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CORPORATE ENTREPRENEURSHIP ASSESSMENT INSTRUMENT: INSIGHTS FROM FOUR REGIONS

Abstract: The main aim of this study is to investigate similarities and differences in assessing the key corporate entrepreneurship factors among top and middle managers in four innovation regions. The sample consisted of 240 managers from the City of Zagreb, the City of Novi Sad, the Province of Vojvodina, and the City of Banja Luka. Research instrument was Corporate Entrepreneurship Assessment Instrument [CEAI] (Kuratko, 2014). All five factors have been analyzed i.e. Management Support, Work Discretion, Rewards, Time availability, and Organizational Boundaries. The written permission has been obtained by authors. The CEAI has been translated into Serbian language (Kontic, 2011), and used as a tool to assess various aspects of corporate entrepreneurship over the last 15 years. In this study Serbian version of the questionnaire has been translated into Croatian and Bosnian languages i.e. ijekavian dialect. The mixed method has been used. Content analysis has been used to process qualitative data. Quantitative data processed by the Correspondence Analysis. The results have been presented by five key factors. The managers from the City of Banja Luka and the City of Zagreb gave higher grades for Management Support factor then managers from the Province of Vojvodina as whole. The results of Work Discretion factor showed similar results. Recoding has been necessary for questions in Work Discretion and Time Availability. Rewards have been similar assessed as the Management Support factor from managers of selected regions. The managers from the City of Zagreb gave the highest grades for Organizational Boundaries factor then managers from the City of Banja Luka, as well as managers from the Province of Vojvodina. Scatter plots for all five factors from CEAI questionnaire have been presented.

Keywords: corporate entrepreneurship, CEAI, regional innovations, Correspondence analysis, strategic management

1. INTRODUCTION

In contemporary business environment, companies that engage in corporate entrepreneurship tend to be more profitable and resilient to crisis than others (Janicijevic, 2025); (Kontic L. Z., 2022); (Janicijevic N. a., 2023); (Kontic L. T., 2025). The most cited studies are those that used CEAI (Kuratko, 2014). It can be applied through various means to

benefit many companies looking for innovation and growth based on corporate entrepreneurship. Since it has been studied from different fields, various definitions of the CE phenomenon have appeared in the relevant literature (Simba, 2019).
The recent literature review and future research agenda has been provided by (Urbano, 2022). Over the last 15 years, corporate entrepreneurship have been well explored in Serbian context (Kontic, 2011); (Kontic L. D., 2017); (Kontic L. a., 2017); (Kontic L. T., 2023).
This study seeks to determinate similarities and/or differences among top and middle managers in assessing the key corporate entrepreneurship factors explored in CEAI questionnaire. Concrete, the research question is: are there differences in assessing key factors by managers from four regions? From Serbia, the authors selected the City of Novi Sad, and the Province of Vojvodina; from Croatia the City of Zagreb, and the City of Banja Luka from Bosnia and Herzegovina. The Province of Vojvodina is a emerging innovator + (Hollanders, 2023). The City of Zagreb is a Strong Innovator - performing above the EU average (Hollanders, Regional Innovation Scoreboard - Regional profiles Croatia , 2023). The City of Banja Luka is a key center for research and innovation in Bosnia and Herzegovina, and classified as Emerging innovator (Hugo Hollanders, European Innovation Scoreboard 2023 Country profile Bosnia and Herzegovina, 2023). In selection process of the companies, three main criteria have been used: innovation performances, financial performance and companies' reputation, and access to top and middle level managers. Sample is representative for investigate corporate entrepreneurship in observed four regions.
In the field of corporate entrepreneurship and strategic management, this is the first study that explored data collected by CEAI and processed by the Correspondence analysis. Correspondence Analysis emerges as a powerful tool for exploring the relationships between categorical variables and revealing hidden patterns within the data. It is widely used to extract meaningful insights from complex datasets in various scientific fields.
The study contributes from theoretical and practical perspectives. Regional collaboration is one of essential component to stimulate innovation in the Western Balkan countries. The innovations generate sustainable growth, improve economics resilient, and improve crisis and strategic management in the companies.
The paper is organized as follows. Next section is devoted to methodology, followed by the presentation and discussion of the research study results. Finally, conclusions are drawn from this empirical study.

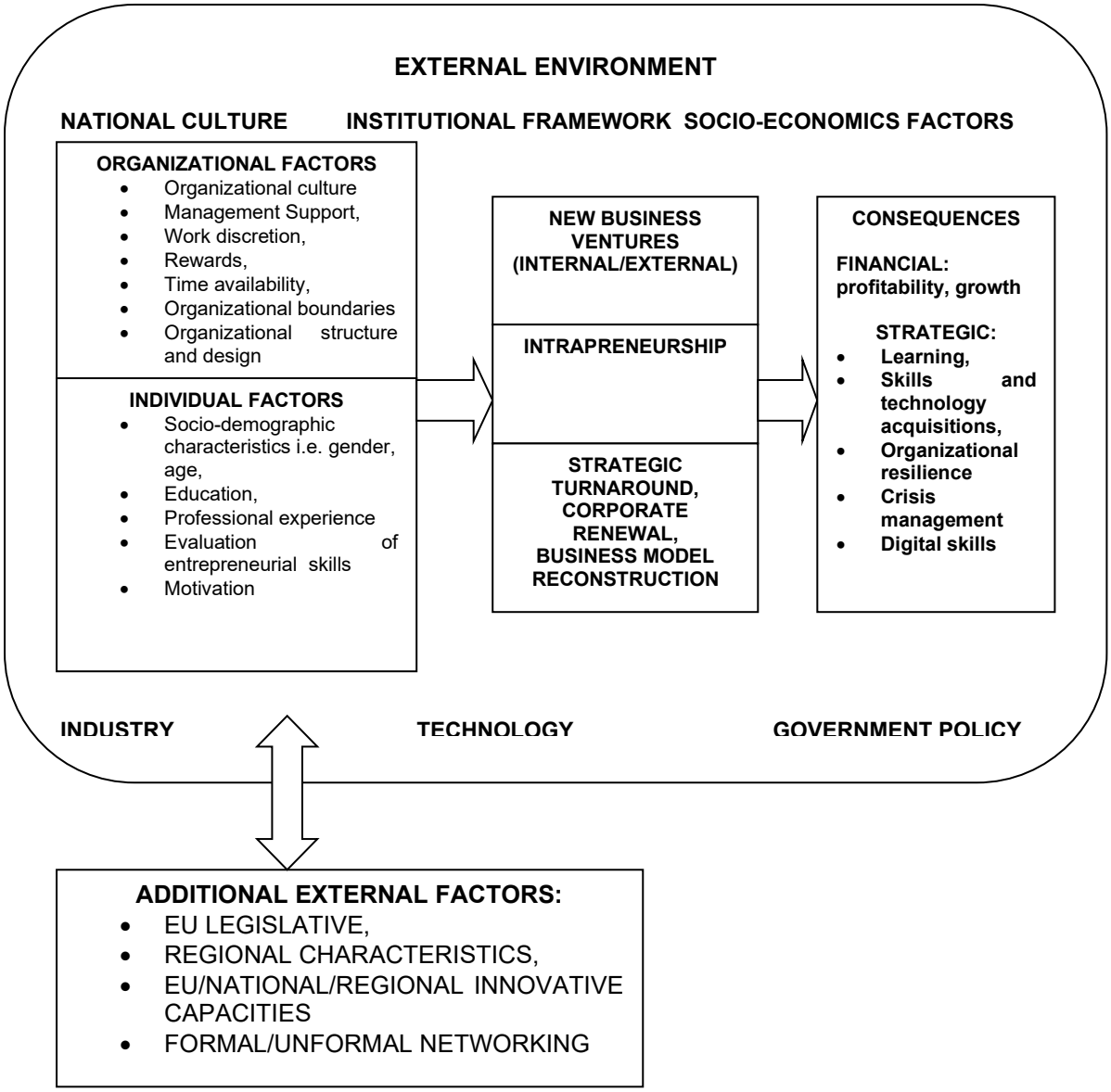
2. REVIEW OF PAST RESEARCH

The corporate entrepreneurship is a complex construct that appears in numerous forms (Urbano, 2022). A systematic literature review revealed a conceptual model of the corporate entrepreneurship which the authors' of this study adopted for purpose of their own research (*See Picture 1*).
External environment influences all companies in one national economy. Various factors have different effects, positive, neutral or negative on the company. The key factors are as follows:

- Socio-economic environment,
- Institutional framework,
- National culture,
- Industry,
- Technology
- Government Policy

Additional factors may include European Union (EU) legislative, innovation capacities at EU, state or regional level, regional characteristics, and formal and/or unformal networking.
At organizational (micro-level) level of analysis main factors can be as followed:

- Entrepreneurial culture,
- Management Support,
- Work discretion,
- Reinforcement/Rewards,
- Organizational boundaries, and
- Time availability, and
- Organizational structure and design.



Picture 1: CE Model
Source: Adapted from Urbano, 2022

Entrepreneurial culture accelerates individual creativity, risk-taking, and organizational learning, and has numerous positive effects on companies (Shiferaw, 2023) (Arabeche, 2022) (Al Koliby, 2024) (Usman, 2024) (Al-Dhaafri, 2022) (Shwedeh, 2024 June). Management support, work discretion, rewards, organizational boundaries and time availability are the key corporate entrepreneurship factors that measured by CEAI (Kuratko, 2014). The results of the previous study revealed that Time availability is related to organizational culture in Serbian context (Janicijevic N. a., 2025).
The review of the past studies that used CEAI in specific context such as the transitional, emerging or developing countries more or less similar to Serbian environment is presented in the Table 1.

Table 1: Validation of CEAI in specific environment in period 2011-2026

Countries/Study	Methods	Main results	Validation of CEAI
South Africa / (van Wyk, 2011)	Confirmatory analysis of 333 responses from managers	The results indicated an eight-factor 34-item questionnaire. Additional factors were: Innovative initiatives, Financial support, and Sufficient time.	Work discretion α = 0.84, Management support and risk-taking α = 0.82, Rewards/ reinforcement α = 0.75, Organizational boundaries α = 0.81 and Inadequate time α = 0.67.
Serbia / Kontic (2011)	Quantitative analysis data from four organizations (167 managers)	Pilot testing revealed possible implementation for investigating CE in Serbian context.	Whole CEAI α=0.927 Time availability α=0.465 was very low
Serbia / Kontic et al. (2017)	Longitudinal study	Employees' attitudes toward the CE key factors have been depended on their age, education, professional experience, and management level	There is a need for some modification in the version translated into Serbian.
Romania / Agapie (2018)	Quantitative analysis data from technology-based companies (175 respondents)	Romania entrepreneurial culture based on ten relevant factors.	CEAI can be used in Romanian context, without Time availability
Case study / (Bisht, 2023)	Single case study	A company need to work in domain of Rewards, and Organizational boundaries	CEAI can be used for assessment CE
Brazil / (de Araujo Castro, 2020)	Quantitative study 548 managers	Statistical analyses showed that organizational factors and entrepreneurial characteristics haven't been interrelated.	Cronbach's Alpha was achieved in all constructs, with the exception of the Time availability α = 0.481, lower than 0.6.
Thai / (Satwong, 2025)	The impact of CEAI key factors on economic, environmental, and social performance outcomes.	Results indicate that CE, particularly reward and reinforcement mechanisms, significantly impact performances. The research highlights the importance of fostering an internal entrepreneurial climate.	CEAI can be use in Thai content.

Source: Markov, 2012.
(Style: SM-SourceTable)

Individual factors that affect corporate entrepreneurship may include the following:

- Socio-demographic characteristics of employees such as gender or age
- Education,
- Professional Experience,
- Motivation.

Moreover, it is important to evaluate entrepreneurial skills of all managers and employees. Self-evaluation questionnaires and standardized questionnaires have been used. Important issue is the employees' intrinsic or extrinsic motivation factors.

Based on the systematic review on the literature, there are three main perspectives of the corporate entrepreneurship (Urbano, 2022). The first view is an internal corporate entrepreneurship, also named intrapreneurship, which includes innovations within companies' boundaries. The second perspective embodies the joint venture in entrepreneurial activities and innovations. Third perspective includes corporate turnaround, corporate revival, renewal, and business process reconstruction.

The consequences or the answer on the following question: Why the managers invest in corporate entrepreneurship activities? is a main component of the CE model. Financial results are important in the terms of profitability and companies' growth. The more important results are strategic results measured by improved learning capacities, adopted new technologies with new technological skills, acquisition of digital skills, and crisis management competencies to build companies that are resilient to all kind of crisis.

3. METHODOLOGY

The sample consisted of 240 top and middle-managers from four regions: The City of Novi Sad, The Province of Vojvodina (besides the City of Novi Sad), The City of Zagreb, and The City of Banja Luka. The regions have been selected by three European Commission Regional Innovation Scoreboard (Hollanders, Regional Innovation Scoreboard - Regional profiles Croatia , 2023) (Hollanders, Regional Innovation Scoreboard, 2023) (Hugo Hollanders, European Innovation Scoreboard 2023 Country profile Bosnia and Herzegovina, 2023). The three main criteria have been used in companies' choices. The first criterion was innovation performances of the company. The second one was financial performances and reputation of company. The third criterion was availability of managers who want to participate in the survey. The authors' personal and professional contacts have been used to obtain relevant data.
The main aim of this study is to investigate regional similarities and differences among top and middle managers in assessing the key corporate entrepreneurship factors.
The hypotheses of the study are following:
H_0: There are differences in assessing the key corporate entrepreneurship factors by managers in four selected regions.
H_1: There are differences in assessing the factor Management Support by managers in four selected regions.
H_2: There are differences in assessing the factor Work Discretion by managers in four selected regions.
H_3: There are differences in assessing the factor Rewards by managers in four selected regions.
H_4: There are differences in assessing the factor Time Availability by managers in four selected regions.
H_5: There are differences in assessing the factor Organizational Boundaries by managers in four selected regions.
The research instrument was Corporate Entrepreneurship Assessments Instrument [CEAI], which consisted of 48 questions. All procedures performed in this study were in accordance with the ethical standards of University of MB, University of Belgrade, University of Osijek, and the Helsinki Declaration.
Data have been processed by the correspondence analysis. Origin of the technique can be found in the early 20. century (Hirschfeld, 1935 October). Forty years later, academics have revived the Correspondence analysis (Benzecri, 1977) (Bourdieu, 1979) (Greenacre M. , 1984) (Hill, 1974). Same happed at the begging of 21. century, to processed numerous qualitative data (Greenacre M. , 2017). The behavioral and social science studies embody questionnaires that have numerous categorical questions i.e. CEAI. Therefore, the correspondence analysis is adequate choice for processing data. A visual result of the Correspondence analysis is a scatterplot (Greenacre M. , 2017).

4. RESULTS AND DISCUSSION

The results of this study will be presented by the similarities of the key corporate entrepreneurship factors. First, the profiles of the key CE factors will be presented (*See Table 2, Table 3 and Table 4*).

Table 2: Profiles of Key Management Support and Rewards (in %)

Factor	Management Support (MS)					Rewards (RW)				
Region	Grades					Grades				
	1	2	3	4	5	1	2	3	4	5
City of Banja Luka (B&H)	1.58	6.68	30.76	48.51	12.48	5.56	8.06	23.33	47.48	15.28
City of Zagreb (HR)	4.23	16.9	33.1	37.32	8.45	10.31	13.93	23.68	39.00	13.09
City of Novi Sad (NS)	26.99	21.84	26.87	21.23	3.07	28.08	15.77	26.54	20.00	9.62
Province of Vojvodina (VV)	20.93	27.06	32.77	15.43	3.81	26.00	16.00	25.33	19.33	13.33

Source: Authors' calculation

Table 3: Profiles of Work Discretion and Time Availability (in %)

Factor	Work Discretion (WD)					Time Availability (TA)				
Region	Grades					Grades				
	1	2	3	4	5	1	2	3	4	5
City of Banja Luka (B&H)	1.83	10.5	26.83	45.83	15.0	8.8	32.8	21.87	32.8	3.73
City of Zagreb (HR)	3.67	14.67	28.0	43.17	10.5	12.53	27.3	27.3	27.86	5.01
City of Novi Sad (NS)	8.67	19.67	27.17	31.85	12.65	11.67	32.3	24.12	26.07	5.84
Province of Vojvodina (VV)	8.43	20.48	22.89	30.92	17.27	16.67	32.67	20.67	19.33	10.67

Source: Authors' calculation

Table 4: Profile of Organizational Boundaries (in %)

Factor / Region	Grades				
	1	**2**	**3**	**4**	**5**
City of Banja Luka (B&H)	1.2	12.2	22.49	51.44	12.68
City of Zagreb (HR)	5.0	10.0	16.43	47.14	21.43
City of Novi Sad (NS)	8.58	7.92	17.16	53.47	12.87
Province of Vojvodina (VV)	8.05	13.22	18.39	42.53	17.82

Source: Authors' calculation

Based on the Chi-square test, data from regions were asymmetric for all factors of the CEAI. Managers from the City of Zagreb and the City of Banja Luka gave grade 4 more often than managers from The Province of Vojvodina, as whole. Insights from Management support and Rewards factors are the following:

- *High difference between City of Banja Luka and the Province of Vojvodina as whole*
- *High difference between the City of Zagreb, on the one side and the Province of Vojvodina and City of Banja Luka, on other side.*
- *Moderate difference between City of Banja Luka, and the City of Zagreb,*
- *Moderate difference between the City of Novi Sad and rest of the Province of Vojvodina*

Work discretion (WD) and Time availability (TA) factor have questions that require inverted codification (For WD it is Q 29; for TA questions Q 36, 39, and 40 from CEAI).
Total inertia enables identification of the principal components composed of these profiles and calculation of variability which is described by each component. The Principal components method can be used for identification similarities and differences between profiles. Detailed analysis identified two principal components by the aforementioned key factors (*See Table 5*).

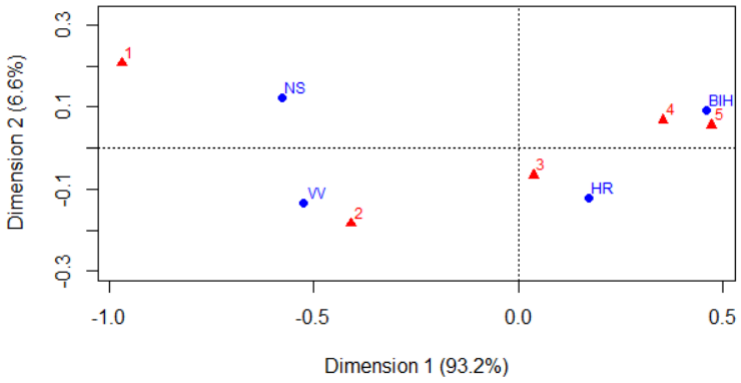
Table 5: Principal components of CEAI factors

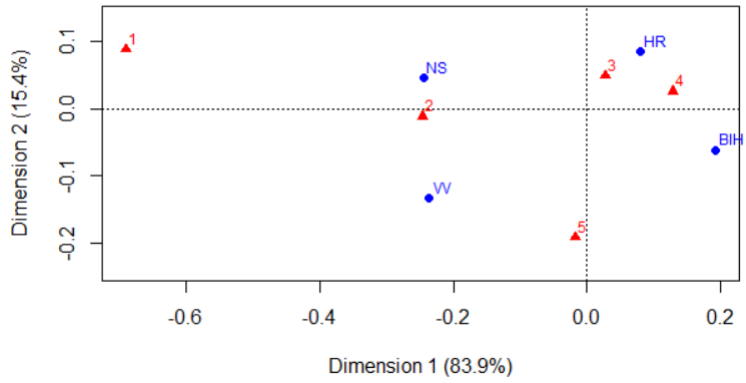
Region	MS		RW		WD		TA		OB	
	1	2	1	2	1	2	1	2	1	2
B&H	1.0556	0.793	1.0711	0.9942	1.0556	0.793	1.0711	0.9942	1.442766	-0.2281
HR	0.3947	-1.066	0.3778	-1.4114	0.3947	-1.066	0.3778	-1.4114	-0.45083	1.1638
NS	-1.3246	1.0565	-1.3245	0.4378	-1.3246	1.0565	-1.3245	0.4378	0.896171	1.5188
VV	-1.2052	-1.1681	-1.1791	0.2329	-1.2052	-1.1681	-1.1791	0.2329	-0.81717	0.3836

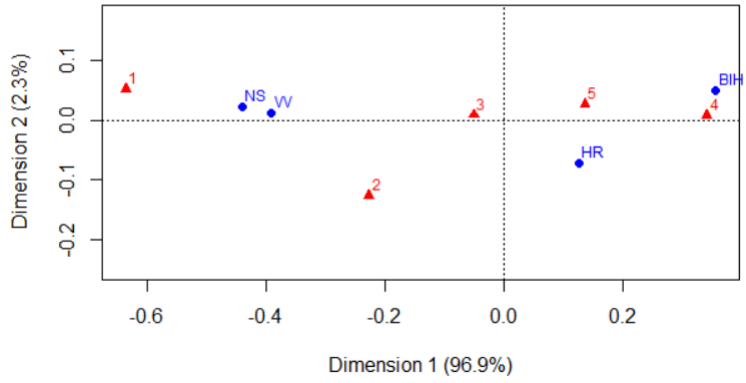
Source: Authors' calculation

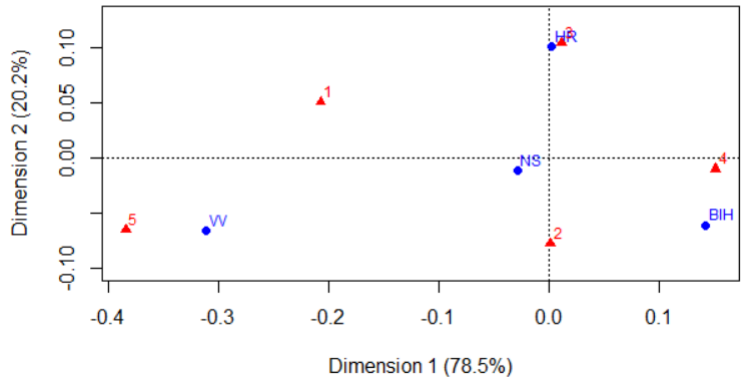
From Table 5 it can be concluded significantly minor differences in assessment WD, and TA than MS. The first component explains 93.15% of total inertia of the Management Support factor. Although, for the factor Rewards, the first component explained 96.87% of total inertia i.e. dispersion of grades between regions.
The first component explains 87.5% of total inertia of the Work Discretion factor. Although, for the factor Time availability, the first component explained 78.53% of total inertia i.e. dispersion of grades between regions.
Moreover, it can be concluded significantly less differences in assessment OB than MS. Total inertias of OB was very low 0.03661765. Detailed analysis identified two principal components. The first component explains 61.15% of total inertia of the Organizational Boundaries factor. The second component explained 29.79% of total inertia i.e. dispersion of grades between regions.
Picture 2: presents scatter plots of CEAI factors in the following order:

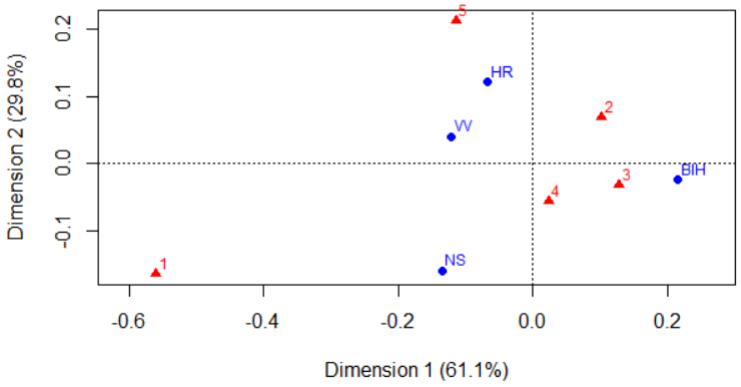
1. Management Support,
2. Rewards,
3. Work Discretion,
4. Time Availability, and
5. Organizational boundaries.


Dimension 2 (6.6%)
0.3
0.1
-0.1
-0.3
-1.0
-0.5
0.0
0.5
Dimension 1 (93.2%)
1
NS
BIH
4
5
3
HR
VV
2


Dimension 2 (15.4%)
0.1
0.0
-0.1
-0.2
1
NS
2
HR
3
4
BIH
VV
5
-0.6
-0.4
-0.2
0.0
0.2
Dimension 1 (83.9%)


Dimension 2 (2.3%)
0.1
0.0
-0.1
-0.2
1
NS
VV
3
5
BIH
4
HR
2
-0.6
-0.4
-0.2
0.0
0.2
Dimension 1 (96.9%)


Dimension 2 (20.2%)
0.10
0.05
0.00
-0.10
HR
1
NS
4
5
VV
BIH
2
-0.4
-0.3
-0.2
-0.1
0.0
0.1
Dimension 1 (78.5%)



Picture 2: Scatterplots for a) MS, b) RW, c) WD, d) TA, and e) OB
Source: Authors' calculation

The best insights can be getting from the Scatter plots, as visual presentation of the Correspondence Analysis. It emerges as a powerful tool for exploring the relationships between categorical variables and revealing hidden patterns within the data. It is widely used to extract meaningful insights from complex datasets.
Based on the picture 2, the first graph illustrated that managers from the City of Zagreb (HR), and the City of Banja Luka (B&H) gave similar grades for Management Support battery of questions. These grades have been higher than grades came from the Province of Vojvodina.The second graph is very similar. The third graph illustrates similarities between managers from the City of Zagreb and City of Banja Luka, on one side, and the Province of Vojvodina on another. The managers from Vojvodina, as whole gave more often extreme grades than other two regions. The fourth graph is similar.
From the graph 5, it can be concluded that managers from the City of Banja Luka had opposite opinions than the rest of the sample regarding the assessment of the Organizational Boundaries factor. Top and middle managers from the City of Zagreb gave more often grade 5 than other managers.

4. CONCLUSION

A particularly important field of research on corporate entrepreneurship includes innovations and regional collaboration to gain and maintain competitive advantage. The five factor questionnaire developed by Kuratko et al., (2014) entitled CEAI (Kuratko, 2014). Over the last 15 years numerous studies conducted by authors using CEAI.
This study confirmed that Correspondence Analysis can be a powerful tool for exploring the relationships between categorical variables and revealing hidden patterns within the data from four regions at different economic development. The results revealed similarities between the managers from the City of Zagreb and the City of Banja Luka in assessing four of five corporate entrepreneurship factors. The results from Organizational Boundaries suggested that managers from the City of Zagreb gave higher ratings then managers from other selected regions.
The limitations of the study regard linguistic and cultural issues when a research instrument created in one national culture had been used in another cultures. Future study will include more companies from selected regions.

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