8	3	2
Koprivničko-križevačka	19	60	1	1	0	0
Ličko-senjska	4	13	0	0	0	0
Virovitičko-podravska	5	17	1	0	0	0
Požeško-slavonska	9	25	1	1	0	0
Brodsko-posavska	13	52	2	2	2	0
Zadarska	34	90	3	1	1	0

Šibensko-kninska	18	38	1	0	1	0
Vukovarsko-srijemska	10	40	1	0	0	0
Dubrovačko-neretvanska	23	71	3	3	0	0
Međimurska	37	98	11	3	1	0
Bjelovarsko-bilogorska	15	57	4	1	0	0
In total	**1 736**	**4 724**	**286**	**172**	**62**	**53**
%	**25 %**	**67 %**	**4 %**	**2 %**	**1 %**	**1 %**

Source: Analysis according to data from Info.Biz

A total of 257 companies with a total of 1,556 employees are insolvent, which is 2% of the total of 13,524 companies of the observed activities. The city of Zagreb has the largest number of insolvent entrepreneurs in business, 108 of them with a total of 1,501 employees, while there is not a single insolvent entrepreneur in Bjelovarsko-bilogorska (table 10) according to data from July 2024.

Table 10
Presentation of the number of insolvent entrepreneurs in the field of computer programming, consulting and related activities and information service activities by county (July 2024.)

County	Number of insolvent business entities	Number of employees in insolvent business entities
City of Zagreb	108	1501
Zagrebačka	15	3
Primorsko-goranska	11	1
Splitsko-dalmatinska	25	6
Osječko-baranjska	20	14
Istarska	12	4
Krapinsko-zagorska	4	2
Sisačko-moslavačka	8	1
Karlovačka	7	6
Varaždinska	10	9
Koprivničko-križevačka	4	2
Ličko-senjska	1	1
Virovitičko-podravska	2	0
Požeško-slavonska	2	1
Brodsko-posavska	5	2
Zadarska	3	0
Šibensko-kninska	6	3
Vukovarsko-srijemska	6	0
Dubrovačko-neretvanska	4	0
Međimurska	4	0
Bjelovarsko-bilogorska	0	0

Source: Analysis according to data from Info.Biz

Methodology

Using a statistical method based on quantitative data according to Fina.info, the J information and communication sector is analyzed according to activities 62 - Computer programming, consulting and related activities and 63 - Information service activities. The basic economic indicators of the sector were analyzed, and a deductive analysis deepened the breakdown according to counties, type - legal status of the company and the number of employees.

Results

The empirical part of the research of agility according to activities 62 - Computer programming, consulting and activities related to them and 63 was carried out during July 2024 in such a way that a total of 3,056 inquiries were sent to e-mail addresses available in the Fine register. The inquiries were sent on Sunday in the evening to meet them on the first working day of the week, Monday. The daily number of responses, thus agility on a daily basis, was recorded, which is shown in table 11, while table 12 shows the number of business entities that have registered e-mails in the Fine register (in the court register). It is evident that business entities without up-to-date e-mail dominate.

Table 11
Presentation of the number of feedback by days of the research period

Feedback timer	Number of responses to an inquiry sent by e-mail – agility on a daily basis	%
First day of research	59	11 %
Second day of research 123	123	23 %
The third day of research 137	137	26 %
Fourth day of research 84	84	16 %
Fifth day of research 75	75	14 %
Tenth day of research 35	35	6 %
Fifteenth day of research	11	2 %
Twentieth day of research	12	2 %
Total number of answers	546	18 %
Total inquiries sent	3 056	100%

Source: Author's analysis

Table 12
Presentation of the number of business entities with e-mail (in the court register) by county (July 2024)

County	Number of business entities	Number of business entities with e-mail (in the court registry)	Number of business entities without e-mail (in the court registry)	% of business entities with e-mail (in the court registry)	% of business entities without e-mail (in the court registry register)
Grad Zagreb	6 006	2 8881	3 125	48 %	52 %
Zagrebačka	939	365	574	39 %	61 %
Primorsko-goranska	873	368	505	42%	58 %
Splitsko-dalmatinska	1194	578	616	48 %	52 %
Osječko-baranjska	844	320	524	38 %	62 %
Istarska	628	128	500	20%	80 %
Krapinsko-zagorska	232	87	145	33 %	67 %
Sisačko-moslavačka	258	86	172	38 %	63 %
Karlovačka	179	68	111	46 %	54 %
Varaždinska	454	202	252	44%	56 %
Koprivničko-križevačka	159	73	86	46 %	54 %
Ličko-senjska	48	3	45	6 %	94 %
Virovitičko-podravska	80	26	54	33 %	68 %
Požeško-slavonska	92	32	60	35 %	65 %
Brodsko-posavska	186	122	64	66 %	34 %
Zadarska	326	117	209	36 %	64 %
Šibensko-kninska	153	48	105	31 %	69 %
Vukovarsko-srijemska	203	49	154	24 %	76 %
Dubrovačko-neretvanska	246	117	129	48 %	52 %
Međimurska	290	146	144	50 %	50 %
Bjelovarsko-bilogorska	163	121	42	74 %	26 %
In total	**13 553**	**5 937**	**7 616**	**44 %**	**56 %**

Source: Author's analysis of data from Info.Biz

The analysis of the research results shows that 44% of business entities in the observed activity sector have registered e-mail, while 56% of them do not. 546 – 18 % business entities provided feedback on 3,056 inquiries sent via e-mail, and most responses were received on the second and third day of the survey.

Conclusion

Organizational agility enables companies to master continuous change while those that successfully adapt prosper. The development of a virtual organization with the aim of participating in the global market is a new challenge of modern business, and organizational agility is aimed at solving the challenges of digital and flexible forms of work through the development of employees in the active use of digital tools. The results of the empirical part of the research show that 60% of business entities in the observed activities of computer programming, consulting and activities related to them and information service activities do not have an e-mail registered in the Fine register (court register). 18 % business entities provided feedback on inquiries sent via e-mail, and most responses were received on the second and third day of the survey. Agility of active communication via e-mail as the basis of virtual communication and development of virtual organizations as well as flexible forms of work in the IT sector is not at the expected level. The IT sector, as fundamental in digitization, should be a leader in agility and have a highly developed world about the importance of digital agility in business. Although we work in a constantly growing and extremely profitable sector with only 2% of insolvent companies in the region, there is a saying that shoemakers have the worst shoes, which can be read in this example.

References

1. Analysis of financial results of entrepreneurs in the Republic of Croatia (2022). Financial agency. Zagreb, available at file:///C:/Users/Korisnik/Downloads/info.BIZ%20-%20Analysis%20financial%20results%20poslovanja%20entrepreneurs%20RH%202022%20.%20(1).pdf
2. Christopher, M. (2000). The agile supply chain competing in a volatile market. Industrial Marketing Management, Vol 29., No. 1, pp. 37–44
3. Digital Decade (2024). Country Report, European Commission, available at Digital_Decade_country_report__Croatia_UYKKULZnVMmjtB28xljTwUnMoml_106712.pdf
4. Digital Economy and Society Index DESI (2022). Thematic chapters, European Commission available at file:///C:/Users/Korisnik/Downloads/0_DESI_Full_European_Analysis_2022_2_C01IJgPAatnNf0qL2LL103tHSw_88764%20(2).pdf
5. Croatia in numbers, 2023. Croatian Statistical Office, Zagreb, available at https://podaci.dzs.hr/media/rh0njfqt/croinfig_2023.pdf
6. Info.Biz – portal of the financing agency
7. Jooss, S., Collings, G.D., McMackin, J., & Dickmann, M. (2024). *A skills-matching perspective on talent management: Developing strategic agility*. Human resources management 63 (1), pp.141-157, doi: 10.1002/hrm.22192
8. Manurung, A. H. & Kurniawan, R. (2022). *Organizational agility: do agile project management and networking opportunities require market orientation?*. International Journal of Project Management in Business 15 (1), pp.1-35
9. Nigam, P. V., Purvi, A. C. & Shirani, B. A. (2022). *Agile Talent Management: Mediating the Relationship Between Agile Competency and Organizational Agility*. International Journal of E-Adoption (IJEA), Volume 14, Issue 1, pp. 1 – 18 doi.org/10.4018/IJEA.314279
10. Obydenov, A (2021). *Parametric Strategic, Management & Business Agility*. 10th International Conference on Industrial Technology and Management (ICITM), pp. 67-72
11. Rahi, K., Bourgault, M. & Preece, C. (2021). *Risk and vulnerability management, project agility and resilience: a comparative analysis*. International Journal of Information Systems and Project management. 9 (4), pp. 5-21, doi. 10.12821/ijispm090401
12. Zaini, M. K., Masrek, M. N., & Sani, M. K. J. A. (2017). *Information technology as a driver of the organization - Agility needs of information security Management*. 29. Sustainable economic growth, education excellence and innovation management through vision, SVETCI, I-VII, pp. 2255-2267

About the authors

Maja Vizjak is scientific associate researcher at the Institute for Migration Research in Zagreb on field of scientific research the labor market, labor migration and globalization. She is equally assistant professor at the Faculty of "Dr. Mijo Mirković" in Pula at the Department of Organization and Management. Previously, she had been assistant at the Faculty of Maritime Studies University of Rijeka at the Department of Logistics and Maritime Management in Transport and was on teaching position of lecturer at European Business School Zagreb. The author can be contacted at **maja.vizjak@imin.hr**

Marina Perić Kaselj is principal of Institute for Migration Research in Zagreb. Senior research associate graduated from the Faculty of Humanities and Social Sciences University of Zagreb, Department of Sociology. Magister scientiae at the University of Zagreb, Faculty of Political Science, "Comparative Politics" Ph.D. from the Faculty of Humanities and Social Sciences, University of Zagreb. Author of over fifty scientific papers and two professional books. Reviewer and evaluator of various professional and scientific programs and projects. The author can be contacted at **marina.peric@imin.hr**

Ivan Balabanić is Senior Research Associate at the Institute for Migration Research. In 2020, he was promoted to Associate Professor of Sociology, specializing in sociological methodology. In 2019, he was also appointed as an Assistant Professor of Communication Studies, University in Maribor. He teaches a range of courses in social research methodology and statistics. From 2020 to 2022, he was the editor-in-chief of the journal Kroatologija, published by the Faculty of Croatian Studies. He is a member of the Croatian team, fieldwork leader, and sampling director for the European Values Study. The author can be contacted at **ivan.balabanic@imin.hr**