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ORGANIZACIJA

Organizacija (Journal of Management, Informatics and Human Resources) is an interdisciplinary peer-reviewed journal which is open to contributions of high quality, from any perspective relevant to the organizational phenomena.

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Organizacija (Revija za management, informatiko in človeške vire) je interdisciplinarna recenzirana revija, ki objavlja visoko kakovostne prispevke z vseh vidikov, ki so pomembni za organizacijske procese in strukture.

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- podjetniški inženiring (npr. organizacijsko oblikovanje, upravljanje poslovnih procesov, paradigme preoblikovanja podjetij itd.);
- članki, ki analizirajo organizacijsko uspešnost in prizadevanja za izboljšanje le-te.

Contents 4/2020

RESEARCH PAPERS	272	Phuong TRAN HUY, Ngan Hoang VU, Hue Thi HOANG, Hanh Thi Hai NGUYEN	Procedural Justice in Selection from the Lens of Psychological Contract Theory
	287	Katarina ROJKO, Nuša ERMAN, Dejan JELOVAC	Impacts of the Transformation to Industry 4.0 in the Manufacturing Sector: The Case of the U.S.
	306	Bulent AKKAYA	Linking Organizational Commitment and Organizational Trust in Health Care Organizations
	319	Mohanad Ali KAREEM, Harsha Vardhan Reddy KUMMITHA	The Impact of Supply Chain Dynamic Capabilities on Operational Performance
	332	Hester SPIES, Nedia MACKAY	An Empirical Investigation of the Mediating Role of Customer Attachment in South African Private Hospitals
	346	Marko KUKANJA, Tanja PLANINC, Marijana SIKOŠEK	Crisis Management Practices in Tourism SMEs During the Covid-19 Pandemic

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Procedural Justice in Selection from the Lens of Psychological Contract Theory

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Background and purpose: In recruitment and selection, job applicants do not only base their justice judgment on the actual experience but also compare what happens and what they expect. This study, therefore, investigates applicants' reaction to procedural justice in recruitment selection through the lens of psychological contract framework. Psychological contract theory highlights the role of expectations, discrepancies between perception and expectation, and perceived contract breach on individual outcomes.

Methodology: Two surveys were conducted with job seekers in Vietnam, one before and one after the selection process. Printed questionnaires were administered to job seekers in the first survey, while the second used online survey. Structural Equation Modeling technique was adopted to analyze the data.

Results: Data from a sample of 232 job seekers indicated that previous job experience and source of candidates were significantly related to justice expectations. In addition, perceived unmet expectations were found to predict procedural contract breach, which in turn negatively influenced job acceptance intention and recommendation intention.

Conclusion: The research highlights the role of unmet justice expectation, the perceived discrepancy between what happened and what was supposed to be, in predicting intention to accept offer and to recommend others. The results suggest that firms should provide updated and official information regarding the selection process to all parties such as internal employees, recruitment agency and job search website to reduce over-expectation.

Keywords: *Applicants' reaction, Procedural justice, Expectations, Psychological contract, Job acceptance intention, Recommendation intention*

1 Introduction

Human resource represents a primary source of sustainable competitive advantages (Kundu & Gahlawat, 2016). Ensuring that the organizations acquire the right types of employees at the right time is the pivotal and challenging task of recruitment and selection function (Absar, 2012; Van Hoyer, 2013). As a result, recruitment and selection of employees have been an important focus of both academics and practitioners (Truxillo et al., 2009; Konradt, et al., 2017). The aspect of recruitment and selection that

attracts the most research interest so far is applicants' justice perceptions in selection settings and subsequent outcomes (Gilliland, 1993; Ryan and Ployhart, 2000; Ployhart and Harold, 2004). Gilliland (1993) suggested that job candidates use the information they have during selection to make inferences about employment situations, which in turn, influence their attitudes, beliefs, and behaviors. Previous research has confirmed the positive relationship between perception of justice in selection and job offer acceptance, subsequent job performance, job attractiveness, organizational attractiveness, and recommendation inten-

tions (Chapman et al., 2005; Hausknecht et al, 2004; McCarthy et al, 2017). Also, negative reactions influence the attitudes and behaviors of both applicants and successful candidates including withdrawal from the selection process, turnover intentions, and counterproductive behaviors (Bauer et al., 2012).

Within the focus of justice perception, a significant body of literature highlights the role of justice expectations in applicants' reaction research (Bell, Ryan and Wiechmann, 2004; Ployhart and Harold, 2004; McCarthy et al., 2017). Bell et al. (2004) proposed that justice expectations serve as a reference point for the evaluation of the fairness of outcomes. Similarly, applicant attribution reaction theory (AART; Ployhart and Harold, 2004) proposed that applicants' reactions are shaped from the match between their expectations and observations. McCarthy et al. (2017) highlighted the role of attribution processes that underlie applicants' justice expectations. Recently, Wang, Hackett, Zhang and Cui (2019) found that fairness expectations play a mediating role in the relationship between applicants' personal characteristics and experience of procedural fairness. In spite of these interests, much is not known about the relationships among employee's expectations, their actual experience, the discrepancies between expectation and experience, and the subsequent outcomes.

First, what role does procedural justice expectation play, together with actual experience of applicants, in predicting applicants' outcomes? Second, if job seekers do have different expectations regarding procedural fairness in selection, then what cause the differences? Because expectations are developed based on available information, do previous experience and source of information influence expectations? Third, what theory can be adopted to explain the influence of expectation and real experience of procedural justice on applicants' reactions? A theoretical framework should be helpful in providing systematic explanation of the causal relationships between procedural justice and applicants' reactions.

Attempting to answer these aforementioned research questions, the purpose of the current study is three-fold. First, it conceptualizes unmet justice expectations as the perceived discrepancy between an applicant's expectation of procedural justice and his actual experience. This conceptualization is realized with the use of a two-wave survey, one before and one after the selection process. Unmet expectation would then lead to a perception of justice contract breach, i.e., the overall perception that the selection process is unjust. Such perception ultimately influences applicants' reactions to the hiring companies. Second, it examines previous job experience, experience in public sector and source of candidate as the antecedents of procedural justice expectations among job applicants. Finally, it explains the proposed relationships through the lens of psychological contract (PC) theory (Rousseau, 1989). Psychological contract encompasses the bundle of employee expectations about the manner of the employer'

behaviors based on promises or past practices (DiMatteo, Bird and Colquitt, 2011). Psychological contract provides a theoretical framework to understand applicants' reaction in the recruitment process. First, the theory acknowledges the importance of applicants' justice expectations in the recruitment process. Second, it highlights the role of perceived discrepancies between expectations and perceptions in shaping the applicants' overall evaluation of procedural justice. Third, the theory postulates that failure to fulfill justice expectations will lead to applicants' negative reactions towards the hiring organizations (Morrison and Robison, 1997; Schalk and Roe, 2007).

Vietnam offers an important context for the current study in a few ways. Practically, according to Tower Watson (2011), turnover intention among Vietnamese workforce is at 46%, much higher than Asia-Pacific average of 39%. This signifies research attempts to understand applicant reactions to selection justice. Theoretically, Hoang, Truxillo, Erdogan and Bauer (2012) argued that Vietnam is "virtually absent in industrial/ organizational psychology research" (p. 210). A meta analytic study by McCarthy et al. (2017) showed a paucity of applicant reaction research in Vietnam. Furthermore, in a rare cross-cultural studies, Hoang et al. (2012) found that there are remarkable differences between Vietnamese and American applicants in their preferred selection methods, suggesting a possible discriminating pattern of reaction towards selection justice between Vietnamese applicants and applicants in other Western context.

2 Literature review

2.1 Theoretical background

Organizational justice (OJ)

Organizational justice refers to employees' subjective perceptions of fairness in the workplace (Colquitt, Greenberg, and Zapata-Phelan, 2005). OJ is usually measured along three dimensions, i.e., distributive, procedural, and interactional justice (Colquitt, 2001). Distributive justice refers to the perception that outcomes are allocated fairly among group members. Procedural justice can be defined as the perception that the procedures for determining outcomes and resolving conflict are fair. Interactional justice refers to both what is said to individuals during the decision process and how it is said. In the context of personnel selection, Konradt et al. (2016) propose that procedural justice is the most important dimension. In a seminal work, Gilliland (1993) proposed that procedural justice is composed of three components: formal characteristics of procedures, explanation of procedures and decision making, and interpersonal treatment. Bauer, et al. (2001) developed the Selection Procedural Justice Scale which

consists of 40 items. The scale is composed of 2 higher order factors, namely, structure and social, each contains 5 lower-order subscales. The structure factor involves the characteristics of the actual process, such as opportunity to perform and the content of the test itself. The social factor involves communication with and treatment of job applicants. Previous research has adopted the structure-social (Bye and Sandal, 2016) or, systematic-interactional (Wang et al., 2019) classification to capture procedural justice in recruitment and selection settings. The current research adopts the systematic-interactional dimensions of selection procedural justice.

Psychological contract

Psychological contract describes the formation of individual perceptions by employees regarding what is owed by themselves and the organization (Rousseau, 1989). Rousseau (1989) viewed the psychological contract at the individual level. She also pointed out the role of perceptions and beliefs in the psychological contract. Rousseau defined it as individual's subjective beliefs with which the parties need not agree on the contract. Psychological contract theory postulates that the applicants tend to develop their own expectations of procedural fairness in selection at the company to which they are applying for, based on the information available to them from such sources as societal and industry norms, past experiences, and information from company's channels. These expectations are incorporated in their psychological contract towards the hiring organization. Moreover, psychological contract theory suggests that applicants compare between what really happens during the recruitment process and what they expected to interpret and evaluate the situation and then prepare subsequent responses. Finally, perception of psychological breach, the perception that obligations have been unfulfilled, will eventually predict their intentions and behaviors towards the hiring organization (Morrison and Robinson, 1997).

2.2 Hypothesis development

Determinants of Fairness expectations

Extant research suggests that psychological contract is mainly created during the encounter stage of the socialization process (Rousseau, 1995; Tomprou and Nikolaou, 2011). However, the important role of pre-entry expectations in the creation of psychological contract has been widely acknowledged (Rousseau, 2001; Tomprou and Nikolaou, 2011; Welander, Blomberg and Isaksson, 2020). Thomas and Anderson (1998) argued that before entering the organization, the individual employee has some pre-entry expectations about the terms and conditions of

his or her employment including those about the jobs, the working conditions, and the organization. Welander et al. (2020, p. 67) proposed that the creation of a psychological contract starts with pre-entry expectations. It can be inferred that job seekers collect information about the hiring organizations and develop expectations regarding procedural fairness based on available information. Pre-entry expectations are affected by a number of factors including the employees previous work experience, the information they had about the organizations, and other individual differences (De Vos, De Stobbeleir and Meganck, 2009; Tomprou and Nikolaou, 2011; Rousseau, Hansen and Tomprou, 2018). In recruitment and selection context, Wang et al. (2019) found that applicants' Confucian value, personality traits such as neuroticism and conscientiousness, and test experience significantly influence fairness expectations. Regarding previous work experience, literature suggests that experienced applicants may develop different cognitive schemata that shape their expectations compared to applicants with limited work experience (Rousseau, 2001). Tomprou and Nikolaou (2011) suggested that employees who have work experience are more likely to have realistic expectations and perceive less promises than those who do not. Similarly, Ng and Feldman (2009, p. 1062) proposed that individuals with more years of work experience tend to have lower expectations because their perceptions of the world of work would become more realistic. First, higher work experience enables people to develop more realistic standards of "good" and "bad" work situation. Second, more experienced employees are less likely to overreact to inevitable disappointments. Therefore, in personnel selection scenarios, it is expected that applicants who have less work experience expect a higher level of procedural fairness than more experienced job seekers.

H1: Work experience is negatively related to procedural fairness expectations in recruitment and selection.

Pre-entry expectations are also influenced by information about societal and industry norms, past experiences, the experiences of family and friends, and other factors that collectively generate expectations regarding the exchange (De Vos et al., 2009). Previous breach of psychological contract has also been found to influence new expectations. Both Krause and Moore (2018) and Tomprou, Rousseau, and Hansen (2015) found that following a breach, an individual may alter his contract by reducing the perceived expectations. In Vietnamese context, Hoang et al. (2012, p. 216) indicated that corruption within recruitment and hiring systems, lack of transparency and invalid assessment practices are prevalent in Vietnamese firms. Because breaches of procedural fairness contract are not exceptions, it is expected that following a breach, job seekers may reduce their expectations regarding procedural fairness in recruitment. Furthermore, Nguyen, Bahaudin, Mujtaba and Cavico (2015) studied the variance in perception towards ethical behavior among employees in Vietnam and found significant individual differences. Specifically,

people with no government work experience demonstrate a higher level of ethical development than those with such experience. In other words, employees with previous work experience in State Owned Enterprises (SOEs) are more tolerant to unfairness and tend to have lower expectations of procedural fairness. Therefore, it is hypothesized that:

H2: Applicants who have experience in SOEs have lower procedural fairness expectations in recruitment and selection.

Tomprou and Nikolaou (2011) asserted that previous work experiences and pre-entry information about the future employer are important determinants of pre-entry expectations. During personnel recruitment process, job applicants are also expected to evaluate the information they have before, during and after the selection process to make final decisions (Bangerter, Roulin and Konig, 2012; Nikolaou and Georgiou, 2018). Rousseau (2001) suggested that organizational newcomers engage in effortful cognitive processing, incorporating both their prior beliefs and newly acquired organizational information to form their PC schema. Thus, it can be expected that before joining the organization, the candidates may seek for information regarding the organization they are applying for. Pre-entry information is collected by job applicants during the job search process from both formal channels such as organizational websites, advertisement and public relation activities, and informal channels such as social networks. Furthermore, during recruitment and selection process, the employer may send messages about the contractual obligations. Psychological contract research concludes that source of information plays an important role in establishing the employees' psychological contract. Specifically, organizational delegates such as managers, recruiters, top management, mentors or structural human resource management practices are considered more reliable source of information than others such as recruitment agencies or other insiders (Rousseau, 2001; Tomprou and Nikolaou, 2011). In personnel selection, Moser (2005) studied the relationship between recruitment sources and post-hires outcomes and found that internal candidates experienced less unmet expectations than external applicants. Internal recruitment sources refer to referrals, rehires, internships and in-house notices while external sources include job advertisements, employment agencies, executive search firms and school/college placement offices. Internal candidates are believed to have higher possibility to receive internal information about the organization before entering the organization. According to Moser (2005), recruitment sources differ in the extent to which they yield realistic information. Specifically, internal candidates receive more realistic information about their new jobs and organizations. Realistic information may help the internal candidates to develop realistic expectations about procedural fairness during selection. Froese, Vo and Garrett (2010) studied the attractiveness of foreign companies in attracting Vietnamese applicants. They found that because the

Vietnamese labor market is competitive, companies have to compete for talents. In order to attract candidates, companies send out specific recruitment messages and emphasize characteristics that applicants find more desirable. In order to be effective, these messages need to reflect the actual characteristics of the firm. Otherwise, job seekers may feel deceived as their expectations are not met, leading to dissatisfaction and turnover. Therefore, internal applicants, who have more correct information about the job, tend to have lower expectation than external candidates who only have access to advertised information.

H3: Internal candidates are more likely to have lower fairness expectations than external candidates.

Unmet expectations and procedural fairness contract breach

Self-regulation theory (Carver and Scheier, 1990) postulates that individuals compare an actual state with a desired state, and take corrective action in case of significant discrepancies. Within the context of a psychological contract, when the employees perceive that their organizations did not meet all of their promises, the perception of breach occurs (Robinson and Rousseau, 1994). Psychological contract breach can even occur even before the employees enter the new organization. Waung and Brice (2000) found that applicants not selected for a position may feel as if a psychological contract has been violated if they do not receive a rejection letter after spending the time to interview with the employer. Consequently, they are less likely to enter into an employment relationship with this employer in the future. In an employment relationship, previous research suggests that a majority of the employees perceive that they are receiving less than what they expected (Robinson and Rousseau, 1994). However, other studies proposed that not all perceived discrepancy would lead to perceived breach (Morrison and Robinson, 1997; Tran Huy and Takahashi, 2018). Schalk and Roe (2007) proposed that minor discrepancies which fall within a certain boundary are unlikely to result in negative reactions. On the other hand, variations beyond this boundary are interpreted as inappropriate or intolerable and they ignite employees' engagement in different types of corrective responses.

H4: Perceived unmet expectations positively predict perceived breach of the procedural fairness contract.

Outcomes of procedural fairness contract breach

Previous psychological contract research has shown that fulfillment of the contract exerted a significant positive impact on individuals' behaviors and attitudes (Coyle-Shapiro and Kessler, 2002; Guerrero and Herrbach, 2008). In contrast, perceived breach has been found to

negatively influence workplace outcomes (Zhao, Wayne, Glibkowski and Bravo, 2007; Bal, De Lange, Jansen and Van Der Velde, 2008; Restubog, Bordia, Tang and Krebs, 2010). Applicant reaction research provides evidences to support the positive direct impact of perceived fairness on subsequent outcomes such as perceived organizational attractiveness, job offer acceptance intention, recommendation intention, actual job offer acceptance, test performance and job performance (McCarthy et al., 2013; Konradt et al., 2017). Alternatively, Waung and Brice (2007) highlighted the role of perceived organizational obligation fulfillment on applicants' reaction. Applicants in both laboratory experiment and field survey indicated that applicants who were rejected without rejection notification tended to perceive that the organization has failed to fulfill its obligations. In addition, in both settings, perception of organizational obligation fulfillment was positively related to applicants' intentions towards the organization including reapplication, recommendations to others, patronizing the organization, and negatively related to speaking badly about the organization. In a similar vein, we can thus hypothesize that:

H5: Breach of the procedural fairness contract is negatively related to job offer acceptance intention.

H6: Breach of the procedural fairness contract is negatively related to recommendation intention.

3 Method

3.1 Sample and Procedure

A two-wave survey was designed to collect data for the current study. The survey was conducted with participants who attended a big job fair organized in Hanoi, Vietnam in 2019. According to organizer, the job fair attracted a total of 40 employers with more than 300 vacancies, many of which target experienced candidates. Reports also indicated that nearly 1500 candidates attended the job fairs with 79% of the participants have at least two years of work experience. A sample of 285 applicants accepted our invitation to join the first survey and filled in the questionnaires before they participate in the first selection activity. The respondents were asked about their demographic characteristics, previous work experience, name of the companies they applied for, and their procedural fairness expectations with regards to the company's selection process. The second wave survey was conducted right after the completion of the whole selection process informed to us by the hiring companies. We telephoned and sent the link to the online version of the questionnaires to the email addresses provided by the respondents. In order to limit the impact of self-serving bias, the second survey was conducted before the release of final selection decision (the applicants did

Table 1: Demographic characteristics of respondents

Characteristics	Description	Frequency	Percentage
Gender	Male	113	48.7
	Female	119	51.3
Age	From 16 to 25	108	46.5
	From 26 to 35	86	37.0
	From 36 to 45	39	16.5
Highest education	High school or below	45	19.4
	Vocational degree	56	24.1
	College/university	106	45.7
	Post-graduate	25	10.8
Work experience	Less than a year	69	29.7
	One to five years	65	28.0
	Six to ten years	63	27.1
	Eleven to fifty years	21	9.1
	Sixteen years or more	16	6.1
Experience in public sector	Yes	101	43.5
	No	131	56.5

not get the results of selection). The authors asked the respondents about the actual perception of procedural fairness during selection and their intentions towards the hiring organizations. There were 232 returned questionnaires which comprise the final dataset for the current study.

Of the participants, 49% were male. The age of the participants ranged from 22 to 38 years with a mean of 28.2 years ($SD=4.3$). A majority (70.3 %) of the respondents had at least one year of experience.

3.2 Analysis

The author use AMOS 22.0 with maximum likelihood estimation to conduct confirmatory factor analyses (CFA) which validate the convergent and discriminant validity of the study variables, and structural equation models (SEM) to test the hypotheses.

3.3 Measures

State experience. This is a dummy variable which take the value of 0 if the respondent has no previous work experience in the public sector and 1 otherwise.

Work Experience. This was measured the length of an applicants' work experience (in years) until the date of survey.

Internal candidate. Respondents were asked to indicate one primary source of information based on which they apply for the job. This variable was coded as a dummy variable which takes 0 if the source was job advertisements, employment agencies, executive search firms, walk-ins, school/college placement offices and so on, and 1 if the source was referrals, rehires, internships, in-house notices, and so on.

Justice expectation: To measure expectation, at the first survey, we asked the respondents to respond to the extent to which they expect about procedural justice in recruitment/selection process at the company they are applying for. The response format was a 5-point Likert scale with 1 representing "to a very small extent" and 5 representing "to a very large extent". Two variables were developed to measure expectation of procedural justice, namely Interactional Justice Expectation (IJE) which focuses on social aspect of procedural and Systematic Justice Expectation (SJE) which concerns with structural aspect. Interactional justice expectation (IJE) was measured by six items, including "the test(s)/interview(s) will be administered to all applicants in the same way". Systematic justice expectation (SJE) was measured by six items including "the content of the selection test(s)/interview(s) will be closely related to the job". These total 12 items were adopted from Selection Procedural Justice Scale (SPJS) by Bauer et al. (2001) and adapted to fit with se-

lection in Vietnamese context. Similar procedural has been reported in Bye and Sandal (2016), and Wang et al. (2019).

Unmet Justice Expectation. To measure unmet expectation, at the second survey conducted after the selection process, we asked the respondents to compare their actual experience with expectation regarding the procedural justice in recruitment/selection process. Responses were scored by a reverse-coded 5-point Likert scale with 1 representing "much more than expected" and 5 representing "much less than expected". Two variables were created; Unmet Systematic Justice (USJ) measures the perception of discrepancy between actual experience and expectation regarding the structure component of the process and Unmet Interactional Justice (UIJ) concerning the social aspect of the process. Each of the variables was measured using a six-item scale concerning the same aspects of the selection process with those used to measure expectation. A sample item for USJ is "the content of the selection test(s)/interview(s) was related to the job", and for UIJ, it is "the test(s)/interview(s) was/were administered to all applicants in the same way". Alpha coefficients for USJ and UIJ were .91 and .89, respectively.

Justice Contract Breach (JCB). The three-item Overall Procedural Justice Scale developed by Bauer et al. (2001) was adapted to measure perceived justice contract breach. The items were: "Overall, the selection process administered by the company is a fair way to select people for the job"; "The selection devices used by the company were fair by nature"; and "Overall, the method of selection used by the company was fair". Responses were measured in a reverse-coded 5-point Likert scale where 1 representing "strongly agree" and 5 representing "strongly disagree", thus higher score represents stronger perception of contract breach. Reliability coefficient for this scale was .89.

Recommendation intention (RI). Recommendation intention was captured by a three-item scale developed and used by Konradt, Warszta, and Ellwart (2013). Sample items include "I would recommend this company to others". The response format was a 5-point Likert scale with 1 representing "strongly disagree" and 5 representing "strongly agree". Reliability coefficient for this scale was .87.

Job acceptance intention (JAI). Job acceptance intention was measured by two items developed by Harris and Fink (1987) and used by Carless (2005). The items read: "If you were offered the job, would you accept it?" and, "If you were offered the job would you accept it immediately". The response format was a 5-point Likert scale with 1 representing "not at all likely" and 5 representing "extremely likely". A Cronbach's Alpha of .75 was obtained for this scale.

Table 2: Measurement items of research variables

Variable	Question wording	Source	α
Interactional Justice Expectation	To what extent do you expect the following from the company you are applying for regarding the recruitment/selection process? 1. To a very small extent. 5. To a very large extent	Bauer et al. (2001)	.83
Items	The test(s)/interview(s) will be administered to all applicants in the same way.		
	There will be no differences in the way test(s)/interview(s) is(are) administered to different applicants.		
	Test administrators will make no distinction in how they treat the applicants.		
	The content of the test(s)/interview(s) will not appear to be prejudiced.		
	The test itself will not be too personal or private.		
	The content of the test will be appropriate.		
Systematic Justice Expectation	To what extent do you expect the following from the company you are applying for regarding the recruitment/selection process? 1. To a very small extent. 5. To a very large extent	Bauer et al. (2001)	.80
Items	The content of the selection test(s)/interview(s) will be related to the job.		
	Doing well on the selection test(s)/interview(s) means that a candidate can do the job well.		
	An applicant's scores on the selection test(s)/interview(s) would indicate whether he is fit for the job.		
	All applicants will see that the selection test(s)/interview(s) is related to the job.		
	Applicants will be able show their skills and abilities through the selection process.		
	The selection process will allow the applicants to show what their job skills are.		
Unmet Interactional Justice	How would you compare your actual experience of the selection process with your expectation regarding the followings? 1. Much more than expected 5. Much less than expected	Bauer et al. (2001)	.89
Items	The test(s)/interview(s) were administered to all applicants in the same way.		
	There were be no differences in the way test(s)/interview(s) is(are) administered to different applicants.		
	Test administrators made no distinction in how they treat the applicants.		
	The content of the test(s)/interview(s) were not appear to be prejudiced.		
	The test itself was not too personal or private.		
	The content of the test was appropriate.		
Unmet Systematic Justice	How would you compare your actual experience of the selection process with your expectation regarding the followings? 1. Much more than expected 5. Much less than expected	Bauer et al. (2001)	.91
Items	The content of the selection test(s)/interview(s) were related to the job.		
	Doing well on the selection test(s)/interview(s) means that a candidate can do the job well.		
	An applicant's scores on the selection test(s)/interview(s) would indicate whether he is fit for the job.		
	All applicants saw that the selection test(s)/interview(s) is related to the job.		
	Applicants were able show their skills and abilities through the selection process.		
	The selection process allowed the applicants to show what their job skills are.		

Table 2: Measurement items of research variables (continues)

Justice Contract Breach	Please indicate your opinion regarding the following statements. (R) 1. Strongly agree 5. Strongly disagree	Bauer et al. (2001)	.89
Items	Overall, the selection process administered by the company is a fair way to select people for the job		
	The selection devices used by the company were fair by nature		
	Overall, the method of selection used by the company was fair		
Recommendation intention	Please indicate your opinion regarding the following statements. 1. Strongly disagree 5. Strongly agree	Konradt et al (2013)	.87
Items	I'd proactively recommend this company to others		
	I'd recommend this company to anyone who asks me about a place to work		
	I'd say positive things about this firm		
Job Acceptance Intention	Please indicate your opinion regarding the following statements. 1. Not at all likely 5. Extremely Likely	Harris and Fink (1987)	.75
Items	If you were offered the job, would you accept it?		
		If you were offered the job would you accept it immediately?	

4 Results

Hypotheses from H1 to H3 propose that work experience, experience in public sector and being an internal candidate would influence procedural justice expectation. To test these hypotheses, data collected from the first survey were used. The mean, standard deviation and correlation of variables in the first survey was showed in table 3.

Prior to testing the hypotheses, a confirmatory factor analysis (CFA) was conducted to evaluate the meas-

urement models of Procedural Justice Expectation. The one-factor model suggests that all 12 items load on a single factor. The 2-factor model proposes that Systematic Justice Expectation and Interactional Justice Expectation load on two different factors, each with 6 items. The results indicated that the 2-factor model fits the data significantly better than the one-factor solution. The correlation between two latent factors was 0.674. In addition, the structural model, detailed in figure 1, also fit well with the data (Table 4).

Table 3: Mean, standard deviation, and correlation of variables – first survey

Variable	Mean	SD	1	2	3	4
1. Work Experience	5.24	2.64				
2. Internal	.376	.285	.013			
3. State Experience	.618	.386	-.104	-.089		
4. Systematic Justice Expectation	3.11	.645	-.285**	-.112*	-.022	
5. Interactional Justice Expectation	3.89	.650	-.142*	-.151*	-.102	.513**

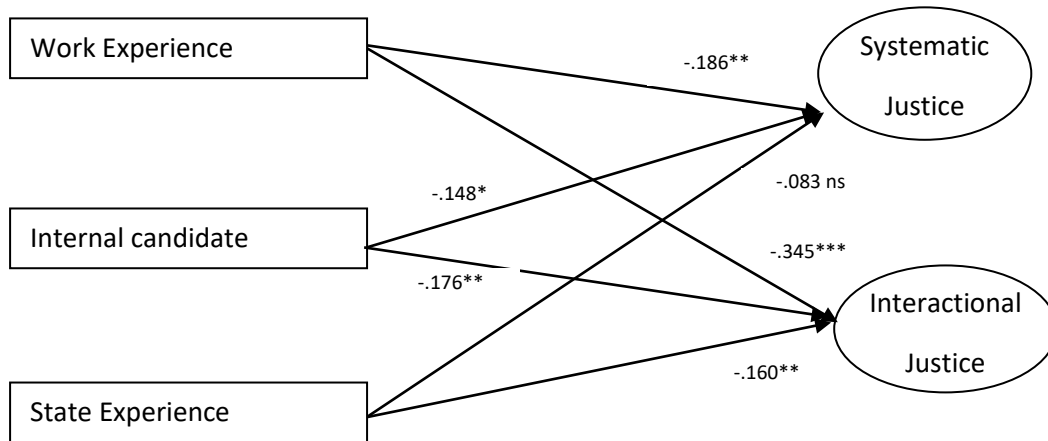
Note: *: $p < 0.5$; **: $p < 0.01$.

Table 4: Fit indices of measurement models of justice expectation

Measurement Model	Chi-square/df	GFI	CFI	TLI	RMSEA	Decision
One factor model	201.5/54	.903	.883	.824	.094	Two factor model
Two factor model	103.2/53	.951	.962	.962	.057	
Structural model (figure 1)	125.4/87	.953	.975	.977	.040	Accepted

The results of hypothesis testing were showed in Figure 1. Accordingly, work experience was found to negatively influence both IJE and SJE, providing support for hypothesis H1. Public experience significantly and negatively predicted IJE but not SJE; as a result, H2 was par-

tially supported. The results also provided support for Hypothesis H3, in which internal candidates had significantly lower expectation of both systematic and interactional justice expectations compared to external candidates.



Note: *: p<0.5; **: p<.01, ***: p<.001, ns: not significant

Figure 1: Antecedents of Procedural Justice Expectation

A confirmatory factor analysis was conducted with data collected from the second survey to test the measurement models and to examine the convergent and discriminant validity of all scales in the model. The research model consisted of five latent variables: USJ, UIJ, JCB, JAI, and RI. The measurement model fit the data well. Specifically, degree of freedom was 160, chi-square was 263.2, CMIN/df = 1.687, CFI = 0.964, TLI = 0.956, GFI = .927; SRMR = .039, RMSEA =0.046, and P-close = 0.76, which represented a close model fit, according to Hu and Bentler (1998).

Reliability, Convergent validity and discriminant validity was tested by calculating and comparing composite reliabilities (CR), average variance extracted (AVE), and maximum shared squared variance (MSV). As indicated in table 5, the critical ratios (CRs) were greater than 0.7 in all cases, confirms the composite validity of the scales. The convergent validity was achieved because no average variance extracted (AVEs) were less than 0.5. Finally, discriminant validity was confirmed when all AVEs were greater than the maximum shared variance (MSV).

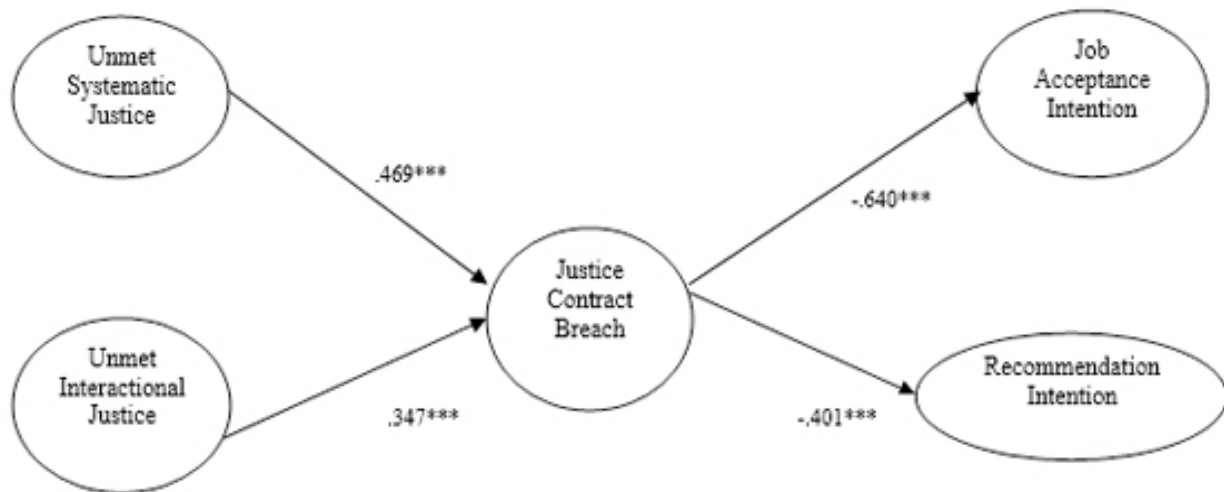
Table 5: Reliability and validity of and correlations among research variables

Variable	CR	AVE	MSV	ASV	1	2	3	4	5
1. Unmet Systematic Justice	.883	.559	.167	.122	(.748)				
2. Unmet Interactional Justice	.871	.532	.453	.284	.409***	(.729)			
3. Justice Contract Breach	.877	.704	.454	.301	.330***	.613***	(.839)		
4. Job Acceptance Intention	.856	.665	.412	.251	-.231***	-.524***	-.642***	(.815)	
5.Recommendation Intention	.712	.553	.265	.224	-.399***	-.492***	-.478***	.515***	(.744)

CR= Composite Reliability, AVE= Average variance extracted; MSV= maximum shared squared variance; ASV: average shared variance. Diagonals (in parentheses) represent the square root of the average variance extracted. N= 232, *: p<0.5; **: p<.01, ***: p<.001.

Path analysis in the structural model (figure 2) was used to test hypotheses from H4 to H6, with data from the second survey. The structural model also produced a good fit to the data ($\chi^2 = 280.3$; $df = 166$, $CMIN/df = 1.752$, $CFI = 0.965$, $TLI = 0.958$, $IFI = 0.975$, $GFI = 0.928$, $SRMR$

$= .048$, $RMSEA = .044$, and P -close is $.87$). The results indicated that both UIJ and USJ significantly predicted JCB, which, in turn, significantly influenced OAI and RI. Therefore, hypotheses H4, H5 and H6 were supported.



Note: *: $p < 0.5$; **: $p < 0.01$; ***: $p < 0.001$, ns: not significant

Figure 2: Antecedents and consequences of Justice Contract Breach

5 Discussion and conclusion

5.1 Discussion

The current research investigates applicant's reactions to procedural justice in recruitment and selection. Unlike other research which focuses on the direct impact of justice perception on applicants' outcomes, it examines the interaction between justice expectation and justice perception as a predictor of job acceptance intention and recommendation intention. The results indicated that it is the perceived discrepancy between real experience and expectation that predicts applicant's intentions. Perceived unmet structural and interactional justice negatively predicted job acceptance intention and recommendation intention. Yet, it was found from the data that perceived unmet expectation of procedural justice components positively predicted the overall justice contract breach. Overall perception of procedural justice contract breach, in turn, appeared to be a better predictor of applicants' reaction, including job acceptance intention and recommendation intention. The findings were in support of the psychological contract theory. The theory suggests that applicants tend to develop the expectation about the jobs and the organizations they are

applying for, including expectations for procedural justice during selection. These expectations can be incorporated into the implied contract towards the hiring organization. During the actual selection process, the applicants compare and contrast what they experience and what they expect. The feeling of unmet expectation occurs when the applicants perceive that the actual experience is less favorable than their expectations. Such unmet expectations, may lead to negative attitudinal and behavioral outcomes. Ultimately, high degree of discrepancies may eventually lead to the perception of overall contract breach, which ultimately affects applicant's reactions.

The expectations regarding procedural justice in selection were developed based on an applicant's past experience and pre-entry information. Specifically, the data showed that applicants rich in work experience have significantly lower procedural fairness expectations than those who lack such experience. The results can be explained in the light of psychological contract which postulate that applicants with a long previous work experience, may develop different cognitive schemata to organize the information they obtain, while those with limited previous work experience are more likely to rely on schemata developed in similar, yet different contexts, such as a college or university. Therefore, candidates with limited previous work experience may have expectations are inconsistent

with the organizational reality (Welander et al., 2020).

Experience in public sector has been found to negatively predict interactional dimension of procedural justice expectations but not systematic dimension. The findings can be explained by previous argument regarding the issue of cronyism in Vietnamese context. Cronyism refers to the favoritism given by the leader to his or her followers based on their personal relationship, rather than the latter's capability or qualification (Khatri and Tsang, 2003). In the public sectors, Tran, Fallon and Vickers (2016) found that, exemplary behaviors and people skills are more valued than intelligence, knowledge, and expertise. Nguyen, Teo and Ho (2018) suggested that employees in Vietnam tend to accept overqualified tasks or those that fall outside their job descriptions and perceive superiors' abuse of power and unfair treatment as legitimately. Therefore, it could be expected that although applicants with experience in public sector may expect fairness in the content of selection tests and interviews, they may have lower expectations regarding the interactional fairness in personnel selection scenarios due to cronyism issues.

Source of candidates was another important determinant of justice expectations, with internal candidate has lower expectations of procedural justice than their external counterparts. Reason for that may be found in the fact that in applying to a new job, applicants are likely to seek information from a wide range of organizational agents, and it is likely that each of these agents will provide the employees with inconsistent information (Welander et al, 2020). It can be expected that external agents such as employment agencies and executive search firms may provide positively-biased information to attract applicants to apply to the hiring companies. On the other hand, for internal sources such as referrals, the referrers, in fear of losing their credentials to friends or acquaintances, are more likely to provide accurate information regarding procedural fairness.

5.2 Theoretical contribution

The current study provides an alternative way to look at applicants' reaction to procedural justice in recruitment and selection. Viewing through the lens of the psychological contract framework, it highlighted the role of justice expectation, the perception of unmet expectation and overall perception of justice contract breach on applicants' outcomes. While previous research acknowledged the important role of fairness expectations in applicants' reaction, no empirical study investigates the relationship between these variables.

By confirming the role of previous work experience and pre-entry information as predictors of justice expectations, it adds to the current understanding of the antecedents of procedural justice expectation in addition to individual difference and personality traits (Wang et al., 2019).

Finally, although there are considerable research evidences in the field of applicant reactions to recruitment and selection, a vast majority of existing studies was conducted in Western context. Nikolaou and Georgiou (2018) indicated that there are very few studies exploring this topic in a non-English culture. Furthermore, McCarthy et al. (2017) reviewed 145 studies conducted in the field in the period from 2000 to 2015. Among these 145 studies, none were dedicatedly focused on an Asia-Pacific country. Although some countries such as Korea, China, Taiwan and Vietnam have been mentioned in previous study, this was only as a part in a multi-country comparative survey. This study provides some insights on the issues of applicants' reaction in Vietnamese context.

5.3 Practical contribution

First, according to Buhwar, Varma and Patel (2016), Vietnam is facing a talent dilemma with an excess supply of non-skilled and semi-skilled labor, while there is a continuing shortage of skilled labor. Strong demand for talent creates fierce competition in the labor market. In that situation, ensuring that the recruitment and selection process is implemented in a fair and justice manner would enhance the job offer acceptance rate and recommendation among applicants.

Second, due to high competition in the labor market, many organizations have to rely on external recruitment agencies and executive search firms to find appropriate applicants for their vacancies. These headhunting agencies search the labor market for suitable candidates and refer them to the hiring organizations. In order to attract qualified applicants, these headhunting companies may exaggerate positive information and conceal negative aspects about the hiring firms and selection procedure, which may lead to unrealistic expectations among job applicants. Inflated expectations based on biased information could increase the experience of contract breach. Therefore, the hiring organizations should provide accurate information about recruitment process via official organizational channels in order to reduce the negative impacts of perceived breach of psychological contract.

5.4 Limitation and future research

In spite of the theoretical and managerial contributions, this study has some limitations that can be addressed in future research. First, data for this study were collected with participants who attended a job fair, which may be subject to selection bias. Respondents would be those who are interested to apply for the job vacancies at the companies in the job fair only. Furthermore, job fair attendants tend to be relatively young, with mean age of 28 years; therefore, generalizability of research results may be limited. Future

research may focus on a wider population to yield more significant results. Second, the current study concerns job offer intention and recommendation intention which may also be influenced by other factor such as individual preference, alternative job offer and offering packages. Intention may not necessarily lead to the actual behaviors. Therefore, future research may include possible moderators in a longitudinal research design. Finally, changes in the expectations are likely to occur in relation to the applicants' actual experience. Current research design is unable to capture such changes in applicants' expectations which leave room for future research.

5.5 Conclusion

This study provides further evidence to support the influence of procedural justice on applicant reactions. By conducting a two-wave survey, the current study suggests that the perceived discrepancy between employee expectation and actual experience of procedural justice is indeed important in shaping employees' reactions. Therefore, ensuring the transparency of recruitment and selection procedure is of great importance to Vietnamese firms. In hiring context, Hoang et al. (2012) found that Vietnamese applicants prefer objective selection methods than methods that require personal contacts, in comparison with U.S applicants. They also indicated that corruption within recruitment, biased judgments of managers and supervisors, and getting a job through one's personal connections are the main reasons. Furthermore, as firms have to compete for talents, many firms rely on outside recruitment agencies to attract candidates. These agencies tend to inflate the benefits of the jobs at the hiring firms, causing unrealistic expectations. In order to reduce unmet negative reactions resulting from perception of nepotism and favoritism, firms need to provide timely and accurate information regarding their recruitment and selection practices via official channels. Furthermore, because of the changing nature of applications' expectations, regular updates to the recruitment and selection procedures may be necessary to ensure a competitive workforce.

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Proceduralna pravičnost pri zaposlovanju v luči teorije psihološke pogodbe

Ozadje in namen: Kandidati za zaposlitev svoje ocene pravičnosti izbire ne temeljijo zgolj na dejanskih izkušnjah, temveč tudi primerjajo, kaj se zgodi pri izbiri kandidatov in kaj so pričakovali. Ta študija zato preučuje reakcijo prosilcev na proceduralno pravičnost pri izbiri kandidatov za zaposlitev skozi prizmo teorije psihološke pogodbe. Le-ta poudarja vlogo pričakovanj, neskladja med zaznavanjem in pričakovanjem ter zaznane kršitve pogodbe pri posameznih izidih.

Zasnova / metodologija / pristop: Izvedeni sta bili dve anketi med iskalci zaposlitve v Vietnamu, ena pred izbirnim postopkom in ena po njem. V prvi anketi so iskalci prejeli natisnjene vprašalnike, v drugi pa so izpolnjevali spletno anketo. Za analizo podatkov je bila uporabljena tehnika modeliranja strukturnih enačb.

Rezultati: Analiza podatkov, ki so bili zbrani na vzorcu 232 iskalcev zaposlitve kažejo, da so bile prejšnje delovne izkušnje in izvor kandidatov (notranji, zunanji) v veliki meri povezani s pričakovanji glede pravičnosti. Poleg tega je bilo ugotovljeno, da zaznana neizpolnjena pričakovanja napovedujejo kršitev proceduralne pogodbe, kar pa je negativno vplivalo na namen sprejetja zaposlitve in namen priporočila drugim kandidatom.

Zaključek: Raziskava poudarja vlogo nezadovoljenega pričakovanja pravičnosti, zaznane neskladje med tem, kar se je zgodilo in tem, kar so pričakovali, pri napovedovanju namere sprejetja ponudbe in priporočanja drugim. Rezultati kažejo, da bi morala podjetja vsem udeležencem, kot so interni zaposleni, agencija za zaposlovanje in spletno mesto za iskanje zaposlitve, zagotoviti posodobljene in uradne informacije v zvezi z izbirnim postopkom, da zmanjšajo prevelika pričakovanja.

Ključne besede: *Reakcija prosilcev, Proceduralna pravičnost, Pričakovanja, Psihološka pogodba, Namen sprejetja dela, Namen priporočila*

Impacts of the Transformation to Industry 4.0 in the Manufacturing Sector: The Case of the U.S.

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Background and purpose: The transformation to Industry 4.0 increases the number of robots installed within industries, which brings great shifts in industrial ecosystems. For this reason, our research goal was to analyze the key performance indicators to investigate the economic and social sustainability of the changes in production.

Methodology: The combination of official (World Bank, U.S. Bureau of Labor Statistics) and publicly available (Federal Reserve Economic Data, Industrial Federation of Robotics) data was used for statistical data processing, including comparison, correlation, cross-correlation and vector autoregression analysis, to present the past developments and also to predict future trends within the U.S. manufacturing sector.

Results: In contrast to robust industry robotization observed in the 2008–2018 period, the share of manufacturing output and employment declined. Nonetheless, the vector autoregression model forecast shows, that the U.S. manufacturing sector has arrived at a turning point, after which robotization can increase employment and labor productivity of workers, while also stimulating further growth of their education levels.

Conclusion: The transition to Industry 4.0 has a major impact on increasing demands for new knowledge and skills for increased productivity. Accordingly, forecasted growths of analyzed manufacturing indicators suggest that negative impacts of robotization in the recent past were only temporary, due to the entrance to the Industry 4.0 era. Nonetheless, additional policies to support sustainable industry development are required.

Keywords: *Industry transformation, Robotization, Industrial output, Labor productivity, Employment, Education level, Industry 4.0, Industry 5.0*

1 Introduction

This paper focuses on the recent transformation of industry, specifically the performance of the manufacturing sector as the most robotized sector, in light of the process of robotization. Namely, based on literature review and initial data processing we noted that robotization has been accelerating during the transformation to Industry 4.0, while the increased number of robots within the industry has been having mostly negative impacts on the economic and social indicators. For this reason, our research goal was to analyze some of the key performance indicators to investigate economic and social sustainability of produc-

tion. Particularly, we aimed to investigate the first two of the concrete and measurable goals that are described as challenges and opportunities of Industry 4.0 production (Gianelle et al., 2016): economic sustainability of production, social sustainability of production, production of future products, and environmental sustainability of production.

This paper intends to provide clear insight into the current developments within Industry 4.0 transformation, due to the inconsistency within the existing literature, some highlighting positive effects of robotization, while others, negative ones. Namely, in some reports (e.g., in WEO, 2018a) only positive consequences of Industry 4.0 are put to the front. On the other hand, there are also negative

views detected in the literature (e.g., in Compagnucci et al., 2019). Based on an initial analysis of certain economic indicators, social indicators, and considering ethical consequences, we first shared negative views. Namely, the recent transition to Industry 4.0 did not bring the expected outcomes, as revealed by, for example, the U.S. Bureau of Labor Statistics (2019a), while it brought great changes in society (claimed by e.g., Johannessen, 2018). Furthermore, it is predicted that all tasks that are highly manual and routine will soon be automated, while artificial intelligence (AI) and robots might present an existential threat to the human role in industry.

In contrast, governments stimulate and supply funds for investments in advanced technologies, including robots; they can also provide “safety nets” to enable social sustainability (in the form of e.g., National Robot Initiative 2.0) of production. For this reason, it is also necessary to determine whether the stimulus and funds are (or will be) achieving their purpose. Our motivation was hence also to determine when (if) we can expect positive outcomes of investments in robotization.

To analyze recent economic and social indicators for the manufacturing sector, we used official data on output, employment, labor productivity, education level change and the Industrial Federation of Robotics (IFR) data on the number of shipped industrial robots¹. Based on the combination of these data, we presented new associations during the past period of Industry 4.0 and calculated the expected future developments.

The following chapter of the paper includes a literature review, introducing some background views on the transition to Industry 4.0. The third chapter describes our research goal and sets out the research questions, while the fourth presents the data and the research methods we used. The next two chapters present data analysis and summarize our key findings. The last chapter puts forward a critical view on certain literature from the field of research and discusses the possibilities for further human-friendly industry transformation. It also includes considerations about the options for the integration of human capabilities with technology, as they cannot be disregarded within this scope.

2 Literature Review

Due to current megatrends (globalization, global knowledge society, technology advancements and resource scarcity), the manufacturing sector is being transformed on the basis of innovations that are available and offer competitive advantages. For this reason, the research priorities of Industry 4.0 are the following: efficient use of resources, customer-focused production, advanced production processes, digital and virtual factories, flexible and smart production systems, mobility, collaboration and human-oriented production (Gianelle et al., 2016).

Smart manufacturing is the central element of the Industry 4.0 concept (Kagermann et al. in Frank et al., 2019). Compared to traditional production, smart factories, which arose within Industry 4.0, are more efficient, produce better quality products, and enable time and cost savings. Smart factories, primarily at the level of processes, change how production plants operate to the extent that all dependent production processes are transparent and combine the virtual and the physical (EFFRA, 2016). The products, resources and processes of the smart factory go into the composition of virtual-physical systems in which materials efficiently move through the production process from the supplier to the finished product and further to the customer. Smart factories combine their solutions for sharing and monitoring, based on a comprehensive integration of manufacturing facilities and technologies. For this reason, Jerman et al. (2020) identified the following key competencies needed by workers in smart factories (from the automotive industry): ICT and technical skills, innovation and creativity, openness to learning, adaptability, and various soft skills.

The recent technology focus in the manufacturing sector is directed toward factories of the future. Factories of the future are raising the level of robotization and are linking knowledge and creativity, enabling increases of added value per employee, and new market opportunities (World Economic Forum, 2018a). However, the integration of technological solutions requires a commitment to the comprehensive exchange of business and production information, based on which it is possible to increase the efficiency and optimization of all production processes: from identifying market needs, planning, modeling and manufacturing a new product, to planning production resources, logistics, and stock management (Gianelle et al.,

¹The term “industrial robots” is based on the definition of the International Organization for Standardization (ISO 8373): an “automatically controlled, reprogrammable multipurpose manipulator programmable in three or more axes”. Industrial robots can be classified according to mechanical structure: articulated, cylindrical, linear (including cartesian and gantry), parallel. or SCARA robots (IFR, 2020).

²Frank et al. (2019) separate Industry 4.0 technologies into two main layers: the first is the front-end, which comprises the four main dimensions of Industry 4.0: smart manufacturing (including AI among others), smart products, smart supply chain and smart working, each of them representing a specific subset of technologies; the second layer is base technologies, which are those that provide connectivity and intelligence to the front-end technologies (IoT, Cloud, Big Data and Analytics).

2016).

Many companies have already applied Industry 4.0 technologies² and processes, but several authors warn about current threats of this fourth industrial revolution in the form of economic and social crises, which are, according to Johannessen (2018), ingredients for a social storm. There are also other problems put forward, such as decreased collected labor taxes, as there is no tax and also no social contributions (Bottone, 2018), and other costs related to robots replacing human workers. There are also mixed views regarding, for example, a robot tax would hamper “freeing up” labor and sustain tension on the labor market in economies with labor scarcity (Vermeulen et al., 2020), but it is advised in economies with labor surplus.

Robots replacing humans in essential sectors reduce or eliminate employees’ social benefits and pensions, creating social disruption (Lakshmia and Bahlib, 2020). Job security is threatened by a growing number of robots that take over even the most underpaid jobs (Johannessen, 2018). All the routine-based and repetitive tasks, both in manufacturing and service-oriented professions, will be threatened (Lima, 2017). Moreover, robotization and informatization may even contribute to a dissolution of the middle class (Davidow and Malone, 2014 and Chiacchio et al., 2018), while we should also consider the ageing of the workers lowering their productivity in some workplaces (e.g., machine operators and assemblers) (Aiyar et al. in Bogataj et al., 2019). Therefore, this development needs to be regulated on national and transnational levels. Otherwise, employment in the manufacturing sector can be reduced dramatically, such as in the 1970s when many of the textile workers in the OECD area were made redundant in less than one year (Hienstra-Kupeus and Van Voss, 2010). Moreover, as Abramova and Grishchenko (2020) state: “Policy-makers should take into account the transition of labor from old to new jobs, reduce the period of adaptation, and likewise prepare education and training system for acquiring skills for the utilization of new technologies.”

The rapid advancements in manufacturing technology and in information and communication technologies require an intense and continuous update of workers’ knowledge, which is essential for their integration and smooth adaptation into industrial working practices (Lindeberg, 2018). Governments should require and encourage enterprises to organize skills-training courses and assist them to adapt to new technologies (Guoping et al., 2017), namely a rapid development of technology enables changes in industry as a whole, and the industry’s focus moved to the funding of advanced technological solutions to increase outputs and productivity.

Although Acemoglu and Restrepo (2017) demonstrated high and robust negative effects of robotization on employment and wages, and Compagnucci et al. (2019) used IFR data to demonstrate that the introduction of ro-

bots plays a key role in slowing down human labor and compensation growth, while Cho and Kim (2018) used IFR data for the multiple regression considering the triangular relationship of employment-working-hours-wages, to show that job destruction due to robotization is not yet very remarkable. In contrast, Cséfalvay (2020) claims “Recent studies clearly show that robotization is associated with economic growth and productivity gains.”

Josefsson in Lindeberg (2018) stated: “Robots are now everywhere, except in the productivity statistics”, having in mind that robots do not have a positive impact on productivity, which can be regarded as the contemporary productivity paradox. Also, Lakshmia and Bahlib (2020), stating: “While robots and AI researchers advocate their significant role in productivity boost, job creation, wage increment and accelerated performance, such promises are not evident in the immediate future,” explain the observed discrepancies through the modern productivity paradox.

While Glaser and Molla (2017) argue that more robots mean fewer jobs, the IFR (2017) has a different opinion, arguing: “Robots substitute labor activities but do not replace jobs.” and “Robots increase productivity and competitiveness.” Also, the Future of Jobs 2018 survey (UK Parliament, 2018) indicates that new technologies create more jobs and new industries. However, it is not clear whether new technologies create more or fewer jobs than these technologies have eliminated.

Some industrial robots can be very expensive, due to advantages including accuracy and productivity, but robots are still generally considered to be a cheaper workforce, which additionally provokes the worry and uncertainty of workers. Such concerns are also derived from the fact that changes in society can happen much slower than changes in technology and that people cannot compete with robots in the speed of data storage, capacity and retrieval of data (Rojko and Jelovac, 2018). People also cannot compete with technological solutions and robots in many other things: power, precision, ability to work under difficult conditions, and similar factors.

As Šimek and Šperka (2019) quote in their case study: “The development of IT capacity and overall technology will move forward to a state where robots will not only execute the workflow but also assign the work across the company to both robots and humans.” The central ethical concern of the transformation to Industry 4.0 is the decreasing need for human engagement and the lack of commitment to consider moral aspects. In fact, installed industry robots replace human workers, which leads to the devaluation of human work and its meaning.

Human workers are afraid that AI and robots can become an existential threat to their existence in industrial processes. However, there are advocates of use and development of AI; Wilson (2017) argues that in the longer perspective the technical evolution, including robots, will serve us all, and Hendler (2017) claims “Humans working

together with smart machines will be able to do better than either one of them can do alone.”

In response to ethical considerations, nine top issues in AI were outlined (Bossemann, 2016): unemployment, inequality, humanity, artificial stupidity, racist robots, security, evil genius, singularity, and robot rights. For our research topic, unemployment, inequality, and humanity are ranked as the top issues, while due to the risk of uncontrolled development of AI, even the World Economic Forum (2018b) facing an automated future, asked: “What moral framework should guide us?”

Supporters of the human role in industry believe that the further transformational goal should be to return jobs to people, but they will have to co-operate, communicate, and interact with advanced technological systems, including robots. However, this poses questions about the ability of AI to apply ethical, cultural and moral norms of modern societies. Specifically, in addition to the above-mentioned concerns over robotization and AI, there are also other impacts; for example, study results of Guo et al. (2019) suggest that humanoid robot’s emotional behaviors can evoke significant emotional responses among users. Accordingly, as already widely acknowledged, Putilo et al. (2020) claim that the mass robotization of the manufacturing and service sectors requires solving the problems of the necessity of introducing the status of electronic personality to intelligent robots, defining their legal capacity in the civil, labor, and other fields of law.

The different opinions presented above show the inconsistency within the literature and provide a blurry picture of the current transformation of industry. Moreover, since governments stimulate and provide funds for investments in advanced technologies, it is necessary to determine whether those stimulus and funds are (or will be) achieving their purpose and if economic and social sustainability (as two of the most important goals of Industry 4.0 according to Gianelle et al. (2016)) of the production are viable outcomes of the recent industry robotization or not.

3 Research goal and research questions

Addressing the challenges of transformations within Industry 4.0 should be a major part of the research in this field, as the effects of robotization are currently not clear. For this reason, our research goal was to analyze the key performance indicators to investigate the economic and social sustainability of production. We used the combination of the official and publicly available data to present developments within the past researched period and to calculate further trends.

We, therefore, set the following research questions:

1)How do employment and output change in the man-

ufacturing sector in relation to the industry as a whole?

2)What were the impacts of robotization on employment and labor productivity in manufacturing during the period of entrance to Industry 4.0?

2.1)How is the impact of robotization reflected in employment and labor productivity in manufacturing?

3)How did the employees’ education level change during the period of manufacturing entrance to Industry 4.0?

3.1)Is the impact of robotization reflected in the change of education level of employees in manufacturing?

4)What are the expected future interrelated developments of manufacturing labor productivity, employment, education level and robotization?

In the next section, we present the methodology with which we made comparisons and calculations to answer the above-listed research questions.

4 Methods

We used official and publicly available data to answer our research questions, as such data allow the highest reliability and lead to solid conclusions. An analysis and statistical data processing of the U.S. Bureau of Labor Statistics (2019a, 2019b and 2019c), the Federal Reserve Economic (2018), and World Bank (2019) data, combined with publicly available IFR (2018b and 2019) data and sources, enabled us to develop an alternative view on the current transformation of the industry ecosystem.

We focused on the data for the period between 2008 and 2018. We started by presenting the data on employment and output in U.S. industry as a whole, compared to the same data for the U.S. manufacturing sector, as well as the predicted growth thereof in the forthcoming 10-year period. In the next stage of our analysis, we focused on multiple time-series data containing the number of industrial robot shipments, labor productivity in the manufacturing sector, employment and employees’ education level in manufacturing. Here, the labor productivity is measured as the amount of goods and services produced according to the number of hours worked to produce those goods and services (U.S. Bureau of Labor Statistics, 2019b), both in the manufacturing sector.

We first outlined the number of industrial robot shipments and employment in manufacturing and compared them to labor productivity in the manufacturing sector. Afterwards, we also studied general education trends vs. industrial robot shipment. In both cases, the significances of trends as a function of time were tested using regression analysis and t-tests.

Following the demonstrated trends, we further investigated the association between the observed time-series data. On the one hand, we calculated the correlation between labor productivity in the manufacturing sector and the number of industrial robot shipments, as well as be-

tween labor productivity and the number of employees in manufacturing. On the other hand, we also analyzed the association between education level change and the number of industrial robot shipments. To do so, we used cross-correlation analysis, which, besides quantifying the immediate correlation between the two time series, enables assessing the responsiveness of one time series to the other, by simultaneously taking into account the time dimension (t). The cross-correlations are calculated as a nor-

$$r_{xy} = \frac{\sigma_{xy}(T)}{\sqrt{\sigma_{xx}(0)\sigma_{yy}(0)}} = \frac{\frac{1}{N-1} \sum_{t=1}^N (x_{t-T} - \mu_x)(y_t - \mu_y)}{\sigma_{xx}(0)\sigma_{yy}(0)}$$

malized version of the cross-covariance function (Shumway and Stoffer, 2017):

(1)

where x_t and y_t are the observed time series with N data points, μ_x and μ_y are their means, $\sigma_{xx}(0)$ and $\sigma_{yy}(0)$ are their variances, T represents a time lag, and $\sigma_{xy}(T)$ is the cross-covariance function between the observed time series at lag T .

Following the normalized cross-covariance function, we calculated the cross-correlation function (CCF), which represents a set of correlations between the time series x_{t+T} and the time series y_t for lag values $T=0, \pm 1, \pm 2$, and so on. The value of r_{xy} ranges from -1 to 1 . It is to note also that the cross-correlation function is not symmetric around zero, which means that $r_{xy}(T) \neq r_{xy}(-T)$. When lag is negative ($T < 0$), the set of correlations refers to the correlation between the x time series at a time before t ($x_{(t-T)}$), and the y time series at time t (y_t). When the lag is positive ($T > 0$), the set of correlations refers to the correlation between the x time series at a time after t ($x_{(t+T)}$), and the y time series at time t (y_t). When time lag equals

$$r_{xy} = \frac{\sigma_{xy}}{\sigma_x \sigma_y}$$

zero ($T=0$), the value of cross-correlation equals the value of the Pearson correlation coefficient:

(2)

where σ_{xy} is the covariance between the observed time series x_t and y_t , while σ_x and σ_y are their standard deviations. Significant correlation values suggest that the changes in one time series appear immediately following the changes in the other time series (Shin, 2017).

To present the results of cross-correlation analysis, we used a graphical representation of CCF using correlation plots. The x-axis represents a time lag (T), and the y-axis represents the value of cross-correlation. Blue dotted lines (at Figures 2, 3, and 5) represent the approximate 95%

confidence intervals that serve as the threshold for identifying statistically significant cross-correlation values. To identify a potential significant correlation between lagged time series x and time series y at time t , we examined the values of CCF for negative lag values ($T < 0$). In this case, when the cross-correlation is statistically significant, then the change in time series x leads to the change in time series y after the period, determined by the lag T , at which cross-correlation is significant (Shin, 2017).

Based on the cross-correlation analysis results between the observed time-series, we also examined possible dynamics of the observed time series. Thus, we finally conducted vector autoregression (VAR) analysis, which is an extension of well-known linear- and auto-regressions. When analyzing k time series, the VAR analysis allows predicting all k time series variables using a single model, instead of fitting k regression models individually. The VAR model is best presented as a system of multiple equations, in which there is one equation for each time series as a dependent variable, where the goal is to estimate each equation separately using the lagged values of all k time series as predictors (Hanck et al. 2019). Following the basic form of a VAR model (as suggested by Zivot and Wang, 2006), for the i -th time series in the VAR model, we can

$$Y_{i,t} = \beta_{i0} + \sum_{i=1}^k \sum_{j=1}^T \beta_{1ij} \cdot Y_{i,t-j}$$

present the equation as:

(3)

where k represents the number of time series included in the model, T denotes a time lag, and the β s are estimated using ordinary least squares.

To fit the best model, we also had to estimate the optimal number of lags (T), which defines a lag order of the VAR model. Here we used the Akaike's Information Criteria (AIC) and chose the specification that has the smallest value for AIC (as explained by Zivot and Wang, 2006). We also assessed the quality of the defined VAR model using F-test and its p-value, as well as the multiple R², to identify the proportion of the variance explained by the model. Then, we estimated the proposed VAR model, in which the significance of the results was tested using a t-test. Finally, we used the estimated model to predict and present the future trends in labor productivity in the manufacturing sector, the number of industrial robot shipments, manufacturing employment, and manufacturing employees' education level change.

5 Results

In comparison to previous studies, we decided to analyze data for one of the most robotized economies (the U.S.)³ and attempted to consider several of the most relevant indicators simultaneously, to show a concise and clear image of the performance of the manufacturing sector in

light of the transformation to Industry 4.0. Specifically, as Essentra (2019) is suggesting, the U.S. is the leading market in Industry 4.0, while Schreiber in Essentra (2019) explains, “The U.S. government sees manufacturing as an engine for growth and we’ve seen increased research and development (R&D) tax credits and lower corporate rates.”

Table 1: Employment (in thousands) and output (billions of dollars) - companies from the manufacturing sector and industry as a whole in the U.S. (years 2008 to 2028) (U.S. Bureau of Labor Statistics, 2019a)

	2008	2018/2008	2018	2028/2018	2028
Total Employment	149,276.00	7.88%	161,037.70	5.22%	169,435.90
Manufacturing Employment	13,405.50	-5.35%	12,688.70	-5.05%	12,048.00
Total Output	28,909.50	14.99%	33,241.90	20.47%	40,045.30
Manufacturing Output	5,989.20	2.42%	6,134.00	16.81%	7,164.90

In Table 1, we present data on employment and outputs in companies from the manufacturing sector and in industry in general in the U.S. to answer our first research question. The data show that the employment in the U.S. grew at a compound annual growth rate (CAGR) of 0.7% from 2008 until 2018 in the industry as a whole, while in the manufacturing sector it declined at a CAGR of 0.5%. Projections show that in the next decade we can expect CAGR growth of 0.5% in industry as a whole, while in manufacturing a continued decline of 0.5% is projected.

Furthermore, the data from Table 1 reveal that from 2008 to 2018, the U.S. industrial output increased by 15.0% in general, while in manufacturing it increased only by 2.4%. Considering the same (constant 2011 dollars) variable, from 2008 to 2018, the CAGR of 1.3% in the industry as a whole was measured, while in the manufacturing sector it grew only by 0.2%. From 2018 to 2028, stronger CAGR growth of 1.7% in industry as a whole is expected, while in manufacturing only the increase of 1.4% is projected.

As a result, the percentage distribution among different sectors shows (U.S. Bureau data, 2019a) that the share of output from the manufacturing sector is decreasing, as it declined from 20.7% in 2008 to 18.5% in 2018, and a further decline is projected in 2028 to 17.9%. Similarly, the share of manufacturing employees declined from 9.0% to 7.9% (2008 vs. 2018), while further decline to 7.1% is

expected in 2028.

Data from Figure 1 answer our second research question, as they present the number of industrial robot shipments in the U.S., which grew at a CAGR of 11.3% from 2008 to 2018 (IFR, 2018b and 2019). As shown in Table 2, the growth in the number of industrial robot shipments in the 2008–2018 period is significant, for which time explains 93.4% of the variation in growth.

In contrast, in the same period, employment in manufacturing declined at a CAGR of 0.5%, and as shown in Table 2 the change in the number of employees in the 2008–2018 period is not significant. Additionally, time explains only 2.5% of the variation in the number of employees. Similarly, labor productivity in manufacturing grew at a CAGR of 0.8% from 2008 to 2018, while the growth in labor productivity in this period is not significant and time explains only 6.7% of the variation in labor productivity growth.

We can observe the drop in both the number of industrial robot shipments as well as the employment in manufacturing in 2009 as compared to 2008, which can be attributed to the 2008-economic crisis. In the following years, from 2011 to 2018, we ascertain steady increases in both the number of industrial robot shipments and employment in manufacturing, but the increase in the latter was much less intense.

³In terms of industrial robot shipments, China led among individual countries, based on 36.5% share in 2018 (1.4 percentage points less than in 2017), while the U.S. climbed from fourth to third place (behind Japan and Republic of Korea) in 2018, based on 21.6% y-o-y growth (IFR, 2019). The driver behind the continued growth of industrial robot shipments in the U.S. is the ongoing trend to automate production in order to strengthen the country’s industry and to keep manufacturing production at home, or to bring it back home (IFR, 2018a). In 2018, the average global robot density of 99 industrial robots installed per 10,000 employees was measured in the manufacturing industry. With an average of 114 units, Europe is the region with the highest robot density, while the Americas the second with 99 units, followed by Asia/Australia with 91 units (IFR, 2019).

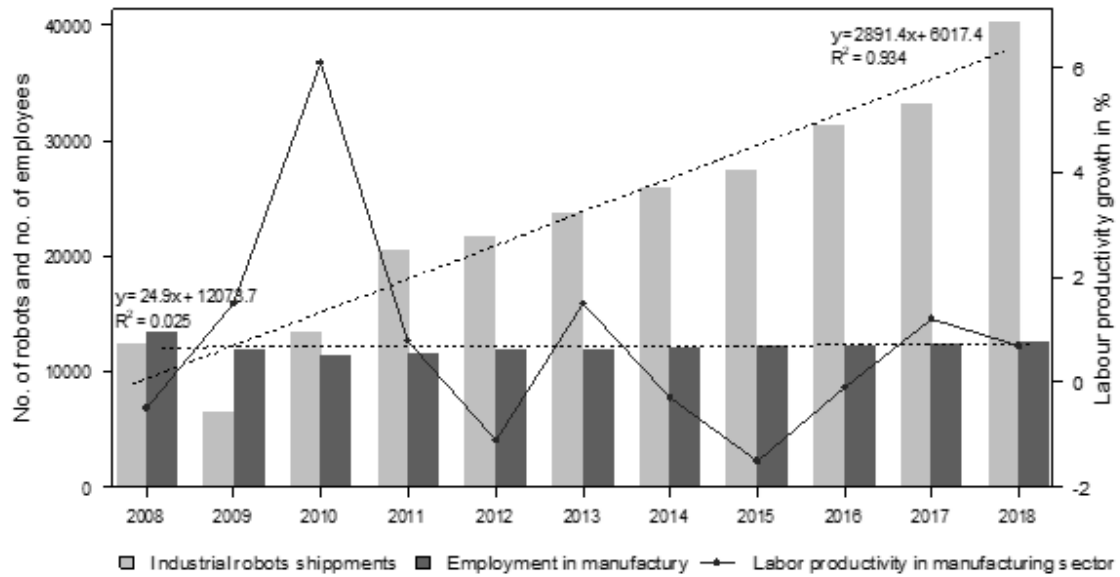


Figure 1: Number of shipped industrial robots and number of employees vs. labor productivity (percentage change from previous year) in the U.S. manufacturing sector (2008-2018) (IFR, 2018b and 2019, U.S. Bureau of Labor Statistics, 2019b and 2019c)

Table 2: Number of shipped industrial robots, number of employees and labor productivity (percentage change from previous year) in the U.S. manufacturing sector (2008-2018) as functions of time

RS	Estimate	Std. error	t-value		F		R ²
			statistic	p-value	statistic	p-value	
Constant	6017.3818**	1744.9017	3.449	0.007	126.308	0.000	0.934
Time	2891.3909**	257.2717	11.239	0.000			
EMPL							
Constant	12073.7000**	348.6529	34.630	0.000	0.234	0.640	0.025
Time	24.8796	51.4061	0.484	0.640			
PROD							
Constant	1.7145	1.3463	1.273	0.235	0.650	0.441	0.067
Time	-0.1600	0.1985	-0.806	0.441			

** The estimate is significant at the 0.01 level.

Furthermore, labor productivity in manufacturing varied from one year to another (U.S. Bureau of Labor Statistics, 2019b), but we would like to emphasize that the situation was not improving. If we exclude direct impacts of the economic crisis starting in 2008, the labor productivity in manufacturing was very low, especially in the last eight years presented, in which the greatest year-over-year growth of 1.4% was recorded in 2013, and the strongest decline of 1.6% was measured in 2015.

To answer our first (2.1) research sub-question, we used the cross-correlation analysis to test the association

and potential impact of industrial robot shipments on employment and labor productivity in the manufacturing sector in the observed 2008–2018 period (Figure 2 and Figure 3).

Figure 2 presents the CCF for the number of industrial robot shipments and employment in manufacturing. The correlation between the observed time-series data (when time lag = 0 years) shows weak positive association ($r = 0.24$), which means that immediately after the number of shipped robots increases, the employment in manufacturing increases too. However, significant correlation appears

only at time lag = -1 year ($r = 0.60$), indicating that an increase in the number of shipped robots more certainly leads to an increase in manufacturing employment about one year later. We can also support this finding with the

calculation that 97.1% of the variation ($R^2 = 0.971$) in manufacturing employment is explained when predicting it using the one-year lagged number of shipped robots.

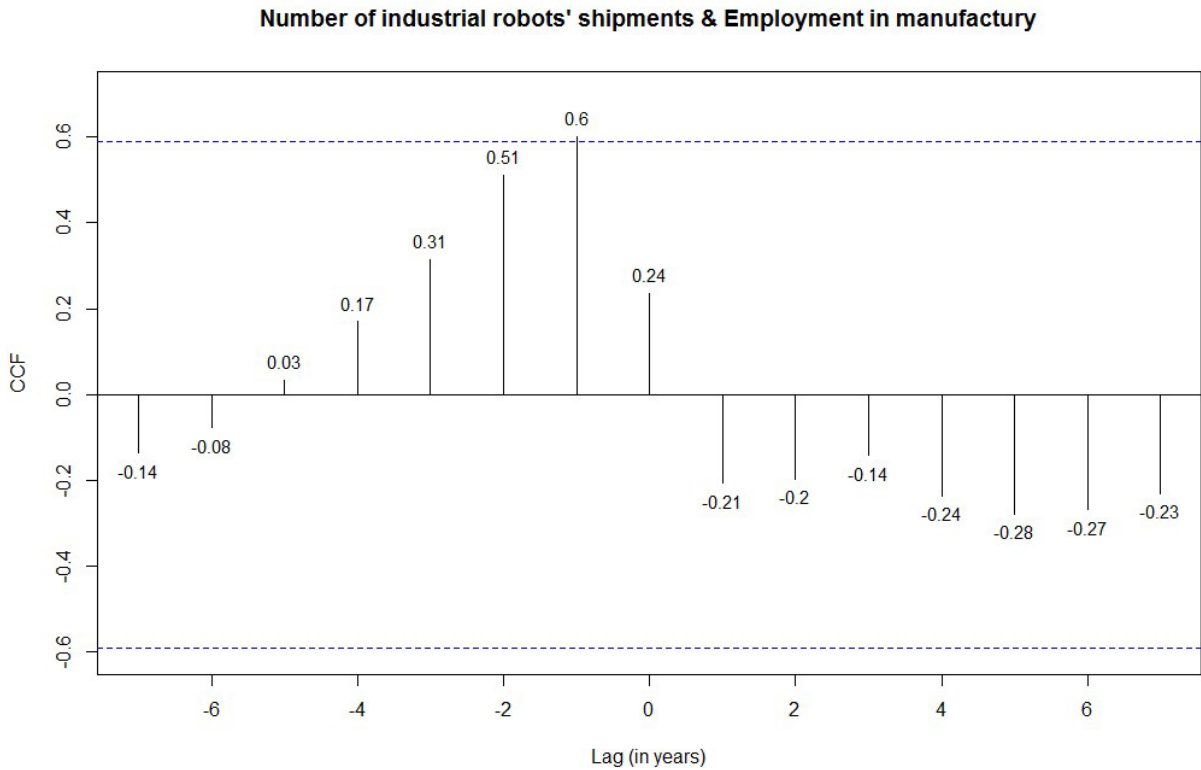


Figure 2: Cross-correlation function (CCF) for the number of industrial robot shipments and employment in manufacturing in the U.S. in the observed 2008-2018 period

Figure 3 presents the CCF for the number of industrial robot shipments and labor productivity in the manufacturing sector in the observed 2008–2018 period. The correlation between the observed time-series data (when time lag = 0 years) shows moderate negative association ($r = -0.34$), which means that immediately after the number of shipped robots increases, the labor productivity in the manufacturing sector decreases. Moreover, at time lag = -1 year the negative correlation becomes even stronger ($r = -0.54$) indicating that an increase in the number of shipped robots about one year later leads to an even stronger decrease in labor productivity. Only after three years (when time lag = -3 years) the correlation turns out to be positive but very weak ($r = 0.15$). However, it is noteworthy that in the presented CCF none of the correlations is statistically significant, which indicates that we have to recognize that

the reasons behind weak labor productivity growth can be several and different and not only related to the introduction of robots. We can also support this finding with the calculation that only 11.6% of the variation ($R^2 = 0.116$) in labor productivity is explained when predicting it using the number of shipped robots.

Data from Figure 4 answers our third research question, presenting the number of industrial robot shipments in the U.S., and the employees' education level⁴ in the manufacturing sector expressed in proportions (IFR, 2018b and 2019, WB, 2019). The proportion of manufacturing employees with lower levels of education (i.e., below upper secondary and upper secondary) is steadily decreasing, while the proportion of manufacturing employees with the highest level of education (i.e., tertiary) is constantly increasing. In 2015, the proportion of man-

⁴To present a level of education the source (WB, 2019) uses the term "adults" for employees aged 24-64, while in our paper we use simply "employees' education level".

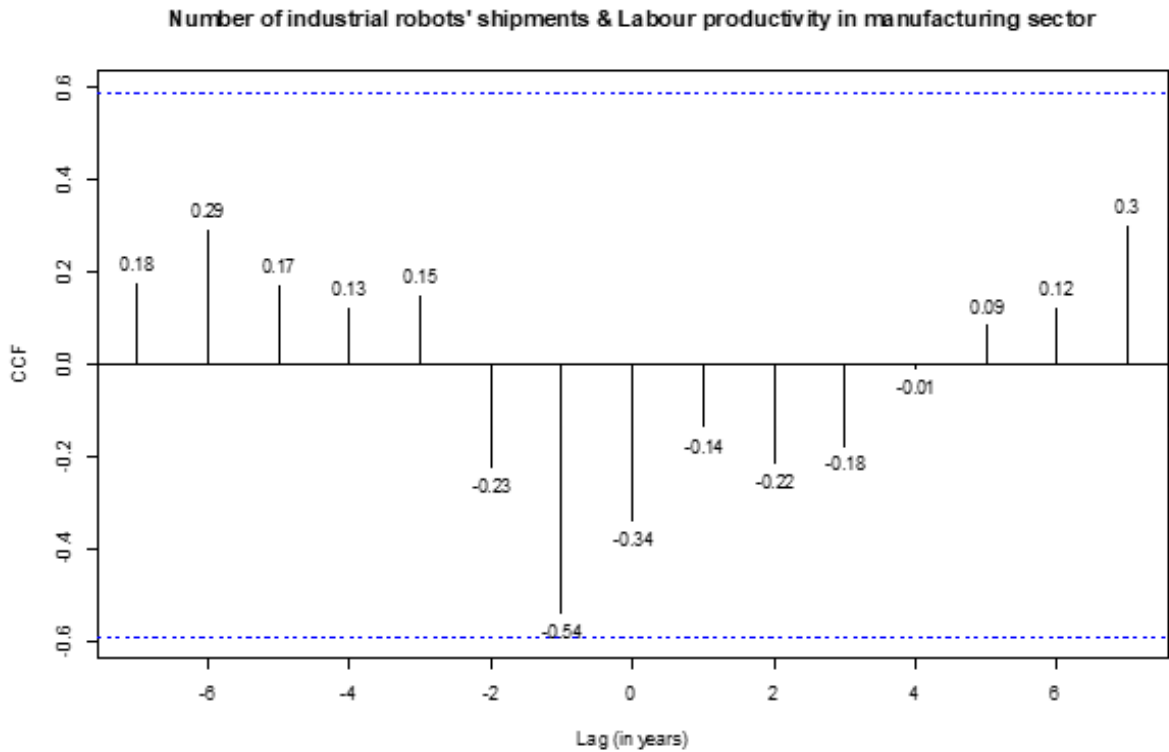


Figure 3: Cross-correlation function (CCF) for the number of industrial robot shipments and labor productivity in manufacturing sector in the U.S. in the observed 2008-2018 period

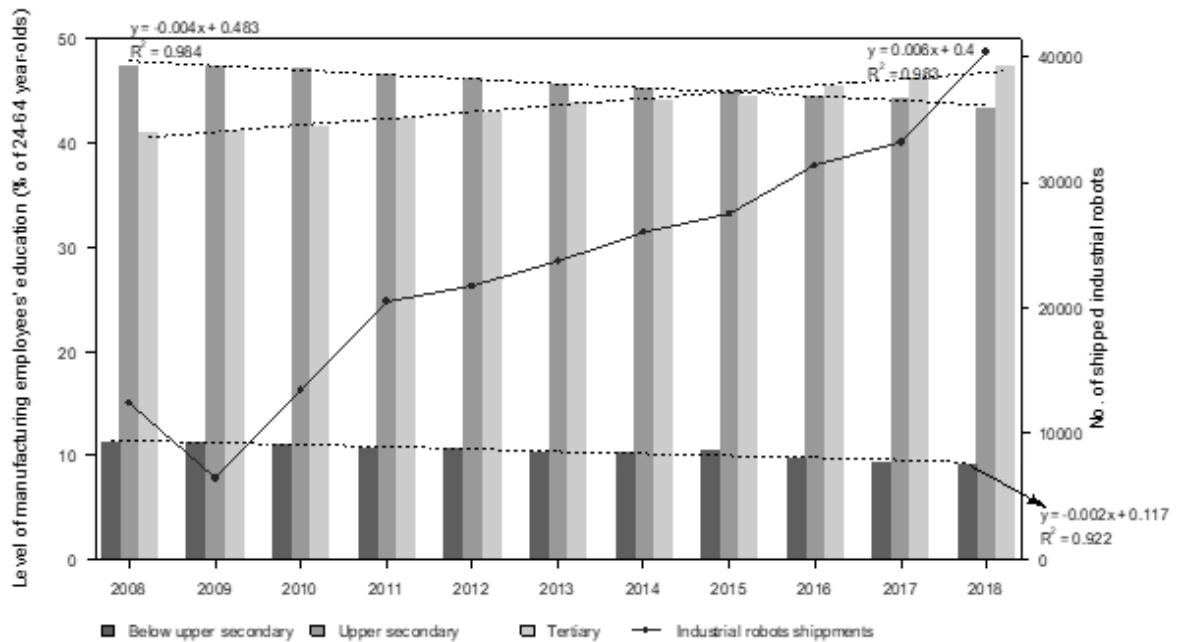


Figure 4: Number of shipped industrial robots vs. level of manufacturing employees' education (% of 24-64-year-olds) in the U.S. in the observed 2008-2018 period (IFR, 2018b and 2019, WB, 2019)

Table 3: Number of shipped industrial robots vs. level of manufacturing employees' education (% of 24-64-year-olds) in the U.S. in the observed 2008-2018 period as functions of time

Below Upper secondary	Estimate	Std. Error	t-value		F		R ²
			statistic	p-value	statistic	p-value	
Constant	0.1169**	0.0014	85.079	0.000	106.572	0.000	0.922
Time	-0.0021**	0.0002	-10.323	0.000			
Upper secondary							
Constant	0.4833**	0.0012	395.706	0.000	557.300	0.000	0.984
Time	-0.0043**	0.0002	-23.607	0.000			
Tertiary							
Constant	0.3999**	0.0019	211.100	0.000	515.646	0.000	0.983
Time	0.0063**	0.0003	22.708	0.000			

** The estimate is significant at the 0.01 level.

ufacturing employees with the upper secondary and tertiary levels of education is nearly the same, but since 2016 the proportion of those with the tertiary level of education exceeds the proportion of those with the upper secondary level of education.

As shown in Table 3, for all three levels of education, the trends as functions of time are also significant, where time explains 92.2%, 98.4%, and 98.3% of the variation in the below upper secondary, upper secondary and tertiary levels of education, respectively.

We are aware that the level of education depends on many factors, and it is growing evenly in most countries, regardless of the introduction of robots. Nonetheless, we decided to analyze the interrelation among the levels of education in manufacturing and robotization, since robotization requires more educated employees (Guoping et al., 2017; Lima, 2017; Lindeberg, 2018; Abramova and Grishchenko, 2020), which are able to supervise, install, reconfigure, etc. robots. We also wanted to determine if robots mostly replace jobs of the employees with the mid education levels (as stated by Davidow and Malone, 2014 and Chiacchio et al., 2018) or with the lowest one. In this regard, Figure 4 data indicate that when the number of industrial robot shipments increases, the education level of manufacturing employees also increases, while the stronger decline of manufacturing employees is measured among those with upper secondary education, not among those with below upper secondary education.

Since there is an obvious trend in the change⁵ of manufacturing employees' level of education as compared to

the number of robot shipments, we also tested the association between the two indicators using the cross-correlation analysis (Figure 5) to answer our second (3.1) sub research question, although we emphasize that we keep in mind that the mutual association between the two observed variables is not decisive.

The correlation between the observed time-series data (when time lag = 0 years) shows significant and very strong positive correlation ($r = 0.96$), which means that immediately after the number of shipped robots increases, the level of manufacturing employees' education also increases. The data also show significant correlation at time lag = - 1 year ($r = 0.75$) indicating that one year after the number of shipped robots increases, the manufacturing employees' education level still increases. In contrast, a significant correlation also appears at time lag = 1 year ($r = 0.69$), which implies that the increase in manufacturing employees' education level can be observed even one year before the number of shipped robots increases.

Although we have emphasized that it is not decisive that growth in the level of education can be attributed to the introduction of robots, the fact that 92.5% of the variation ($R^2 = 0.925$) in manufacturing employees' education level change is explained by the number of industrial robot shipments is self-evident.

Following the findings presented above, there is a tendency of association between labor productivity, employment and industrial robot shipments on the one hand, and the education level and industrial robot shipments on the other.

⁵Here, we calculated the change in education level as the difference between the proportion of manufacturing employees with below upper secondary level of education and the proportion of those with tertiary level of education.

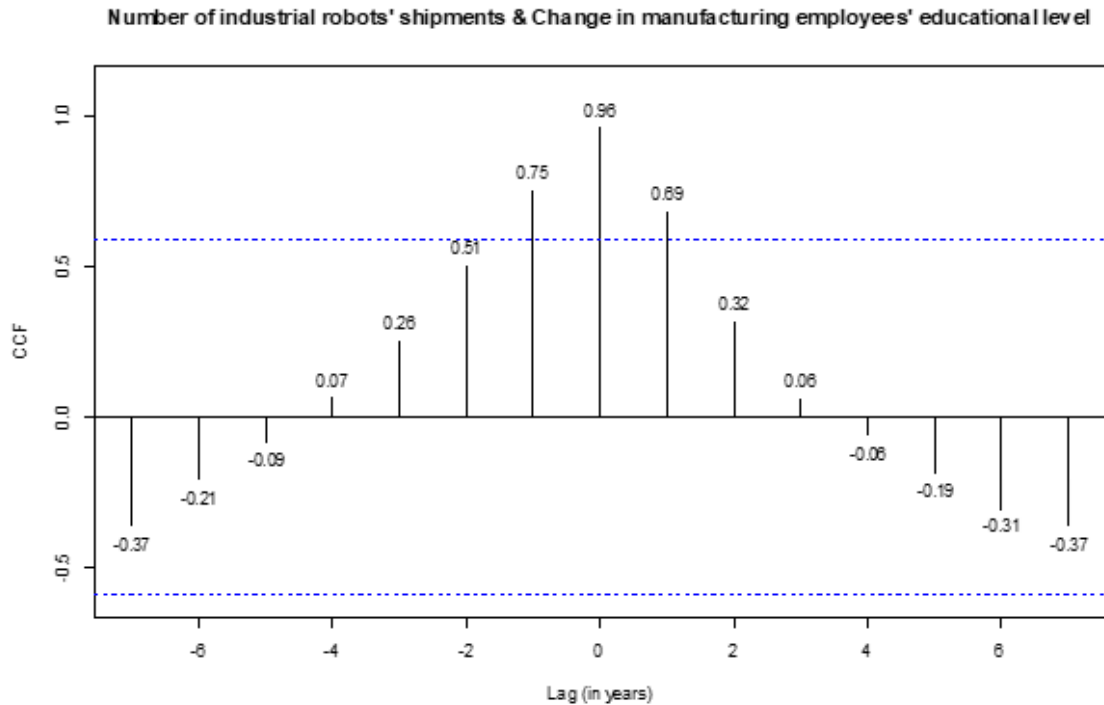


Figure 5: Cross-correlation function (CCF) for the number of industrial robot shipments and change in manufacturing employees' education level in the U.S. in the observed 2008-2018 period

Hence, we generated a time-series using multiple variables, i.e., labor productivity in the manufacturing sector (PROD), industrial robot shipments (RS), employment in the manufacturing sector (EMPL), and change in the education level of manufacturing employees (EDU_ch). To

eliminate the influence of different measurement scales of the observed variables, we used the standardized time-series data from 2008 to 2018 and conducted VAR analysis to predict multiple time series variables, using a sin-

$$PROD_t = \beta_{10} + \beta_{11}PROD_{t-1} + \beta_{12}RS_{t-1} + \beta_{13}EMPL_{t-1} + \beta_{14}EDU_ch_{t-1}$$

$$RS_t = \beta_{20} + \beta_{21}PROD_{t-1} + \beta_{22}RS_{t-1} + \beta_{23}EMPL_{t-1} + \beta_{24}EDU_ch_{t-1}$$

$$EMPL_t = \beta_{30} + \beta_{31}PROD_{t-1} + \beta_{32}RS_{t-1} + \beta_{33}EMPL_{t-1} + \beta_{34}EDU_ch_{t-1}$$

$$EDU_ch_t = \beta_{40} + \beta_{41}PROD_{t-1} + \beta_{42}RS_{t-1} + \beta_{43}EMPL_{t-1} + \beta_{44}EDU_{t-1}$$

gle model. Here, we used the AIC criteria to find the best model and to estimate the optimal number of lags for the time-series. Based on the 1-ordered time lag is the most optimal; therefore, we estimated the vector autoregression model specifying the time lag order as 1.

Using VAR model analysis, we were looking to estimate four autoregression equations, one for each of the observed variables:

The results are presented in Table 4 and Table 5; when combined with the trends presented in Figure 6, they an-

swer our last research question: "What are the expected future interrelated developments of manufacturing labor productivity, employment, education level, and robotization?"

When predicting each of the observed variables, the VAR models are statistically significant ($p < 0.05$). It also turns out that the strength of the analyzed relationships is relatively high. Namely, the values of the R2 range from 0.865 and 0.986, which indicates that at least 86.5% of the variation in dependent variables is caused by independent variables in the VAR model.

Table 4: Summary of vector autoregression models

Model	F			R ²	Adjusted R ²
	statistic	df	p-value		
1 ^a	8.04	4, 5	0.0210	0.865	0.758
2 ^b	51.89	4, 5	0.0003	0.977	0.958
3 ^c	86.85	4, 5	0.0000	0.986	0.975
4 ^d	53.21	4, 5	0.0003	0.977	0.959

a Dependent variable: PROD; Independent variables: RS, EMPL, EDU_ch.

b Dependent variable: RS; Independent variables: PROD, EMPL, EDU_ch.

c Dependent variable: EMPL; Independent variables: PROD, RS, EDU_ch.

d Dependent variable: EDU_ch; Independent variables: PROD, RS, EMPL.

Table 5: Vector autoregression coefficients for the estimated models

PROD	Estimate	Std. error	t-value	p-value
Constant	0.1296	0.1684	0.770	0.476
PROD _{t-1}	-0.4119	0.2144	-1.921	0.113
RS _{t-1}	-3.7311**	0.7378	-5.057	0.004
EMPL _{t-1}	-0.0732	0.1995	-0.367	0.729
EDU_ch _{t-1}	3.3002**	0.7790	4.237	0.008
RS				
Constant	0.2551*	0.0666	3.832	0.012
PROD _{t-1}	-0.0139	0.0848	-0.164	0.876
RS _{t-1}	0.3589	0.2917	1.230	0.273
EMPL _{t-1}	-0.3196**	0.0789	-4.052	0.010
EDU_ch _{t-1}	0.7051	0.3079	2.209	0.071
EMPL				
Constant	-0.1039*	0.0366	-2.839	0.036
PROD _{t-1}	0.0219	0.0466	0.470	0.658
RS _{t-1}	0.4054	0.1603	2.528	0.053
EMPL _{t-1}	0.1280*	0.0434	2.952	0.032
EDU_ch _{t-1}	0.3381	0.1693	1.998	0.102
EDU_CH				
Constant	0.3120	0.0646	4.832	0.005
PROD _{t-1}	-0.0279	0.0822	-0.339	0.748
RS _{t-1}	-0.0814	0.2830	-0.288	0.785
EMPL _{t-1}	-0.0725	0.0765	-0.948	0.387
EDU_ch _{t-1}	1.1782*	0.2987	3.944	0.011

** The estimate is significant at the 0.01 level.

* The estimate is significant at the 0.05 level.

In the first model, when estimating the equation for labor productivity, the first time lag of industrial robot shipments and the first time lag of change in education level for manufacturing employees are statistically significant, which indicates that labor productivity significantly drops one year after the number of industrial robot shipments increases. Furthermore, the results also show that the increase in the educational level leads to a significant increase in labor productivity one year later. It also turns out that the first time lag of labor productivity in the manufacturing sector and the first time lag of the number of employees in manufacturing has some impact on labor productivity, although their impact is not statistically significant.

In the second model, when estimating the equation for the number of industrial robot shipments, the first time lag of the number of employees in manufacturing is statistically significant. This finding indicates that the increase in the number of employees in manufacturing has a negative influence on the number of industrial robot shipments one year later.

In the third model, when estimating the equation for employment in manufacturing, the first time lag of employment in manufacturing is statistically significant. In the last model, when estimating the equation for the change in education level for manufacturing employees, the first time lag of the change in education level for manufacturing employees is statistically significant.

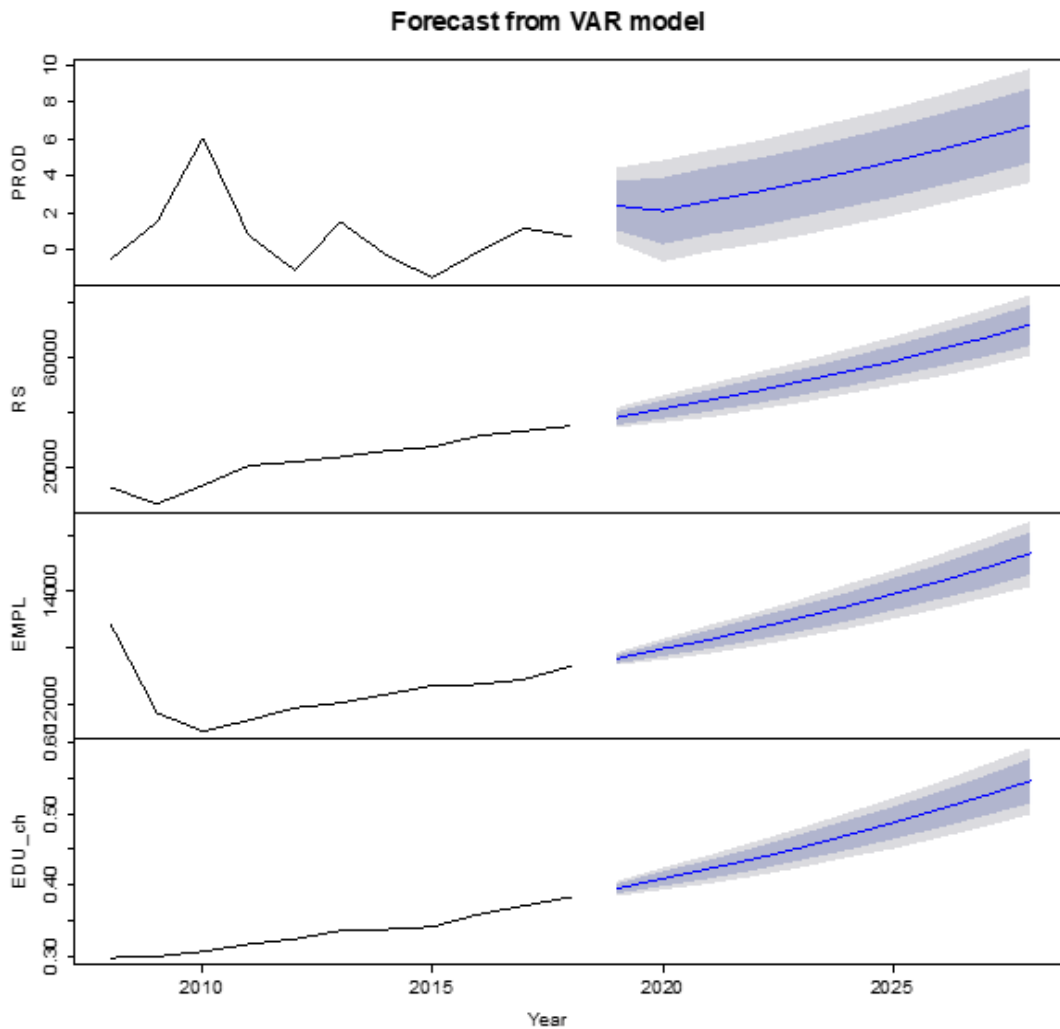


Figure 6: Predicted values for U.S. labor productivity (PROD), industrial robot shipments (RS), number of employees (EMPL) and change in employees' education level (EDU_ch) in manufacturing vs. industrial robot shipments (RS) based on VAR model (2008-2018 historical, 2019–2028 predicted)

Following the estimated VAR models, we have also conducted the predictions for the future, which are presented in Figure 6. The left side of the figure shows the actual data for the observed 2008–2018 period, and the right side represents the predictions for the next 10-year period based on each autoregression equation. The predicted values for each individual time-series variable are presented as lines, and the shaded areas represent 80% and 95% confidence intervals thereof.

The results show that in the coming 10-year period, we can expect an increase in all of the observed variables. Accordingly, although the number of industrial robot shipments will increase, we can also expect a growth in the number of employees in the manufacturing sector with higher levels of education as compared to 2018. Consequently, labor productivity in the manufacturing sector will increase as well. These calculations project a bright future, which is in contrast to (for example) the U.S. Bureau of Labor of Statistics (2019a) data presented in Figure 1. Specifically, Figure 1 data project employment decline of 5.05% in manufacturing over the forecasted period (2028/18). Nonetheless, in case of significant economic situation changes in the forecasted decade, the future might not be as bright as predicted in Figure 6.

6 Discussion

It is widely accepted that the current transition to Industry 4.0 requires significant and also long-term investments in company resources, while new technological opportunities change the performance of industrial enterprises and offer possibilities for increased profits and labor productivity. Nonetheless, besides investments in technology, investments in workers are also required. New employee profiles have to upgrade their skills all the time and have to be able to co-operate and work together with robots that take over traditional jobs within industry.

In this paper, we have attempted to provide clearer insight into the current developments within Industry 4.0 transformation, while our motivation was also to determine when (if) can we expect better impacts of investments in robotization, based on analysis of recent economic and social indicators for the manufacturing sector.

Answers and reflections are given to our research questions below:

1) How has the employment and output changed in the manufacturing sector in relation to the industry as a whole?

During the transition to Industry 4.0, U.S. manufacturing output has barely grown, while the number of employees decreased (Table 1). Having these findings in mind, the observed significant investments in the multipurpose robots in the U.S. (Figure 1) did not prevent manufacturing output share decline within industries, while they also lead to the reduction of manufacturing employees' share within industries.

Simpler tasks with lower required qualifications are taken by machines, robots. However, we have to keep in mind that robots can be extremely helpful in workplaces with difficult conditions and where the possibility of health problems occurs. Nonetheless, since people cannot compete with robots in many things (power, etc.), we agree with Dyer et al. (2010) that creativity will be one of the most sought-after talents in the future. Besides creativity, reasoning, adaptability, emotional intelligence, moral acting, critical thinking, problem solving, decision making, and similar, are the human qualities that will continue to gain importance. Thus, both now and in the future, there will be a constantly growing need for new knowledge and competences, and thus the place for human workers.

2) What were the impacts of robotization on employment and labor productivity in manufacturing during the period of entrance to Industry 4.0?

As the number of industrial robot shipments in the U.S. grew from 2008 to 2018, employment in manufacturing declined in 2018 vs. 2008 (Figure 1). Nonetheless, employment in manufacturing declined year-on-year only in 2009 and 2010, which can be attributed to the 2008-economic crisis, while in the period from 2011 to 2018 it was steadily increasing, although much less intense, as the industrial robot shipments.

Figure 1 data also present unexpectedly low labor productivity growth in the U.S. manufacturing sector, compared to robust growths of robots' shipments, especially in the last eight years, and as such they support the claims of Josefsson in Lindeberg (2018), that robots are now everywhere, except in productivity statistics.

For this reason, we must agree with Guoping et al. (2017) that government has to play a catalytic and supervisory role in processes of industry transformation and to accelerate and simultaneously guarantee proper development. Namely, the agitations over Industry 4.0, in which people who are replaced by robots have to be considered, and the preparation of the new national and transnational policies for sustainable industry development must be stimulated. Otherwise, as robots are becoming less expensive and more capable, they might replace many human workers, while unemployment could grow to meet the conditions for social crisis (even a social storm, as claimed by Johannessen, 2018).

2.1) How is the impact of robotization reflected in employment and labor productivity in manufacturing?

To answer this research question, we used the cross-correlation analysis to test the association and potential impact of industrial robot shipments on employment and labor productivity in the U.S. manufacturing sector in the observed 2008–2018 period (Figure 2 and Figure 3).

The correlation between the observed time-series data (when time lag = 0 years) presented in Figure 2 shows a weak, positive association, which means that immediately after the number of shipped robots increases, the employment in manufacturing increases too. However, significant

correlation appears only at time lag = -1 year, indicating that an increase in the number of shipped robots more certainly leads to an increase in manufacturing employment about one year later. We also were able to support this finding with the calculation that 97.1% of the variation in manufacturing employment is explained when predicting it using the one-year lagged number of shipped robots.

In contrast, the correlation between the observed time-series data (when time lag = 0 years) presented in Figure 3 shows a moderate, negative association, which indicates that immediately after the number of shipped robots increases, the labor productivity in manufacturing sector decreases. Moreover, at time lag = -1 year the negative correlation becomes even stronger, implying that an increase in the number of shipped robots about one year later leads to an even stronger decline in labor productivity. Only after three years did the correlation turn positive, but very weak. However, it is to be noted that in this calculation none of the correlations is statistically significant, which indicates that we have to recognize that the reasons behind weak labor productivity growth can be several and different and not only related to the introduction of robots. We can also support this finding with the calculation that only 11.6% of the variation in labor productivity is explained when predicting it using the number of shipped robots. Thus, our research results cannot firmly support either the advocates of contemporary productivity paradox (Josefsson in Lindberg, 2018; Lakshmia and Bahlib, 2020), the positive claims of IFR (2017) "robots increase productivity" nor Cséfalvay's claim (2020) "Today in the literature a new consensus is emerging that adoption of industrial robots considerably increases productivity and contributes significantly to economic growth."

3) How did the employees' education level change during the period of manufacturing entrance to Industry 4.0?

We determined that the proportion of manufacturing employees with lower levels of education (i.e., below upper secondary and upper secondary) is steadily decreasing, while the proportion of manufacturing employees with the highest level of education (i.e., tertiary) is constantly increasing (Figure 4) and follows the robot shipment growth. We also determined that in the past researched period in the U.S., robots more likely replaced employees with the mid education levels (as stated by Davidow and Malone, 2014 and Chiacchio et al., 2018), since the stronger decline in the number of manufacturing employees was measured among those with upper secondary education, not among those with below upper secondary education.

Despite the above-indicated findings, we are aware that the level of education in manufacturing depends on many factors, not only on the introduction of robots. Nonetheless, robotization requires more educated employees (as suggested by Guoping et al., 2017; Lima, 2017; Lindeberg, 2018; Abramova and Grishchenko, 2020).

3.1) Is the impact of industry robotization reflected in the change of education level of employees in manufac-

turing?

The correlation between the observed time-series data (when time lag = 0 years), presented in Figure 5, reveals significant and very strong positive correlation, which means that immediately after the number of shipped robots increases, the level of manufacturing employees' education also increases. The data also show significant correlation at time lag = -1 year, indicating that one year after the number of shipped robots increases, the manufacturing employees' education level still increases. In contrast, significant correlation appears at time lag = 1 year as well, implying that the increase in manufacturing employees' education level can be observed even one year before the number of shipped robots increases. Following these findings, we assume that the introduction of robots to the work process is at least three-fold, since a year before, in the same year and in the year after the investments in new robots in manufacturing, the employees' education increases at a significant level.

We nonetheless emphasize that the introduction of robots is not decisive for the level of education change, but the calculations show that 92.5% of the variation in manufacturing employees' education level change is explained by the number of industrial robots' shipment. From this point of view, the results support the claims that robotization tends to require higher educated workers (Guoping et al., 2017; Lima, 2017; Lindeberg, 2018; Abramova and Grishchenko, 2020).

4) What are the expected future interrelated developments of manufacturing labor productivity, employment, education level and robotization?

Based on the estimated VAR models (Figure 6), we predict positive developments in the U.S. manufacturing sector. Bearing in mind the presented calculations, it might be anticipated, that the U.S. has now finally arrived at the turning point within the Industry 4.0 period, after a period of negative trends of employment and labor productivity, which was the impact of country's entrance into Industry 4.0.

The forecasted growth in manufacturing employment, labor productivity, education, coexistent with the robot shipment growth, suggests that outlined negative trends of the number of employees and labor productivity in the researched period were only temporary, and we believe that was due to the lack of opportunity and knowledge on how to exploit robotization for the maximum efficiency. These findings oppose the U.S. Bureau of Labor of Statistics (2019a) data presented in Table 1 and also disagree with the claims of other authors (e.g., Compagnucci et al., 2019).

We emphasize that the projected positive future developments are expected for the U.S., while the same could also hold for most other developed countries in terms of Industry 4.0 adoption, as the calculations were made based on data for the U.S., which are one of the most robotized economies, according to IFR (2019). Nonetheless, in case

of significant economic changes in the forecasted period (e.g., impact of current coronavirus pandemic (COVID-19), the future might not be as bright as projected in Figure 6.

Especially when analyzing and predicting such complex and impactful trends of economic and social stability, it is necessary to consider different factors and models, although projections are usually made based on a single observed variable. For this reason, we used VAR analysis, which allows predicting several time series variables using a single model. Although this analytical technique enables a more advanced forecasting approach than, for example, a simple linear regression method, it still assumes that the trend growths in the analyzed time series are all linear, which is also reflected in the predictions we made for the coming 10-year period. However, we recognize that unexpected events, such as the current coronavirus pandemic, also cause changes and cyclical trends in the studied indicators. As shown on the left side of Figure 6, the past trends of the economic indicators used are more or less non-linear, which is the most obvious in case of labor productivity, whereas in the case of the number of employees the trend is relatively stable. In this regard, it is proposed for future research that the linear predictive approach using VAR modeling is done on the transformed time series data (we can use, e.g., logarithmic or power transformations), since the transformations may inhibit greater fluctuations and improve linearity in non-linear time series (Shumway & Stoffer, 2017). Future research could furthermore use some other approaches, which allow analyzing non-linear multiple time series, e.g., non-linear VAR models (as described by Kilian & Lütkepohl, 2017) or even VAR neural network models (as described by Yasin et al., 2018), which allow the analysis of non-linear time series without their prior transformation.

There are also other limitations of our research, which are suggested to be addressed in future research, such as analyzing a longer period, which could lead to more accurate statistical calculations and forecasts. In contrast, since our focus was on Industry 4.0, it would not make any sense to analyze a longer research period.

In future research, however, we recommend a comparison of the U.S. market with other countries (considering different demographic structure, etc.), and other details about the robot shipments are advised to be analyzed (e.g., their value, type, application etc.), as this would provide additional insight into the impacts of transformation to Industry 4.0. In light of the current coronavirus pandemic, which significantly changed the criteria and approach to robotization, it would be especially interesting to analyze how manufacturing companies already equipped with Industry 4.0 technology and robots will overcome the situation in comparison with other “lagging” companies. Since robots can work in surroundings harmful for human health, they should have a major advantage; nonetheless,

generally decreased demand for manufactured goods most likely also has a negative impact on them.

7 Conclusion

During the transition to Industry 4.0, the manufacturing output, as well as the number of employees in manufacturing and labor productivity, have barely grown in the U.S. (see Table 1 and Figure 1). Nonetheless, our projections for the next decade (Figure 6) project brighter developments; for this reason, we support advocates of the development and use of AI and robots (as Wilson, 2017 and Hendlar, 2017) in manufacturing. The future is in cooperation between robots and human. This partnership can bring prosperity and increased labor productivity, which is expected within a future global economy.

However, it is self-evident that people must maintain their decisive role in work processes; otherwise, robots might replace human workers, which would lead to even greater social inequity and consequent crisis. One can ask: “How can Sophia get human rights (Saudi Arabia citizenship), but I can’t keep my job to maintain basic human dignity?” For this reason, new strategic directions are required, in which the humanization of industry must be highlighted as the most important. This implies that the transformation of industry has to be planned sustainably, due to the possible significant negative impact on society as a whole. For this reason, there is a constant need to investigate the impacts of industrial development, since the changes in society are much slower than the changes in technology.

The data we used for our research showed that there is still room for a human contribution in industry. Specifically, based on the VAR model, in the coming 10-year period, we can expect an increase in all of the observed variables. Projections thus show that while the number of industrial robot shipments will increase, we can also expect a growth in the number of employees in the manufacturing sector with increasing level of education, and the growth of labor productivity in the U.S. manufacturing sector. These calculation results are contrary to certain data and findings we present in our paper (e.g. U.S. Bureau of Labor of Statistics (2019a), Acemouglu and Restrepo (2017), Glaser and Molla (2017), Josefsson in Lindeberg (2018), Lakshmia and Bahlil (2020), while they support findings from the IFR (2017), the UK Parliament (2018), and Cséfalvay (2020), among others. However, as already mentioned, in case of any disruption or changed circumstances, the calculated indicators for the future might change. Nonetheless, since the transition to Industry 4.0 has a major impact on increasing demands for new knowledge about technologies and production processes, at least a part of our modelled predictions should hold.

Especially now, at the “turning point” of the U.S. man-

ufacturing sector, as indicated by our calculations, workers must focus on other tasks: those enabling the optimization of work processes, including control, analytics and regulation, while emphasis must also be on the effective communication, creativity and problem-solving acting. Here, the opportunity for an increased role of human workers should appear, while a higher degree of reasoning, flexibility, reliability, problem-solving acting, moral responsibility, and fast learning will be expected from the employees. According to Essentra (2019), for example, there is a current lack of the right workforce composition and the skill sets needed for the future; the skills U.S. manufacturers are most lacking are technology and computer skills, problem-solving ability, design engineering and mathematics, claiming “U.S. manufacturers are currently more concerned about how to attract and upskill workers rather than making plans to let them go.”

Among the above-mentioned challenges and opportunities in the field of industry robotization, the economic and social sustainability of production requires the integration of human and technology. As Harper (2019) explains, a human-computer interaction perspective can help define interactions between AI and users that can enhance rather than substitute creativity. The new step in industry development – Industry 5.0 – should therefore focus primarily on human and robot engagement and the integration of human knowledge, creativity, intuition, skills, experience, etc. within robotized production. Moreover, Industry 5.0 should give reasons for human presence in industrial processes, but in forms based on the changed staffing requirements of modern production, including the ability to co-operate with robots.

Thus Industry 5.0 is supposed to change robots from programmable machined into ideal human companions, commonly termed as “cobot”, that will already know, or quickly learn, what to do (Nahavandi, 2019). Although the prediction of Industry 5.0 is currently questionable, further industry transition should be regulated and oriented towards the integration of the virtual and the physical, considering the changed role of qualified workers and the newly established social responsibility of robots. Accordingly, we conclude that there is a need for increased awareness about the consequences of the transformation to Industry 4.0, which calls for new policies for industry’s economic and social sustainability, considering the specifics and labor (surplus or scarcity (Vermeulen, 2020) demands of individual economies and industrial sectors.

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Vplivi transformacije v industrijo 4.0 v proizvodnem sektorju: primer ZDA

Ozadje in namen: S transformacijo v industrijo 4.0 se v industriji povečuje število nameščenih robotov, kar prinaša velike premike v industrijskih ekosistemih. Zato je bil naš raziskovalni cilj analizirati ključne kazalnike uspešnosti, da bi raziskali ekonomsko in socialno vzdržnost teh sprememb v proizvodnji.

Zasnova / metodologija / pristop: Kombinacija uradnih (World Bank, U.S. Bureau of Labor Statistics) in javno dostopnih (Federal Reserve Economic Data, Industrial Federation of Robotics) podatkov je bila uporabljena za statistično obdelavo podatkov, vključujoč primerjavo, korelacijo, navzkrižno korelacijo in analizo vektorske avtoregresije, da bi predstavili pretekli razvoj in tudi napovedali prihodnje trende v ameriškem proizvodnem sektorju.

Rezultati: V nasprotju z močno robotizacijo v obdobju 2008–2018 se je delež proizvodnje in zaposlitve v proizvodnem sektorju v tem obdobju zmanjšal glede na celotno industrijo. Kljub temu napoved modela vektorske avtoregresije kaže, da je ameriški proizvodni sektor prišel do prelomne točke, po kateri lahko robotizacija poveča zaposlenost in produktivnost delavcev, hkrati pa spodbuja nadaljnjo rast njihove izobrazbene ravni.

Zaključek: Prehod na industrijo 4.0 močno vpliva na vse večje potrebe po novih znanjih in veščinah za večjo produktivnost. V skladu s tem napovedane rasti analiziranih proizvodnih kazalnikov kažejo, da so bili negativni vplivi robotizacije v nedavni preteklosti le začasni zaradi vstopa v industrijo 4.0. Kljub temu pa so potrebne dodatne politike za podporo trajnostnemu razvoju industrije.

Ključne besede: Transformacija industrije, Robotizacija, Industrijska proizvodnja, Produktivnost dela, Zaposlitev, Stopnja izobrazbe, Industrija 4.0, Industrija 5.0

Linking Organizational Commitment and Organizational Trust in Health Care Organizations

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Background and purpose: Health care organizations should apply new methods to motivate their employees be more effective and successful. This can be achieved by commitment to the organization and trusting their managers. Therefore, health care organizations must take care of the commitment and trust aspects in order to have a full knowledge of employees and to increase organizational performance and effectiveness. The present study aims to link sub-dimensions of organizational trust and sub-dimensions of organizational commitment of administrative personnel of health care organizations.

Methodology: The survey was conducted among 156 administrative personnel in health organizations in Turkey. Sub-dimensions of organizational trust and sub-dimensions of organisational commitment were linked and correlated. Nyhan and Marlowe's OTI survey was used for the assessment of organizational trust and Meyer's and Allen's OCQ for the assessment of organizational commitment. Correlation, Path analysis and Structural Equation Modelling (SEM) were used to analyse the data with the help of SPSS and SmartPLS programs.

Results: Results suggest that trust in organization has a positive impact on effective organizational commitment and continuance organizational commitment, however, has not impact on normative organizational commitment. Additionally, trust in supervisors has a positive impact on affective organizational commitment, continuance organizational commitment and normative organizational commitment.

Conclusion: Awareness of organizational trust and commitment can be beneficial to leaders and managers, as they can handle, develop and empower their workers better with this information. Moreover, the key point is that all leaders and managers should focus on creating an atmosphere that will make workers very more committed and trusting, hence, to enable them perform beyond their formal duty requirements.

Keywords: *Organizational trust; Organizational commitment; Health care organizations, Strategic management*

1 Introduction

The trust in organization and organizational commitment has become important issue in health management field. Today, health organizations and their managers are trying to find new ways to boost participation of their personnel and maximize their impact. Organizational trust can lead to collaboration among administrative personnel, teams and organizations. Organizational trust can also lead to enhanced administrative personnel' commitment to their organizations. Companies need a high degree of in-

terpersonal confidence among co-workers in an organization for positive feedback and evaluation of advanced organizational behaviour. As it is known, organizational trust plays a key role in management and confidence among co-workers (Paliszkievicz, Koohang, Gołuchowski & Nord, 2014), therefore, is the responsibility of professional managers. We are in Industry 4.0 era which maximizes the competitive advantages among health organizations. Responding to the basic needs of administrative personnel in each organization is a priority in Industry 4.0 era. In such an era, for their survival, health organizations need

quality human resources to respond well to environmental and technological challenges. In health organizations, administrative personnel have an important role as they are a bridge between top managers and employees. Thus, one of the most important needs of administrative personnel in health organizations is building organizational trust and providing their organizational commitment. There are two components of organizational trust; trust in the organisation, and trust in supervisor (Nyhan & Marlowe, 1997; Vanhala, Heilmann & Salminen, 2016; Ozturk & Karatepe, 2019) and three components of organizational commitment; affective, continuance and normative (Meyer & Allen, 1991; Kareem, Mahmood, Jameel, & Ahmad, 2019; Almaaitah, Alsafadi, Altahat & Yousfi, 2020). Organizational commitment is commonly identified as the key factor in interactions between personnel and organizations in the management and organizational behaviour literature. The most powerful driving forces for organizational success are organizational trust and organizational commitment (Bastug, Pala, Kumartasli, Günel & Duyan, 2016). Therefore, managers should recognize and be aware of nature of trust and its impact on organizational commitment (Sheik-Mohamed, Mohiadeen, & Anisa, 2012). Organizations must proactively seek a better understanding of trust and must take steps to improve employee confidence, commitment and trust (Bobbio, Bellan & Manganelli, 2012). Besides managerial, administrative personnel are also an important force in the planning and execution of the health organizational goals (Aryee, Budhwar & Chen, 2002). Hence, maintaining administrative personnel by strengthening their organizational commitment and trust is an issue of highest concern, and hospital administrators should give it priority.

There are numerous researches and current studies on organizational commitment and organizational trust with different variables in literature. For example, Dirks and Ferrin (2001) claimed that employee trust is related to several attitudinal outcomes, especially organizational commitment. Ng (2015) studied the relationship between organizational commitment, trust, and organizational identification. Yılmaz (2008) researched organizational trust and organizational commitment in Turkish primary schools. Pranitasari (2020) investigated leadership and organizational commitment. Timuroğlu and Çokgören (2019) linked organizational citizenship and organizational trust while Filiz and Bardakçı (2020) related organizational climate and organizational trust. There are some other current studies, using one or more variables of this research, have similar results (Baird, Tung & Yu, 2019; Jain, Duggal & Ansari, 2019). These findings confirm that organizational trust and organizational commitment are essential for an effective organization. Many other international studies in different disciplines with different samples, such as nursing and public administration, also claimed that trust

in organization has a significant impact on commitment (Cho & Park, 2011). Organizational commitment is also related to psychological empowerment and job satisfaction (Jordan, Miglič, Todorović & Marič, 2017). Some national studies in Turkey linked trust and commitment of doctors and nurses (Durukan, Akyürek, & Coşkun 2010) and organizational trust levels of health employees (Filiz & Bardakçı, 2020). However, till now, there have been no studies that focused on the relationship between sub-dimensions of organizational trust and sub-dimensions of organizational commitment of administrative personnel. This gap has shaped this study's scientific research model. Thus, this study aims to investigate the relationship among sub-dimensions by conducting an empirical analysis from the perspective of health organizations' administrative personnel.

The research consists of four sections: literature review, methodology, findings and interpretations; and the conclusions and implications. Hopefully, this research will help health organization managers to consider the needs of administrative personnel and the factors that influence their commitment and trust in order to improve or arrange successful human resource structures.

2 Literature Review and Hypotheses

Organizational trust refers to people's positive expectations and the organization members' expectations about competence, reliability and benevolence and refers to the trust between the employees and managers in an organization (Mayer, Davis & Schoorman, 1995). Organizational trust can lead to job satisfaction of employees which is the pre-requirement of organizational commitment. Therefore, organizational trust and commitment in organization and amongst organization members is challenged as a necessity (Durukan et al., 2010).

2.1 Organizational Trust

Organizational trust is not a new topic in management field. Organizational trust is the core element of effective organization (Sadq, Ahmad, Saed, Othman & Mohammed, 2020). Organizational trust has become the priority of management studies researchers, especially study of organizational behaviour. Organizational trust is the confidence of the employee in the objectives of the organization's actions and strategies which represent the satisfaction and commitment of the employee to the organization. At the same time, it is the degree of confidence one person has in another's competence and willingness to behave honestly and predictably (Nguyen, Pham, Le, & Bui, 2020). In other words, organizational trust is the level of confidence that one person has in another's com-

petence and his/her willingness to act in a fair, ethical and predictable manner and is a psychological state which provides feedback on how employees perceive the problems in situations (Ji & Jan, 2020). Thus, organizational trust occurs on both individual and organization level. On the individual basis, the feeling of trust emerges depending on the personal characteristics of the workers and experience in their interpersonal relationships.

Various dimensions of trust have been the focus of researchers in the past. But considering in the context of organization there are two dimensions of organizational trust. These are trust in the organisation, and trust in supervisor. Trust in the organization is about the organization members 'optimistic assumptions regarding individuals' intentions and actions based on organizational roles, interactions, and experiences while trust in supervisor is about the employee's belief that the executive would keep his / her promises, act fairly and give honest and correct answers (Demircan & Ceylan, 2003; Warnock-Smith, Cameron & O'Connell, 2020). Researches have shown that trust in supervisors and organizations play a substantial role in building trust of employees (Ji & Jan, 2020).

2.2 Organizational Commitment

There are numerous definitions of organizational commitment in literature. But Meyer and Allen (1991) described a more systematic approach to organizational commitment and proposed the three dimensional model in early 90's. Many appreciations have been given to this model as so far it covers all the basic dimensions (Vandenberghe, 2008). Organizational commitment is characterized as the alignment of individuals with organizational values and goals, the willingness to perform duties and exhibit organizational efforts (Meyer & Allen, 1991). Earlier researchers found organizational commitment to be a unilateral concept but Meyer and Allen (1991) introduced a multidimensional model of organizational commitment (Masud & Daud, 2019). Organizational commitment has been classified by Meyer and Allen (1991) in three dimensions. These are affective organizational commitment, continuance organizational commitment and normative organizational commitment.

Affective Organizational Commitment (AOC): It is related to organizational behaviours and is characterized as the member of the organization being psychologically or emotionally attached, identified, and involved (Meyer & Allen, 1997). This ensures that members can stay emotionally connected to the organization while evoking a sense of identification with the organization and participate more in the goals of the organization.

Continuance Organizational Commitment (COC): It means remaining in the organization, as there is no choice (Meyer & Allen, 1997). Namely, the organization mem-

ber feels it's important to remain in the organization for reasons, such as, it's costly to leave organization, interest in the organization will be lost and time will be wasted. In other words, the organisation's leader is aware of the risks of leaving the company. Organizational members with ongoing dedication remain as members until a new and more appropriate organization is found for them (Meyer & Allen, 1997).

Normative Organizational Commitment (NOC): It means that the members believe that it is moral to stay in the organization. Doubtful members do not want to stay voluntarily in their organizations and do not want to make sacrifices (Meyer & Allen, 1997).

To summarize, affective organizational commitment is seen as an emotional connection of the workers to their organization. In other words, employees perform far beyond to receive the stated recompense. Employees with normative commitment have a social obligation to remain with their company. Continuance commitment refers to the calculative type of commitment: workers evaluate the importance of retaining organizational membership compared to leaving the organization (Meyer & Allen, 1997).

2.3 Linkage between Organizational Trust and Organizational Commitment

Number of positive attitudes and behaviours linked to work have been described as outcomes of organizational trust (Dirks & Ferrin, 2001). For example, it is critical factor for employees' job satisfaction and performance (Aryee et al., 2002; Meng & Berger, 2019). Thus, organizational trust is a key element in organizational behaviours and organizational commitment is one of the key strategies and primary objectives for organizations to protect their advantages in competitive environment because employees with organizational commitment are more adapted, relaxed and competitive (Sadq et al., 2019). In this study, organizational commitment is focused as an outcome of organizational trust. Previous studies indicate that organizational commitment is one of the central consequences of organizational trust (Aryee et al., 2002; Jiang, Gollan & Brooks, 2017). One of the most important factors that effected by organizational trust is organizational commitment (Yilmaz, 2008). Empirical researches have been conducted to relate organizational trust to organizational commitment (Baird et al, 2019; Jain, et al., 2019). Researchers have disclosed that organizational trust is a significant predictor of organizational commitment and the positive relationships between dimensions of organizational trust and organizational commitment have been explained by social exchange and HRM practices (Canning, Murphy, Emerson, Chatman, Dweck, & Kray, 2020; Jain et al.,

2019). Several empirical studies have also shown a positive link between organizational trust and commitment in different circumstances. Trust in organization has been associated with higher organizational commitment and trust in supervisors has correlated positively with innovative behaviour and satisfactions with supervisor (Canning et al., 2020). Therefore, it seems rational to anticipate that the degree of organizational trust among employees would affect their commitment to organization (Sadq et al., 2020). Furthermore, previous studies indicate that organizational commitment is one of the central consequences of organizational trust (Aryee et al., 2002;) Nevertheless, organizational commitment and organizational trust have a common connection. Also organizational trust may affect organizational commitment (Stinglhamber, 2006).

No organization can work without trust among its personnel and managers or can neglect the strong element of trust in doing business (Sadq et al., 2020). The degree of organizational trust defines the organizational composition of the factors that affect it, such as organizational structure, work design, communication, employee performance, commitment and organizational employee attitudes (Baird et al., 2019). Commitment and trust are, therefore, important factors in such environments.

Administrative personnel with a high organizational commitment are able to continue working within the organization and are able to work together to achieve organizational objectives. Organisational trust should relate positively with organizational commitment (Chen, Wu, Chang, Lin, Kung, Weng & Lee, 2015). Organizational trust has a high positive association with organizational commitment (Mirza & Redzuan, 2012) and organizational trust strongly influences emotional commitment (Schoorman, Mayer & Davis, 2007). These studies support the notion that organizational trust closely relates with organizational commitment that creates a good reputation for a company's business and increases its attractiveness.

Based on previous above presented theoretical review and evidence from previous trust and commitment studies, it is assumed that different dimensions of organizational trust (trust in supervisor and trust in organization) can be positively associated with employees' organizational commitment and administrative personnel may highly be committed to their organizations when they have high trust in their organization and supervisors. Thus, the research model is designed in Figure 1 and hypotheses are listed as below.

H1: Administrative personnel' trust in organization is positively linked to their affective organizational commitment.

H2: Administrative personnel' trust in organization is positively linked to their continuance organizational commitment.

H3: Administrative personnel' trust in organization is

positively linked to their normative organizational commitment.

H4: Administrative personnel' trust in supervisors is positively linked to their affective organizational commitment.

H5: Administrative personnel' trust in supervisors is positively linked to their continuance organizational commitment.

H6: Administrative personnel' trust in supervisors is positively linked to their normative organizational commitment.

3 Methodology

Two dimensions of organizational trust (trust in supervisor and trust in organization) are independent variables and three dimensions of organizational commitment (affective, continuance and normative) are dependent variables in this research. Based on this relation, KMO, Bartlett's Test and Cronbach Alpha were used to evaluate the variables reliability, normal distribution, and adequacy of data in this research. Correlation analysis was used to test the relations among variables mentioned above. In addition, Path analysis based on Structural Equation Model (Chin, 1998) was used to estimate the relationship between dependent and independent variables. SEM is a statistical technique that is used to determine the factor structure of variables and helps scholars to check for validity (Sarstedt & Cheah, 2019). Partial least square structural equation modelling (PLS-SEM) was used in this study to analyse and test the model owing to the model's sample size and complexity (Hair, Ringle, & Sarstedt, 2013). SmartPLS (V.3.3.1) and SPSS (V.26) programs were used to evaluate the variables reliability and convergent validity. The factor loadings of each item exceeded .70. (See Figure 1). Cronbach's alpha (α), composite reliability (CR) and average variance extracted (AVE) exceeded .70, .70 and 0.5, respectively (Hair et al., 2013) (see Table 5).

3.1 Sample and Procedure

Simple random sampling technique was used to collect data from all eighteen healthcare organizations in Manisa, a city in West of Turkey. The respondents were administrative personnel working in healthcare organizations. They were informed about the purpose of the research, and thereafter they were told that the data they provided would not be shared with third parties. Voluntary participants took part in the survey from January to December in 2019. About 10-12 respondents were interviewed from each organization. A total of 200 respondents were asked to complete the survey at their comfortable time to enhance response rate. The sample size was selected based

on Comrey and Lee (1992) inferential statistics. According to this statistic, a sample size of below 50 respondents is a weaker sample, a sample size of 100 respondents is weak, 200 respondents sample size is adequate, 300 is good, 500 is very good, and 1000 is excellent. Therefore, a sample size of two hundred (200) respondents was selected. Of 200 responses, 44 forms were eliminated due to missing values or uncompleted. Data was analysed with 156 valid forms for this research (78.0% response rate).

3.2 Measures

Considering the objective and design of the study, data were collected by two questionnaires (see Appendixes). The first one is Organizational Trust Inventory developed by Nyhan and Marlowe in 1997 and adapted to Turkish by Demircan in 2003. It consists of 12 questions and two dimensions which are called trust in supervisor and trust in organization. Respondents were asked to rate their trust in organization and trust in supervisor by which their organizations and managers provide better trust; trust in organization (4-items) and trust in managers (8-items). All items were measured on a five-point Likert-type rate (1=very low, 5 = very high). The other one is the Organi-

zational Commitment Questionnaire developed by Meyer and Allen (1991). It includes 18 questions and has three dimensions of organizational commitment: affective, continuance and normative. The questionnaire was developed to Turkish by Wasti (2000). Respondents were asked to rate their commitment to their organization by which their organizations provide a better loyalty; affective organizational commitment (6-items), continuance organizational commitment (6-items) and normative organizational commitment (6-items). All items were measured on a five-point Likert-type scale (1=strongly disagree, 5 = strongly agree).

Both questionnaires were adapted to Turkish culture and language and have been used by many scholars in Turkish and literature which shows the reliability and validation of the questionnaires. For example, organizational trust is used for up-to-date researchers such as Kabadayi and Türkay (2020) while organizational commitment is used by Akgerman and Sönmez (2020) in Turkey.

3.3 Data Analysis and Results

Some basic demographic statistics of the respondents (education, age, gender, work experience, work unit and organizations) are presented in Table 1.

Table 1: Respondents Profile

		Frequency	Percent
Age	19-30	41	26,3
	31-40	73	46,8
	41 years and over	42	26,9
Gender	Male	92	58,1
	Female	64	41,9
Education	High School	34	21,8
	Bachelor	94	60,3
	Postgraduate	28	17,9
Work Experience	Less than 5 years	12	7,7
	6-10 years	31	19,9
	11-20 years	73	46,8
	21 years and over	40	25,6
Working Unit	Intensive care	18	11,5
	Service	52	33,3
	Administrative Units	86	55,2
Organization	Government	102	65,4
	Private	54	34,6

Before analysing the data, it is necessary to check some statistical values for adequacy of the data and normal distribution. Kaise-Meyer-Olkin (KMO) and Bartlett's Test are two statistical techniques that can give idea about the adequacy of the sample. The KMO value must be between 0.5 and 1 while Bartlett's Test must be less than 0.05 (Seçer, 2015). KMO and Bartlett's Test were performed for both scales used in this study (see Table 2 and Table 3).

As seen in Table 2 and Table 3 KMO value is more than 0.5 and Bartlett's test value is lower than 0.5 that

shows that the sample is adequate for both scales. To test the reliability of the scales, Cronbach Alpha (α) was calculated. Cronbach Alpha (α) value is more than 0.70 for both scales, indicating the reliability of the scales.

For conducting parametric tests such as T test, Anova, Manova test, Regression and Structural Equation Model, the distribution of data should be normal. p value of the Kolmogorov-Smirnov and Shapiro-Wilks test must be more than 0.05 and Skewness and Kurtosis values must be between +1 and -1 (George & Mallery, 2003).

Table 2: KMO and Bartlett's Test (Organizational Commitment Questionnaire)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,710
Bartlett's Test of Sphericity	Approx. Chi-Square	1659,206
	df	171
	Sig.	,000
Cronbach's Alpha		,795

Table 3: KMO and Bartlett's Test (Organizational Trust Questionnaire)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,904
Bartlett's Test of Sphericity	Approx. Chi-Square	2409,648
	df	55
	Sig.	,000
Cronbach's Alpha		,975

Table 4: Normal Distribution Test Results

Dimensions	n	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Skewness	Kurtosis
		Statistic	df	Sig.	Statistic	df	Sig.	Statistic	Statistic
Organizational Trust	156	,095	156	,058	,965	156	,022	-,163	-,855
Organizational Commitment	156	,107	156	,069	,958	156	,018	,500	-,539

^aLilliefors Significance Correction

When checking Table 4, it is seen that the p value is more than 0.05, and Skewness and Kurtosis values are between +1 and -1. Therefore, parametric analysis tests were conducted in this research.

The averages, composite reliability standard, AVE and correlation coefficients between the variables gathered from the research are presented in Table 5.

According to Table 5, the factor with the highest average is observed to be normative organizational com-

mitment while the factor with the lowest is trust in organization. Pearson correlation was calculated to test the relationship between variables. Trust in supervisors has the strongest correlation with Trust in organization ($r=0,748$, $p<0,01$) while Trust in organization has the lowest correlation with Normative organizational commitment ($r=0,549$, $p<0,01$) and the other variables have medium level correlation with each other's.

Table 5: Descriptive Results and Correlation Matrix

Variables	AOC.	COC.	NOC.	TiO.	TiS.
Affective organizational commitment	1				
Continuance organizational commitment	0.686**	1			
Normative organizational commitment	0.579**	0.666**	1		
Trust in organization	0.619**	0.699**	0.549	1	
Trust in supervisors	0.665**	0.719**	0.612**	0.748**	1
Cronbach's Alpha	0.902	0.863	0.830	0.897	0.836
Composite Reliability	0.924	0.897	0.875	0.928	0.875
AVE	0.671	0.593	0.540	0.763	0.552
Mean	3,964	3,853	3,989	3,867	3,827

**Correlation is significant at the 0.01 level (2-tailed).

To assess the psychometric properties of the measurement instruments, a null model is estimated with no structural relationships. Reliability is evaluated by Cronbach's Alpha in addition to the means of composite scale reliability (CR) and average variance extracted (AVE). For all measures, PLS-based CR and Cronbach's Alpha are more than the cut-off value of .70, and AVE is above the cut-off value of .50. As Fornell and Larcker (1981) suggested, the AVE for each construct was more than the squared latent factor correlations between pairs of constructs (see Table 5).

The research model was developed with independent variables (trust in supervisor and trust in organization) and dependent variables (affective organizational commitment,

continuance organizational commitment and normative organizational commitment). PLS path modelling, which allows for explicit estimation of latent variable (LV) scores, was used to estimate the relationship between variables in research model (Figure 1). PLS Graph 3.3.1¹ and the bootstrapping resampling method were used to test their statistical significance. This procedure, firstly, was entailed by generating 500 sub-samples of cases randomly were selected from the original data. Then Path coefficients were generated for each randomly selected sub-sample. T-statistics were calculated for all coefficients based on their stability across the sub-samples in order to determine which paths were statistically significant (see Table 6).

Table 6: Testing The Research Model (Path Analysis Results for Organizational Trust and Organizational Commitment)

Paths	Standard Deviation	T Statistics	Path coefficient(β)	P Values
Trust in organization -> Affective Organizational Commitment	0.096	2.584	0.248	0.010
Trust in organization -> Continuance Organizational Commitment	0.088	4.211	0.372	0.000
Trust in organization -> Normative Organizational Commitment	0.130	1.255	0.163	0.210
Trust in supervisors -> Affective Organizational Commitment	0.093	5.997	0.555	0.000
Trust in supervisors -> Continuance Organizational Commitment	0.087	5.792	0.504	0.000
Trust in supervisors -> Normative Organizational Commitment	0.129	4.439	0.573	0.000
RMStheta : 0.149; SRMR: 0.078; Chi-Square: 992.920; GoF: 0.618; NFI: 0.802				
Endogenous Variables	R²			
Affective Organizational Commitment	0.603			
Continuance Organizational Commitment	0.710			
Normative Organizational Commitment	0.514			

¹PLS Graph 3.3.1 was downloaded from (<https://www.smartpls.com/downloads> (27th.01.2020))

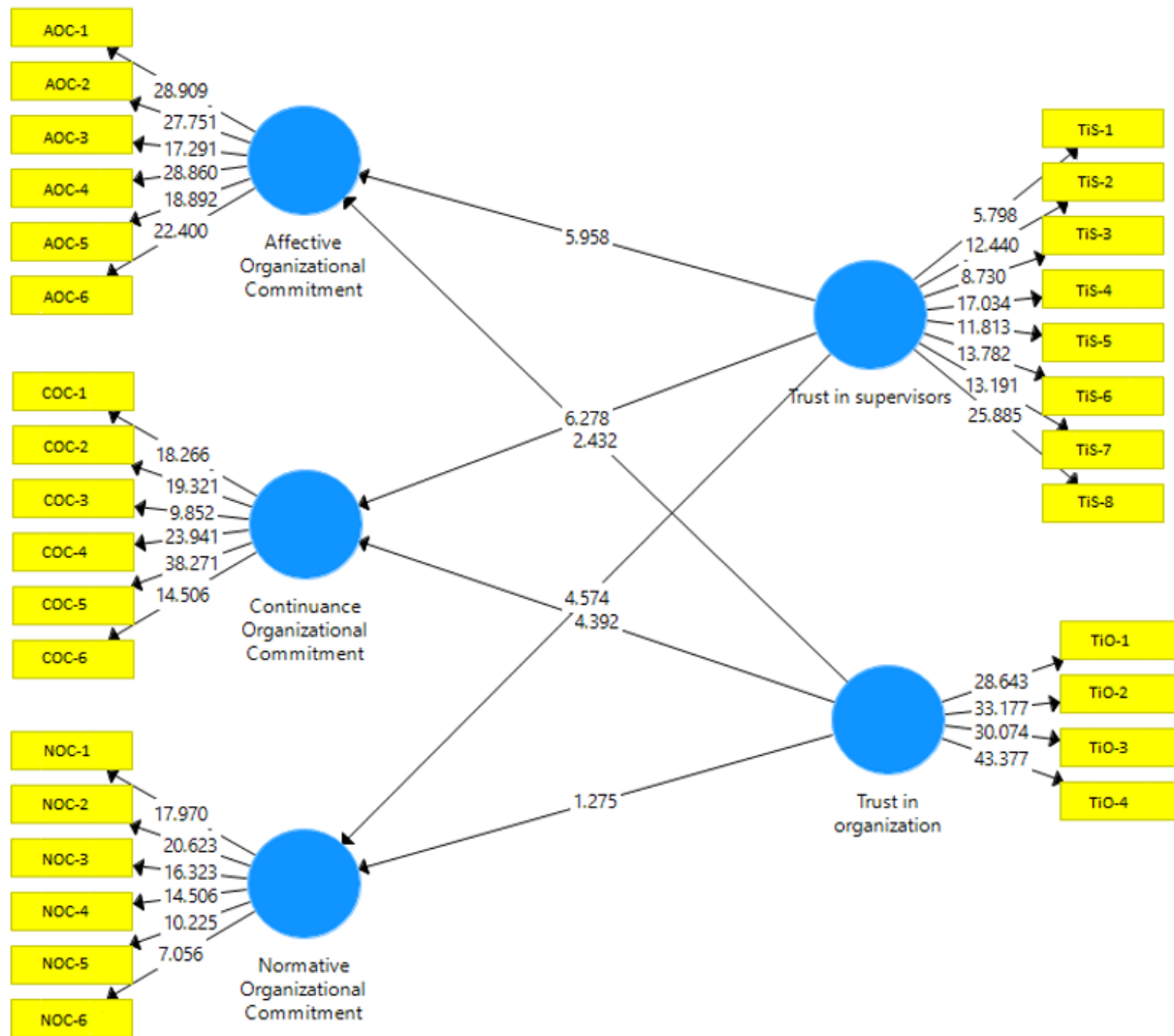


Figure 1: The Research Model (Organizational Trust and Organizational Commitment)

As presented in Table 6, five hypotheses are largely supported while only one hypothesis rejected. The results show that trust in organization has positive impact on affective organizational commitment ($\beta=.248, p<0,01$; H1 is supported), on continuance organizational commitment ($\beta=.372, p<0,01$; H2 is supported), but has no positive impact on normative organizational commitment ($\beta=.163, p>0,05$; H3 is rejected). Trust in supervisors has also positive impact on affective organizational commitment ($\beta=.555, p<0,01$; H4 is supported), on continuance organizational commitment ($\beta=.504, p<0,01$; H5 is supported), and on normative organizational commitment ($\beta=.573, p<0,01$; H6 is supported). Moreover, the organizational trust sub-dimensions, trust in supervisors and trust in organization explain 60.3 percent of the variance ($R^2 = .60$) in affective organizational commitment, 71.0 percent

of the variance ($R^2 = .71$) in continuance organizational commitment and 51.4 percent of the variance ($R^2 = .51$) in normative organizational commitment which are sub-dimensions of organizational commitment.

4 Discussion and Conclusion

The results of this study showed that organizational trust has direct effect on organizational commitment. It means that the less the trust between employees and top level managers, the greater will be the fear of expression of opinions and lack of guidance for achieving organizational objectives. Moreover, the relation among sub-dimensions of organizational commitment and organizational trust were tested to see the more details about this relationship.

In this context, six hypotheses were tested. The results show that participants' affective organizational commitment and continuance organizational commitment are significantly impacted by their perception of trust in organization. Thus, H1 and H2 are supported ($p < 0,01$). Through increasing trust in the organization, personnel are more pleased with their job and with the organization they work, and personnel will be more affectively and continually committed to their organization. Participants' normative organizational commitment is not significantly impacted by their perception of trust in organization in contradistinction for. Therefore, H3 is rejected ($p > 0,05$). It means that the personnel believe that due to the trust in organization, it is moral to stay in the organization and doubtful personnel do not want to be volunteer in their organizations and to make sacrifices. Participants' affective organizational commitment, continuance organizational commitment and normative organizational commitment are significantly impacted by their perception of trust in supervisors. It is seen that H4, H5 and H6 are supported ($p < 0,01$). These three variables are the outcome of supervisor's organizational trust. Indeed, trust among administrative personnel, supervisors and managers have an impact on organizational commitment. Trustworthy managers may lead to different trusts, knowledge or views based on fulfilling any conditions. Because they can overcome presenting negative outcomes. Furthermore, they can give information or friendly trust in an individual as ideas with the aim of supporting personnel in the organization. This notion positively influences productivity in organization performance and motivation of personnel, and can ultimately increase personnel' commitment to organization, work, workmates and even managers.

The statistical results showed that the relationship between organizational trust and organizational commitment is significant. Canning et al. (2020) support the results of this research. They found that trust in organization was associated with higher organizational commitment and trust in supervisors correlated positively with innovative behaviour and satisfactions with supervisor. The results of these studies are also supported with the results of the study conducted by Bastug et al. (2016), Sheik-Mohamed et al. (2012). Bastug et al. (2016) found that a significant relationship between trust in director, emotional commitment and continuance commitment while an insignificant relationship among organizational trust sub-dimensions and normative commitment. Sheik-Mohamed et al., (2012) reached the results that show significance of the relationship between organizational trust, job satisfaction and organizational commitment.

Dynamics and enhancement of motivation of trust among personnel are one of the most important factors of integration. The personnel-trust in organization is successful in advancing its goals. Trust, as seen in this study, plays an important role in consistency between personnel and

organizations and their managers, and has a special position. Trust allows the organization to focus on long-term goals and objectives, and may be one of the key components for effective organizational change. If managers try to increase trust among their employees, they will observe personnel' commitment and their active behaviours to the changes that have happened inside and outside the organization.

Life and sustainability of an organization rely on a close relationship among employees, managers, and their organizations. And the most important factor is the role of manager in this relationship. If manager can give sense of trust and share his/her experiences the performance of organization can be enhanced. As it is stated earlier, sharing of experiences and organizational rules impact organizational performance (Cecez-Kecmanovic, Janson & Zupancic, 2010).

Finally, awareness of organizational trust and commitment can be beneficial to leaders and managers, as they can handle, develop and empower their workers better with this information. Moreover, the key point is that all leaders and managers should focus on creating an atmosphere that will make workers more committed and trusting to enable them to perform beyond their formal duty requirements.

In addition to important findings that contribute to literature, this study has also some limitations. Due to time and space limitations, data were collected from a small sample. Also, this research does not address the impact of demographic characteristics on organizational trust and organizational commitment, such as age, education, marital status and work experience. Finally, while the aim of the study is to provide an overview into the model, it is suggested that future studies can implement more comprehensive measures, a broader sample of health workers, especially frontline workers, as well as can integrate alternative methods to provide a more comprehensive perspective into these links. Future studies can also provide a clearer insight into the hypothesized relationships through the use of qualitative and/or quantitative measurements with larger samples to handle the use of Mixed method. Future studies can also explore the impact of additional contingency factors on improving the organizational commitment and trust of health or some different institutions' personnel.

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Povezava med organizacijsko pripadnostjo in organizacijskim zaupanjem v zdravstvenih organizacijah

Ozadje in namen: Zdravstvene organizacije bi morale uporabljati nove metode za motiviranje svojih zaposlenih, da bodo bolj učinkovite in uspešne. To lahko dosežejo z zavezanostjo organizaciji in zaupanjem njihovim menedžerjem. Zato morajo zdravstvene organizacije skrbeti za organizacijsko pripadnost in različne vidike zaupanja, da bodo v celoti poznale zaposlene in povečale uspešnost in učinkovitost. Namen te študije je povezati poddimenzije organizacijskega zaupanja in poddimenzije organizacijske zavezanosti administrativnega osebja zdravstvenih organizacij.

Zasnova / metodologija / pristop: Podsatke za študijo smo zbrali z anketo, ki je bila izvedena med 156 upravnimi uslužbenci v zdravstvenih organizacijah v Turčiji. Za oceno organizacijskega zaupanja je bila uporabljena raziskava OTI avtorjev Nyhan in Marlowe ter Meyerjev in Allenov OCQ vprašalnik za oceno organizacijske zavezanosti. Za analizo podatkov s pomočjo programov SPSS in SmartPLS smo uporabili korelacijo, analizo poti in modeliranje strukturnih enačb (SEM).

Rezultati: Ugotavljamo, da zaupanje v organizacijo pozitivno vpliva na učinkovito organizacijsko zavezanost in nadaljevanje organizacijske zavezanosti, vendar ne vpliva na normativno organizacijsko zavezanost. Poleg tega zaupanje v nadrejene pozitivno vpliva na čustveno organizacijsko zavezanost, željo ostati v organizaciji, in normativno organizacijsko zavezanost.

Zaključek: Zavedanje organizacijskega zaupanja in zavzetosti je lahko koristno za vodje in managerje, saj lahko s temi informacijami bolje obvladujejo, razvijajo in opolnomočujejo svoje delavce. Poleg tega je ključno, da se morajo vsi vodje in menedžerji osredotočiti na ustvarjanje vzdušja, zaradi katerega bodo delavci postali bolj zavzeti in bodo bolj zaupali vodjem in bili pripravljeni narediti tudi več kot so formalne zahteve za njihovo delovno mesto.

Ključne besede: Organizacijsko zaupanje; Organizacijska zavezanost; Zdravstvene organizacije, Strateško upravljanje

Appendix A: Organizational Commitment Questionnaire (Meyer and Allen, 1991)

Scale: Strongly Disagree :1 Disagree: 2 Neither Agree nor Disagree: 3 Agree: 4 Strongly Agree: 5

- AOC-1. It would be very hard for me to leave my department right now, even if I wanted to
 AOC-2. I do not feel any obligation to remain with my current employer
 AOC-3. I would be very happy to spend the rest of my career with this department
 AOC-4. One of the few negative consequences of leaving this department would be the scarcity of available alternatives
 AOC-5. Even if it were to my advantage, I do not feel it would be right to leave my organization now
 AOC-6. I really feel as if this department's problems are my own
 COC-1. Right now, staying with my department is a matter of necessity as much as desire
 COC-2. I do not feel a strong sense of "belonging" to my department
 COC-3. I feel that I have too few options to consider leaving this department
 COC-4. I do not feel "emotionally attached" to this department
 COC-5. I would feel guilty if I left my organization now
 COC-6. I do not feel like "part of the family" at my department
 NOC-1. This organization deserves my loyalty
 NOC-2. If I had not already put so much of myself into this department, I might consider working elsewhere
 NOC-3. Would not leave my organization right now because I have a sense of obligation to the people in it
 NOC-4. This department has a great deal of personal meaning for me
 NOC-5. Too much of my life would be disrupted if I decided I wanted to leave my department now
 NOC-6. I owe a great deal to my organization

Appendix B: Organizational Trust Inventory (Nyhan and Marlowe, 1997)

Scale: Very Low: 1, Low: 2, Fifty-Fifty: 3, High :4, Very High :5

1. My level of trust that supervisor is technically competent at the critical elements of his/her job ____.
2. My level of trust that supervisor will make well throughout decisions about his/her job ____.
3. My level of trust that supervisor will follow through on assignment is ____.
4. My level of trust that supervisor has an acceptable level of understanding of his/her job ____.
5. My level of trust that supervisor will be able to do his/her job in acceptable manner is ____.
6. When supervisor tells me something, my level of trust that I can rely on what they tell me is ____.
7. My trust in supervisor to do the job without causing other problem is ____.
8. My level of trust that supervisor will think through what s/he is doing job is ____.
9. My level of trust that this organization will treat me fairly is ____.
10. The level of trust between supervisor and workers in the organization is ____.
11. The level of trust the people I work with on regular basis is ____.
12. The degree to which we can depend on each other in this organization is ____.

The Impact of Supply Chain Dynamic Capabilities on Operational Performance

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Background and purpose: Literature is lacking on how supply chain dynamic capabilities influence operational performance. This study aims to empirically investigate the impact of supply chain dynamic capabilities on operational performance in Hungarian manufacturing companies.

Design/Methodology/Approach: The study used an online survey for data collection. The model is tested with data from 208 supply chain management professionals from Hungarian manufacturing industry. Structural equation modelling (SEM) was used to test the proposed hypotheses.

Results: The empirical results indicate that supply chain dynamic capabilities namely; collaboration capability, agility capability, and responsiveness capability are significantly and positively associated with operational performance. However, the results show that integration capability has no significant impact on operational performance.

Conclusion: The study concludes that in a dynamic environment, developing supply chain dynamic capabilities can help manufacturing company managers to build effective supply chains and achieve superior performance. Further, managers need to recognize that supply chain dynamic capabilities are multidimensional and each dimension has different effects on operational performance. Also, the study provides theoretical and managerial implications that are further discussed in detail.

Keywords: *Dynamic capabilities, Supply chain, Operational performance*

1 Introduction

The supply chain has become an increasingly significant area in business and academia. Due to the rapid economic growth, trends in globalization, and continuous changes in business environments. These challenges prevent firms from maintaining their competitive advantages through diagnosing the shifts in the business environment and sensing the opportunities and risks at the right time. Therefore, the key to survival in such situations requires the firms to develop capabilities that enable them to distinguish their processes over competitors. Thus, the sustainable competitive advantages and superior operational performance of a firm rely on its dynamic supply chain capability (Ju et al., 2016). In a rapidly changing environ-

ment where uncertainty is high, ordinary efficiency-oriented supply chains are not appropriate enough to cope with the shifts in the business environment. From the dynamic capabilities perspective, organizations need to adopt the supply chain dynamic capabilities, which enables the organization to meet changes and successfully sustain the organization's competitive positions and long-term profitability (Narasimhan, et al., 2004; Stevenson and Spring, 2007). Supply chain capabilities are the processes of integrating the internal and external competences, resources, and information to enhance supply chain practices.

Many researchers and scholars have investigated the relationship between supply chain and operational performance. Morash (2001), Kristal et al. (2010), Miguel and Brito (2011) argue that supply chain practices positively

enhance firm performance. Likewise, Gao & Tian, (2014) state that the supply chain positively impacts enterprise performance. Hong et al. (2019) claim that supply chain quality management significantly affect both operational performance and innovation performance. Yu et al. (2018) explore the impact of data-driven supply chain capabilities on financial performance. These reviews show that the existing literature is primarily focused on the traditional supply chain practices and their impact on operational performance in a static business environment.

There has been rather limited research on supply chain dynamic capabilities, and how they can impact on firm performance in a dynamic business environment. Ju et al. (2016) argue that dynamic supply chain capabilities (information sharing, collaboration, integration, and agility) have a significant and positive relationship with technological innovation and operational performance of the organization. Namusonge (2017) argues that supply chain capabilities influence firm performance. Mandal et al. (2016) state that supply chain capabilities of collaboration, flexibility, velocity, and visibility positively influence supply chain resilience and supply chain performance. Some researchers have attempted to explore the indirect relationship between supply chain capabilities and operational performance. (Fung & Chen, 2010) state that human capital moderates the relationship between supply chain capabilities and firm performance. Oh et al. (2019) argue that supply chain capabilities influence a firm's performance through the mediating role of information technology.

Despite these efforts, the direct impact of supply chain dynamic capabilities has been largely ignored. To fill this gap in our understanding, this paper aims to investigate the impact of supply chain dynamic capabilities on operational performance and attempts to empirically address the research question:

How do dynamic supply chain capabilities influence operational performance?

The objective of this paper is to answer this research question by proposing an empirical model that demonstrates that dynamic supply chain capabilities (collaboration capability, integration capability, agility capability, and responsiveness capability) have a positive impact on operational performance in the manufacturing industry in Hungary.

The study contributes to the literature by giving a better understanding of the nature of the relationship between supply chain dynamic capabilities and operational performance. Also, this study provides an empirical model that demonstrates the hypothesized relationship between supply chain dynamic capabilities and operational performance.

The next parts of this paper are organized in the following manner. Section two presents the literature review while section three discusses the methodology. The empirical results and findings are discussed in section four while

section five provides the dissection and conclusion along with the theoretical and practical implications of the study.

2 Literature review and hypotheses development

2.1 Dynamic supply chain capabilities

This study is based on the dynamic capabilities theory. The concept of dynamic capabilities has emerged due to uncertainty and continual changes in the business environment and market. The dynamic capabilities theory was developed by Teece et al. (1997). They define dynamic capabilities as a firm's ability to build, integrate and reconfigure its internal and external resources and competences to cope with the rapid changes in the business environment. Zahra & George, (2002) argue that dynamic capabilities enable firms to renew and reconfigure their resource base to meet evolving customer demands and competitor strategies.

The use of dynamic capabilities in the supply chain is becoming increasingly important (Witcher et al., 2008 & Allred et al., 2011). The emergence of dynamic capabilities in the supply chain are due to the changes in the long and short-term supply and demand, market structure and customer requirements (Ju et al., 2016). Therefore, firms must have dynamic supply chain capabilities to address these changes. Through dynamic supply chain capabilities, firms can create a collaborative relationship with other organizations, customers and suppliers and precisely predict market demands, in turn, enhancing the supply chain responsiveness to meet customer and supplier needs (Sanders, 2014).

Several researchers have investigated the dynamic capabilities from a supply chain perspective. Mathivathanan et al. (2017) argue that the development of dynamic capabilities through the supply chain has an important role to deal with future needs. Oh et al. (2019) describe dynamic supply chain capabilities as a firm's ability to sense and exploit internal and external resources in order to enhance supply chain practices efficiently and effectively. They also state that dynamic supply chain capabilities include sharing information, coordination, integration, and supply chain responsiveness. Ju et al. (2016) argue that dynamic supply chain capabilities are processes of information exchange, supply chain alignment, and information technology in order to meet customer needs and maintain competitiveness in a dynamic environment. Aslam et al. (2018) suggest that supply chain agility and adaptability are coherent components of dynamic supply chain capabilities which should be integrated to support supply chain ambidexterity. Many studies (Teece, 2007; Ju et al, 2016 and Yu et al, 2018) argue that dynamic capabilities are the

high-order capabilities and this can be disaggregated into different capacities. Thus, in our study, the supply chain dynamic capabilities were disaggregated into the collaboration capability, integration capability, agility capability, and responsiveness capability. Each of the four dimensions reflects a firm's ability to meet customer needs and market requirements in order to achieve sustainable competitive advantage in a dynamic environment.

Collaboration capability refers to a firm's ability to build a long-term partnership in terms of supply chain activities and exchange of information, resources, and risk to achieve common objectives (Bowersox et al., 2002). Cao and Zhang (2011) argue that supply chain collaboration capability is an organization's capability to share information, knowledge and resource, goal consistency. Yunus (2018) discusses that customer collaboration, supplier collaboration, and internal collaboration are important elements to constitute the collaboration supply chain.

Integration capability indicates the firm's capacity to build strategic relationships and collaborate with its supply chain partners (Flynn et al., 2010). Supply chain integration emphasizes the availability of the right products, to the right consumers, at the right time at a competitive price (Angeles, 2009). Rajaguru and Matanda (2019) argue that supply chain integration consists of information flow integration, physical flow integration, and financial flow integration.

Agility capability refers to the firm's ability to respond speedily to the changes and turbulence in the market in order to enhance its suppliers and customers (Aslam et al., 2018). Moreover, supply chain agility is a dynamically process to adjust or reconfigure the current business process to address the shifts in the market and other uncertainty. Li et al., (2009) suggest that supply chain agility consists of important elements are strategic readiness and response capability, operational readiness and response capability, and episodic readiness and response capability.

Responsiveness capability is defined as the ability of supply chain partners to respond to changes and shifts in the environment (Williams et al., 2013). Singh and Sharma (2015) allude that supply chain responsiveness emphasizes a reduction in lead time, improves service quality, quick response to a customer's requirements, and transportation optimization. Shekarian et al., (2020) argue that responsiveness in supply chain has three key elements: first, agility to respond to customer needs; second, flexibility to ensue a new product development and entering new markets and third, reduce the risk of supply chain bottlenecks and disruptions.

2.2 Operational performance

In a dynamic environment, firms strive to obtain competitive advantages and achieve excellent organizational

performance (Rajaguru and Matanda, 2019). Operational performance is related to the firm's internal operations efficiency, which may enable the firm to enhance its competitiveness and profitability in the market (Hong et al., 2019). Operational performance is a multidimensional construct that includes the effective transformation of operational capabilities into competitive advantages of organizations. It can be assessed by productivity, quality, cost, delivery, flexibility, and customer satisfaction (Gambi et al., 2015; Ju et al., 2016; Saleh, et al., 2018). We now try to investigate and understand how dynamic supply chain capabilities interrelate and impact on operational performance as shown follows.

2.3 Supply chain collaboration capability's contribution to operational performance

Previous studies suggested that supply chain collaboration benefits include acquisition, sharing and development of new knowledge, learning capability, risk-sharing, and collaborative communication (Cao et al., 2010). Simatupang and Sridharan (2005) propose a supply chain collaboration index to measure the level of collaborative practices and find that the collaboration index positively impacts on operational performance. Cao and Zhang, (2011) argue that supply chain collaboration enhances collaborative advantage that enables supply chain partners to improve synergies and achieve superior performance. Jimenez et al. (2018) state that the supply chain collaboration with external partners boosts both incremental and radical innovations. Stank et al. (2001) suggest that both internal and external partnerships are important to ensure performance. Collaboration can increase profitability, reduce purchasing costs, and enhance technical cooperation. Thus, this study hypothesizes:

H1: Collaboration capability has a significant positive impact on operational performance.

2.4 Supply chain integration capability's contribution to operational performance

Supply chain integration capability is a set of continuous restructuring activities to facilitate a firm to reorganizing processes and resources more effectively, thus enhancing operational performance (Chen et al., 2009; Wu et al., 2006) argue that supply chain integration capabilities that are established with the organizational processes are likely to have a good potential to achieve a set of organizational performance. Oh et al. (2016) state that supply chain integration contributes to improving firm performance through reducing the bullwhip effect in the supply chain and sup-

port a firm to respond to demands of the market more quickly. Flynn et al. (2010) insatiate the impact of supply chain integration on operational performance. They found that supply chain integration was significantly related to both operational and business performance. Furthermore, the results indicated that internal and customer integration were more strongly related to improving performance than supplier integration. Accordingly, we hypothesize that:

H2: Integration capability has a significant positive impact on operational performance.

2.5 Supply chain agility capability contributes to operational performance

In today's dynamic and uncertain business environment, firms need to pay efforts to their supply chain risk to boost the agility and resilience of their supply chain systems (Tang and Tomlin, 2008).

Supply chain agility capability enables a firm to effectively match the internal and external resources to market changes. This capability helps a firm's efforts to take advantage of opportunities or counteract threats from turbulent environments (Van Hoek et al., 2001), which may lead to the achievement or maintenance of a competitive position (Eisenhardt and Martin 2000). Many studies state that the continuous improvement in supply chain agility capability, that is, improving the responsiveness to changes at small costs, has a positive impact on firm performance and competitiveness (Blome et al., 2013; Chakravarty et al., 2013; Oh et al., 2018). Moreover, (Vinodh et al., 2011) argue that supply chain agility may be able to enhance the

operational performance by a more effective response to external supply disruptions, provides significant benefits for the internal processes of the firm, lower cost, improves quality, and delivery performance. Accordingly, we hypothesize that:

H3: Agility capability has a significant positive impact on operational performance.

2.6 Supply chain responsiveness contributes to operational performance

In today's rapidly changing business environment, supply chain responsiveness has become a highly significant capability of a firm's supply chain system (Williams et al., 2013). Supply chain responsiveness is a firm's ability to responds quickly to changes in consumer needs, production and delivery quantities and, product mix, volume, and delivery in response to shifts in demand and supply. These changes are most likely to lead to enhancing performance outcomes such as a lower production cost, greater customer satisfaction, and faster delivery (Yu et al., 2016). Moreover, (Prajogo and Olhager, 2016; Mandal et al., 2016) show that supply chain responsiveness positively impacts on operational performance. Accordingly, we hypothesize that:

H4: Supply chain responsiveness capability has a significant positive impact on operational performance.

This study develops an empirical research model considering the above-mentioned hypothesizes and theoretical background as it is shown in Fig.1.

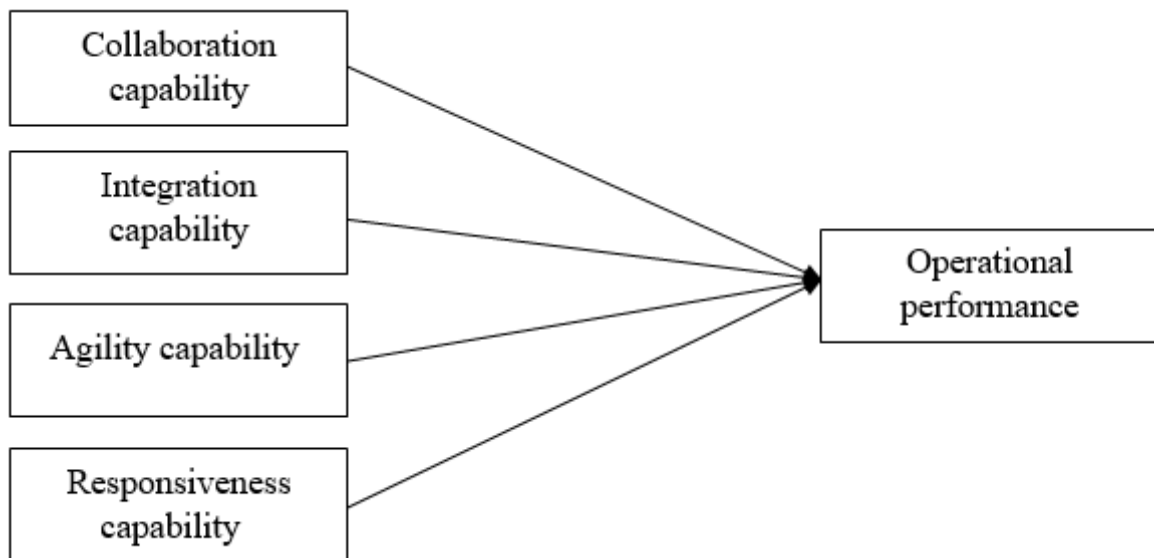


Figure 1: Conceptual model

3 Research Methodology

3.1 Questionnaire design and measures

In order to assess the proposed hypotheses, we conducted a survey to managers, supervisors, and management personnel of manufacturing enterprises in Hungary. The survey instrument was developed based on the literature. The survey questionnaire was created by the google-forms tool. It was divided into three sections, namely: respondent and organization profile, dynamic supply chain capabilities, and operational performance.

The measurements were developed based on an extensive review of the literature. All measurements used a seven-point Likert scale. Dynamic supply chain capabilities were operationalized in four-dimensional constructs including collaboration capability, integration capability, agility capability, and responsiveness capability. Twenty items used for measuring dynamic supply chain capabilities were adopted from Ju et al. (2016), Wu et al. (2006), Aslam et al. (2018), Oh et al. (2019), Hong et al. (2019), and Rajaguru & Matanda, (2019). Seven items measuring operational performance were adopted from Flynn et al. (2010), Yu et al. (2018), and Rajaguru & Matanda, (2019). The list of measurement items is presented in Appendix 1.

3.2 Control variables

The firm size and firm age were used as control variables in our model. However, the firm type cannot be a control variable for our study because we validate the research model using data collected from manufacturing firms (Hong et al., 2017). The firm age is a potential characteristic that has a considerable impact on firm performance. The number of employees was used as a proxy for the firm size because larger firms may have more resources for managing supply chain activities, and thus may achieve higher business performance than small firms (Yu et al., 2013).

3.3 Data collection and sample description

This study collected data from manufacturing companies in Hungary in the period 05/Jan.2020- 04/Mar.2020 by using an online questionnaire. To avoid the biases associated with convenience sampling (Hong et al., 2017). Thus, the manufacturing companies were selected randomly from the complete list of manufacturers in Hungary. The types of selected enterprises include private enterprises, state-owned enterprises, foreign-funded enterprises, and joint ventures. The investigated enterprises are involved in a wide range of activities such as furniture production, electricity production, clothing, pharmacy, food, electronic products, rubber, and plastic. The respondents mainly included several CEOs, presidents, directors, managers, supervisors, and senior staff who work in jobs related to supply chain management or operation management. We mailed the questionnaire, including a cover letter highlighting the study's objectives and the importance of the respondent's cooperation. Out of 235 companies contacted, a total of 421 questionnaires were distributed, out of which 208 completed questionnaires were obtained, with a response rate of 49.40% of the respondents. We distributed more than one questionnaire from the same firm. Because of several managers representing different organizational levels at the same time for one firm. Thus, supply chain dynamic capabilities should be involved the opinions not only from the CEO or president but also from operations and supply chain managers. This approach has the benefit of providing an overall perspective from the top executives and an expert perspective from the relevant functional area of the firm (Li et al., 2008; Yu, 2017).

The respondent profile information is presented in Table 1. It shows that the majority of the companies (23.6%) are food industry. Most of the companies at (33.2%) are private companies. A little lower than half of the investigated companies were in the relatively large company classification of over 500 employees. Most of the companies (36.5%) were more than 20 years old.

Table 1: Respondent profile information

Characteristics	Categories	Frequency	Percentage (%)
Industry	Furniture production	18	8.7
	Electricity production	21	10.1
	Clothing	15	7.2
	Pharmacy	19	9.1
	Food	49	23.6
	Electronic products	45	21.6
	Rubber and plastic	41	19.7

Table 1: Respondent profile information (continues)

Type of firm	State-owned company	35	16.8
	Private company	69	33.2
	Foreign-owned	62	29.8
	Joint venture	42	20.2
Size (Employees)	Less than 100	54	26.0
	100-300	37	17.8
	301-500	28	13.5
	501-1000	25	12.0
	More than 1000	64	30.8
Age of firm	Less than 4 years	13	6.3
	4-5 years	33	15.9
	6-10 years	29	13.9
	11-20 years	57	27.4
	More than 20 years	76	36.5

4 Data analysis and results

4.1 Descriptive statistics

Table 2 presents descriptive statistics such (mean, standard deviation, and correlation). The results show that the means score for all the constructs is located between (3.28-4.91) and standard deviation (0.83-1.04) which indicates that the firms have a good implementation of supply chain dynamic capabilities. Also, the results show that each of the constructs is positively and significantly correlated with each other.

4.2 Reliability and Validity

The reliability and validity of measurement scales were assessed by using confirmatory factor analysis (CFA), and AMOS 24 was used to estimate convergent validity and discriminant validity. The reliability of the scales was evaluated using Cronbach's alpha coefficient as seen in (Table 3). Cronbach's alpha coefficient for all constructs ranges

between 0.774 and 0.789 which are above the threshold value .50. This indicates that all the items are internally consistent (Hair et al., 2010). The convergent validity was determined in three important indicators, which are factor loadings (standardized estimates), Average Variance Extracted (AVE), and Composite Reliability (CR).

This study establishes that out of a total of 27 initial items, 24 items have been maintained (see in Table 3). This indicates that the 3 items were deleted because of poor loadings. The remaining 24 items retained should be loaded highly on one factor with a factor loading of 0.50 or greater and statistically significant ($p < 0.05$) as recommended by Hair et al. (2010). Composite reliability (CR) for all constructs ranges between 0.830 and 0.898 which are above 0.50, indicating that all the constructs demonstrate a good level of composite reliability (CR) as recommended by Hair et al. (2012). The average variance extracted (AVE) value for all the constructs is located between 0.707 to 0.764 which is above the threshold value (.50) which is suggested by Hair et al., (2010).

Discriminant validity was examined by using (Fornell & Larcker, 1981) method. They suggested that if the

Table 2: Descriptive statistics

	Mean	S.D.	CC	IC	AC	RC	OP
CC	3.53	0.92	1				
IC	3.37	0.87	0.624**	1			
AC	3.49	0.83	0.603**	0.9510**	1		
RC	3.28	0.91	0.547**	0.638**	0.680**	1	
OP	4.91	1.04	0.480**	0.551**	0.689**	0.627**	1

** Correlation is significant at the 0.01 level (2-tailed).

CC= Collaboration capability, IC= Integration capability, AC=Agility capability, RC= Responsiveness capability, OF= Operational performance. Measurement Items used for the constitution of the listed variables are presented in Appendix 1.

Table 3: CFA results: reliability and validity.

Constructs	Measurement Items	Factor Loading	a	CR	AVE	PValue
Collaboration capability	CC1	0.717	0.778	0.878	0.716	0.000
	CC2	0.774				0.000
	CC3	0.787				0.000
	CC4	0.723				0.000
	CC5	deleted				
Integration capability	IC1	0.624	0.783	0.830	0.751	0.000
	IC2	deleted				
	IC3	0.614				0.000
	IC4	0.591				0.000
	IC5	0.635				0.000
Agility capability	AC1	0.688	0.785	0.887	0.727	0.000
	AC2	0.621				0.000
	AC3	0.572				0.000
	AC4	0.683				0.000
	AC5	0.695				0.000
Responsiveness capability	RC1	0.559	0.774	0.874	0.707	0.000
	RC2	0.685				0.000
	RC3	0.583				0.000
	RC4	0.581				0.000
	RC5	0.663				0.000
Operational performance	OP1	0.599	0.789	0.898	0.764	0.000
	OP2	0.669				0.000
	OP3	deleted				0.000
	OP4	0.614				0.000
	OP5	0.611				0.000
	OP6	0.601				0.000
	OP7	0.687				0.000

a= Cronbach's alpha, CR = Composite Reliability and Average, AVE=Variance Extracted

square root of the AVE for a latent construct is greater than the correlation values among all the latent variables that means discriminant validity is supported. Table 4 shows that the square root of the AVE values of all the constructs is greater than the inter-construct correlations which confirm discriminant validity. Also, Hair et al. (2010) suggest that if AVE for a latent construct is larger than the maximum shared variance (MSV) with other latent constructs that provides evidence of discriminant validity. The goodness-of-fit measures were used to assess the fitness of a measurement model. The results confirm an adequate model fit (CMIN/df= 1.431, GFI=0.873, TLI= 0.898, CFI=0.899,

RMSEA=0.047). Thus, the measurement model indicates good construct validity and reliability.

Table 4: Discriminant validity

	AVE	MSV	CC	IC	AC	RC	OP
CC	0.716	0.568	0.846				
IC	0.751	0.466	0.332	0.867			
AC	0.727	0.604	0.432	0.478	0.853		
RC	0.707	0.504	0.664	0.603	0.332	0.841	
OP	0.764	0.361	0.621	0.731	0.635	0.719	0.874

Notes: Bold values in diagonal represent the squared root estimate of AVE.

AVE= Average Variance Extracted, MSV= Maximum shared variance.

4.3 Common method bias checks

The Harman one-factor test (Podsakoff & Organ, 1986) was used to test for common method bias. A principal component analysis (PCA) was performed for all the items included in the study. The results show that the total variance for a single factor is less than 50%. We conclude that common method bias does not confound the interpretations of the results.

4.4 Test of hypotheses

The structural equation modeling (SEM) was used to test empirically the proposed hypotheses. The results of the hypothesis test are shown in Table 5 and Fig. 3. The results show that collaboration capability ($B=0.446$, $p<0.001$), agility capability ($B=0.552$, $p<0.001$), and responsiveness capability ($B=0.266$, $p<0.021$) significantly and positively impact on an operational performance, which strongly supports H1, H3, and H4. However, there was no significant relationship between integration capability ($B=0.096$, $p<0.373$) and operational performance. Hence, H2 is rejected.

Table 5: Result of hypothesis Test

NO.	Hypotheses	Beta Coefficient	P.Value	Result
H1	Collaboration capability → Operational Performance	0.446	0.00	Supported
H2	Integration Capability → Operational Performance	0.096	.373	Not Supported
H3	Agility Capability → Operational Performance	0.552	0.00	Supported
H3	Responsiveness Capability → Operational Performance	0.266	.021	Supported

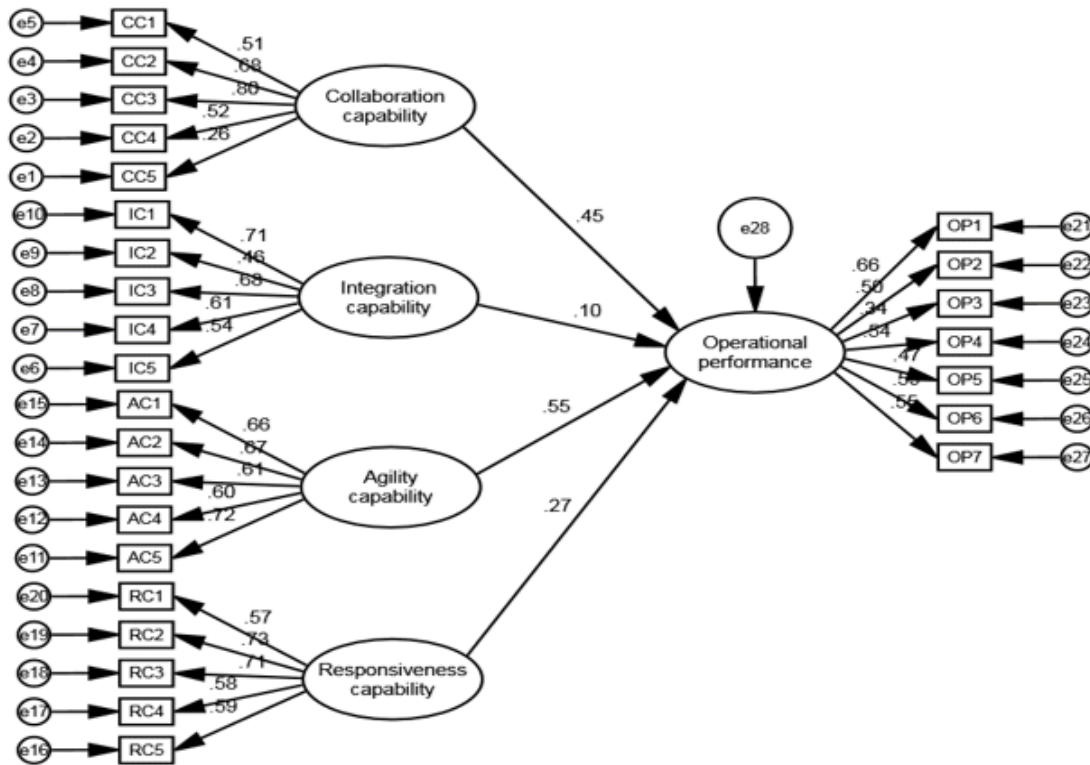


Figure 2: The SEM model analysis

5 Discussion and conclusion

This study investigates the interaction impact between supply chain dynamic capabilities and operational performance. In particular, we evaluate the impact of four supply chain dynamic capabilities, namely collaboration capability, integration capability, agility capability, and responsiveness capability on the operational performance of manufacturers in Hungary. The study revealed four key findings. First, we find that collaboration capability has a significant positive impact on operational performance. This is in line with the results of Yu et al. (2018). They argue that when a firm builds a good relationship with partners, collaboration supply chain capability has a potential impact on firm operational performance. Our finding is also consistent with the results of Cao and Zhang, (2011) which indicate that supply chain collaboration capability improves collaborative advantage, in turn, positively impacts firm performance. Second, this study finds that integration supply chain capability has no significant impact on operational performance. This finding is significantly different from some previous studies. For example, Flynn et al. (2010) argue that integration supply chain capability positively influences operational performance through

customer and supplier integration. However, a potential reason for the inconsistent findings may be due to the fact that it is not an easy task for firms and their partners to implement effective integration supply chain to ensure their objectives (Shashi et al., 2019). Third, we find that agility supply chain capability has the highest significant positive relationship with operational performance. This is in line with the results of (Aslam et al., 2018). They state that supply chain agility capability enables a firm to grab opportunities in the marketplace that may enhance the firm's performance. Our findings are also consistent with the results of Oh et al. (2018). They argue that the agility supply chain contributes to a firm's operational performance through the quick speed to market and customer satisfaction. Fourth, this study finds that supply chain responsiveness capability positively influences operational performance. This is in line with the results of Aslam et al. (2018) and Hong et al. (2019). They argue that a firm's ability to respond quickly to changing consumer needs, to competitors' strategies, and to develop new products quickly can improve its performance. Finally, this study concludes that in a changing environment, supply chain dynamic capabilities such as collaboration capability, agility capability, and responsiveness capability have a positive impact on operational performance.

5.1 Theoretical contributions

This study provides two important theoretical contributions. First, although researches on the supply chain have attracted considerable attention in literature, very limited researches have been done on supply chain dynamic capabilities. Therefore, this study introduces an empirical approach to investigating the impact of supply chain dynamic capabilities on operational performance. Thus, it has important potential to fill the gap in the literature. Second, the study contributes to supply chain literature by demonstrating a clear understanding of the specific supply chain dynamic capabilities that firms need to develop in order to enhance operational performance. Moreover, we find that these supply chain dynamic capabilities are multidimensional, measurable, and applicable which will help scholars to use these measurements in future research.

5.2 Managerial implications

This study provides important practical implications for manufacturers. To survive in changing environments, managers should recognize the role of supply chain dynamic capabilities in improving operational performance. Our results confirm that collaboration capability, agility capability, and responsiveness capability are significantly and positively associated with operational performance. Also, the results show that integration capability has no positive association with operational performance. The study suggests that building these capabilities can help manufacturing managers to build effective supply chains and achieve superior performance. Further, managers need to recognize that supply chain dynamic capabilities are multidimensional and each dimension has differential effects on operational performance. Thus, manufacturing firm managers have to focus on the supply chain dynamic capabilities that need to be targeted to improve operational performance.

5.3 Limitations and future research

This study has some limitations that need to be addressed in future research. First, the study applied cross-sectional research design, thus findings of this study cannot be considered as definitive evidence of the underlying causal relationships. Future research may use a longitudinal research design that could give conclusive evidence for the highlighted relationships. Second, this study used self-reported data for measuring the variables of the study. Future research may employ dataset with knowledgeable informants from each firm that may enhance the validity of the findings. Third, this study focuses on four dimensions of supply chain dynamic capabilities. Future research should consider other potential dimensions.

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Vpliv dinamičnih zmožnosti dobavne verige na operativno uspešnost

Ozadje in namen: V literaturi najdemo malo raziskav o tem, kako dinamične zmogljivosti dobavne verige vplivajo na njeno operativno uspešnost. Namen te študije je empirično raziskati vpliv dinamičnih zmožnosti dobavne verige na operativne rezultate v madžarskih proizvodnih podjetjih.

Zasnova / metodologija / pristop: Študija je uporabila spletno anketo za zbiranje podatkov, v kateri je sodelovalo 208 strokovnjakov za upravljanje dobavne verige iz madžarske predelovalne industrije. Za testiranje predlaganih hipotez so uporabili modeliranje strukturnih enačb (SEM).

Rezultati: Empirični rezultati kažejo, da so dinamične zmogljivosti oskrbovalne verige, namreč; sposobnost sodelovanja, sposobnost prilagajanja in odzivnost pomembno in pozitivno povezane z operativno učinkovitostjo. Rezultati pa kažejo, da zmožnost integracije nima pomembnega vpliva na operativno uspešnost.

Zaključek: Študija ugotavlja, da lahko v dinamičnem okolju razvoj dinamičnih zmogljivosti oskrbovalne verige pomaga vodjem proizvodnih podjetij, da zgradijo učinkovite dobavne verige in dosežejo boljše rezultate. Nadalje morajo upravitelji prepoznati, da so dinamične zmogljivosti dobavne verige večdimenzionalne in ima vsaka dimenzija različne učinke na operativno uspešnost. Študija podaja tudi teoretične in vodstvene posledice, ki so podrobneje predstavljene v članku.

Ključne besede: *Dinamične zmogljivosti, Dobavna veriga, Operativna uspešnost*

Appendix A. List of Measurement Items: Supply Chain Dynamic Capabilities

Collaboration Capability

CC1: Our company operates an agreement with partners

CC2: Our company collaborates actively in group decision making with partners

CC3: Our company collaborates actively in group problem solving with partners

CC4: Our company has a good relationship with partners

CC5: Our company develops strategic plans in collaboration with our partners.

Integration capability

IC1: Our company ensures the standardization of data with partners

IC2: Our company ensures integration of information system with partners

IC3: Our company removes repetition with partners

IC4: Our company ensures data consistency with partners

IC5: Our company always forecasts and plans activities collaboratively with our partner

Agility capability

AC1: Our company adapts services and/or products to new customer requirements quickly

AC2: Our company reacts to new market developments quickly

AC3: Our company reacts to significant increases and decreases in demand quickly

AC4: Our company adjusts product portfolio as per market requirement

AC5: Our company responds to competitors strategy change more quickly than our competitors

Responsiveness capability

RC1: Our company responds quickly to changing consumer needs

RC2: Our company ensures feedback to suppliers more quickly and effectively

RC3: Our company responds to the quality strategy of competitors more quickly and effectively

RC4: Our company responds quickly to changing scope of supply

RC5: Our company responds to the risk of the supply chain more quickly and effectively

Operational performance

OP1: Our company's effectiveness in fulfilling requirements.

OP2: Our company's effectiveness in responding to changes in market demand.

OP3: Our company's effectiveness in on-time delivery.

OP4: Our company's effectiveness in delivering reliable quality products.

OP5: Reduction in lead time to fulfill customers' orders.

OP6: Reduction in overhead costs

OP7: Reduction in inventory costs

An Empirical Investigation of the Mediating Role of Customer Attachment in South African Private Hospitals

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Background and purpose: Relationship marketing literature acknowledges the important role of attachment in customer-organization relationships, but shows limited theoretical and empirical understanding of the factors that contribute to the development and maintenance of attached customers. To address this gap, this paper draws on the relationship marketing view and synthesizes important relationship constructs with the aim of developing a mediated attachment model for private hospitals in South Africa.

Design/Methodology/Approach: A quantitative descriptive research design was implemented, collecting 303 useable questionnaires via non-probability convenience sampling. Cronbach's alpha coefficients and a confirmatory factor analysis were conducted to determine the reliability and validity of the measures respectively, and a SEM was conducted for the mediation analysis.

Results: The results indicate that respondents' relationship value was significantly related to attachment, loyalty and fear of relationship loss, and attachment was significantly related to loyalty and fear of relationship loss. Moreover, the indirect effect of attachment in the relationship between relationship value and loyalty, as well as in the relationship between relationship value and fear of relationship loss was found to be significant.

Conclusion: Attachment plays a significant role in both the direct and indirect relationships with key relationship marketing constructs. The importance of attachment in building patient-hospital relationships should therefore not be ignored, and private hospitals are encouraged to invest in their relationships with patients, with the aim of establishing attachment.

Keywords: Attachment, Fear of relationship loss, Loyalty, Private hospitals, Relationship value

1 Introduction

The rationale behind building lasting customer relationships is that retaining existing customer relationships cost less than continually attracting new customers, which contributes to higher profitability (Barber et al., 2018, p. 563). This cost-saving property of retaining customers motivates hospitals to develop and implement successful relationship marketing strategies, as this would enable them to create a sustained competitive advantage (Kanthé et al., 2016:36; Poku et al., 2017:101). To establish and main-

tain successful long-term customer relationships, various researchers are of the opinion that organizations should focus their relationship marketing strategies on those customers who have formed a bond with the organization, that is, customers with high levels of attachment to the organization (Dwyer, Mudrick, Greenhalgh, LeCrom & Drayer, 2015, p. 578; Moussa & Touzani, 2017, p. 157). Beldona and Kher (2015, p. 363) note that customers' attachment styles influence how they view their relationship with the organization, and that customers typically experience an emotional attachment to the organizations they can trust. A customer who trusts an organization generally displays a

higher level of loyalty, and should have stronger intentions to continue in a relationship with the organization (Mende, Bolton & Bitner, 2013, p. 138). The value of attachment in building long-term profitable customer relationships should therefore not be undervalued (Bahri-Ammari, Van Niekerk, Khelis & Chtioui, 2016, p. 563; Mende et al., 2013, p. 139).

To form a better understanding of attachment in customer-organizational relationships, Moussa and Touzani (2017, p. 157) and Verbeke, Belschack, Bagozzi, Pozharliev and Ein-Dor (2017, p. 51) suggest that the factors contributing to the development and maintenance of attached customers should be studied. Existing research indicates that customers' relationship value may influence the level of their attachment. Beldona and Kher (2015, p. 363) and Danjuma and Rasli (2012, p. 99) explain that customers are also more likely to develop attachment when an organization meets the conditions valued by them in the relationship. Moreover, organizations that operate in a competitive market regard both customer attachment, and sustaining it as important, because it offers various outcomes that contribute to building sustainable customer relationships. According to Bahri-Ammari et al. (2016, p. 574) and Kumar, Bohling and Ladda (2003, p. 670), customers who are emotionally attached to the organization have developed a bond with it and will consequently not only exhibit a fear of losing their relationship with their organization, but will also demonstrate resistance to switching organizations, ensuring the establishment of a loyal customer base, all of which contribute to the development and success of customer relationships.

It can be inferred from the above discussion that various relationship-specific constructs are related to customers' attachment, including relationship value, fear of relationship loss, and loyalty. While a limited number of studies have examined the relationship between attachment and some of the abovementioned constructs in isolation, these studies have not yet investigated these constructs in relation with each other, limiting the understanding of the customer attachment concept (Mende et al., 2013, p. 139; Moussa & Touzani, 2017, p. 157; Verbeke et al., 2017, p. 51). Determining the role of the abovementioned constructs on customers' attachment will not only enhance marketers' understanding of attachment in customer-organizational relationships, but will also contribute to the growing body of research on customer attachment. Moreover, although the importance and contribution of customer attachment in building relationships is undisputed, according to the researchers' knowledge no research has examined customers' attachment in the South African private hospital sector. Gaining insight into patients' attachment could, therefore, guide private hospitals in South Africa in their efforts to build relationships with patients. For these reasons, this study sets out to determine the interrelationships amongst respondents' attachment and se-

lected relationship marketing constructs (i.e. relationship value, fear of relationship loss, and loyalty) in the private hospital sector of South Africa.

2 Literature review

2.1 Attachment

Ainsworth, Blehar, Waters and Wall (1978) and Bowlby (1958) refer to attachment as individuals' emotional and behavioral tendencies (bonds) captured in personal relationships, which are developed over time based on these individuals' prior experiences. To describe and measure attachment, research in psychology has converged on the use of two dimensions, namely attachment avoidance and attachment anxiety.

The avoidance dimension captures an individual's fear of personal intimacy, dependence, and disclosure; whereas the anxiety dimension captures an individual's fear of rejection and abandonment (Yip, Ehrhardt, Black & Walker, 2018, p. 188). According to Dwyer et al. (2015, p. 571), both attachment avoidance and attachment anxiety can assist in forming an understanding of regulating human emotions, which forms the basis of the attachment theory. The attachment theory refers to people's psychological instinct to form and maintain affectionate ties with specific attachment figures (such as father, mother, or organization). These attachment figures guide people's expectations and perceptions in close relationships, which in turn determine their internal working models of relationships (mental representations of relationship partners and the self) (Sutton, 2019, p. 10; Yip et al., 2018, p. 187).

Although most of the early research on attachment focused almost entirely on parent-infant (Ainsworth et al., 1978; Bowlby, 1958) and adult relationships (Sutton, 2019, p. 2), marketing studies have suggested that customers' internal working models (attachment representations) may be activated when they are engaging with particular brands, organizations or employees (Beldona & Kher, 2015, p. 362-363; Mende et al., 2013, p. 139). These researchers argue that customers' internal working models of attachment will be activated when they are faced with certain emotional experiences (such as a service failure), seeing that the relationship between a customer and the representatives of an organization can be viewed as an adult relationship. Consequently, if attached adults are able to regulate their emotions during emotional experiences (Dwyer et al., 2015, p. 571), it can be expected that attached customers will do the same, which, in turn, will allow organizations to build sustainable customer relationships.

2.2 Relationship value

Although research on value has traditionally focused on the value of physical products, recent studies have emphasized the importance of the value of relationships (Cui & Coenen, 2016, p. 61; Sun, Pan, Wu & Kuo, 2014, p. 94). According to Corsaro, Fiocca, Henneberg and Tunisini (2013, p. 282), the need to introduce the relationship value concept stems from the fact that customer-organizational relationships hold positive economic consequences for organizations. Ulaga and Eggert (2005, p. 81) define relationship value as a trade-off between the benefits (what is received) and the costs experienced or sacrifices (what is given) for a customer in their relationship with an organization, also taking into consideration what competitors can offer. This definition highlights the balance or compensation between benefits and sacrifices that the customer perceives in comparison to other providers.

The benefits for which customers are searching originate mostly from the existing relationship with an organization in the form of benefits relating to the product, the service, the community, the supplier's know-how, and the organization's capacity to improve time-to-market for its customers. The sacrifices, on the other hand, include the price paid to the organization and the process costs (Corsaro et al., 2013, p. 282; Ulaga & Eggert, 2005, p. 88). Moliner-Velazquez, Fuentes-Blasco and Gil-Saura (2014, p. 222) advocate that marketing managers should carefully manage the value of the relationship provided to their customers, as it could form the foundation for building, enhancing and maintaining relationships with them. If properly implemented, relationship value will be advantageous to organizations, as it will lead not only to positive economic outcomes, but also to satisfied customers (Cui & Coenen, 2016, p. 54). Moreover, customers who value their relationship with the organization will also develop a fear of losing this relationship with the organization (Beldona & Kher, 2015, p. 356; Blut, Beatty, Evanschitzky & Brock, 2016, p. 286) (discussed in section 2.4).

2.2.1 The link between relationship value and attachment

Customers who value their relationship with an organization will be more attached to the organization. The rationale for this is that the presence or absence of different sources that customers value, such as a relationship, influence the strength of their attachment to the organization. When an organization meets the conditions valued by their customers, the customers will become more attached to the organization (Aldlaigan & Buttle, 2005, p. 356-357; Corsaro et al., 2013, p. 288). It is therefore hypothesized that:

H1: Relationship value has a significant positive effect on customers' attachment to their private hospital.

2.3 Loyalty

Customer loyalty can be defined as customers' attachment to an organization with which they form a psychological bond. They show continuous purchase intentions and behaviors towards this organization (Wirtz & Lovelock, 2018, p. 56). This definition incorporates both an attitudinal and a behavioral dimension of loyalty, which most researchers regard as the best measure of true customer loyalty (Bowen & McCain, 2015, p. 418; Khan, 2012, p. 260). The attitudinal dimension of loyalty delineates how customers think and feel about a brand, product, service, or organization (i.e. psychological bond and attachment formed). This is reflected, for instance, in customers' preference for an organization, their commitment to it, and their willingness to recommend it to other customers (Khan, Humayun & Sajjad, 2015, p. 168-169; Zeithaml, Berry & Parasuraman, 1996, p. 35). In contrast, behavioral loyalty amounts to customers' purchasing behavior over time. This is reflected, for instance, in customers' commitment to frequently purchase from the organization and their willingness to spend more at this organization as compared to competing organizations (Khan et al., 2015, p. 168-169; Zeithaml et al., 1996, p. 36).

Several scholars are in agreement that customer loyalty can be viewed as a core marketing activity for organizations operating in fiercely competitive environments, as this yields various benefits for organizations in the form of higher repurchase intentions, an increased share of wallet, word-of-mouth and lowered acquisition costs, which ultimately result in higher organizational profits (Khan, 2012, p. 250-258; Wirtz & Lovelock, 2018, p. 375). According to Prayag and Ryan (2012, p. 9), one of the main factors contributing to the establishment of a loyal customer base is customers' level of involvement with employees and organizational activities. These researchers argue that, through customers' involvement with employees and organizational activities, they form an emotional bond with the organization, which, in turn, may lead to loyal customers.

2.3.1 The link between attachment and loyalty

Customer loyalty can be regarded as an essential aspect of customer attachment, seeing that attachment is developed gradually during service experiences over time (Wirtz & Lovelock, 2018, p. 386; Yim, Tse & Chan, 2008, p. 752,753). Yim et al. (2008, p. 752) explain that customers develop feelings of intimacy, passion and commitment as they connect with the organization, which leads to stronger bonds and resistance to change (i.e. establishing loyalty). Research by Khan (2012, p. 246) and Levy and Hino (2016, p. 143) confirms the relationship between at-

tachment and loyalty, and states that true customer loyalty can be established only through customers' attachment to the organization. Therefore, it is hypothesized that:

H2: Customers' attachment has a significant positive effect on their loyalty to their private hospital.

2.3.2 The link between relationship value and loyalty

Previous research by Chen and Myagmarsuren (2011, p. 969) reveal that customers who value their relationship with the organization are more likely to become loyal. Sun et al. (2014, p. 92) support this view by explaining that when customers perceive that they are receiving more value from the relationship with the organization, they are prepared to buy more from the organization and sustain a long-term relationship with it. Therefore, it is hypothesized that:

H3: Relationship value has a significant positive effect on customers' loyalty to their private hospital.

2.4 Fear of relationship loss

Customers' motivation to build and maintain relationships with organizations are rooted in the relationship benefits (confidence, social, and special treatment) (Hennig-Thurau, Gwinner & Gremler, 2010, p. 387; Wei, McIntyre & Soparnot, 2015, p. 16) and the relational bonds (financial, structural, and social) (Wang, 2014, p. 320) arising from such relationships. Hennig-Thurau et al. (2010, p. 379) and Yen, Liu, Chen and Lee (2015, p. 176) explain that customers choose to continue their relationship with the organization, as they know what to expect from this relationship (confidence benefits). Customers, therefore, develop a sense of familiarity and even a social relationship in the form of a friendship with their organization (social benefits) and may even receive benefits in the form of economic or customization benefits (special treatment benefits).

These relationship benefits facilitate the formation of a relationship bond between the customer and the organization (Liang & Wang, 2006, p. 123; Spake & Megehee, 2010, p. 319). It is through the relationship bond created between the customer and organization that customers develop a fear of losing a relationship with the organization, as they have formed an emotional attachment to the organization (Mende et al., 2013, p. 139). Huang, Fang, Huang, Chang and Fang (2014, p. 195) and Lee, Kim, Kim, Lee and Lim (2015, p. 838) argue that emotionally-attached customers fear losing their relationship with the organization owing to the money they are saving in the relationship (financial bond), value-added benefits which competing organizations cannot provide (structural bond), and feel-

ings of familiarity, personal recognition, friendship and social support (social bond). Consequently, customers are motivated to stay and continue the relationship with the organization because they fear losing the relationship benefits and bonds (Blut et al., 2016, p. 286; Kumar et al., 2003, p. 670). Kumar et al. (2003, p. 670) and Sutton (2019, p. 11) add that, in an attempt to maintain and restore a relationship with an organization, customers not only exhibit a fear of losing the relationship with their organization, but also opt to forgive a transgression (such as a service failure).

2.4.1 The link between attachment and fear of relationship loss

Over time, customers become more motivated to develop a bond with an organization through their interactions with the organization as well as the relationship benefits they receive. It is through the bond created between the customer and organization that the likelihood of developing a successful customer-organizational relationship increases (Liang & Wang, 2006, p. 123; Spake & Megehee, 2010, p. 316). Chelminski and Coulter (2011, p. 366), Kumar et al. (2003, p. 670) and Mende et al. (2013, p. 138) also note that customers who have developed a bond with an organization are also more emotionally attached to the organization and they may fear the possible consequences of losing their relationship (such as their relationship bond and relationship benefits). It is therefore hypothesized that:

H4: Customers' attachment has a significant positive effect on their fear of losing their relationship with their private hospital.

2.4.2 The link between relationship value and fear of relationship loss

Previous research by Aldlaigan and Buttle (2005, p. 356-357) established that customers are encouraged to develop an attachment with an organization through the presence or absence of different sources that they value. These sources may appear in the form of customer-organizational relationships. When customers perceive that they are receiving more value from the relationship with the organization, they are more prepared to build a bond with the organization. By developing a bond with the organization, the customer becomes more committed towards the organization, increasing the likelihood of developing a successful, long-term relationship (Chen & Myagmarsuren, 2011, p. 969; Sun et al., 2014, p. 92). According to Beldona and Kher (2015, p. 356), Chelminski and Coulter (2011, p. 366), and Kumar et al. (2003, p. 670), customers who have developed a bond with an organization are emotionally attached to the organization and will exhibit fear of the possible consequences (relational benefits and

bonds) of losing the relationship with the organization. It is thus hypothesized that:

H5: Relationship value has a significant positive effect on customers' fear of losing their relationship with their private hospital.

2.5 The mediating effect of attachment

The proposed positive relationships discussed in the previous sections shed further light on the possibility of attachment serving as a mediating variable in the proposed model on the positive relationship between relationship value and loyalty. Similarly, the positive relationship be-

tween relationship value and attachment, as well as between attachment and fear of relationship loss, also point towards the possibility of attachment serving a mediating role on the positive impact of relationship value on fear of relationship loss. Hence, it is proposed that:

H6: Relationship value has a significant positive indirect effect on customers' loyalty towards their private hospital, as mediated by attachment.

H7: Relationship value has a significant positive indirect effect on customers' fear of losing their relationship with their private hospital, as mediated by attachment.

Figure 1 illustrates the hypothesized relationships between the constructs under investigation, as proposed from the above literature discussion.

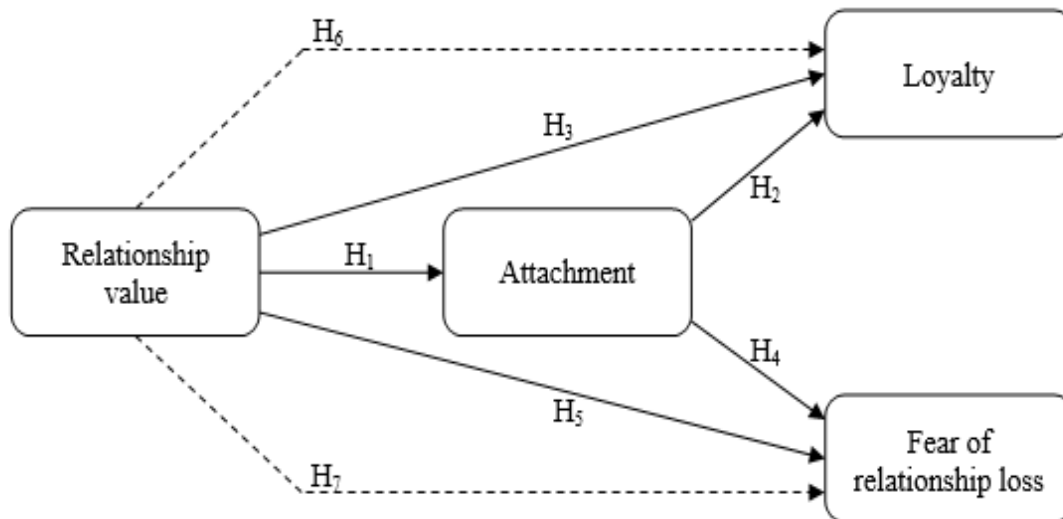


Figure 1: Conceptual model

3 Methodology

3.1 Research context

In general, healthcare can be viewed as highly complex, universally-used services that significantly influence economies, individuals' quality of life, and their disposable income (Van de Schoot, Pavlova, Atanasova & Groot, 2017, p. 67). This is particularly the case for healthcare in the South African hospital industry, which is often regarded as unaffordable, and therefore inaccessible to the majority of South Africans (Gray & Vawda, 2018, p. 8; RH Bophelo, 2019). Characterized by poor service deliveries, resource shortages, deteriorated equipment, limited availability of qualified staff, and inconsistent management, the South African public hospital sector is ranked amongst the

worst in the world, leaving the majority of South Africans without proper healthcare (Mutwali & Ross, 2019, p. 36). These challenges faced by the public hospital sector resulted in a demand for quality healthcare among South Africans, which has led to the growth of the private hospital sector (Barber, Kumar, Roubal, Colombo & Lorenzoni, 2018, p. 562; RH Bophelo, 2019).

According to Mutwali and Ross (2019, p. 35), the private hospital sector plays a pivotal role in South African healthcare owing to sustained profitability and its political and economic relevance, helping the government fulfil its constitutional mandate to provide quality healthcare. However, despite the significant financial contribution by the private hospital sector, it serves only 20% of the South African population, and has been exposed to considerable changes in the marketplace in the form of new technologies, more informed patients, and increased pa-

tient demands for better service delivery, leading to a surge of competitors. Subsequently, these changes have forced private hospitals to actively compete for a share in the market.

3.2 Sample and data collection

The sample for this research included residents of three South African provinces (i.e. Gauteng, KwaZulu-Natal, and North West) who made use of private hospital services during a three-year period. A quantitative descriptive (cross-sectional) research design was used to observe and investigate the behavior of respondents. The respondents were selected by means of a non-probability convenience sampling method, owing to the absence

of a sampling frame and budget constraints. Respondents were approached by trained fieldworkers in convenient but high-traffic public areas, and requested to complete the structured self-administered survey. A total of 320 questionnaires were distributed, of which 303 were useable for further analysis, resulting in a 94% response rate.

As summarized in Table 1, respondents with various demographic characteristics participated in the research, of which most were White (78.5%) females (63.0%), aged 28 or younger (39.9%) and 50 or older (22.2%). The respondents were further requested to indicate the duration for which they had been making use of their hospital's services. The results revealed that the majority indicated a period of less than one year (34.3%).

Table 1: Sample profile

Variables	F	%
Gender		
Male	112	37.0
Female	191	63.0
Race		
Asian	5	1.7
Black	42	13.9
Colored	14	4.6
Indian	4	1.3
White	238	78.5
Age		
28 or younger	121	39.9
29 to 37 years old	51	16.8
38 to 49 years old	64	21.1
50 or older	67	22.2
Length of time making use of hospital's services		
Less than 1 year	104	34.3
1 to 3 years	75	24.8
4 to 6 years	60	19.8
Longer than 6 years	64	21.1

3.3 Measurement and analysis approach

This research utilized a structured self-administered questionnaire, comprising three sections. The first section included a preamble, which indicated the objectives of the research, explained and ensured respondents' confidentiality and anonymity, and indicated the approximate time of completion (which was 10 minutes on average). The preamble concluded with a screening question to ensure that only eligible respondents took part in the research (i.e. respondents who had made use of private hospital services during the last three years). The second section of the questionnaire measured respondents' socio-demographic elements, and the third section measured the constructs of the study.

The constructs were measured by means of scales adapted from existing research, which were previously validated by the respective researchers. The items used to measure relationship value were adapted from the work of Ulaga and Eggert (2006, p. 134), attachment was measured by adapting a scale from Mende et al. (2013, p. 130), fear of relationship loss was measured by adapting a scale from the work of Kumar et al. (2003, p. 675-676), and loyalty was measured by a scale adapted from the work of Dagger and David (2012, p. 468) who developed the scale based upon the work of Hennig-Thurau et al. (2010, p. 388), Oliver (2010, p. 378), Plank and Newell (2007, p. 66), and Zeithaml et al. (1996, p. 38). Questionnaire items are presented in the Appendix.

Before commencing the data collection process, the questionnaire was first pre-tested among 30 respondents from the target population, resulting in some technical adjustments.

Data analysis was done using both the SPSS (version 24) and Mplus 8 programs. SPSS was utilized for the calculation of the descriptive statistics and Cronbach's alpha coefficients, and Mplus for the mediation analysis. The SEM model in this study made use of Maximum Likelihood for parameter estimation, as this has been considered most suitable for multivariate normal data. The researchers were also allowed to investigate the correlations between the latent variables, as Mplus generated a zero-order correlation matrix. Effect sizes for the correlation values were considered to have a large practical effect with $r \geq 0.50$ (Hair, Black, Babin & Anderson, 2014, p. 10).

To evaluate the fit of the measurement model to the data, the following indices were considered: confirmatory factor analysis (CFA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA) (Van de Schoot, Lugtig & Hox, 2012, p. 487-488). The cut-off values for both the CFI and TLI should be above 0.90 and the RMSEA requires a value of up to 0.10 to be considered acceptable (Hair et al., 2014, p. 580; Van de Schoot et al., 2012, p.

487). Finally, the model's indirect function was specified in accordance with the hypotheses through Mplus, to investigate the potential mediating variables in the research model. Using bootstrapping, the mediation was tested with requests for 5 000 draws and bias-corrected 95% confidence intervals in the output, focusing on the size and the significance of the indirect effects. An investigation was furthermore made to evaluate whether the indirect effects would not cross zero at that level.

4 Results

4.1 Reliability and validity assessment

Cronbach's alpha coefficients were calculated to assess the internal consistency reliability of attachment, loyalty, relationship value, and fear of relationship loss. According to Hair et al. (2014, p. 123), Cronbach's alpha values of 0.70 or more can be considered reliable. The Cronbach's alpha values for all the measures used in this research ranged from 0.82 to 0.95 (see Appendix), indicating acceptable reliability.

All scales were adapted from existing scales measuring attachment (Mende et al., 2013, p. 130), relationship value (Ulaga & Eggert, 2006, p. 134), fear of relationship loss (Kumar et al., 2003, p. 675-676), and loyalty (Dagger & David, 2012, p. 468). These respective researchers determined the scales measuring these constructs to be valid in their corresponding studies, thus confirming face validity.

With regard to the measurement model, both the CFI at 0.99 and the TLI at 0.98 surpassed the rule of thumb of 0.90 for indication of an acceptable model fit (Hair et al., 2014, p. 580). The acceptable model fit is also supported by the RMSEA with a value of 0.07, which is less than the cut-off point of 0.10 (Hoe, 2008, p. 78). The fit indices were followed by a confirmatory factor analysis, which revealed that the items loaded satisfactorily on the constructs, with all exceeding 0.50, and with all correlations being significant (p -value < 0.001) (Hair et al., 2014, p. 123). Taking into consideration the acceptable model fit and the positive significant loadings of all the items on the variables, convergent validity was also confirmed.

4.2 Correlation matrix

A correlation analysis was conducted to measure the strength of the linear relationship between the latent variables as indicated in Table 2.

Table 2 indicates that large correlations were found between all the variables used in the analysis. Even though the large correlations between the variables may possibly indicate a high degree of multicollinearity, all of the cor-

Table 2: Correlation matrix of the latent variables

Variables	Attachment	Relationship value	Fear of relationship loss	Loyalty
Attachment	–			
Relationship value	0.88*	–		
Fear of relationship loss	0.66*	0.67*	-	
Loyalty	0.87*	0.88*	0.64*	-
*Large effect size ($r \geq 0.50$)				

relations were below 0.90, diminishing the concern with multicollinearity, which arises at correlations of 0.90 and higher (Tabachnick & Fidell, 2013, p. 90).

4.3 Assessing the structural model

The structural paths were added to the measurement model after the correlation assessment and are presented in Table 3 in terms of the hypotheses (H), the path coefficients (β), the standard error (SE), the statistical significance at the 0.05 level (p-value), and the result.

The results of the structural paths indicate that all the hypotheses were supported. Specifically, relationship value was statistically significantly related to attachment ($\beta = 0.88$; SE = 0.02; $p < 0.001$; supporting H1), loyalty ($\beta = 0.51$; SE = 0.10; $p < 0.001$; supporting H3) and fear of relationship loss ($\beta = 0.37$; SE = 0.16; $p < 0.017$; sup-

porting H5). Significant relationships also exist between attachment and loyalty ($\beta = 0.42$; SE = 0.11; $p < 0.001$; supporting H2) and fear of relationship loss ($\beta = 0.33$; SE = 0.16; $p < 0.036$; supporting H4).

Lastly, the bootstrapping of the indirect effects indicated that relationship value had an indirect relationship with loyalty (estimate = 0.37; 95% CI [0.19, 0.57] – did not cross zero) and fear of relationship loss (estimate = 0.29; 95% CI [0.02, 0.58] – did not cross zero) through attachment. Consequently, attachment can be viewed as a complementary (partial) mediator in these two relationships, as the direct relationships were also significant. Research hypotheses H6 and H7 are therefore supported. A summary of the significant relationships identified in the SEM is presented in Figure 2.

Table 3: Structural paths of the latent variables

H	Path	β	SE	p-value	Result
H ₁	Relationship value → Attachment	0.88	0.02	0.001	Significant
H ₂	Attachment → Loyalty	0.42	0.11	0.001	Significant
H ₃	Relationship value → Loyalty	0.51	0.10	0.001	Significant
H ₄	Attachment → Fear of relationship loss	0.33	0.16	0.036	Significant
H ₅	Relationship value → Fear of relationship loss	0.37	0.16	0.017	Significant
β: beta coefficient; SE: standard error; p-value: two-tailed statistical significance					

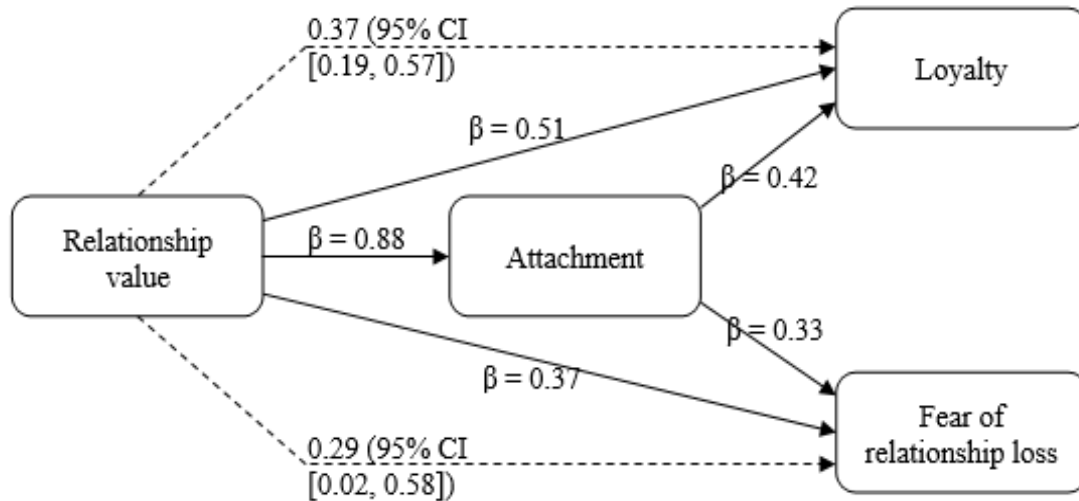


Figure 1: Summary of significant relationships

5 Discussion and conclusions

The purpose of this research was to respond to scholars and marketing managers' calls to form a better understanding of the role of attachment within customer-private hospital relationships. To achieve this goal, this study set out to determine the interrelationships amongst respondents' attachment and selected relationship marketing constructs by means of a SEM analysis. The first result of the structural paths indicated that patients' relationship value was statistically significantly related to attachment. This finding concurs with the earlier work done by Aldlaigan and Buttle (2005, p. 356-357), who found that customers who value the relationship with their organization will also exhibit higher levels of attachment. Exhibiting higher levels of attachment can imply that private hospitals have met the conditions valued by patients. Relationship value was also found to influence loyalty statistically significantly. This finding is aligned with the research of Chen and Myagmarsuren (2011, p. 969) and Khan (2012, p. 246) who not only confirm the relationship between relationship value and loyalty but also argue that when customers perceive that they are receiving more value from the relationship with the organization, they are prepared to buy more from the organization and sustain a long-term relationship with it.

The research findings also confirmed that relationship value statistically significantly influences fear of relationships loss. This finding is consistent with arguments of Beldona and Kher (2015, p. 356), Chelminski and Coulter (2011, p. 366), and Kumar et al. (2003, p. 670), who argue that customers develop a fear of losing a relationship with an organization due to the value they receive from the

relationship in the form of relational benefits and bonds. Despite the well-reasoned arguments supporting the relationship between relationship value and fear of relationship loss, the relationship between these two constructs have not been empirically tested. This paper, therefore empirically contributes to the theory by confirming the relationship between relationship value and fear of relationship loss.

Taking into account the abovementioned results it is advised that private hospitals add value to their relationship with their patients in order to reap the benefits of patients' attachment, loyalty, and fear of relationship loss. Private hospitals might achieve this goal by increasing the relationship benefits (i.e. core benefits, sourcing benefits, and operations benefits) or decreasing the relationship costs (i.e. direct costs, acquisition costs, and operational costs). Specifically, private hospitals are advised to increase their relationship benefits by providing satisfactory service delivery and producing quality products and services (core benefits). They are also advised to provide high levels of support during service delivery and personal interaction (sourcing benefits) in order to understand their patients' needs and wants and get along with them. By understanding their patients' needs and wants, private hospitals should be able to provide their products and services in time for marketing (operations costs). Private hospitals should also attempt to decrease their relationships costs by offering a fair market price and reducing prices when internal costs are reduced (direct costs). They should also aim to handle patients' requests more efficiently and ensure that the products and services provided exceed their patients' expectations (acquisition costs). To decrease their

operational costs, private hospitals could focus on reducing the product costs and the process or the warranty costs of the existing products and services offered.

Furthermore, the results of the structural paths also indicated that attachment was statistically significantly related to loyalty. This finding is aligned with the work of Levy and Hino (2016, p. 143) and Yim et al. (2008, p. 752) who have also found a positive relationship between these variables. This relationship has also been confirmed by Khan (2012, p. 246) who argues that true customer loyalty can be established only through customers' attachment to the organization. The results also revealed that patients' attachment was statistically significantly related to fear of relationship loss. This finding is consistent with the arguments put forth by researchers like Chelminski and Coulter (2011, p. 366), Kumar et al. (2003, p. 670) and Mende et al. (2013, p. 138) that customers who have developed an attachment to the organization, may fear the possible consequences of losing their relationship (such as their relationship bond and relationship benefits). These studies, however, have not empirically tested the relationship between these two variables. This paper, therefore, makes an empirical contribution to theory by confirming the arguments put forth by the aforementioned researchers.

Considering the abovementioned findings, it is important for private hospitals to nurture bonds with their attached patient, seeing as patients' attachment has an influence on their loyalty and fear of relationship loss.. This can be done by providing social relationship marketing programs that comprises the personalization of the relationships through social engagements with patients or by assigning special status to them (e.g. interactive websites, inviting patients to events, newsletters, birthday cards, phone calls, and face-to-face meetings). Private hospitals must also focus on their financial reward programs that offer patients economic benefits in exchange for their loyalty (e.g. loyalty programs, discounts, gift giving and free service samples) and their structural reward programs which create values (e.g. motivational programs and demonstrating the quality of their services and products).

Moreover, after testing the significant relationships between the constructs, two prospective mediating effects were possible, which necessitated further investigation. The results indicated that relationship value had an indirect relationship with loyalty and fear of relationship loss through attachment, establishing attachment as a complementary (partial) mediator. Attachment, therefore, not only plays an important role in the direct relationship with the key relationship marketing constructs, but also indirectly. These findings are valuable, as the mediating effect of attachment between various relationship marketing constructs have not been examined before. Subsequently, these results set the scene for further research on this topic, as it offers an initial understanding into the matter. The

importance of attachment in building relationships should therefore not be ignored. These findings should encourage private hospitals to spend their marketing resources on building long-term bonds with patients (as suggested in the discussion above) with the aim of establishing an attachment.

Finally, the theoretical and practical contributions of this paper should be noted, as it enhances marketing researchers and managers understanding of the interrelationships amongst patients' attachment and selected relationship marketing constructs. This paper also contributes to the support of the attachment theory and introduces a model that assesses patients' attachment in the private hospital sector. It develops testable hypotheses, and illustrates how these hypotheses may be used to guide a systematic analysis of the state of patient-private hospital relationships. This paper also contributes towards the growing research on customer attachment and the empirical insight gained from this research will add to the existing body of literature on the interrelationships amongst respondents' attachment and selected relationship marketing constructs.

6 Limitations and directions for future research

The research findings are based on the responses obtained from respondents from only one service setting (i.e. private hospitals), using non-probability convenience sampling. The results can therefore not be generalized, and it is therefore suggested that future research encompass different service settings, using probability sampling.

Most research related to relationship marketing indicates that customer-organizational relationships are built over time. The relationship building constructs therefore relate to long-term measurements. Seeing as the data may differ over time with regard to the interrelationships of the constructs in this paper, it is suggested that this research be replicated over time, making use of a longitudinal study.

Furthermore, although the model presented in this paper contributed towards clarifying and explaining the role of attachment in customer-organizational relationships, other relevant variables not included in this research exist and need to be taken in consideration as it might offer additional insight into attachment and its role in customer-organizational relationships. For example, future research could examine the moderating role of customer demographics on the relationships between involvement, relationship value, and attachment. Important relationship marketing constructs such as trust, commitment and service quality could also be considered as possible antecedents or outcomes of attachment.

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Empirična študija vloge navezanosti strank v južnoafriških zasebnih bolnišnicah

Ozadje in namen: Literatura o odnosnem marketingu priznava pomembno vlogo navezanosti v odnosih med stranko in organizacijo, vendar kaže na omejeno teoretično in empirično razumevanje dejavnikov, ki prispevajo k razvoju in vzdrževanju navezanosti strank. Da bi zapolnili to vrzel, se članek opira na odnosni marketing in sintetizira pomembne konstrukte odnosov z namenom razviti posredni model navezanosti na zasebne bolnišnice v Južni Afriki.

Zasnova / metodologija / pristop: Izvedena je bila kvantitativna deskriptivna zasnova raziskave. Z nenaključnim vzorčenjem med pacienti/strankami smo zbrali 303 uporabnih vprašalnikov. Za določitev zanesljivosti in veljavnosti podatkov sta bila izvedena Cronbachov koeficient alfa in potrditvena faktorska analiza, za mediacijsko analizo pa SEM.

Rezultati: Rezultati kažejo, da je bila vrednost razmerja anketirancev bistveno povezana z navezanostjo, zvestobo in strahom pred izgubo razmerja, navezanost pa je bila pomembno povezana z zvestobo in strahom pred izgubo zveze. Poleg tega se je izkazal za pomembnega posredni učinek navezanosti na razmerje med vrednostjo razmerja in zvestobo ter na razmerje med vrednostjo razmerja in strahom pred izgubo razmerja.

Zaključek: Navezanost igra pomembno vlogo tako v neposrednih kot posrednih odnosih s ključnimi konstrukti odnosnega marketinga. Zato ne smemo prezreti pomena navezanosti pri vzpostavljanju odnosov med bolnikom in bolnišnico, zasebne bolnišnice pa spodbujamo, da vlagajo v svoje odnose s pacienti, da bi vzpostavile to navezanost.

Ključne besede: Navezanost, Strah pred izgubo razmerja, Zvestoba, Zasebne bolnišnice, Vrednost razmerja

Appendix A

Variable & items	Cronbach's alpha
Attachment	0.90
It is a comfortable feeling to depend on my hospital.	
I am comfortable having a close relationship with my hospital.	
It is easy for me to feel warm and friendly toward my hospital.	
It helps to turn to my hospital in times of need.	
Relationship value	0.94
My hospital adds a great deal of value to our relationship.	
I gain a lot from my relationship with my hospital.	
My hospital creates a lot of value for me when comparing all the costs and benefits of doing business with this hospital.	
Overall, the relationship with my hospital is valuable.	
Fear of relationship loss	0.82
I am afraid to lose my identification with my hospital's brand name by switching to another hospital.	
I am afraid to lose my relationship with my hospital by switching to another hospital.	
I am afraid to lose the services of my hospital by switching to another hospital.	
Loyalty	0.95
I say positive things about my hospital to other people.	
I would recommend my hospital to someone who seeks my advice.	
I encourage friends and relatives to do business with my hospital.	
I consider my hospital as my first choice when I need services concerning my health.	
I intend to continue doing business with my hospital in the next few years.	

Crisis Management Practices in Tourism SMEs During the Covid-19 Pandemic

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Background and purpose: This study examines crisis management practices (CMPs) for micro, small, and medium-sized enterprises (SMEs) in the field of tourism during the global coronavirus (COVID-19) pandemic. The purpose of this study is to analyse how tourism SMEs reacted to the crisis caused by the pandemic. The present research aims to determine which operational CMPs were deployed by tourism SMEs to minimize the impact of the crisis.

Design/Methodology/Approach: This study focuses on the following types of tourism SMEs – lodging facilities, food and beverage (F&B) facilities, and tourist agencies (TA). A total of 574 valid online questionnaires were obtained from SME managers. The structured questionnaire included 27 CMPs belonging to the four dimensions of crisis management – workforce, cost control, organizational support and marketing CMPs. Exploratory factor analysis and the non-parametric Kruskal Wallis H test and Mann-Whitney U test were used to investigate SMEs response to the crisis.

Results: Results indicate that SMEs primarily focus on the following CMP dimensions (respectively): workforce, cost control, organizational support, and promotional and customer-related marketing practices. Results show that there are statistically significant differences in the usage of different CMPs among the different types of SMEs.

Conclusion: The use of selected variables enables an internationally comparable benchmarking process and facilitates the improvement of tourism SMEs crisis management. The conclusion provides suggestions for future research and useful information for scholars, policy makers, and tourism managers.

Keywords: COVID-19, Crisis management, Slovenia, SMEs, Tourism

1 Introduction

In the last decade, the tourism industry has substantially increased in importance and relevance for the global economy. In 2018 alone, the global tourism sector grew by 3.9% and made an economic and social contribution of \$8.8 trillion in revenues and 319 million jobs to the global economy (Wttc, 2019). Despite its economic importance, however, this sector of the economy is extremely volatile and susceptible to political, economic, social, and environmental changes. In the Republic of Slovenia, a small European (EU) economy, tourism is a fast-growing industry, which in 2019 directly and indirectly contributed as much as 9.9% of the gross domestic product (GDP) and

employed 10.3% of the total labour force in the country (STO, 2020).

The international tourism industry is mostly composed of micro, small and medium-sized enterprises (SMEs). According to the United Nations World Tourism Organisation (UNWTO), globally, SMEs represent around 80% of all tourism businesses. In the EU, SMEs represent 99% of all business entities (European Commission, 2020). In Slovenia, SMEs are even more important, as they represent 98.8% of all business enterprises in the country and 99.9% of all business entities in the tourism sector (Republic of Slovenia Statistical Office, 2019). Small and dynamic SMEs have significantly contributed to the economic and social growth of the EU by generating employment, con-

tributing to the GDP, and providing the necessary innovative potential (European Commission, 2020). However, even though SMEs are major contributors to economic growth, they are often the business that are the most vulnerable and exposed to crisis situations (Carruthers, 2020).

On 30 January 2020, the World Health Organisation (WHO) declared the outbreak of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which led to the COVID-19 disease as a global pandemic (an international public health emergency of global concern) (World Health Organization, 2020). Beyond the devastating health impacts, the pandemic has hit the global economy with brute force.

In order to limit the advancement of the pandemic, governments worldwide have implemented various restrictions (e.g., social distancing, travel restrictions, closure of borders, public facilities and services, etc.), which have put the global economic activities to a halt and triggered a new global recession. Fernandes (2020) states that the consequences of the COVID-19 pandemic on the global economy will be much worse than the effects of the Great Depression of the 1930s and the global financial crisis (GFC) of 2008. It is estimated (Sumner et al., 2020) that due to the pandemic crisis the global poverty level will increase to 0.5 billion (around 8% of the global population) and the contraction of income will rise to 20% on a global scale (World Bank, 2020). According to Sachs (2020), the scenarios are not very promising, and the situation might get worse due to ripple effects that might produce other crises, such as humanitarian or debt crises. While no economic sector has been left unharmed, the tourism industry has suffered severe losses (World Tourism Organization, 2020). According to Fernandes (2020), the global tourism industry faced reductions of activity of more than 90% in the first quartile of 2020, making it one of the most affected sectors of the economy. Moreover, the pandemic erupted during a period of the year in which the liquidity position of tourism firms is usually weak due to the typical seasonality of demand (Ozili & Arun, 2020).

In order to minimize the devastating influences of the pandemic, the EU Commission and the EU member states have implemented several corrective measures to help the economy to recover from the reverse impacts of the pandemic. In March 2020, the EU commission issued its official and coordinated approach to state aid in the COVID-19 context (European Commission, 2020). The allowed EU state aid schemes mostly included various fiscal stimulus and financial aid packages, such as direct grants, tax benefits and upfront payments, government guarantees for loans to companies, subsidized public loans to companies, and safeguards for banks that transfer state aid to the economy (European Commission, 2020). Following the EU guidelines, the government of the Republic of Slovenia has also issued four stimulus aid packages to help the

national economy in fighting the crisis.

In the tourism context, important state measures included covering employees' wages and taxes by the government, state purchase of receivables from Slovenian companies, deferral of payment of taxes, favourable national loans, and issuing of vouchers to all Slovenian citizens in order to stimulate domestic tourism consumption (Urad Vlade Republike Slovenije za komuniciranje, 2020). Due to favourable health conditions, Slovenia was the very first EU country to announce the official end of the epidemic on May 15th. All tourism facilities in Slovenia stayed closed from March 16th till June 1st. Despite the end of the epidemic and the reopening of businesses, substantial social and health measures have remained in force, severely affecting the tourism sector. In Slovenia, in the first five months of 2020, there was a decline of almost 60% in tourism overnights in comparison to the same period of 2019 (Statistical office of the Republic of Slovenia, 2020).

In addition to the extensive governmental (institutional) support to the economy, substantial crisis recovery measures will have to be implemented by individual SMEs. According to Tham et al. (2020), SMEs can accelerate their recovery by implementing a well-structured crisis management plan. In this paper, we focus on CMPs implemented by tourism SMEs after their reopening in June and July 2020.

The theory of crisis management offers numerous guidelines on how to cope with different crisis situations (Seraphin, 2019). However, the concept of the 2020 global crisis is novel in modern history, as all prior international catastrophes in the last century were caused by environmental hazards and/or financial crises (Fernandes, 2020). Because the initial health crisis has translated to economic and social crises of major concern, the focus of scholars has expanded from medical studies to the economic and social consequences of the pandemic. In our literature review, we have not found any previous studies investigating the relationships between major global crises and tourism SMEs crisis management on operational (micro) level. The current study, therefore, expands the existing body of literature by examining operational CMPs in tourism SMEs in the time of a pandemic.

The purpose of this study is to analyse how tourism SMEs reacted to the crisis caused by the pandemic. The main goal of the current study is to determine which CMPs were deployed by tourism SMEs to minimize the impact of the crisis.

This paper is based on a mixed methodological approach (Arora, 2012). After the literature review, primary data were collected using an online questionnaire. The design of the questionnaires was based on the study of Radwan (2017). An exploratory factor analyses (EFA) was performed to investigate the implementation of CMPs, and

the Kruskal Wallis H test and the Wilcoxon Mann-Whitney U test were conducted to analyse the differences in CMP usage among the different types of SMEs. In the conclusion, information for practitioners (managers) and suggestions for future research (academia) are provided.

2 Theoretical background

2.1 Coronaviruses – a new reality?

The existence of different coronaviruses has been known to humanity for more than fifty years (World Health Organization, 2020). In the past, WHO has already managed to successfully limit the spread of the infectious diseases caused by different coronaviruses, such as the Severe Acute Respiratory Syndrome (SARS-CoV-1) and the Porcine Epidemic Diarrhea V (PEDV), also known as the “Swine flu”. As the spread of SARS-CoV-2 currently presents a global threat to human health, humanity will have to adapt to the new reality of re-emerging threats caused by coronaviruses. In particular, the tourism industry will have to find a way to adjust to this new reality.

2.2 Tourism SMEs in times of pandemic

The implemented preventive health measures have severely damaged the tourism sector. In this vein, the global scientific community has also joined forces in sharing knowledge and supporting efforts to address the socio-economic impacts of the pandemic. Many scholars have started to analyse the different issues related to the coronavirus and tourism. The WHO and the UNWTO started to cooperate for a better understanding of the impact of the pandemic on human health, economy, and tourism (Wttc, 2019). Moreover, the WHO has issued a global initiative called “Global research on coronavirus disease (COVID-19)”, based on which the latest international scientific findings are collected on a daily basis (World Health Organization, 2020). To date, only a few studies have investigated the influence of the pandemic on the tourism sector. This studies analysed the influence of the pandemic on tourism from different perspectives, such as the macro-economic perspective (Ozili & Arun, 2020, Sachs, 2020), sports and events (Miles & Shipway, 2020), tourism of Nepal (Ulak, 2020) and India (Kalyankar, 2020), and the hospitality industry (Thams et al., 2020). Only a few studies have focused on topics related to tourism SMEs. For example, Lu et al. (2020) analysed the perceived impact of the pandemic on SMEs in China; Bartik et al. (2020) investigated the adjustment of small businesses in the USA; and Casalino et al. (2019) analysed the digital transformation of SMEs in times of pandemic.

Being a labour-intensive sector, tourism SMEs are extremely vulnerable to market changes, particularly because they mostly generate revenue for the rest of the year during a relatively short season. Tourism SMEs typically subsist on low profit margins, and even small sales losses can have a big impact on firms’ profitability. Lu et al. (2020) found that the major problem of Chinese SMEs in times of pandemic is the lack of cash flow, the disruption of supply chains, and the low market demand. Consequently, many businesses are facing drastic declines in revenues and fear of insolvency. According to the World Bank Group (WBG) analyses, firms in the US restaurant industry can, on average, cover their operating expenses for up to thirty days, while hotel and tourism firms held financial resources for covering operating expenses (expressed in Days of Cash on Hand) only for up to eighty days, which makes them extremely financially fragile (World Bank, 2020). In this view, Carruthers (2020) states that the pandemic will significantly reduce the number of SMEs on a global scale. These predictions are in line with those of Fernandes (2020), who reported that countries with more service-oriented economies will be more affected in comparison to economies that are more industrial in their focus. The EU economy is a highly service-oriented economy. Because of its economic and employment potential, tourism plays an important role in the EU economy. In 2016, one in ten enterprises in the EU non-financial business economy belonged to the tourism sector (Eurostat, 2020). Moreover, due to the multiplier effects of the tourism sector, other businesses will also suffer the spillover effects of the crisis (e.g. transportation, agriculture, etc.).

Tourism SMEs are generally highly adaptable and self-reliant organisations (Carruthers, 2020); however, in the case of external crises, such as a state of pandemic that is beyond their control, they need institutional (governmental) assistance (Lu et al., 2020). In the first phase, the government has already implemented several measures that have helped SMEs to alleviate their liquidity problems, preserved the jobs, and supported families under financial distress. In the second phase, however, SMEs’ long-term survival will depend on how they react to the crisis and adapt to the new economic and social reality. Knowing the importance of tourism SMEs for the EU economy, it is crucial to focus on different crisis management measures that can help them to lower their business mortality rate.

2.3 Crisis management

In the literature, several definitions of crisis have been proposed. For example, Pearson and Clair (1998, 66) defined a crisis as “a low-probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organization”. Beirman (2011) defined a

crisis as an event or a set of circumstances that can damage the reputation and marketability of tourism businesses or the entire destination, and Williams et al. (2017) defined a crisis as a process that can culminate in an event that disrupts the actor's normal functioning. According to Simón-Moya et al. (2016), Pearson and Clair's (1998) definition is the most commonly used definition of crises in business and management research. Crises in business-context research have also been categorized as 'major' or 'minor'; 'internal' or 'external'; 'technical' or 'economic' in nature; and 'people-', 'organization-', or 'social-centric' (Simón-Moya et al., 2016). Accordingly, different crisis situations demand different crisis management approaches. In this view, McCool (2012) proposed three groups of measures that are vital for a firm's survival in times of crisis – planning prior to the crisis, a quick response during the crisis, and a recovery strategy after the crisis. Similarly, Mohammad et al. (2016) stress the importance of four consecutive stages in a crisis situation – prevention, preparedness, response, and recovery. According to Alonso-Almeida et al. (2015), the concept of crisis management consists of three generic domains, regardless of the type of crisis – crisis identification, proactive, and reactive crisis management strategies. The proactive strategies are preventive and pre-defined measures which are concerned with strengthening a firm's market leadership and/or operational efficiency. This means that the management sets actions and procedures in place to be undertaken prior to, during, and after the crisis. In contrast, reactive (also called responsive) crisis management strategies are spontaneous (ad-hoc) and inconclusive management reactions to environmental changes, which mainly consist of immediate cost-cutting measures. Hayes and Patton (2001) state that reactive strategies are often perceived as panic-driven responses to a crisis. As noted by Alonso-Almeida et al. (2015), in practice, crisis management is concerned with a mix of reactive and proactive strategies. Radwan (2017) asserts that crisis management remains insufficiently explored and highlights the necessity of further investigations into how to better cope with different crisis situations.

The tourism industry is extremely sensitive to crisis situations, as even minor negative events can seriously affect tourism demand and deteriorate tourism firms' financial performance. Crises in tourism are most often caused by external factors and can cause the development of further crisis situations, such as socio-political, economic, cultural, and technological crises. The outbreak of the pandemic has paused all tourism activities and caused a major crisis in the global tourism industry. In this uncertain environment, it is difficult to forecast the development of any potential further crisis situations, as there is no historical benchmark that can be used directly, as all other previous global crises in the last century resulted from other causes

(e.g., natural disasters, wars, economic causes, etc.). Because the current problem does not emanate directly from the financial sector like the last GFC, finding solutions will be significantly more challenging. The appropriate recovery strategies will have to be based on knowledge and experience from previous literature on crisis management, although it is relatively difficult to compare the different crisis management activities, as the impacts of environmental hazards and epidemics are not the same. Namely, environmental hazards primarily cause significant physical damage to the infrastructure, while epidemics have a more devastating and prolonged impact on the society and economics (Lu et al., 2020).

2.4 Operational CMPs

The majority of literature on crisis management in tourism focuses on general guidelines on how to cope with different crisis situations at the macro (destinational) and micro (firm) level. Crisis situations most often refer to natural disasters, war and terrorism, sanitary issues and economic events (Seraphin, 2019). A recent study by Jiang et al. (2019) involved bibliometric research on crisis management in tourism. Research results revealed that recent studies have moved from broader topics to more specific issues, such as resilience and economic crisis recovery. In this view, Kimes (2009) investigated the practices in hotel revenue management in times of economic downturn. The analysis revealed that the crisis was global and there were no major differences among hotels, regardless of the type of facility or its brand or quality level. In contrast, Kapiki (2011) analysed the impact of GFC on tourism and hospitality in Greece and found that the recession caused serious problems for luxury hotels in particular. This result corroborates the findings reported by Hampson and McGoldrick (2011), who investigated guests' shopping patterns in times of recession and found that guests are much more demanding, knowledgeable, and concerned with the right "value for money" in such times. Similarly, Alonso-Almeida and Bremser (2013) reported that along with the brand image and efficiency performance, the best way to cope with an economic crisis is to have established a large and loyal customer base, since loyal guests have a positive impact on hospitality firms' financial performance during and after the crisis. Azabagaoglu and Oraman (2011) stated that despite the fact that shopping patterns change during recessions, guests prefer well-known quality brands and tend to be loyal to them.

Another commonly reported practice in the restaurant industry in times of recession was cost reduction (Kukanja & Planinc, 2013). Although it can seriously deteriorate a hospitality firm's long term marketing and competitive position, managers seemed to frequently use this practice

during and after the GFC. Interestingly, cost reduction was one of the most widely used practice to cope with the GFC in Spain (Alonso-Almeida & Bremser, 2013). Similar measures were also implemented by hotel managers in Croatia. Smolčić Jurdana and Maškarin (2010) reported that during the GFC, hotel managers primarily focused on pricing policy, product policy, intense promotion, and cost reductions. Smallbone et al. (2012) examined the responses of SMEs to GFC in the United Kingdom and New Zealand and found that their responses led to changes in sales, marketing, and employment practices. While cost reduction strategy is essential, however, it must be carefully implemented. Cutbacks in the labour force constitute a common practice; however, McCool (2012) stressed the importance of staff for the hospitality industry and suggested the enhancement of other practices, such as business competitiveness and cutbacks in areas other than labour. Moreover, the author suggested staff active involvement in crisis management activities. Cost reductions must also take into account other key elements, in particular the image of the brand and the quality of the services offered. In this view, Alonso-Almeida and Bremser (2013) reported that hotels should focus on quality, branding, a reliance on loyal customers and increasing marketing to counteract the crisis.

Reduction of profits by price cuts and reduction of occupancy rates was the last step taken by the most successful Spanish hoteliers during the GFC (Alonso-Almeida & Bremser, 2013). This is important, because significant reduction of rates during crises could have a destructive impact on the tourism industry after the economic downturn, as it might boost guests' price sensitivity and lead to price wars among tourism providers. According to Radwan (2017), the branded providers of luxury services should be particularly careful before discounting and lowering the quality of their services, as this practice could influence their image and market position in the long term. Despite the fact that, generally, price reductions present a major threat to tourist firms' and destinations' long-term competitiveness and economic survival Smeral, (2010), Blažević and Drvenkar (2011) reported that during the GFC, Croatian TA lowered the prices of the Adriatic-Sea arrangements by up to 30%. The authors found that last-minute arrangements were the key price strategy for the development of Croatian tourism during the crisis. To avoid this scenario, Caudillo-Fuentes and Li (2010) proposed the implementation of a revenue management strategy for hotels, while Iordache (2013) recommended partnerships with event organizers and intense use of opaque (mostly IT) distribution channels.

In terms of marketing-related CMPs, Kukanja and Planinc (2013) analysed the response of the restaurant industry in Slovenia to the GFC. The authors found the restaurant managers increased the number of marketing

actions, reduced the number of permanent employees, lowered personal income, and increased the number of fixed-price menus in order to alleviate the influence of the GFC. Similarly, Campiranon and Scott (2014) identified the critical success factors for crisis recovery management in Thai hotels after the GFC. The authors proposed that the following measures be implemented by hoteliers: development of a crisis management plan, crisis market segmentation, intense marketing promotion, and staff management plan. Radwan (2017) thoroughly analysed the response of the Egyptian hotel industry to the GFC and assembled a list of 32 practices for managing hotel businesses during the crisis, concentrating on four dimensions: marketing, workforce, cost control, and responsible bodies support.

As different theoretical approaches exist in the literature on how to best cope with economic crises, Campo et al. (2014) investigated the importance of innovation for hotels' operational performance. Research results indicate that the tendency of a hotel to innovate does not contribute directly to its short-term performance; however, innovativeness influences hotel's financial performance in the long term. Similarly, Kossyva et al. (2015) suggested that cooptation could be an appropriate business strategy for SMEs, as it gives them the opportunity to develop and strengthen their competitive portfolio and become even more competitive in the long term.

In reviewing the literature, only three quantitative studies that utilised a holistic (multidimensional) approach to investigate CMPs in tourism firms were identified (see Table 1). All presented studies refer to the response of the tourism industry to the GFC.

As can be seen from Table 1, all presented studies include relatively similar operational CMPs, which can be logically divided into three CMP dimensions – marketing, workforce, and cost control. Only the study by Alonso-Almeida and Bremser (21 CMPs), does not include specific practices related to the dimension governmental and/or organizational support, which is included in Kukanja and Planinc's study (19 CMPs) and Radwan's research (32 CMPs). The study by Radwan (2017) offers probably the most comprehensive selection of operational CMPs for the tourism industry.

Beside the presented CMPs, to our knowledge, there are no studies that have specifically addressed the micro-level CMPs in tourism SMEs and that could, therefore, help us to better understand SMEs response to the current crisis. Ulak (2020) states that the implementation of CMPs can significantly reduce the negative impacts of the crisis. Therefore, monitoring SMEs' responses to the crisis is crucial in refining and minimizing the negative impacts of the present and any potential future crises on SMEs' performance.

According to the results of presented studies, we pose our main research question (RQ1): Which operational

CMPs were implemented by tourism SMEs in order to cope with the crisis caused by the COVID-19 pandemic?

Based on literature reviews (Alonso-Almeida & Bremser, 2013; Kukanja & Planinc, 2013; Radwan, 2017) we might assume that different types of SMEs have reacted

differently to the crisis. Based on this assumption, we formulate our second research question (RQ2): Is there a statistically significant distinction in the implementation of CMPs between the different types of tourism SMEs?

Table 1: CMPs used in previous studies

Authors	Sample	Operational CMPs
Alonso-Almeida & Bremser (2013)	Hotels in Madrid (n=134)	Cancel expansions, cancel investments, reduce management levels, decrease or eliminate training budget, decrease or eliminate the budget for internal and external social spending, enter into strategic alliances with other companies, improve processes to save operating costs, ask clients more about what would increase the value of the product, renegotiate prices or payment conditions with suppliers, create or improve loyalty programs, reduce sales forecast for the year, create awards for employee's ideas to reduce costs or increase sales, introduce employee empowerment, introduce new IT systems, products or services in high demand are not changed but the lesser demanded ones are omitted to reduce costs, costly products or services are substituted by cheaper ones, competitors' practices and services are imitated, renegotiate bank credits, reduce personnel in all departments, strengthen the commercial area, increase spending on advertising.
Kukanja & Planinc (2013)	Restaurant industry in Slovenia (n=94)	Reduce the number of employees, shorten working hours, lower personal income, replace high-tenure employees with new employees, increase reliance on outsourced human resources, joint marketing campaigns with business partners, active advertising in the media, increase the number of specific actions, price drops, promote new products and services, market to new segments, increase the number of fixed-price menus, cost cuts by limiting restaurant services, cost cuts by using cheaper substitutes, postpone maintenance, postpone scheduled payments, organized protest against the tax legislation, organize protest against labour legislation, increase the sector's power by joining catering associations, unions, etc.
Radwan (2017)	Hotels in Hurgada (n=82)	Target new market segments, enlarge hotel's marketing and advertising campaigns, provide highly discounted rates, provide and promote special offers and price, cuts on hotel products and services, study and understand the needs of the target customers and the changes that take place, focus on loyal customers during crisis, make use of electronic marketing and opaque distribution channels, increase hotel's marketing budget, keep up with competitors to take advantage of any developments that arise, reduce employees' wages and pay rates, give employees unpaid mandatory vacations, lay off employees to reduce labour force, require staff to undertake additional duties that are not in the employee's job description, make changes in the hotel's organizational structure, reduce staff's working hours, replace permanent employees with part-time temporary employees, emphasize cost reduction in all business activities, postpone some of the hotel due costs and/or reschedule payments, develop additional avenues for revenues, close some departments and/or accommodation sections, when purchasing use less expensive substitutes, start discounting strategy, use new technologies for reducing operating costs, shrink investment directed for expansions, develop and promote alternative types of tourism, provide technical and financial support to hotels, cooperate with hotels and hold meetings to discuss ways out of the crisis, provide additional facilities to many countries, improve the country's image as a tourist destination, the government should encourage domestic tourism, invite to and participate in international events and exhibitions, segment the tourism market and target some specific and new markets.

Source: Authors' own research. Note: Studies focusing on single practices (e.g. Innovation, pricing policy, etc.) were not included in Table 1.

3 Research method

3.1 Research process

In the first part of the study, qualitative research was performed to identify previous studies on SMEs' responses to the pandemic and crisis situations. Articles related to research topic were retrieved from May to July 2020 from major academic databases for hospitality research, such as Science Direct, EBSCOHost, and the Springer database. Specifically, the WHO Global research database on COVID-19 was thoroughly analysed. Keywords used to retrieve literature included: "COVID-19", "pandemic", "crisis", "SMEs", and "tourism and hospitality". No studies were found in the literature in relation to tourism SMEs' adjustment to the pandemic. The majority of the research refers to health issues and the global economy, while the tourism-related research is primarily concerned with destination management, macroeconomics, de-globalisation and future tourism perspectives (World Health Organization, 2020).

In the next part of the study, SMEs' CMPs were analysed based on a modified version of a questionnaire developed by Radwan (2017) as a tool for managing hotels during crisis situations. The original questionnaire comprises 32 generic CMPs concentrated on four main CMP dimensions – marketing, operational processes, governmental assistance, and human resources (see Table 1). To address the current crisis in the country, five specific CMPs related to the category of governmental assistance were removed from the original version of the questionnaire, as the government has already offered substantial support to the tourism sector. The final questionnaire is therefore composed of 27 practices belonging to four dimensions (see Table 2).

3.2 Data gathering and sample description

Data and contact information about SMEs were obtained from the only official business register (AJPES) in the country, which in Slovenia is in the public domain. The following types of SMEs were included in the study – lodging facilities, food and beverage (F&B) facilities, and tourist agencies (TA). According to the Statistical classification of economic activities in the European Community (NACE) and the Standardized classification of activities in the Republic of Slovenia (SKD), 13.258 enterprises are registered as lodging, F&B, and TA SMEs (N=13.258), of which 63.44% are F&B SMEs (NACE code I56), 28.74% are lodging facilities (NACE code I55), and 7.80% are TA SMEs (NACE code I79). Not all SMEs listed in the register have publicly available email addresses. Therefore, a total of 2,875 surveys were emailed to all above-men-

tioned groups of SMEs with published email addresses in the business register (21.68% of all SMEs in the country registered as I55, I56, and I79). Participation to the survey was voluntary, without any financial reimbursement. The survey captured data in June and July 2020, after the reopening of all tourism facilities.

We collected 574 valid questionnaires (the response rate was 19.96%). The sample (n=574) was mainly composed of F&B (58.4%), lodging (29.3%), and TA SMEs (12.3%). The questionnaire measured managers' usage of CMPs on a five-point Likert-type ordinal scale ranging from 1 (rarely used) to 5 (extensively used). In the second part of the questionnaire, managers' socio-demographic data and some general information on SMEs were collected. Information about respondents' and SMEs' characteristics were presented using descriptive statistical analysis. EFA, a Kruskal Wallis H test and a Mann-Whitney U test were performed to answer the RQs. All data were analysed using SPSS (version 25) software.

4 Research results

Findings of the first part of the study show that the majority of respondents (33%) were an average of slightly less than 46 years of age, and the majority of the sample was composed of male managers (51%). The majority of managers had completed professional or secondary education (52.3%), 37.3% of managers had acquired a high school or university education, 9.1% of managers had obtained a master's degree, and 1.3% had only finished elementary school. Next, SME ownership was analysed. Results show that the vast majority of managers (86%) owned the firms they managed. In addition, the number of staff employed was also analysed. Results show that the vast majority of SMEs (82.2%) employed up to five workers, followed by SMEs employing 5 to 10 workers (31.5%), while only 13 SMEs (2.2%) employed more than 30 workers. Managers were also asked if they or the firm had a written crisis management plan. Interestingly, only three managers reported having such a plan. Survey questions related to managers' demographic characteristics and SMEs' physical characteristics were formulated as open-ended questions.

The results presented in Table 2 show that all 27 CMPs were evaluated relatively highly (the average mean value is +3.77 on scale 1 to 5). Among the four dimensions, the highest-rated dimension was Organizational support (mean value +4.02), with OI27 as its highest-rated practice (+4.35, SD±0.99). Results indicate that the lowest usage is related to the dimension Workforce practices (mean value +3.68), with the lowest scores related to the practice WI16 (+3.19, SD±1.80). The standard deviations (SD) show the dispersion in managers' usage of different CMPs (see Table 2).

Next, EFA was performed to assess the factor struc-

Table 2: Managers' usage of CMPs

CMP Indicators	Mean	SD
Marketing practices		
MI1 – Target new market segments	3.72	1.37
MI2 – Enlarge marketing campaigns	3.66	1.16
MI3 – Provide highly discounted rates and special offers	3.30	1.18
MI4 – Study and understand the needs (expectations) of the target customer segments	4.07	0.84
MI5 – Focus on loyal customers	4.10	0.96
MI6 – Make use of electronic marketing and opaque distribution channels	4.07	0.98
MI7 – Increase marketing budget	3.16	1.16
MI8 – Keep up with the competitors to take advantage of any developments that arise	3.48	1.19
MI9 – Improve the quality of our offerings	3.92	1.02
Workforce practices		
WI10 – Reduce wages and pay rates	3.83	1.85
WI11 – Give employees mandatory unpaid vacations	4.17	1.61
WI12 – Reduce the number of employees	3.77	1.68
WI13 – Increase the productivity	4.17	1.37
WI14 – Require staff to take additional duties that are not in their job descriptions	3.53	1.78
WI15 – Make changes in the organizational structure	3.54	1.45
WI16 – Extend staff working hours	3.19	1.80
WI17 – Replace permanent employees with part-time employees	3.29	1.94
Cost control practices		
CI18 – Emphasize cost control and reduce operating costs	4.01	1.07
CI19 – Postpone some of the firm's due costs and/or reschedule payments	3.68	1.22
CI120 – Develop additional avenues for revenues	3.83	1.12
CI21 – Close some non-profitable departments and/or business operations	3.84	1.48
CI22 – When purchasing, use less expensive substitutes	3.80	1.42
CI23 – Use new IT technologies for reducing operating costs	3.88	1.34
CI24 – Shrink all planned investments	3.89	1.24
Organizational support		
OI25 – Cooperate with other tourism providers	4.19	1.01
OI26 – Cooperate with different organizations (chambers of commerce, business associations, etc.)	3.54	1.23
OI27 – Cooperate on different activities that could improve the image of the tourist destination	4.35	0.99

Source: Authors' own research

ture of managers' usage of CMPs. Because we could not confirm a normal distribution of data for any of the selected CMPs of the first set (a Kolmogorov-Smirnov test was used), it was necessary to use the Principal Axis Factoring method to perform the EFA. Based on the values of the Kaiser-Meyer-Olkin measure of Sampling Adequacy – KMO (0.879) and the Bartlett Test of Sphericity ($\chi^2=4092.494$; $DF=351$), we estimated that all 27 indicators were suitable

for performing EFA.

Most of the indicators of the first set had adequate communalities (≥ 0.50), indicating that the greater part of their heterogeneity can be explained by the effect of the common factors. Only one indicator with a too-low communality (MI9) was excluded from further analysis. Therefore, a model with 26 indicators with satisfactory communalities was selected for inclusion in the final factor model.

The suitability of data for inclusion in the final model was also supported by the high values of KMO (0.879) and the Bartlett test ($\chi^2=4015.308$; $DF=325$). Based on a rotated factor matrix solution, we have decided to include five factor groups (CMP dimensions) in the final model, as doing so allows for a meaningful interpretation of the factor structure. In the final model, factor weights which contain three or more indicators and have factor loadings higher than 0.3 were retained. The final factor model is presented in Table 3. Based on the results, indicators belonging to the initial dimension of Marketing were log-

ically divided into two sub-marketing dimensions. According to the content prevalence of their indicators, both dimensions were marked as Marketing promotional practices (primarily externally oriented CMPs) and Marketing customer practices (primarily internally oriented CMPs) (see Table 3). Moreover, internal consistency was calculated using Cronbach's alpha (α). The values for all factor groups (workforce=0.900; cost control=0.898; organisational support=0.802; marketing=0.796) indicate a reasonably good reliability ($\alpha \geq 0.8$).

Based on the rotated factor matrix presented in Table

Table 3: Rotated factor solution

CMP indicators	CMP dimensions				
	Workforce	Cost control	Organisational support	Marketing (promo)	Marketing (customer)
MI14	.853				
WI10	.796				
WI12	.790				
WI17	.789				
WI11	.765				
WI16	.760				
WI13	.702				
WI15	.611				
CI23		.729			
CI21		.667			
CI22		.624			
CI24		.498			
CI20		.480			
CI19		.432			
OI25			.863		
OI26			.605		
OI27			.598		
MI2				.819	
MI1				.699	
MI3				.374	
MI7				.452	
MI5					.796
MI4					.652
MI8					.318
Variance %	30.9	9.6	5.8	4.5	3.6

Source: Authors' own research

3, it is evident that managers primarily use the following CMP dimensions (respectively) to cope with the crisis: Workforce, Cost control, Organisational support, and Marketing practices. According to the values of their total explained variances, it is evident that CMPs related to the dimension Workforce have by far the greatest importance in coping with the crisis (30.9%), followed by the CMP dimensions of Cost control (9.6%) and Organisational support (5.8%). Results presented in Table 3 thus provide the answer to RQ1.

In order to answer RQ2, we used the non-parametric Kruskal Wallis H test for the independent groups of samples. The main reason for choosing the H test lies in the asymmetric distribution of the ordinal data. For the empirical analysis (H test), we formulated the null (Ho:

$Me1=Me2=Me3$) and the alternative hypothesis (H1: $Me1\neq Me2\neq Me3$) for each pair of analysed variables. Research results revealed that statistically significant differences ($p \leq 0.050$) exist for sixteen practices (i.e., Ho was rejected in favour of H1 for I - M1, M4, M5, W10, W11, W12, W13, W14, W15, W16, C19, C21, C22, C23, C24, and O26). The majority of presented indicators belong to the dimensions of Workforce and Cost control (see Table 2).

Next, a Mann-Whitney U test was performed to investigate the differences in usage of the identified sixteen CMPs, between the different types (the two independent groups) of SMEs. Statistically significant results ($p \leq 0.050$) are presented in Tables 4, 5, and 6.

Results of Kruskal Wallis H test and Mann-Whitney U

Table 4: U test – lodging and TA SMEs

	WI10	CI21	CI23	CI24	OI26
U	3428.5	3355.0	3218.5	3508.5	3485.5
W	13158.5	13085.0	12948.5	13238.5	13215.5
Z	-2.739	-2.932	-3.292	-2.511	-2.602
Sig.	0.006	0.003	0.001	0.012	0.009

Source: Authors' own research. Note: For Mann-Whitney U and Wilcoxon W values, the last two decimals (00) were removed. Sig. = Asymp. Sig. 2-tailed.

Table 5: U test – lodging and F&B SMEs

	MI4	MI5	WI12	WI13	WI14	WI16
U	4095.0	3811.0	4096.5	4067.5	3695.0	3892.5
W	13825.0	13541.0	6871.5	6842.5	6470.0	6667.5
Z	-2.728	-3.398	-2.516	-2.614	-3.504	-3.031
Sig.	0.006	0.001	0.012	0.009	0.000	0.002

Source: Authors' own research. Note: For Mann-Whitney U and Wilcoxon W values, the last two decimals (00) were removed. Sig. = Asymp. Sig. 2-tailed.

Table 6: U test – F&B and TA SMEs

	MI1	WI10	WI11	WI12	WI14	WI15	WI16	CI19	CI22	CI23	CI24
U	1712.5	1524.0	1672.0	1648.5	1292.0	1640.5	1391.0	1815.0	1769.0	1575.5	1770.5
W	4487.5	4299.0	4447.0	4423.5	4067.0	4415.5	4166.0	4590.0	4544.0	4350.5	4545.5
Z	-2.894	-3.731	-3.089	-3.142	-4.777	-3.221	-4.323	-2.434	-2.618	-3.502	-2.652
Sig.	0.004	0.000	0.002	0.002	0.000	0.001	0.000	0.015	0.009	0.000	0.008

Source: Authors' own research. Note: For Mann-Whitney U and Wilcoxon W values, the last two decimals (00) were removed. Sig. = Asymp. Sig. 2-tailed.

test clearly indicate that statistically significant differences exist in the usage of CMPs among the different types of SMEs. In the case of differences between lodging and TA SMEs, H_0 was rejected in favour of H_1 for five CMPs (see Table 4); in the case of differences between lodging and F&B SMEs, H_0 was rejected in favour of H_1 for six CMPs (see Table 5); and in the case of differences between F&B and TA SMEs, H_0 was rejected in favour of H_1 for 11 (out of 26) CMPs (see Table 6). For all other CMPs, no statistically significant differences were found. The presented results provide the answer to RQ2.

5 Discussion

Prior studies investigating crisis management in tourism enterprises (presented in the literature review) identified different management approaches to handle different crisis situations. In reviewing the literature, no data were found on the association between CMPs in tourism SMEs and the crisis caused by the pandemic. The first RQ in this study sought to determine how tourism SMEs are coping with the crisis. The results of this study show that managers use the majority of operational CMPs identified in previous research (Alonso-Almeida & Bremser, 2013; Kukanja & Planinc, 2013; Radwan, 2017).

One interesting finding is that the practice related to direct improvement of the quality of offerings (MI9) with a too-low communality had to be excluded from the analysis. It is relatively difficult to explain this result, as it directly refers to SMEs' quality improvements, although this finding might be somehow related to managers' high perceptions of their quality offerings as previously reported by Kukanja et al. (2017) and/or their belief that there is little room for quality improvements. This finding is also contradictory to the finding of Hampson and McGoldrick

(2011), who reported that guests in times of crisis are much more demanding and concerned with the quality and the right "value for money". However, it is encouraging that managers reported that they are trying to understand the needs of their target customers (MI4) and are focusing on their loyal customers (MI5) (see also Table 3 – fifth dimension), as both practices present the concept of service quality management (Kukanja et al., 2017).

Another important finding is that managers primarily use workforce- and cost control-related practices to cope with the crisis. Cutbacks in the labour force and enhanced cost control are common reactive crisis management practices. These practices also prevailed in previous research (Alonso-Almeida & Bremser, 2013; Kukanja & Planinc, 2013). Tourism is a labour-intensive economic sector. Therefore, cost reductions are essential, but they must be carefully implemented, as they might deteriorate a tourism SME's marketing position – especially its image and the quality of the services offered. Another important issue is that of cutbacks in the labour force, which result in reductions in the number of employees (WI12). Beside the quality concerns, this practice could also result in SMEs' high employment and training costs in the long term. When taking into consideration the small number of employees in tourism SMEs (in our study 82.2% of SMEs reported employing up to 5 workers), a major reduction of employees might seriously affect the industry in the long term. Therefore, it is somewhat expected that this specific practice coincides with other workforce-related CMPs, such as changes in the organizational structure (WI15), increased productivity (WI13), and additional work duties (WI14). Overall, it seems that managers are trying to use different approaches to solve the issue of sectoral labour intensiveness in times of crisis. A possible explanation for this result might be related to the governmental interventions, which have been oriented to preserving jobs during the crisis. It

is possible, therefore, that governmental measures have triggered SME managers to focus on CMPs related to the workforce.

In terms of cost control, it is encouraging that managers are primarily focusing on new IT solutions (CI23), abandoning non-profitable business operations (CI21), and buying cheaper substitutes (CI22) in order to reduce operational costs. These practices could also present an opportunity to investigate and optimize SMEs' internal resources (hidden reserves), which could also help SMEs to improve their competitiveness in the long term, as previously suggested by Kossyva et al. (2015).

The third dimension relates to organizational support. As the EU commission and the national government have already offered substantial support to assist the economy (institutional support), this dimension includes practices related to the co-operational activities among businesses and other (non-)governmental organisations (OI25, 26, 27). The overall responses were positive, as managers expressed high levels of willingness to cooperate with other stakeholders in overcoming the crisis (the joint approach). According to Haywood (2020), the post-COVID renewal of tourism will definitely call for much higher degrees of cooperativeness and will demand changes in firms' competitive ethics.

The fourth and fifth dimensions are two marketing sub-dimensions. The fourth dimension is primarily composed of CMPs which emphasize SMEs' external marketing activities, such as active advertising (MI2), focusing on new market segments (MI1), and provision of highly discounted rates and special offers (MI3). Results of the first two practices corroborate the findings of Campiranon and Scott (2014), which have proposed the implementation of crisis market segmentation and intense marketing promotion for successful crisis recovery. Similarly, the result of indicator MI3 is consistent with the earlier findings of Radwan (2017), which reported that price-cuttings should be avoided to prevent erosion of the hotels' future competitive position. This is also important, because a significant reduction of selling prices might increase guests' price sensitivity after the crisis ends. The fifth dimension refers to SMEs' customer-oriented marketing practices. These practices prioritize the importance of SMEs' understanding of their guests' needs and quality expectations (MI4), highlight SMEs' focus on loyal guests (MI5), and emphasize the relevance of SMEs benchmarking activities (MI8). As household spending was reduced due to economic uncertainty (Sachs, 2020) and several governmental limitations were implemented to stop the spread of the virus (in terms of social restrictions and mobility limitations), this also might have influenced managers' decision to minimize their individual marketing activities.

In terms of differences in the usage of CMPs between the different groups of SMEs (RQ2), the fewest differences exist between lodging and TA SMEs (see Table 4). A

possible explanation for this might be that lodging and TA SMEs are highly connected businesses. The majority of practices where differences occur (CI-21, 23, and 24) belong to the dimension of Cost control. It seems possible that the operational differences between the businesses (the majority of small TA are sub-agencies (brokers), while lodging SMEs require a higher labour and capital intensive production process) may have influenced the selection of different cost control CMPs. Despite the differences presented in Table 4, it seems that both groups of SMEs use relatively similar CMPs to alleviate the impacts of the crisis.

Between lodging and F&B SMEs, differences exist at six practices (see Table 5). Four CMPs (out of six) belong to the dimension Workforce (WI-12, 13, 14, 16). It is difficult to explain this result, as both businesses are labour-intensive. Surprisingly, no statistically significant differences were found in practices belonging to the dimension Cost control. It is also surprising that differences were identified at MI4 and MI5, which indicate SMEs' orientation towards knowing guests' quality expectations and focusing on loyal guests. This finding was unexpected, as lodging and F&B facilities present the fundamental essence of the hospitality industry. More research using controlled trials is needed to better understand these differences.

The most differences (11 CMPs) occur between F&B and TA SMEs (see Table 6). Most of these belong to the dimensions of Workforce (WI-10, 11, 12, 14, 15, 16) and Cost control (CI-19, 22, 23, and 24). This is somewhat expected, as F&B and TA SMEs are relatively different in terms of their production processes. Interestingly, results show that both groups of SMEs implemented similar marketing CMPs to alleviate the impact of the crisis, as the difference occurs in only one (MI1) marketing practice.

Overall, results also indicate that practically no differences among the different types of SMEs were found in practices belonging to the dimension Organizational support, indicating a strong commitment to a collaborative approach in fighting the crisis. These results might also be related to a prompt response of the Slovenian government to the crisis. As practically all managers reported not having a crisis management plan and reacted to the crisis by introducing cost-cutting measures, we can assume that CMPs were mostly implemented reactively, as a direct response to the external crisis. Nevertheless, more future studies on the current topics are recommended to better explain the usage of and differences in CMPs among the different types of tourism SMEs.

6 Conclusion

The main goal of the current study was to determine how tourism SMEs have responded to the crisis caused by the COVID-19 pandemic. The first question (RQ1) aimed

to determine which operational CMPs were implemented by tourism SMEs to cope with the crisis. Research results reveal that SMEs primarily focus on the following dimensions of CMPs (respectively): Workforce, Cost control, Organisational support, and Marketing practices. This study has clearly shown that the dimensions Workforce and Cost control have by far the greatest importance in coping with the crisis. The second question (RQ2) sought to determine whether statistically significant differences exist in the usage of CMPs among the different types of tourism SMEs. Research results show that statistically significant differences exist in the usage of sixteen (out of 27) CMP. The fewest differences occur between lodging and TA SMEs (5 CMPs), and the most differences exist between TA and F&B SMEs (11 CMPs). These results are likely to be related to the heterogeneity of the tourism industry.

This study has also shown that crisis management is performed through different combinations of CMPs and that most SMEs managers do not have a crisis management plan. Therefore, we might assume that CMPs were mostly used reactively, as a direct response to the crisis (the dimensions of Workforce and Cost control prevailed). This finding is consistent with previous studies (Kukanja & Planinc, 2013), which have also shown that tourism SMEs responded reactively to the external crisis, primarily by implementing CMPs related to labour and cost reductions. Although cost optimization is an important crisis management activity, CMPs which directly affect the workforce must be implemented with extreme caution. People are crucial for the long-term success of tourism SMEs, as their performance directly affects SMEs' brand image, efficiency, and quality performance (Kukanja et al., 2017). In this view, McCool (2012) suggested that staff should be actively involved in the development of crisis management strategies. According to Alonso-Almeida and Bremser (2013) the more drastic measures, such as the reduction of the number of employees, should first be replaced by measures resulting in SMEs' performance enhancement and productivity improvement.

Interestingly, research results revealed that managers heavily rely on organizational support (the joint approach) in fighting the crisis. Tourism SMEs depend on unique relationships with different stakeholders (e.g., guests, workers, suppliers, etc.). These relationships are time-consuming and costly to build and maintain, as they require intangible assets such as the creation of knowledge and reputation. Pushing tourism SMEs into bankruptcy would mean that the different relationships would need to be re-established, causing a transitory shock which would additionally slow the recovery of the economy. In this view, two of the more significant findings to emerge from this study are that marketing practices (the individual approach) constituted the least implemented dimension(s) and that relatively few differences were found in their usage among the different types of SMEs.

This work contributes to existing knowledge of crisis management by providing evidence on how tourism SMEs have responded to the crisis caused by the pandemic. Specifically, the empirical findings in this study provide a new understanding of differences in CMP usage among the different types of tourism SMEs.

Lu et al. (2020) state that there are three critical aspects to save SMEs in times of pandemic. First it is necessary to alleviate the survival pressure on SMEs; second, it is necessary to assist them to resume production; and third, it is necessary to stimulate consumption. The governmental response was prompt and in line with theoretical recommendations (Lu et al., 2020) and guidelines issued by the EU commission. Therefore, we might assume that similar CMPs could have also been implemented in other EU countries.

The major limitation of this study is the limited geographical area in which the study was performed. The main suggestion for future research is therefore to extend the study to other regions. Moreover, this study only gives a snapshot of the situation during the pandemic. A larger data set and a longitudinal study are required to detect the long-term effects of the crisis. SMEs' financial reports could also offer useful information on the effectiveness of different CMPs. In addition, analyses of guests' expectations during and after the crisis could also help us to better understand guests' post-crisis behavioural patterns and provide a deeper understanding of the "post-corona" tourism. According to Turnšek et al. (2020), we cannot easily predict how the general population will behave regarding their future travel avoidance. As the pandemic continues, we cannot precisely foresee its impact on the future of the tourism industry. In future studies on the current topic, the challenge of managing the right balance between public health safety and tourism firms' operational profitability should also be addressed. Therefore, there is a need for further analyses on the further impacts of the pandemic on tourism.

In the context of tourism industry recommendations, managers should focus on increased competitiveness and efficiency performance without deteriorating their marketing position, as previously suggested by Alonso-Almeida and Bremser (2013). The continuous monitoring and spread of information (especially in terms of the best practice example) should also help tourism managers in coping with the crisis. The current pandemic will eventually pass, but there will always be different crisis situations. The identified CMP can, therefore, be used as a guideline for tourism SMEs on how to cope with the current crisis or even avoid different future crisis situations if the practices are used proactively.

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Tehnike kriznega menedžmenta v turističnih MSP-jih med pandemijo Covid-19

Ozadje in namen: Raziskava preučuje tehnike kriznega menedžmenta v mikro, malih in srednje velikih podjetjih (MSP) v turizmu v času pandemije korona virusa (COVID-19). Namen pričujoče raziskave je preučiti, kako so se turistična podjetja odzvala na krizo, ki jo je povzročila pandemija COVID-19. Cilj raziskave je ugotoviti, katere operativne tehnike kriznega menedžmenta so implementirale različne vrste turističnih MSP-jev, da bi zmanjšale vpliv globalne krize.

Zasnova / metodologija / pristop: Študija se osredotoča na naslednje vrste turističnih MSP-jev: nastanitveni obrati, prehranski obrati (F&B) ter turistične agencije (TA). S strani menedžerjev turističnih MSP-jev je bilo pridobljenih 574 veljavnih spletnih vprašalnikov. Strukturirani vprašalnik je zajemal 27 spremenljivk (tehnik) kriznega menedžmenta, ki vsebinsko spadajo v štiri dimenzije (področja) kriznega menedžmenta – delovno silo, nadzor stroškov, organizacijsko podporo in trženjske prakse. Za preučevanje odziva MSP-jev na krizo so bile uporabljene sledeče statistične metode – eksplorativna faktorska analiza ter Kruskal Wallisov H in Mann-Whitneyev U test.

Rezultati: Rezultati pričajo o tem, da se MSP-ji primarno osredotočajo na naslednje dimenzije kriznega menedžmenta (glede na pomen) – delovno silo, nadzor stroškov, organizacijsko podporo ter trženjske prakse. Rezultati kažejo, da obstajajo statistično značilne razlike v uporabi različnih tehnik kriznega menedžmenta med različnimi vrstami turističnih MSP-jev.

Zaključek: Uporaba izbranih tehnik kriznega menedžmenta omogoča mednarodno primerjalno analizo ter olajša izbor tehnik kriznega menedžmenta v turističnih MSP-jih. Zaključek raziskave vsebuje predloge za izvedbo prihodnjih raziskav in koristne informacije za raziskovalce, menedžerje ter snovalce razvojnih politik v turizmu.

Ključne besede: COVID-19; Krizni menedžment; Slovenija; MSP; Turizem

AUTHOR GUIDELINES / NAVODILA AVTORJEM

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CONTENTS - 4/2020

Phuong TRAN HUY, Ngan Hoang VU, Hue Thi HOANG, Hanh Thi Hai NGUYEN Procedural Justice in Selection from the Lens of Psychological Contract Theory	272
Katarina ROJKO, Nuša ERMAN, Dejan JELOVAC Impacts of the Transformation to Industry 4.0 in the Manufacturing Sector: The Case of the U.S	287
Bulent AKKAYA Linking Organizational Commitment and Organizational Trust in Health Care Organizations	306
Mohanad Ali KAREEM, Harsha Vardhan Reddy KUMMITHA The Impact of Supply Chain Dynamic Capabilities on Operational Performance	319
Hester SPIES, Nedra MACKAY An Empirical Investigation of the Mediating Role of Customer Attachment in South African Private Hospitals	332
Marko KUKANJA, Tanja PLANINC, Marijana SIKOŠEK Crisis Management Practices in Tourism SMEs During the Covid-19 Pandemic	346