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HOW TO INCREASE JOB SATISFACTION AND ORGANISATIONAL COMMITMENT IN THE ICT SECTOR THROUGH JOB DESIGN

ABSTRACT: *The paper investigates the relationship between job design and work-related attitudes (job satisfaction and organisational commitment) in the Information and Communication Technology (ICT) sector. We use data collected via an online questionnaire (using the Google Forms platform) from 97 employees working in the ICT sector in Serbia. The data was collected between February and June 2019. The analysis shows that job design is a predictor of both job satisfaction and organisational commitment. Of the five investigated job dimensions (Skill variety, Task identity, Task significance, Autonomy, Feedback from job), 'Autonomy' was the most positively associated with job satisfaction (r=0.629) but was only moderately associated with organisational commitment (r=0.4). The other job dimensions were found to be weakly correlated with the investigated work attitudes, although the relationships were positive. Furthermore, the results indicate that work engagement mediates both investigated relationships, providing a deeper insight into how job design is translated into positive work-related attitudes. We discuss the possible managerial implications of the 'Autonomy' dimension and the interventions in work engagement required to positively influence work-related attitude formation and management in the ICT sector, and we distinguish between 'bottom-up' and 'top-down' interventions.*

KEY WORDS: *job design, job satisfaction, organisational commitment, work engagement*

JEL CLASSIFICATION: M54, J28, J40

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1. INTRODUCTION

The ICT sector is a key driver of innovation that accounts for one-third of patent applications in the world (OECD 2017) and is one of the most influential factors in the changing economic, social, and political environment. The explosive growth of the ICT sector and its increasing importance for economic development and advancement has created a globally significant increase in demand for highly skilled ICT expertise and in the number of IT-related jobs. Employees in the ICT sector are required to have a wide variety of skills to help clients understand their businesses and develop desired systems, especially in the service delivery phase. However, the supply of such employees is insufficient, thus further increasing the number of job vacancies and increasing competition between employers in recruiting and maintaining ICT specialists, who have extremely high turnover rates and prefer many career transitions from one company to another and from one country to another (El-Ayouti & Kamel, 2003, p. 207).

Even though the supply of ICT specialists has increased moderately in recent years, demand for ICT specialists is expected to grow at a fast pace (OECD 2017) and 41% of businesses in the European Union that opt for specialized ICT workers report having difficulties filling vacancies (OECD 2017). When there is such a discrepancy between the ICT workforce and the labour market, businesses struggle not only to fill vacancies but also to motivate employees to remain in their organisation and not leave for more attractive working conditions and benefits.

Businesses' efforts to attract and retain their workforce are taking on a new shape, based on carefully forming and managing employees' attitudes to work. Basing our study on the argument that job satisfaction and organisational commitment are negatively related to employee absenteeism (Eby, Freeman, Rush & Lance, 1999) and turnover intention (Reichers, 1985; Mathieu & Zajac, 1990; Zournatzi, Tsiggilis, Koystelios & Pintzopoulou, 2006), our aim is to examine which factors influence the formation and reinforcement of these work-related attitudes.

Drawing on the work of Hackman and Oldham (1974, 1980) and their Job Characteristics Theory we investigate the effect of job resources on the formation of work-related attitudes (job satisfaction and organisational

commitment). Furthermore, leaning on the Job Demands–Resources Theory (Demerouti, Bakker, Nachreiner and Schaufeli, 2001), we examine the effect that work engagement has on job satisfaction and organisational commitment. The aim of this paper is to provide a deeper understanding of the relationship between job design, work engagement, and work-related attitudes and to propose potential managerial interventions concerning job design that can be applied in order to enhance job satisfaction and organisational commitment, thus contributing to more effective employee retention in companies in the ICT sector.

The paper is divided into five sections. Section 2 describes the research context, i.e., the characteristics of the ICT sector in Serbia. The theoretical framework of the analysis and the proposed hypotheses are set out in Section 3. Section 4 describes the research methodology – the sample and variables. The results and the discussion of their implications are presented in Section 5. Finally, in Section 6 we provide conclusions, discuss the limitations of the study, and highlight possible directions for future research.

2. RESEARCH CONTEXT: THE ICT SECTOR IN SERBIA

By the ICT sector we understand, in line with the OECD definition, industries that manufacture or offer services that capture, transmit, or display data and information electronically.[1] In this study we are guided by the industry classification, which encompasses two sub-sectors, telecommunications and information technologies (IT), which are further segmented into hardware production, software production, and services. The industry encompasses many distinct jobs and its explosive growth during the last decade has resulted in the appearance of an entirely new set of job positions, such as Knowledge Management Consultant, Software QA/test analyst, Game Developer, IT System Auditor, e-Business Manager, Robotics Specialist, ERP (SAP/Oracle/etc.) Consultant, Business Intelligence Consultant, Information Auditing and

[1] Source: https://stats.oecd.org/glossary/detail.asp?ID=6274, accessed 10 June 2019.

Compliance Specialist, Chief Information Officer (CIO), Business Applications Integrator, Net-centric Developer, and many others.[2]

As is the case globally, the Serbian national strategy for information society development also recognises ICT as an important driver of the economy, which is projected to yield revenue of over five billion euros in 2020.[3] The strategic interventions to achieve this growth include infrastructure investment; legislative adjustment; the development and strengthening of cooperation between public, private, and civil sectors; and the strategic development of ICT skills and education by developing the role of ICT in the education system[4] in order to provide a solid source of specialized ICT workers for future sector needs. Data from 2016 (SITO 2017) shows that the Serbian IT industry numbered 2,046 companies employing 21,514 workers and yielding a revenue of 1.83 billion euros, while the more mature Telephone Company industry employed 18,842 workers in around 250 companies and had revenues of 2.20 billion euros.

The Serbian ICT workforce is estimated at 50,000 ICT specialists (ICT Vojvodina Cluster 2018). The current training and educational capacity is insufficient to feed the sector's workforce demand, and 85% of companies report difficulties in filling vacancies, due to either an insufficient supply of qualified specialists or to a lack of specialized and applicable knowledge (ICT Vojvodina Cluster 2018). Despite the fact that the ICT workforce is quite a modest proportion of the country's total workforce, attracting specialized ICT workers is a growing challenge as qualified employees have a competitive advantage in a market that is no longer local but global.

To successfully cope with the fierce competition for qualified ICT workers, companies need to redefine their approach to attracting new talent and retaining existing employees. New job candidates have mainly been attracted through offers of competitive salaries and attractive non-financial benefits. However, this

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2 For additional career opportunities in the ICT sector see https://www.researchgate.net/publication/281550372_ICT_Graduate_Career_Awareness [accessed 30 May 2019].

3 Strategija razvoja informacionog društva u Republici Srbiji do 2020. godine, "Službeni glasnik RS" 51/2010.

4 Ibid.

study emphasises the formation of work-related attitudes and management as effective methods for retaining existing high-quality employees.

3. THEORETICAL FRAMEWORK

3.1. Work-related attitudes: Job satisfaction and organisational commitment

Attitudes are defined as evaluative responses toward a certain object that are characterized by some degree of favourability or unfavourability (Eagly & Chaiken, 1993) and are comprised of emotional, cognitive, and behavioural components (Breckler, 1984) that guide individuals' emotional, thinking, and acting reactions. In a work-related context, job satisfaction and organisational commitment predict individual effectiveness (Zhao, Wayne, Glibkowski & Bravo, 2007) and can constitute invaluable information about employees, since a positive overall work attitude comprised of job satisfaction and commitment to the organisation triggers employees' motivation to contribute positively rather than withdraw positive behaviours (Harrison, Newman & Roth, 2006). Because job satisfaction and organisational commitment predict work behaviour, measuring and managing them become important Human Resource Management (HRM) tools.

Job satisfaction is defined as a "pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p.1304) and is comprised of an individual's affective experiences and belief structures connected to their job (Weiss & Cropanzano, 1996). The level of job satisfaction is generally influenced by the following groups of factors (Greenberg & Baron, 1995; George & Jones, 2002): 1) personality and personal traits (predicting whether thoughts and feelings about a job will be positive or negative), 2) personal values (reflecting an individual's beliefs about desired results and how to behave on the job), 3) working context characteristics (job design, interpersonal relations, working conditions, compensation, etc.), and 4) social influence (colleagues, family, trade unions, culture, etc.). Job satisfaction is associated with productivity, worker absenteeism, and staff mobility, and depends on the work content (Koustelios & Kousteliou, 2001; Halepota & Shah, 2011). It is also associated with the reduction of errors in the workplace, the intention of employees to leave their jobs (Zournatzi et al., 2006), and motivation (Ayub & Rafif, 2011). Other factors that contribute to job satisfaction are workplace climate (Shuck, Reio & Rocco, 2011),

economic incentives (Stringer, Didham & Shantapriyan, 2011), and achievement and interpersonal relationships (Halepota & Shah, 2011). Some authors claim that job satisfaction is only moderately correlated with motivation, job involvement, organisation affiliation, and turnover and correlates strongly with perceived job stress and organisational commitment (Kreitner & Kinicki, 2002, p.196; Scott & Taylor, 1985).

Organisational commitment mirrors an individual's feelings about personal working experience in the organisation and is defined as the collection of feelings and emotions that a person has about the organisation (Steers, 1977; Porter, Steers, Mowday & Boulian, 1974), their psychological attachment to the organisation and its goals and their role in relation to this (O'Reilly & Chatman, 1986), and attachment to the organisation for its own sake rather than for its strictly instrumental value (Cook & Wall, 1980, p.40). Many studies confirm the positive effects of organisational commitment on both individuals and the organisation (O'Driscoll, Pierce & Coghlan, 2006; Riketta & Van Dick, 2005; Meyer, Stanley, Herscovitch & Topolnytsky, 2002; Mathieu & Zajac, 1990). At the organisational level, organisational commitment positively influences organisational performance (McElroy, 2001) and organisation competitiveness (Bergmann et al., 2000), reflects leadership quality (Stum, 1999), and positively contributes to the transfer and dissemination of knowledge within the organisation (Alvesson, 2001). At the individual level, many studies show that organisational commitment positively influences employee attitudes, behaviours, motivation, and job satisfaction (Mowday, Porter & Steers, 1982; Allen & Meyer, 1996; Meyer et al., 2002; Cooper-Hakim & Viswesvaran, 2005; Chughtai & Zafar, 2006; Markovits, Davis & Vandrick, 2007), increases employees' affiliation to their organisation (Meyer et al., 2002; Riketta, 2002), and is negatively related to absenteeism (Eby et al., 1999) and employees' intention to move to other employment (Reichers, 1985; Mathieu & Zajac, 1990; Cooper-Hakim & Viswesvaran, 2005; Chughtai & Zafar, 2006).

3.2. Influence of job design on work-related attitudes

Job design (JD) is the process of linking specific goals to specific jobs and making decisions about which techniques, equipment, and procedures are used to attain those goals (George & Jones, 2002). Job design shows how teams and individuals do things in organisations and what the organisational roles of individuals are

(Armstrong & Taylor, 2017, p. 162). Job design is concerned less with job purpose and more with what duties the job entails (Taylor, 2014, p.128). Oldham (1996) believes that few topics in the field of organisational psychology and behaviour have attracted as much research as work design, probably due to the fact that it can have an enormous impact on organisational success and individual well-being (Morgeson & Campion, 2003). There have been numerous approaches to job design in the relevant literature and in practice, especially during the 20th century. Many argue that the notion of job design emerged as early as 1776 when Adam Smith presented his idea of the division of labour. Frederick Taylor introduced the scientific management approach much later, in 1911, suggesting principles for the most efficient ways to design a job: task simplification, worker specialisation, and workers' motions on the job should follow strictly defined procedures to finish a task in the shortest possible time. 'Taylorism' also proposed removing responsibility from employees to engineers and managers. In 1914 'Fordism' further enhanced and promoted the idea of simplifying tasks and introduced the moving assembly line. During the 1940s and 1950s a somewhat new approach to job design emerged: 'job enlargement' was a way to decrease the degree of employees' horizontal specialisation by expanding the number of tasks associated with a job (Griffin, 1982), thus reducing some of the monotony associated with doing the same thing every single day. During the 1960s, as a response to the limited motivational effects of job enlargement, Herzberg (1968) introduced the idea of job enrichment as 'vertical job loading' (p. 83), increasing employee responsibilities for scheduling a job and the way in which the job is carried out.

Following the job enlargement and job enrichment approaches, Hackman and Oldham (1974, 1980) introduced their Job Characteristics Model, proposing that job satisfaction, motivation, and effectiveness occur when any job contains the following five characteristics.

1. Skill variety (SV) – the degree to which performing a job effectively requires the job-holder to possess and utilise their different skills, abilities, and talents.
2. Task identity (TI) – the degree to which a job involves completing an identifiable piece of work from start to finish with a visible outcome.

3. Task significance (TS) – the degree to which a job impacts the lives of others inside and/or outside the organisation, enabling employees to experience their work as more meaningful.
4. Autonomy (AU) – the degree to which a job provides the worker with freedom, independence, and discretion in scheduling work, decision-making, and work methods, enabling them to feel a stronger responsibility for their job outcomes.
5. Feedback (FB) – the degree to which the job provides the worker with direct information about their performance and personal effectiveness.

According to the Job Characteristics Model, the presence of these five core job dimensions leads employees to experience three psychological states: 1) viewing their work as meaningful, 2) feeling responsible for outcomes, and 3) acquiring knowledge of results. These three psychological states are in turn related to positive outcomes such as overall job satisfaction, internal motivation, high performance, and low absenteeism and turnover (Renn & Vandenberg, 1995; Brass, 1985; Johns, Xie & Fang, 1992; Humphrey, Nahrgang & Morgeson, 2007).

According to Hackman and Oldham (1975), autonomy and feedback are more important elements in creating the motivation potential score (MPS) than skill variety, task identity, or task significance. Thus, if a job completely lacks autonomy (or feedback), regardless of the levels of task variety, identity, and significance the MPS will be very low. However, more recently Greg Oldham (2012) confirmed the validity of MPS in the contemporary workplace and added some application outcomes such as creativity (especially in relation to autonomy), altruism as a lack of selfishness in dealing with counterparts, willingness of employees to learn new skills and demonstrate resilience at difficult times, and a higher quality of family life. He has also suggested a sixth dimension to be considered in the job characteristics model – social interaction, leading to high levels of performance.

Research has found that job design can have a profound impact on employee attitudes and behaviour (Campion, Mumford, Morgeson & Nahrgang, 2005) at both the individual and organisational level (Fried & Ferris, 1987; Humphrey et al., 2007). It is an important determinant of employees' affective commitment (Dunham, Grube & Castañeda, 1994; Raharjo, Solimun & Fernandes, 2018), job

satisfaction (Lawler, 1969; Hackman & Oldham, 1974, 1980; Brass, 1985; Bhuidan & Buklend, 2002; Glisson & Durick, 1988; Fahr, 2011), higher employee motivation (Hackman & Oldham 1974, 1980; Campion & Thayer, 1987; Humphrey et al., 2007; Cheng & Lu, 2012), increased job performance (Lawler, 1969; Hackman & Oldham, 1974, 1980; Brass, 1985; Campion & Thayer, 1987), career incentives (Kaarboe & Olsen, 2006), greater involvement and lower absenteeism (Campion & Thayer, 1987; Hackman & Oldham, 1974, 1980), lower turnover (Hackman & Oldham, 1974, 1980), higher engagement and performance ratings, and enacting more organisational citizenship behaviours and engaging in fewer deviant behaviours (Shantz, Alfes, Truss & Soane, 2013). However, Parker, Wall and Corderly (2001) propose that the collective effects of the core job characteristics on affective responses (satisfaction and motivation) are largely supported in the relevant research, but those for behaviour (i.e., work performance, turnover, and absence) less consistently so.

3.3. Influence of work engagement on job satisfaction and organisational commitment

Schaufeli et al. (2002) define engagement as "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption", stating that it represents a "pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behaviour" (p. 74), but rather remains related to the individual's work experience. Even though it does show fluctuating levels over time, the general levels of engagement can be measured, and it is important to see whether these levels can be enhanced by human resource practices (Bakker & Albrecht, 2018).

Work engagement as a concept gained popularity because it proved to be a good predictor of employee, team, and organisational outcomes (Bakker & Albrecht, 2018), with the ability to influence a range of motivational outcomes. Engaged employees demonstrate openness to new experiences and a tendency to explore their environment more freely, which boosts their creativity; they are more open to learning and tend to transform their thoughts into actions more easily; and engaged employees report better health and more active and positive emotions (Bakker, Demerouti & Sanz-Vergel, 2014). Work engagement is found to influence numerous job-related outcomes: the formation of positive attitudes towards work and the organisation (Schaufeli, 2014, p.30; Bakker & Schaufeli, 2014), and a positive relation with organisational citizenship behaviour and in-

role and contextual performance (Christian, Garza & Slaughter, 2011; Breckler, 1984). Interestingly, the transference of work engagement between people in a group is often described as "contagious" (Bakker & Schaufeli, 2017).

Kahn (1990) argues that when working, people can be more or less psychologically present and can use varying degrees of their physical, cognitive, and emotional presence to suit the role they are performing (Kahn, 1990). Pursuing the identity of those factors that explain the process of individual selves' investment in their in-role experience, Kahn (1990) coined the concept of personal engagement, describing it as a situation where "people employ and express themselves physically, cognitively, and emotionally during role performances" (p. 694). He identifies three psychological conditions that trigger personal engagement: meaningfulness, safety, and availability. Meaningfulness, corresponding to the feeling of being rightfully reciprocated for personal investment, is influenced by the nature of the job (task and role characteristics); psychological safety depends on social environment (interpersonal, group, and managerial relations, and social norms); whereas availability is connected to the personal resources for investment which the individual has at their disposal (Schaufeli, 2014, p. 25).

In line with Kahn's (1990) view on engagement, Schaufeli et al. (2002) argue that engagement can be viewed as a three-component structure encompassing three fundamental qualities: vigour, dedication, and absorption. Vigour is described as a high-level energy state, the willingness to invest effort and to persist despite any work difficulties, and as mental resilience during work; dedication refers to a deep involvement in work and experiencing inspiration, pride, challenges, and significance from work; whereas absorption refers to a full and deep concentration that emerges during work, when time passes unnoticed and when it becomes hard to detach oneself from work (Schaufeli et al., 2002; Bakker & Schaufeli, 2017).

According to the job demands–resources model (JD–R) (Demerouti et al., 2001; Bakker et al., 2014), work engagement is influenced by job resources, since a well-designed job can advance employee well-being and engagement (Bakker & Demerouti, 2014; Hackman & Oldham, 1980; Parker & Wall, 1998). This model suggests that employee well-being can be attributed to the characteristics of the

work environment, which can be classified in one of two general categories, regardless of the differences between different organisations: job demands and job resources (Bakker et al., 2014). Job demands are those aspects of the organisational environment associated with an individual's psychological or physical investment, which therefore require substantial effort in order to be handled (Xanthopoulou, Bakker, Demerouti & Schaufeli, 2007; Bakker, 2014). On the other hand, job resources are "physical, social or organizational apects of the job that are: (a) functional in achieving work-related goals, (b) reduce job demands that are associated with physiological and psychological costs, and (c) stimulate personal growth and development" (Xanthopoulou et al., 2007, p. 122). These two types of organisational aspect, which differ in nature, trigger different psychological processes which affect employee well-being; thus job demands correlate with exhaustion and burnout, whereas job resources trigger motivational processes and the work engagement connected to them (Bakker & Schaufeli, 2017; Demerouti et al., 2001; Xanthopoulou et al., 2007; Bakker et al., 2014).

According to Hackman and Oldham (1980), job resources can be viewed as several distinct job characteristics (autonomy, task variety, task significance, task identity, and feedback) that may foster work engagement and subsequently work-related attitudes such as job satisfaction and organisational commitment (Christian et al., 2011).

3.4. The hypotheses

In line with the above, we propose the following:

H1: There is a strong positive relationship between Job Design (JD) and Work Engagement (WE).

H2: There is a strong positive relationship between Job Design (JD) and Job Satisfaction (JS).

H3: There is a strong positive relationship between Job Design (JD) and Organisational Commitment (OC).

H4: Work Engagement (WE) mediates the relationship between Job Design (JD) and Job Satisfaction (JS).

H5: Work Engagement (WE) mediates the relationship between Job Design (JD) and Organisational Commitment (OC).

4. RESEARCH METHODOLOGY

This study explores the influence of job design on work-related attitudes related to job satisfaction and organisational commitment. Drawing lines according to the JD–R model, we hypothesise that job design, comprised of autonomy, task significance, task variety, task identity, and feedback, takes the form of job resources that influence the formation of job-related attitudes, so that work engagement is a mediator in this relationship.

The hypotheses were tested on a sample of 97 employees working in the ICT sector in Serbia. Data was collected via an online questionnaire, using the Google Forms platform, in the period February–June 2019. The questionnaire was distributed with the help of various ICT organisations – ICT clusters and companies that were contacted with a request to further disseminate the questionnaire. Participation in the questionnaire was voluntary and anonymous.

4.1. Sample

The majority of respondents (59.8%) reported that their company worked in software development, 45.3% that their company offered IT services, and 28.8% and 6.1% of respondents reported that their company worked in telecommunication and hardware production respectively. 61.9% of companies were domestic, while 38.1% of respondents worked in a company whose headquarters were abroad. 6.2% of respondents worked in micro companies (less than 10 people), 23.7% in small companies, 25.8% in middle-sized companies, and 44.3% in companies with more than 250 employees. Most businesses were privately owned (80.4%), and the rest were state-owned.

The demographic structure of the respondents was 51.5% male and 47.4% female. The distribution by age and education level is presented in Table 1, and the distribution by work experience and tenure is shown in Table 2.

Table 1: Distribution of employees by age and education level

Age	**N**	**%**		**Education level**	**N**	**%**
Less than 26	28	28.9		High school diploma	11	11.3
26 – 35	37	38.1		Higher specialised studies	8	8.2
36 – 45	20	20.6		Bachelor Degree	34	35.1
46 – 55	7	7.2		Masters Degree	39	40.2
Over 55	5	5.2		PhD	2	2.1
Total	97	100		Other	3	3.1
				Total	97	100

Table 2: Distribution of employees by length of work experience and tenure in the company

Length of work experience	N	%		Employees' tenure in organisation	N	%
< 2 years	21	21.6		< 2 years	55	56.7
2 – 3	13	13.4		2 – 3	11	11.3
3 – 5	12	12.4		3 – 5	13	13.4
5 – 10	21	21.6		5 – 10	3	3.1
10 – 20	16	16.5		10 – 20	5	5.2
20 – 30	10	10.3		20 – 30	6	6.2
> 30 years	4	4.1		> 30 years	4	4.1
Total	97	100		Total	97	100

What stands out is the fact that the majority of respondents reported having been employed in their current organisation for less than 2 years (56.7%), which can be considered a short-term tenure. This cannot be totally explained by first-time employment, as only 21.6% of the respondents had less than two years' working experience. This leads to the conclusion that more than a quarter of the respondents had changed their company in the previous two years.

The majority of the respondents worked at operating-level positions (64.9%), while 24.7% were middle-level management and 9.3% were in higher or top-level management positions.

4.2. Measures

To measure the variables Job Design (JD), Work Engagement (WE), Job Satisfaction (JS), and Organisational Commitment (OC) we used instruments which had yielded high internal consistency in previous research. The scales we used were translated from English to Serbian following the double translation method. The Work Engagement scale used was officially translated to Serbian by its authors (Schaufeli & Bakker, 2004).

Job Design (JD). In accordance with Hackman and Oldham (1975), we viewed job design as complex variable consisting of five different dimensions: autonomy, task variety, task significance, task identity, and feedback. To measure each dimension we used a shortened Morgeson and Humphrey (2006) Work Design Questionnaire (WDQ). Answers were given on a five-point scale from *I strongly disagree* to *I strongly agree*. Some sample statements are: *The job allows me to make decisions about what methods I use to complete my work* (Autonomy); *The job involves performing a variety of tasks* (Task variety); *The job itself is very significant and important in the broader scheme of things* (Task significance); *The job provides me the chance to completely finish the pieces of work I begin* (Task identity); *The job itself provides me with information about my performance* (Feedback). The Job Design variable was computed as the mean of all five dimensions with a theoretical range from 1 to 5.

Work Engagement (WE). To measure work engagement, we used Schaufeli and Bakker's (2004) short UWES 9 scale, which measures engagement as a composite measure of its three dimensions: vigour, dedication, and absorption. Answers were given on a seven-point scale (from 0 to 6) depicting the frequency of times an individual agreed with the statements, i.e., *At my work, I am bursting with energy* (vigour); *I am enthusiastic about my job* (dedication); *I get carried away when I am working* (absorption).

Job Satisfaction (JS). We measured job satisfaction as a general feeling about one's job that is composed of a constellation of attitudes related to various facets

of the work (Spector, 1997). It was measured on a 15-item scale developed by Warr, Cook and Wall (1979), with answers ranging from 1 (completely unsatisfied) to 5 (completely satisfied). Respondents answered how satisfied they were with their immediate boss, their colleagues, the amount of responsibility they were given, etc. The scale has shown high internal consistency in previous studies (α=0.85, α=0.88) (Warr et al., 1979).

Organisational Commitment (OC). To measure affective (attitudinal) commitment toward the organisation we used Meyer et al.'s (1993) 6-item scale to measure items such as *This organisation has a great deal of personal meaning for me* and *I do not feel 'emotionally attached' to this organisation* (reverse coded). Answers were given on a 7-point scale ranging from 1, *I completely disagree*, to 7, *I agree completely*. Previous studies have found the scale to have high internal consistency (Meyer et al., 1993).

5. RESEARCH FINDINGS

Reliability analysis examining the internal consistency of the scales showed satisfactory levels: α=0.821 for job design, α=0.917 for work engagement, α=0.937 for job satisfaction, and α=0.861 for organisational commitment.

5.1. Descriptive statistics

In the first step of analysis we performed descriptive statistics of the variables Job Design (JD), Work Engagement (WE), Job Satisfaction (JS), and Organisational Commitment (OC). The results are presented in Table 3.

Table 3: Descriptive statistics

		JD	WE	JS	OC
N	Valid	97	97	97	97
	Missing	0	0	0	0
Mean		3.764	4.601	3.679	4.751
Median		3.9	5	3.8	4.833
Mode		4.2	5	3.8	4.833
Std. Deviation		0.628	1.133	0.852	1.398
Skewness		–0.773	–1.18	–0.487	–0.458
Std. Error of Skewness		0.245	0.245	0.245	0.245
Kurtosis		0.297	0.692	–0.517	–0.275
Std. Error of Kurtosis		0.485	0.485	0.485	0.485
Minimum		2.133	1.444	1.4	1
Maximum		4.933	6	5	7
Theoretical range		1–5	0–6	1–5	1–7

JD = Job Design; WE = Work Engagement; JS = Job Satisfaction; OC = Organisational Commitment

Despite being slightly negatively skewed the variables show acceptable levels of skewness and kurtosis. All variables scored higher measured means than their theoretical means would suggest – μ (JS) = 3.764; μ(OC) = 4.751; μ (WE) = 4.601 – indicating that the employees in the sample were relatively satisfied with their jobs; demonstrated relatively high levels of organisational commitment; declared higher levels of engagement than its theoretical mean would predict; and reported relatively high levels of autonomy, task variety, task significance, task identity, and job performance/results feedback, as the measured mean for the variable Job Design has shifted to the right of its theoretical mean.

5.2. Hypotheses testing

To test hypotheses H1–H3 we conducted Pearson's correlation test, which yielded the results presented in Table 4.

Table 4: Correlation analysis

	Variable	1	2	3	4	5	6	7	8
1	Autonomy	1							
2	Task Sign.	.199	1						
3	Task Var.	.330**	.387**	1					
4	Task Ident.	.475**	.253*	.353**	1				
5	Feedback	.422**	.131	.387**	.540**	1			
6	Job Design	.687**	.584**	.696**	.758**	.729**	1		
7	Work Eng.	.365**	.270**	.344**	.269**	.360**	.465**	1	
8	Job Sat.	.629**	.181	.358**	.319**	.365**	.527**	.446**	1
9	Org. Com.	.400**	.290**	.327**	.240*	.371**	.471**	.575**	.397**

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

* Correlation is significant at the 0.05% level (2-tailed).

Job design and work engagement. The results indicate that job design (comprised of five job characteristics) is positively related to work engagement (r=0.465), as predicted by Hypothesis 1. As this relationship is still in the domain of moderate coefficient level, we can only state that Hypothesis 1 is partially confirmed. However, work engagement would be increased if any of the job characteristics were enhanced. This is especially the case with autonomy at work and job feedback as these correlation scores are the highest of all (r (autonomy) = 0.365; r (feedback) = 0.360).

Engagement can be increased when factors with motivational potential (Humphrey et al. 2007), such as the five job characteristics, are carefully managed. This is in line with Christian et al.'s (2011) meta-analysis confirming the positive correlation between engagement and focal job characteristics.

Job design and job satisfaction. The research findings reveal that job design is positively related to job satisfaction (r=0.527), indicating that an increase/decrease in certain job dimension scores is associated with some increase/decrease in job satisfaction scores. The correlation coefficients for the relationship between individual job dimensions and job satisfaction suggest that 'autonomy' is most strongly correlated with job satisfaction (r=0.629), indicating that employees who are allowed high autonomy will feel that the results of their jobs are determined by their efforts, actions, and decisions, and so will feel more

satisfied. This finding supports previous research that finds a positive association between job autonomy and job satisfaction (DeCarlo & Agarwal, 1999; Liu, Spector & Jex, 2005; Nguyen et al., 2003; Thompson & Prottas, 2006). Other job dimensions such as 'feedback', 'task variety' and 'task identity' are weakly correlated with job satisfaction (r= 0.365, r=0.358, and r=0.319, respectively), yet the relationship is positive, whereas the correlation between 'task significance' and JS is shown to be insignificant. All in all, we conclude that Hypothesis 2 is partially supported, as the results confirm the direction but not the strength of the relationship.

Job design and organisational commitment. The results indicate that job design is positively related to organisational commitment (r=0.471). Therefore Hypothesis 3 is partially confirmed, as the direction of the relationship between the variables is positive, as we predicted. However, the results show a rather moderate relationship. The correlation coefficients obtained for the relationship between individual job dimensions and organisational commitment suggest that it correlates most strongly with 'autonomy' (r=0.400), followed by 'feedback' from the job (r=0.371).

In order to test Hypothesis 4 we confirmed that all conditions for the existence of mediation were fulfilled: the independent variable predicts the dependent variable and mediator; and the mediating variable is a significant predictor of the dependent variable (Baron & Kenny, 1986). Job design is a positive predictor of work engagement (β=0.465) with 20.8% of variance explained by the regression model (see Table 5).

Table 5: Job design as a predictor of work engagement

Model		β	t	P	
1	Constant		2.307	.023	R =.465, $adj.R^2$=.208,
	Job Design	.465	5.113	.000	F=26.139, p=.000

Furthermore, the model where work engagement mediates the relationship between job design and job satisfaction proved to have better predictive potential (adj. R^2=.315) (see Table 6, Model 2) than when the model includes only the relationship between job design and job satisfaction (adj. R^2=.270) (see Table 6, Model 1).

Table 6: Work engagement as the mediating variable in the relationship between job design and job satisfaction

Model		β	t	P	
1	Constant		2.185	.031	R =.527, $adj.R^2$=.270, F=36.546 p=.000
	Job Design	.527	6.045	.000	
2	Constant		1.576	.118	R =.574, $adj.R^2$=.315, F= 23.093 p=.000
	Job Design	.408	4.277	.000	
	Work Engagement	.257	2.691	.008	

In the first step of analysis we examined the relationship between job design (as the independent variable) and job satisfaction (dependent variable) (see Table 6, Model 1). Job design is positively and significantly related to job satisfaction (β=0.527). When we included work engagement (see Table 6, Model 2) the model was still significant. The direct effect of job design on job satisfaction was reduced to β=0.408, indicating that work engagement yields a partial mediation effect (β=0.257). We used the Sobel test to test the mediation model, which proved that mediation existed (z=2.382, p=.017). The mediation effect was calculated by the bootstrapping method, indicating that 22.62% of the relationship between job design and job satisfaction is achieved through the mediating variable, i.e., work engagement. Therefore, we conclude that Hypothesis 4 is supported.

In order to test the mediation of work engagement in the relationship between job design and organisational commitment, we confirmed the existence of all conditions for the mediation model to be fulfilled (independent variable predicts dependent variable – β=.471, p=.000 (see Table 7); independent variable predicts mediator – β=.465, p=.000 (see Table 5); and mediator predicts dependent variable – β=.454, p=.000 (see Table 7). When work engagement is included in Model 2 (see Table 7) the predictive potential of the model increases from adjR^2=0.213 (when only job design is used to explain organisational commitment) to adjR^2=0.370 (when work engagement is included).

When including 'work engagement' in the regression model the direct effect of job design on organisational commitment is reduced from β=0.471 to β=0.260, indicating that there is partial and significant mediation of work engagement in

the relationship between job design and organisational commitment, giving β=0.454.

Table 7: Mediating role of work engagement in the relationship between job design and organisational commitment

Model		β	t	p	
1	Constant		1.045	.299	*R =.471 adj.R^2=.213*
	Job Design	.471	5.201	.000	*F=27.053, p=.000*
2	Constant		–.008	.994	
	Job Design	.260	2.840	.006	*R =.619 adj.R2=.370*
	Work Engagement	.454	4.969	.000	*F=29.245, p=.000*

To test this mediation we conducted the Sobel test, which proved mediation to be significant (z=3.563, p=.000). Bootstrapping analysis indicates that 44.8% of the relationship between job design and organisational commitment is achieved through the mediating variable, i.e., work engagement.

Taking everything into consideration, we have sufficient evidence to support Hypothesis 5.

6. DISCUSSION: MANAGERIAL IMPLICATIONS AND INTERVENTIONS

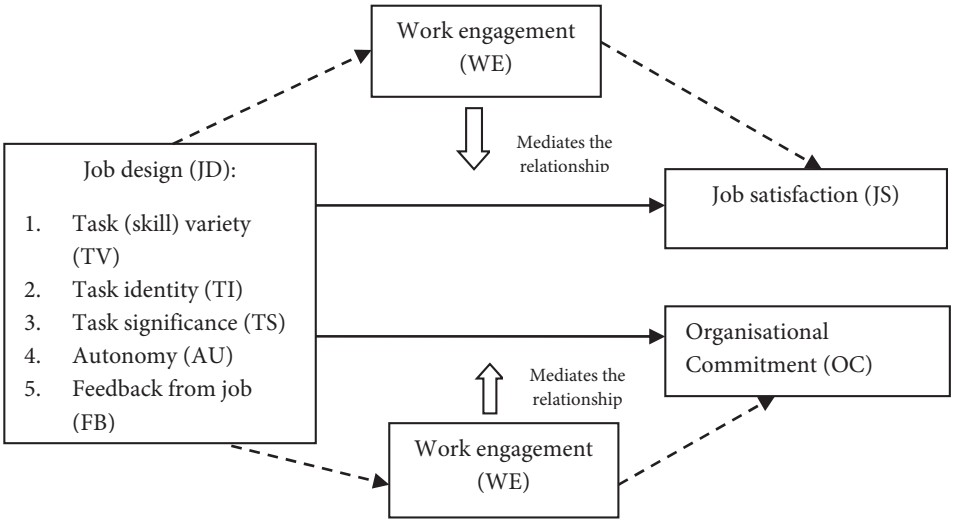
This study aims to expand our understanding of the relationship between job design and positive work outcomes such as job satisfaction and organisational commitment. The results only partially support the hypotheses of a strong positive relationship between job design (JD) and job satisfaction (JS) on the one hand, and job design and organisational commitment (OC) on the other; rather they indicate that these correlations are moderate (r=0.527 and r=0.471, respectively). Of the five investigated job dimensions, 'autonomy' seems to be the dimension that is most strongly and positively associated with job satisfaction (r=0.629), indicating that variation (increase/decrease) in this dimension's score is very much associated with variation in the 'job satisfaction' score (increase/decrease). The results also indicate only a moderate positive correlation of the autonomy dimension with organisational commitment (r=0.4). Other job dimensions are weakly correlated with the investigated work attitudes, although

the relationships are shown to be positive. Finally, regression analysis demonstrated that work engagement (WE) mediates both relationships.

These results have a number of implications. First, they add to our understanding of the job dimensions that are important for ICT sector employees to get more satisfaction from their jobs. Previous research has mainly focused on the impact of ICT technology on job satisfaction among different occupational groups and the factors that contribute positively to job satisfaction among employees in healthcare, teaching, and banking services, and less on the job dimensions that positively influence job satisfaction and organisational commitment specifically among ICT employees. By investigating the relationship between the five job dimensions and work-related attitudes, we have shown that the 'autonomy' dimension is the most important when designing jobs with positive organisational outcomes in the ICT sector. This result could contribute to ICT sector management attracting and retaining high-achieving and productive employees by designing a working environment where job autonomy is highly valued and promoted, thus allowing employees' role expectations and working environment to match, as suggested by Morgeson and Dierdorff (2011).

Second, the finding that work engagement mediates the relationship between job design and job satisfaction and between job design and organisational commitment shows how job design translates into a positive work attitude (see Figure 1). The predictive potential of job design is greater when work engagement is included in the model. This helps to better understand the process by which the causal effect of job design is transmitted to important organisational outcomes such as job satisfaction and organisational commitment. Fostering work engagement among employees is shown to be important for increasing the positive effect of job design on the process of work attitude formation and management in the ICT sector.

Figure 1: Proposed model of relationship between job design, work engagement, and work-related attitudes in the ICT sector



The research findings in the 'autonomy' dimension and work engagement have implications for management in the ICT sector and require interventions in order to positively influence the formation of work-related attitudes. In the following sections we distinguish between 'bottom-up' and 'top-down' interventions.

6.1. Bottom-up interventions: job crafting

In the late 1970s, role theory suggested that although an individual`s behaviour is context-specific, individuals in the same job perform in slightly different ways, making changes to their work roles as active job "crafters" or "sculptors" (Morgeson, Delaney-Klinger & Hemingway, 2005). Wrzesniewski and Dutton (2001) proposed the concept of job crafting, which assumes that individuals actively modify the task characteristics, social work environment, and cognitive boundaries of their job. Task modification leads to relational and cognitive crafting; relational and cognitive crafting increases employees' fit with the organisation, which is positively associated with job satisfaction (Kim, Im, and Qu, 2018). The JD-R model offers a somewhat different approach to job crafting. In this view, job crafting refers to proactively increasing structural (e.g., autonomy and variety) and social (e.g., asking for coaching or feedback) job resources, increasing challenging job demands (e.g., asking for new projects

and/or responsibilities), and decreasing demands that hinder work (e.g., cognitive and emotional demands; Tims & Bakker, 2010; Tims, Bakker & Derks, 2012).

The underlying assumption behind the concept is that employees are increasingly expected to be active agents who craft their jobs, rather than passive participants in changes at work (Wrzesniewski & Dutton, 2001; Tims et al., 2012). As the result of an individual initiative on the part of the employee (Tims & Bakker, 2014, p.141), job crafting assumes that employees autonomously change the meaning of their work to increase their well-being (Tims, Bakker & Derks, 2013), specifically their job satisfaction (Beer, Tims & Bakker, 2016; Villajos, García-Ael & Topa, 2019), organisational commitment (Kim & Lee, 2016), and work engagement (Tims et al., 2012, 2013; Petrou, Demerouti, Peeters, Schaufeli & Hetland, 2012). On the whole, employee behaviours that extend beyond formal job requirements are a good predictor of effective organisational functioning (Barnard, 1938; Katz & Kahn, 1978).

Thus, as "a model of individual job redesign" (Tims & Bakker, 2010), job crafting can be an effective bottom-up strategy for increasing job autonomy and work engagement that has a positive effect on the formation and management of work-related attitudes in the ICT sector. To be successful, job crafting should be promoted and aligned with organisational goals through managers communicating the individual and organisational outcomes that they desire, and by welcoming the application of a job-crafting strategy among employees (Tims & Bakker, 2014) and encouraging a proactive attitude that allows job crafting to occur (Kim & Lee, 2016, p. 86). Previous research has also investigated the profile of individuals engaging in extra role behaviours and suggests that autonomy, cognitive ability, and job-related skills will incrementally predict role breadth (Morgeson et al., 2005), indicating that any organisation aiming at fostering job crafting should focus its recruitment and selection efforts on such individuals and direct its training practices at the improvement of job-related skills.

6.2. Top-down interventions: job resources and work engagement

Interventions in job resources. As mentioned above, research suggests that autonomy, as one of the core task characteristics in the job characteristics model, is the most strongly correlated with the formation of positive work attitudes,

specifically job satisfaction of employees in the ICT sector. Therefore, major top-down interventions should focus on increasing job autonomy, although actions that focus on other job dimensions may also produce an increase in positive work attitude scores.

Job autonomy refers to viewing a context of accountability, authority, and responsibility (Mrayyan, 2006) as structural empowerment (Kanter, 1993, 1997) through access to information, support, resources, and growth opportunities that directly affect workers' level of control. Therefore, increasing job autonomy may include the following interventions:

- Changing 'on the job' experiences of employees in the ICT sector either through 'job enrichment', by removing some controls and granting additional authority to employees while retaining and even increasing their accountability for their work (Herzberg, 1968), or through job rotation, in order to learn and experience different and potentially more autonomous jobs in the same or different organisational units.
- Empowering ICT employees by delegating responsibility for tasks down the hierarchy so as to give workers increased decision-making authority in the execution of their primary work tasks (Leach, Wall & Jackson, 2003, p. 28), which will encourage individual autonomy and create a deeper sense of responsibility among all employees. Granting employees' autonomy in their individual tasks may further increase their ability to respond effectively to their clients' requirements.
- Encouraging managers to delegate responsibility for tasks to employees through human resource management, information sharing, purposely designed training practices aimed at building trust in the working environment and management learning how to delegate tasks, and less reliance on direct supervision as a main coordinating mechanism.
- Increasing employees' fit with the organisation through recruitment of individuals with higher levels of autonomy, ability, and job-related skills who will achieve better performance, engage in job crafting, and be able to perform additional tasks, as suggested by Morgeson et al. (2005).
- Developing self-managing teams, autonomous and self-regulating work groups that operate largely without supervision; decide on work methods, planning, scheduling, and control; distribute tasks among their members;

monitor their own performance; and take corrective action when required (Armstrong & Taylor, 2017, p. 171).

- Creating more growth and career opportunities and choices for employees within the boundaries of the organisation to allow individuals to make career transitions to different and more autonomous jobs.
- Providing the majority of employees permanent working status instead of temporary arrangements, as previous research focusing on healthcare workers (e.g., nurses) suggests that permanent staff have and seek more job autonomy (Cawley & McNamara, 2011; Han, Moon & Yun, 2009).

Increasing job autonomy in the ICT sector may achieve additional positive outcomes including higher intrinsic motivation and quality of performance and lower absenteeism and turnover (Hackman & Oldman, 1975), and greater job involvement and general health and well-being (Demerouti, Bakker, Nachreiner & Schaufeli, 2000; Thompson & Prottas, 2006). Increased autonomy will probably lead to increased task variability, which may further influence job design in the direction of empowering employees in the ICT sector.

Interventions in work engagement. Research finding that work engagement mediates the relationship between job design and positive work-related attitudes suggests that appropriate interventions in work engagement may further positively influence job satisfaction and the organisational commitment of employees in the ICT sector. Such interventions may include the following:

- Systematically fostering the main drivers of work engagement such as job and personal resources (Bakker, 2009) to create working conditions and provide resources for employees that enhance positive work experiences (Bakker Demerouti & Schaufeli, 2005) through increased social support, autonomy, teamwork, performance feedback, and supervisory coaching opportunities for learning and development.
- Promoting transformational leadership through adequate HR development and training practices, as previous research (summarised by Tims & Bakker, 2014) suggests that a) transformational leaders may be effective in fostering employees' personal and job resources, thus enhancing their work engagement, b) managers' perceptions that their executives are acting and behaving as transformational leaders are positively correlated with the

managers' own engagement, and c) leaders can be trained to be transformational in a relatively short period of time.

- Valuing and promoting a socially engaging environment where values and information are shared, employees feel socially embedded, and there are many opportunities for open discussion and expression of ideas (Soane, 2014).
- Changing personal resources through selection practices aimed at hiring a particular profile of individuals, as engaged employees differ from other employees in terms of personal characteristics, scoring higher on extraversion and conscientiousness and lower on neuroticism, are more optimistic, have more self-efficacy, self-esteem, and resilience, and have an active copying style (Bakker, 2009).
- Measuring work engagement by establishing some type of work engagement monitor (Bakker, 2009) to assess engagement levels and working context factors that may be related to engagement in order to identify the interventions needed to improve work engagement in the organisation (Gruman & Saks, 2011).
- Increasing employees' daily engagement (a) through the allocation of sufficient job resources (e.g., feedback, coaching) and (b) by enhancing employees' positive self-belief regarding self-efficacy and optimism (Xanthopoulou et al., 2008, 2009a, 2009b).
- Facilitating the crossover (transmission) of work engagement from one employee or group of employees in the organisation to another, i.e., the process that occurs when the psychological well-being experienced by one person affects the level of well-being of another (Westman, 2001). Previous research suggests that work engagement crosses over when employees communicate frequently with an engaged colleague on a daily basis (Bakker & Xanthopoulou, 2009), because engaged employees have a positive impact on others with whom they collaborate.

7. CONCLUSION

Given that companies are having difficulty filling vacancies for highly skilled ICT workers, we investigated which interventions could be used to help companies attract and retain their workforce. As ICT labour demand exceeds supply (and there are indications that this gap will grow in the future), companies are

competing for skilled workers through various financial and non-financial incentives. However, we argue that careful managerial and leadership governance with regard to employee job satisfaction and organisational commitment could solve much of this problem. In the battle for highly skilled employees, job attitudes can be a new weapon and important tool to attract and retain current employees. Furthermore, in respect of the implications of the JD–R model, we included the effect of work engagement, which lately has been getting increasing attention in the literature.

We conducted our research on a sample of ICT sector employees in Serbia (N=97) and confirmed that job resources, in the form of five job characteristics (autonomy, task variety, task significance, task identity, feedback), are positively related to engagement, work-related attitudes, job satisfaction, and organisational commitment. Furthermore, when mediating the relationship between job design and work attitudes, with work engagement as the mediating variable, the predictive capacity of the models was increased and remained significant. This implies that partial mediation through engagement exists and that job satisfaction and organisational commitment can be influenced through interventions that tackle job crafting and that foster job resources, and through interventions that enhance work engagement. As the mediation of work engagement in the relationship between job design and job attitudes has been little investigated in previous research, we believe this study to be insightful in regard to the impact of work engagement on the formation of work attitudes.

To our knowledge, there is no similar research on the Serbian ICT workforce. As it is still a young sector in its development phase, researchers have paid scant attention to organisational behaviour in companies in this sector. Therefore, we view this study as valuable input for HRM practitioners in ICT companies and invite fellow colleagues to further examine the relationship between job design and work-related outcomes. Our study involved a relatively small sample size (N=97) so this paper should be viewed as a preliminary study rather than as ground-breaking research. Further research based on a bigger employee sample could shed more light on organisational behaviour issues in the sector.

The main limitation of this study is the sampling method used. Employees in the sector were sent an open invitation through various platforms (ICT organisations

and clusters) to participate in the research. Therefore, future research should aim to use more careful and thorough sampling.

Furthermore, when investigating the model of the relationship between job design and work-related attitudes the only motivational resources that we included were the five job characteristics. We knowingly omitted social and contextual factors that may affect this relationship and which should be included in future, more encompassing research; e.g., social support, leader–member exchange, and work conditions.

Another limitation that concerns incomplete variable modelling is the nature of work engagement, which we used as the mediating variable. In order to fully understand the nature of this phenomenon we suggest that future research include personal resources, which may affect the formation of engagement.

One way to tackle this problem would be to use interviewing techniques that get more detailed information about organisational behaviour in the sector. We used closed questions and scales developed by researchers from the field of industrial psychology, but we suggest that future researchers interview ICT employees in order to discover if specific cultural dimensions yield other factors that influence either engagement or attitude formation.

In order to better understand the relationship between job design and job satisfaction, and organisational commitment in the ICT sector, future studies should expand existing knowledge by considering job design not only as an independent variable but also as a dependent variable in order to investigate how job design is influenced and shaped at the higher level (global, international, national, and occupational influences), the lower level (work-group influences), and by individual factors, as well as by the complex interactions within this multilevel system of job design (Parker, Van den Broeck & Holman, 2017).

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