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Work Characteristics and Work Performance of Knowledge Workers: What Goes Hand in Hand?

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WORK CHARACTERISTICS AND WORK PERFORMANCE OF KNOWLEDGE WORKERS: WHAT GOES HAND IN HAND?

Abstract

The aim of the paper was to investigate the interplay among a wide range of work characteristics and knowledge workers' performance outcomes. Specifically, we examined the nature of relationships between various task-, knowledge- and social characteristics of work design and both task and contextual performance. Using an adapted Work Design Questionnaire and applying PLS-SEM modelling technique, we analysed cross-sectional and cross-occupational sample of 512 Croatian knowledge workers from 48 organizations. Our findings confirmed the existence and importance of interaction between work characteristics and work outcomes. However, the results suggest that only knowledge characteristics of work design exhibit a significant effect on both distinct dimensions of work behaviour, while task and social characteristics showed different effects on task and contextual performance, respectively.

Key words

work design, work characteristics, task performance, contextual performance, PLS-SEM

JEL classification

M12, M50, J81

INTRODUCTION

Work design is an antecedent of organizational behaviour. It is tightly woven into the structure and function of organizations (Torraco, 2005), representing the central pillar of performance. Decisions made about work design can have an enormous, either positive or negative impact on organizational success and individual well-being (Morgeson & Campion, 2003). They can reduce stress, enhance motivation, improve productivity and even represent a potential source of competitive advantage (e.g., Pfeffer, 1994; Garg & Rastogi, 2005; Grant, Fried, & Juillerat, 2010a).

Due to the importance and significant impact of work design on various work outcomes, not surprisingly it has been one of the most researched topics in the field of organizational psychology and behaviour (e.g., Griffin & McMahan, 1993; Oldham, 1996; Foss, Minbaeva, Pedersen, & Reinholt, 2009). Traditionally conceptualized under the topic of job design, work design used to be defined as the set of opportunities and constraints structured into assigned tasks and responsibilities that affect how an employee accomplishes and experiences work (Hackman & Oldham, 1980). During the 1970s and 1980s jobs were dominantly described and evaluated through task characteristics with a strong emphasis on the motivational aspects of work. Such a limited view of work features was broadly accepted although it neglected other important aspects of work (such as the social and physical environment, cognitive requirements and work context).

However, the world of work is now different than it was then, perhaps fundamentally so (Oldham & Hackman, 2010). Increased complexity, technological revolution and competitiveness are dramatically changing the settled ways of organizing and working (e.g., Hernaus, 2011a). Work has become more cognitively demanding and complex, flexible working arrangements are gaining the momentum, teamwork has almost become a norm while workforce composition is much more diverse than it used to be. Knowledge workers are becoming an increasingly important and voluminous group of employees, covering a quarter to a half of workers in advanced economies (e.g., Davenport, 2006; Levenson, 2012). Substantial changes in the nature of work and the rise of knowledge economy recently revived the academic interest and broadened the focus from job design to work design, and from task characteristics to work characteristics. Theoretical models and empirical studies of job design have been replaced by the work design concept, which has drawn attention to the increased importance of studying a wider range of work characteristics (e.g., Parker, Wall, & Cordery, 2001; Molinsky & Margolis, 2005; Morgeson & Humphrey, 2006; Grant, 2007; Grant, Fried, Parker, & Frese, 2010b; Dierdorff & Morgeson, 2013). Scholars have realized that an overwhelming number of studies were focused solely on a single task characteristic or a few of them, and their influence on individual outcomes such as job satisfaction, organizational commitment or job performance. The nature and design of manual work were heavily addressed in the last 40 years, while cognitively-demanding and non-repetitive working practices still represent an under-researched issue. Obviously, multidimensionality of work characteristics has not been emphasized enough (e.g., Grant et al., 2010a) and large number of knowledge work relationships (e.g., specialization, problem solving, and information processing) have not yet been sufficiently and systemically studied (Grant, 2007; Humphrey, Nahrgang, & Morgeson, 2007).

Better understanding of the knowledge work context could be achieved by expanding the range of work characteristics beyond task characteristics, where their interaction and multidimensionality should be studied more thoroughly (e.g., Parker & Ohly, 2008; Grant et al., 2010a). Although Campion and Thayer (1985) and Morgeson and Humphrey (2006) among the others have developed a very broad understanding of modern work design theory, their models should be empirically tested in order to be validated and further improved.

The aim of this paper is to capture a broader set of work characteristics and to determine a specific pattern of relationships among various task, knowledge and social characteristics of work design and work outcomes. It is clearly shown how particular work characteristics influence task and contextual performance. Additionally, as we know very little about how work design is done in transitional

economies (e.g., Fay & Frese, 2000) this empirical study will reveal the nature of work characteristics in the Central and Eastern European context.

WORK DESIGN AND PERFORMANCE

Work Characteristics

Jobs are tightly woven into the structure and affect every aspect of the organization. Their nature can vary substantially within and between organizations. As formal representations of work, jobs exist at various hierarchical levels and provide a range of specific tasks. They are related to particular occupational types, demand various KSA's, require more or less coordinated effort and offer distinguishable motivational opportunities. However, although heterogeneous in nature, jobs can be conceived, analysed and compared in broader terms.

Work design offers both holistic and analytical view for studying jobs. Simply defined as the system of arrangements and procedures for organizing work (Sinha & Van de Ven, 2005), it explains how work is translated across organizational levels, structured for the units and the individuals who perform the work (Torraco, 2005). Additionally, work design identifies certain objective characteristics of work that describe its task, job, social, and organizational environment.

Work characteristics have a central part in work design research. They represent measurable dimensions of work and reflect conceptually distinct design features (e.g., Morgeson & Campion, 2003). During the years, numerous models have been developed based on the measurement of objective work characteristics. The most influential one was *The Job Characteristics Model (JCM)* introduced by Hackman and Oldham (1976) and cited over 4.080 times (*Google Scholar*, accessed 27 June 2013). The authors identified five core task characteristics (autonomy, task variety, task identity, task significance, feedback) that are primarily concerned with how the work itself is accomplished and the range and nature of tasks associated with a particular job (Morgeson & Humphrey, 2006). The basic idea of JCM was to build into jobs those attributes that create conditions for high work motivation, satisfaction, and performance.

Researchers devoted a great attention to extend the JCM conceptually to include a broader range of work characteristics. *The interdisciplinary perspective* introduced by Campion and Thayer (1985) and Campion (1987) was one of the most significant efforts. It recognized additional work characteristics and outcomes that had not previously been documented in psychological and organizational research on work design, especially from the standpoints of ergonomics, human factors, and industrial engineering (Grant et al., 2010a). Warr (1987) has concurrently created his extensive *Vitamin Model*, while several years later Parker et al. (2001) developed their *Elaborated Model of Work Design*, distinguishing among five categories of variables (antecedents, work characteristics, outcomes, mechanisms, and contingencies). Finally, Humphrey et al. (2007) conducted the meta-analysis and developed an integrative work design typology. They placed 18 work characteristics into three major categories: motivational, social, and contextual. The category of motivational characteristics was further subdivided into those work characteristics that reflect the task and knowledge requirements of work (Pierce, Jussila, & Cummings, 2009).

Obviously, the aforementioned extensions to the original *Job Characteristics Model* addressed important work features that should be additionally investigated. Besides the traditionally researched task characteristics, it has been argued that both social and knowledge characteristics should be more thoroughly studied. Contextual work characteristics also play an important role in understanding work design practices. However, they should be excluded from this study as they represent attributes of the broader work environment, not exclusively of a particular work position, which is in the focus of this research.

Task characteristics are the most commonly investigated motivational attributes of work. They are primarily concerned with how work itself is accomplished and describe the range and nature of tasks associated with a particular job. Task characteristics are associated with task environment and reflect structural aspects of work tasks (Spector & van Katwyk, 1999). High levels of these characteristics lead to higher motivating potential of a particular job. Widely accepted and recognized task characteristics are: *work autonomy*, *task variety*, *task significance*, *task identity*, and *feedback*.

Cognitive or **knowledge characteristics** reflect the kinds of knowledge, skill, and ability demands that are placed on an individual as a function of what is done on the job (Morgeson & Humphrey, 2006). Recent dissemination of service work and overflow of knowledge workers have particularly emphasized the importance of cognitive ability for handling working issues. As organizations increasingly struggle with complexity and tend to build their future on the knowledge work, they should be able to recognize, understand and design jobs that will utilize competencies of their workers. The most prominent knowledge characteristics are: *job complexity*, *information processing*, *problem solving*, *skill variety*, and *specialization*.

Social characteristics provide a unique perspective on work design beyond motivational characteristics (Humphrey et al., 2007). They are the structural features of jobs that influence and emphasize interpersonal interactions and social environment as pervasive and important determinants of work design. Social characteristics have become especially important due to a recent wider application of teams and teamwork in organizations, where it has been realized that people often cannot handle complex tasks by themselves. *Interdependence*, both received and initiated, strongly determines the nature of a particular work. However, there are other relevant social characteristics such as: *social support*, *interaction outside the organization*, and *feedback from others*.

Although the abovementioned work characteristics explain a respective amount of variance in work outcomes (e.g., Humphrey et al., 2007), the list is not exhaustive. Not only that some work characteristics cannot fit neatly into these three categories, there are other significant categories (e.g., physical characteristics, temporal characteristics, group characteristics, organizational characteristics, occupational characteristics) that also strongly shape the work and influence on employees' outcomes. However, it is not possible to address their entire complexity in a single study, so the research focus will be on the most relevant task-, knowledge- and social characteristics, and their relationship with work outcome variables.

Task and Contextual Performance

Knowledge workers are assigned to handle specific jobs with a particular set of work characteristics. Their workplace efforts can be more or less motivated, productive, satisfied or committed. The nature of employees' work outcomes depends on the person-job fit (e.g., Edwards, 1991; Cable & Judge, 1996; Kristof-Brown, Zimmerman, & Johnson, 2005). While we can hardly change the personal traits, values and KSA's of our employees in a short run, work design choices are much more reconfigurable. This means that the adjustment of work characteristics can result either in positive or negative outcomes.

The range of outcomes usually considered in work design research has been criticized as being too limited. Traditional outcomes such as job satisfaction, motivation, attendance and performance will certainly remain central to the agenda (Parker et al., 2001). However, some additional measures should be also included such as contextual performance, proactive performance, group performance, and adaptive performance.

In the last two decades an increasing number of authors (e.g., Campbell, 1990; Borman & Motowidlo, 1993, 1997; Motowidlo & Van Scotter, 1994; Motowidlo & Schmit, 1999) strongly suggested that work performance should be measured as behavioural outcomes that consist of task performance and contextual performance. Those constructs are presumed to exist in virtually all jobs (Hattrup,

O'Connell, & Wingate, 1998) and their combination accounted for by 42 per cent of variance in performance evaluations (Podsakoff, MacKenzie, Paine, & Bachrach, 2000).

Task performance or in-role performance can be defined as the effectiveness with which employees perform activities that contribute to the organization's technical core (Borman & Motowidlo, 1997). Employees can add value either directly by designing and implementing a part of its technological process, such as creating product prototype, delivering and improving service, managing subordinates, or indirectly by providing it with the needed knowledge support. Such kind of performance refers to activities that are formally part of a job description and evaluates the basic required duties of a particular job (Ng & Feldman, 2009).

Contextual performance or extra-role performance, a construct very similar in nature to organizational citizenship behaviour – OCB (e.g., Organ, 1988, 1997), represents behaviour that does not necessarily support the organization's technical core as much as it supports the organization's climate and culture (Motowidlo & Van Scotter, 1994; Conway, 1996; Borman & Motowidlo, 1997; Motowidlo, Borman, & Schmit, 1997; Edwards, Bell, Decuir, & Decuir, 2008; Jex & Britt, 2008). Contextual activities are important because they contribute to organizational effectiveness by shaping the organizational, social, and psychological context and for serving as a catalyst for task activities and processes. Such activities include volunteering to carry out task activities that are not formally part of the job, as well as helping and cooperating with the others in the organization to get the tasks accomplished (Borman & Motowidlo, 1997).

Task and contextual performance reflect different aspects of overall work performance (e.g., Griffin, Neal, & Neale, 2000) and they are predicted differently by individual differences variables (Hattrup et al., 1998). Likewise, we assume that task and contextual performance are affected by work characteristics in a specific manner. Both outcomes were found to be important in determining work quality that is responsible for enhancing individual work performance (e.g., Motowidlo & Van Scotter, 1994). Task and contextual performance as outcome variables represent a starting point in determining overall contribution of a knowledge worker to a wider, organizational system and are both crucial for organizational success.

RELATIONSHIP BETWEEN WORK CHARACTERISTICS AND WORK OUTCOMES

Work design has an effect on various attitudinal, motivational, and behavioural outcomes. Although relationships between work characteristics and outcomes tend to be in the same direction for all employees (Morgeson & Humphrey, 2006), they nevertheless diverge depending on the nature and size of outcome. The same is valid for work performance as an outcome variable.

Extensive research suggests that employees, who work in jobs with enriched work characteristics, tend to manifest higher task performance and more frequent organizational citizenship behaviours (Grant, 2012). However, previous studies were dominantly focused on traditional job characteristics emphasizing a lack of studies that explicitly compare the effect of various work characteristics (task, social, and knowledge) on two distinctive work outcomes such as task and contextual performance. Although Humphrey et al. (2007) have done the groundwork for such research, by analysing numerous work characteristics and outcomes; unfortunately they did not emphasize enough work performance, particularly not its contextual dimension.

Previous research efforts were heavily focused on non-managerial jobs and revealed a significant influence of **task characteristics** on individual performance (e.g., Hackman & Oldham, 1976; Fried & Ferris, 1987; Dodd & Ganster, 1996; Singh, 1998; Morgeson & Humphrey, 2006, 2008; Humphrey et al., 2007; Indartono, Chiou, & Chen, 2010). Even though more emphasis has been put on task performance rather than contextual performance, the results of meta-analyses revealed that task characteristics are weakly related to task performance (e.g., Fried, 1991; Podsakoff, MacKenzie, &

Bommer, 1996, Sonnentag, Volmer, & Spychala, 2008) and somewhat stronger associated with contextual performance (e.g., Podsakoff et al., 1996; Purvanova, Bono, & Dzieweczynski, 2006; Johari, 2011). Several studies suggest that task characteristics have a stronger link with contextual than they do with task performance (Parker & Wall, 1998; Chen & Chiu, 2009). However, the size of the effects significantly varied among work characteristics. Because the issue has not been previously studied in-depth, particularly not within the Central and Eastern European context, and has been primarily focused on the non-managerial and routine jobs, we formulate the following hypothesis:

Hypothesis 1: Task characteristics of knowledge workers have a stronger effect on contextual than task performance.

Recently, researchers have noted that **social characteristics** are important components of work (Parker & Wall, 2001; Humphrey et al., 2007) that can potentially influence on both task and contextual performance. Enriched social characteristics are related to positive, socially oriented work behaviours (Grant, 2007; Dierdorff & Morgeson, 2013) and may generate positive affect. They are particularly important for knowledge-based activities (e.g., Starbuck, 1992), because managers and professionals mostly conduct their work by coordinating the efforts of their subordinates or through interaction, collaboration, and exchange of information with their colleagues or business partners. Although already Hackman and Lawler (1971) have found that jobs with enriched social roles significantly relate to job performance, empirical findings regarding the nature of their influence on work performance outcomes are still insufficient. Thus, we formulate the following hypothesis:

Hypothesis 2: Social characteristics of knowledge workers have a stronger effect on contextual than task performance.

Finally, we should not neglect the influence of **knowledge characteristics** on work outcomes. Knowledge characteristics are the structural features of jobs that affect the development and utilization of information and skills (Parker et al., 2001). If they are enriched, they can create challenging jobs and provide workers with opportunities to solve problems, process complex information, and to apply deep and broad skills (e.g., Morgeson & Campion, 2002; Morgeson & Humphrey, 2006). Their recent development reflects the wide increase of knowledge work and knowledge workers in modern business (Huang, 2011). Demanding and complex work settings for knowledge workers should positively influence on their task and contextual performance. Additionally, due to intangible nature of knowledge and knowledge dissemination within organizations, we expect knowledge characteristics of managerial and professional work to have a stronger effect on contextual than on task performance:

Hypothesis 3: Knowledge characteristics of knowledge workers have a stronger effect on contextual than task performance.

Workers with enriched task, social, and knowledge characteristics may feel grateful to the organization for providing desirable jobs (Slattery, Selvarajan, & Anderson, & Sardessai, 2010). According to Grant (2012), their core motives can be satisfied by enriched work designs that provide meaning, connection and the sense of social belonging, as well as learning and developmental opportunities. Eventually, such positive, motivational and challenging stimuli should result in better work performance results.

METHOD

Sample

The empirical research was conducted through a field study of the largest Croatian organizations with more than 500 employees. Cross-sectional and cross-occupational research design was applied in order to include knowledge workers – managers and professionals – from a variety of different jobs and occupations.

Data collection process began in November 2009 and lasted until February 2010. The self-administered questionnaire supplemented with a cover letter and a short brochure was distributed by postal mail to CEOs of targeted organizations. The snowball sampling strategy was used in order to increase sample variety. Contact persons in each organization, chosen by their CEOs, had received guidelines for choosing the sample of managers and professionals, which represented various parts and levels of the organization. Respondents were surveyed regarding the nature of their work characteristics.

A total of 139 managers and 373 professionals from 48 organizations were chosen to participate in the research with the overall response rate of 21.2%. The survey sample covered organizations from 12 different industries, and was mostly represented by manufacturing organizations (33.3%), along with transport and financial companies (each 12.5%). Chosen sampling strategy ensured a considerable number of diverse jobs at the individual level (185 different job titles), thereby increasing the external validity of the findings (e.g., Chen & Chiu, 2009). The modal number of respondents per organization was six, $M = 10.69$, $SD = 7.72$. Most of the participants were 30-39 years old, with more than 10 years of work experience (60.9%), and 48.7% were female. Respondents dominantly had a university diploma (77.0%) and were mainly positioned on the third or fourth hierarchical level within the organization (56.5%).

Research instrument

The work characteristics were assessed using the adapted Work Design Questionnaire – WDQ, a comprehensive instrument and a general measure of work design originally developed and validated by Morgeson and Humphrey (2006). Since WDQ provides a very good platform for work design research (e.g., Truxillo, Cadiz, Rineer, Zaniboni, & Fraccaroli, 2012), we decided to adopt 11 out of 21 original WDQ measures, and followed a later example of Dierdorff and Morgeson (2013), who computed work autonomy and interdependence measures into a single variable each. Other measures, related to the nature of task, skill variety, skill utilization, and group cooperation have been adopted from the revised Job Diagnostic Survey – JDS (Idaszak & Drasgow, 1987), Karasek's Job-Demand-Control model – JDC (Xie, 1996) and the work of Campion, Medsker and Higgs (1993), respectively.

The survey questionnaire was focused on gathering perceived work characteristics of knowledge workers rather than objective characteristics; because there is a strong evidence and common thinking that employee self-ratings are congruent with objective job features (e.g., Oldham, Hackman, & Pearce, 1976; Fried & Ferris, 1987; Kulik, Oldham, & Hackman, 1987; Naughton & Outcalt, 1988; Spector, 1992; Parker & Ohly, 2009; Hornung, Rousseau, Glaser, Angerer, & Weigl, 2010; Barrick, Mount, & Li, 2013). Furthermore, as most research on work design has been conducted such that employees evaluated both the work characteristics and perceptual outcomes (Humphrey et al., 2007); we have also decided to adopt subjective measures of work performance. We used work outcome measures of task and contextual performance initially developed by Borman and Motowidlo (1993, 1997), and lately empirically tested and adjusted by Befort and Hattrup (2003). Such subjective measures of work performance are introduced as the most appropriate measures not only within the field of HRM (e.g., Wall et al., 2004), but they are valid in almost all the major topic areas in the field of organizational psychology (Mowday & Sutton, 1993).

The survey instrument encompassed 72 items on a 5-point Likert-type scale measuring 14 work design variables and 2 outcome variables. Respondents had to indicate the extent of agreement versus disagreement with statements about their work characteristics (ranging from 1 = "strongly disagree" to 5 = "strongly agree"). The adapted questionnaire was pre-tested and its reliability and validity had been checked causing smaller changes in the initial design, ultimately resulting in 65 items that are aggregately shown in Table 1.

(Table 1 about here)

Data Analysis

In order to test the previously formulated research hypotheses we applied partial least squares structural equation modelling (PLS-SEM). PLS-SEM is a variance-based modelling technique that gains increasing popularity in organizational research (e.g., Becker, Klein, & Wetzels, 2012; Hair, Sarstedt, Pieper, & Ringle, 2012; Peng & Lai, 2012; Wilden, Gudergan, Nielsen, & Lings 2013). It is considered advantageous over covariance-based SEM in terms of the robustness of estimations and statistical power when applied to small sample sizes (Reinartz, Haenlein, & Henseler, 2009). It also deals more efficiently with non-normal data and it facilitates model estimations that involve both reflectively and formatively identified variables (Ringle, Sarstedt, & Straub, 2012). The latter feature is the main reason for applying PLS-SEM in the present study, since the focal exogenous variables cannot be appropriately modelled as reflectively identified constructs (i.e. task, knowledge, and social characteristics). These variables were modelled as second-order formative constructs with several reflectively identified first-order constructs (see Figure 1). The endogenous or outcome variables were modelled as first-order reflective constructs (i.e. task and contextual performance).

A two-step analytical approach was taken. Reliability and validity of the measurement model were thoroughly examined before analysing the inner path structures of the model. The reporting guidelines for formative and reflective model evaluation by Ringle et al. (2012) were applied. The sequential latent variable score method was used in estimating the model (Wetzels et al., 2009; Hair, Hult, Ringle, & Sarstedt, 2013b). This method involves two stages. In a first stage, latent variable scores (LVS) of the first-order reflective constructs are calculated without the second-order construct present (e.g., Agarwal & Karahanna, 2000). Single-factor solutions were extracted with Varimax rotation. In a second stage, LVSs of these first-order reflective constructs enter the main model in which they are used as manifest indicators of the respective second-order formative construct (i.e. task, knowledge, and social characteristics). Although recent studies advocate the use of a variant of the repeated indicator approach for reflective-formative higher-order constructs (like the ones in our study), it is acknowledged that the two-stage approach proves more useful when the researcher's interest is in the path coefficients from and to the higher-order constructs (Becker et al., 2012). Moreover, this approach results in a more parsimonious model which incorporates only focal higher-order constructs.

All model estimations in this study were conducted with *SmartPLS 2.0* software (Ringle, Wende, & Will, 2005). Prior to the estimations the data were mean-centred. The path weighting scheme was used and missing data were excluded case-wise. A graphical representation of the estimated model is given in Figure 1.

(Figure 1 about here)

Pre-modelling activities included a thorough explorative data analysis. *SPSS software package* was used to check the normality of the data and to calculate other descriptive statistics, including correlation coefficients. Data were linear and normally distributed (Shapiro-Wilk test showed a value above .88). As an introduction to the results, Table 2 displays means, standard deviations, and matrix of correlations for all examined variables.

(Table 2 about here)

RESULTS

Measurement model results

First we examined the reflectively identified parts of the model. The Cronbach's alphas and the composite reliability (CR) scores for the two reflectively identified endogenous constructs indicate high internal consistency (see Table 3). Respective values significantly exceed the cut-off value of .7 (Bagozzi & Yi, 1988). The average variances extracted (AVE) of the two constructs also exceed the cut-off value of .5 which indicates sufficient convergent validity. Furthermore, both constructs meet

the Fornell-Larcker criterion of discriminant validity (Fornell & Larcker, 1981; Henseler, Ringle, & Sinkovics, 2009). An examination of absolute standardized outer loadings further reveals a sufficient level of indicator reliability. Although not all the loadings exceed the cut-off value of .7, scores above .5 can be considered acceptable when the respective construct is measured by other indicators as well (e.g., Chin, 1998).

(Table 3 about here)

To assess the quality of the formative measurement model we examined the magnitude of indicator weights and their significance. Since significance-levels are not automatically reported in PLS-SEM we applied a bootstrap procedure to calculate standard errors and to obtain t-statistics (Tenenhaus, Pagés, Ambroisine, & Guinot, 2005). The number of bootstrap samples was set to 5000 with the number of cases set equal to the number of cases in the original sample (n = 512). The results of this analysis revealed statistical significance of most indicators, with three exceptions, all of them related to knowledge characteristics – i.e. job specialization (JOBSPEC), problem solving (PROBSOLV), and skill variety (SKILLVAR) (see Table 4).

(Table 4 about here)

An examination of collinearity statistics did not reveal redundancy of any of the first-order constructs. The tolerance statistic was significantly above the cut-off value of .2 for all the indicators (Hair, Ringle, & Sarstedt, 2013a), with maximum variance inflation factors (VIF) of 1.479, 2.066 and 1.240 within task-, knowledge-, and social work characteristics, respectively. All indicators of the formative second-order constructs were thus retained in the model.

Structural model results

We first assessed the coefficients of determination (R^2) of the two endogenous variables to evaluate the predictive power of the model. For task performance (TASKPERF) and contextual performance (CONPERF) scores of R^2 were .240 and .402, respectively. Although Chin (1998) recommends a cut-off value of .4 as indicating substantial path structures in the inner model, the lower score still significantly exceeds the acceptable threshold of .1 (Falk & Miller, 1981; Lew & Sinkovics, 2013).

In the next step we estimated effect sizes (f^2) to assess the impact of the individual latent exogenous variables on the endogenous variables. Separate scores for the two endogenous variables were calculated using the following formula (Chin, 2010):

$$f^2 = (R^2_{included} - R^2_{excluded}) / (1 - R^2_{included})$$

where $R^2_{included}$ is the coefficient of determination in the main model (all exogenous variables included), and $R^2_{excluded}$ the coefficient of determination with the focal predictor omitted from the model. Threshold values of .02, .15 and .35 were used to classify the effect sizes into small, medium and large ones, respectively (Cohen, 1988). This analysis yielded small effect sizes for all three categories of work characteristics, except the medium effect size of knowledge characteristics on contextual performance (f^2 = .152). The results are summarized in Table 5.

(Table 5 about here)

We then examined Stone-Geisser's Q^2 statistic to assess the predictive relevance of the model (Stone, 1974; Geisser, 1975). This statistic evaluates how well endogenous variables are explained by exogenous variables in the structural model (Chin, 1998; Hair et al., 2013b). This statistic should be above .0 (it is reported as cross-validated redundancy in *SmartPLS 2.0*). We further computed scores of cross-validated communality (q^2) which measures the model's ability to predict the manifest indicators from the calculated latent variables (Tenenhaus et al., 2005). q^2 scores of .02, .15 and .35 are indicative of a weak, moderate, and strong degree of predictive relevance of each effect, respectively. Both cross-validated communality and redundancy were obtained following the

blindfolding and jackknife re-sampling approaches. Results are presented in Table 6. The Q^2 measure exceeds zero for all inner model variables, thus indicating predictive relevance of their explanatory variables (Henseler et al., 2009). The q^2 measure indicates strong predictive relevance for knowledge characteristics, a medium level for task characteristics, and very weak predictive relevance for social characteristics.

(Table 6 about here)

Finally, we assessed the significance of the estimated path coefficients in the inner model, i.e. between focal types of work characteristics and the two work outcome variables (i.e. task and contextual performance). To obtain insight into significance-levels we again applied the bootstrap procedure earlier described when assessing the significance of weights of the first-order indicators. The results are provided in Table 7.

(Table 7 about here)

The results reveal that task characteristics in general have a statistically significant effect on task performance, $t = 2.629$, $p < .001$, but not on contextual performance. Thus, our first hypothesis (H_1) is rejected because the influence of task characteristics on contextual performance is weaker than their impact on task performance of knowledge workers. Conversely, a range of social characteristics have shown a statistically significant effect on contextual performance, $t = 4.302$, $p < .001$, but not on task performance of the same group of respondents, $t = 1.235$, $p > .01$). Accordingly, we were able to accept the second hypothesis (H_2) and to conclude that social characteristics have a stronger effect on contextual than task performance of knowledge workers. Finally, our data unambiguously show that knowledge characteristics have a significant effect on both contextual and task performance of knowledge workers, $t = 10.618$, $p < .001$ and $t = 6.784$, $p < .001$, respectively. The path coefficient is, however, larger between knowledge characteristics and contextual performance than between knowledge characteristics and task performance (.460 and .336, respectively). This result is in line with the earlier calculated effect size statistic f^2 (see Table 4). Accordingly, the third hypothesis (H_3) of our research is also accepted.

DISCUSSION AND CONCLUSION

Research findings

The present study aimed to empirically test an extended model of work design in order to determine effects among various sets of work characteristics and two different performance measures. This was done by applying the PLS-SEM modelling technique to a model that encompasses both reflectively and formatively identified variables. Using an adapted Work Design Questionnaire (WDQ), originally introduced by Morgeson and Humphrey (2006), and just recently applied within the US occupational research context (Dierdorff & Morgeson, 2013; Morgeson & Garza, 2013), we examined work design practices of Croatian knowledge workers. Our findings confirmed the existence and importance of the relationship between work design and work performance. However, the results suggested that different categories of work characteristics had different effect on task and contextual performance.

Firstly, we found that task characteristics of knowledge workers have a statistically significant and stronger effect on task performance than contextual performance. Although such results are not aligned with the existing literature, they clearly emphasize the need to take distinct work design approaches towards manual (non-knowledge) and knowledge workers. While previous research efforts and findings were dominantly focused on the former, who primarily conduct routine and non-challenging tasks, the present study examined managers and professionals, who handle very complex and non-repetitive tasks on a daily basis. Their knowledge and cognitively-demanding tasks do not only have enriched task characteristics, but they also presumably create higher value directly through their work tasks. In such circumstances, knowledge workers probably feel more responsible for the work itself and are keen to offer greater task performance. Additionally, as task characteristics can be

understood as formal elements of jobs, it seems that effective accomplishment of cognitive tasks contributes more strongly to task than contextual performance.

Secondly, social characteristics seemed to have an opposite although expected effect on work performance of knowledge workers. By definition, contextual performance requires people to take a broader perspective and provide a less visible contribution. This means that higher levels of performance are achieved when employees communicate among themselves, mutually support each other and generously share ideas, knowledge and information. Such altruistic or prosocial behaviour (e.g., Parker, Williams, & Turner, 2006; Grant, 2012, 2013; Dierdorff & Morgeson, 2013) from givers often requires extra time and effort, which can potentially diminish their task performance results. This is especially valid within the knowledge work context, where tasks are complex and uncertain, and employees do not have a lot of slack resources for handling additional, non-assigned tasks. However, knowledge workers with enriched social characteristics certainly have more opportunities to work and behave proactively (e.g., Grant & Parker, 2009), which can eventually result in higher contextual but lower task performance, as indicated by our research findings.

Thirdly, knowledge characteristics provide strong and positive effects on both task and contextual performance. They seem to be the most influential set of work design characteristics because their path coefficient estimates significantly outweigh the effects of other work characteristics. Such results confirm a distinctive nature and importance of knowledge work for modern business society. Obviously, if organizations want to be successful, their knowledge jobs should be designed with enriched knowledge characteristics. In such work design environment, knowledge workers will be able to deal with complex problem solving and information overload more effectively, while at the same time continuously developing their competences and further expanding the knowledge base. Eventually, this could result in a spillover effect, where employees will start to share their knowledge and help each other in handling challenging and interdependent tasks.

Finally, given our focus on professional and managerial employees, the study demonstrated that contextual performance is an at least equally important work outcome measure like the traditionally established and extensively investigated task or in-role performance. In other words, our findings, along with similar studies (e.g., Hoffer Gittell, Weinberg, Bennett, & Miller, 2008; Grant, 2012) suggest that knowledge jobs should be designed with explicit attention to how well they contribute to other beneficiaries. Interestingly, it seems that prosocial work behaviour can be achieved not solely through "social enrichment" (e.g., Morgeson & Humphrey, 2006; Grant, 2012), but also, as shown in the case of Croatian knowledge workers, through "knowledge enrichment" (e.g., Parker, Wall, & Jackson, 1997).

Strengths and limitations

To the best of our knowledge, the present study is the first experiment in which extensive number of different work characteristics of knowledge workers was jointly examined with their task and contextual performance, making this systematic investigation unique and practically significant. As such, it is a logical extension of the seminal work and meta-analytic review of work design literature made by Humphrey et al. (2007) which offers insights from an under-researched Central and Eastern European research context.

This study not only advances the understanding of existing relationships between a wide range of work characteristics and distinct work performance outcomes, but it also indicates the existence of possible differences in work design practices in various backgrounds. Although researchers have become increasingly concerned with the workforce differentiation (e.g., Von Glinow, 1988; Becker, Huselid, & Beatty, 2009; de Lange et al., 2010), still very few of them empirically focused on distinctive work design characteristics of knowledge and non-knowledge workers (e.g., Huang, 2011; Yan, Peng, & Francesco, 2011).

We managed to test an extended model of work design and provide useful results for second-order formative constructs (task-, knowledge- and social characteristics) that allowed for a more generalized view of work design practice. In addition, by applying the PLS-SEM modelling technique, we shed a new light on interactions between work characteristics and work outcomes, and presented possible insights for its further application within both psychological and organizational research field.

Despite its contributions and strengths, this study has several limitations. Although various work design variables had been observed, due to rigorous methodological requirements and research scope constraints, few interesting and important ones were not included. Furthermore, the sample used was based on employees from various parts and levels of organizations, with different occupations. Such a cross-occupational sample offers greater width, but again it potentially results in somewhat lower effect sizes. A related problem here is also how to distinguish knowledge from non-knowledge jobs. Although we followed Drucker's (1967) definition of knowledge workers and classified engineers, technicians and managers as eligible respondents for our study, such classification is maybe outdated.

There were also some minor construct reliability problems. Although the research instrument was previously tested and validated within Croatian context on a larger and more diverse sample of employees (e.g., Hernaus, 2011b), Cronbach's alphas for three constructs were slightly below the cut-off value for the examined sample of knowledge workers. Finally, the findings reported in this study were based on self-reports and may therefore be subject to bias. However, some authors (Spector, 2006; de Lange et al., 2010) argued that the problem of common-method variance is overstated and may even be outdated, as it is more a question of measurement bias than bias of the method itself. Our scales showed good reliability scores and were designed to measure a fundamentally unobservable knowledge work (e.g., Allee, 1997; Pfeffer & Sutton, 2000), so we therefore expect that the measurement bias in this study is relatively small.

Practical implications

The research findings have several important implications for theory and practice. They offer valuable insights about work design and its impact on work performance to academicians, managers, and HRM professionals. It is clearly shown that work design efforts are not straightforward but rather context-specific, and with diverging performance effects. For modern business environment, "knowledge enrichment" seems to be particularly important, although "social enrichment" and "task enrichment" for knowledge workers are also more than welcome. Organizations can significantly enhance their bottom-line performance by designing challenging and cognitively-demanding configurations of work tasks for their knowledge workers. Job enrichment in general and "knowledge enrichment" in particular, can lead towards better skill utilization, higher employee satisfaction and further development of the workforce (e.g., Morrison, Cordery, Girardi, & Payne, 2005). Such work design approach is recommendable for knowledge workers and it goes hand in hand with their motivational background. However, we need to find a balance between work requirements and human capabilities. Chronic job demands and over-enriched work design eventually have potential drawbacks and can result in a burnout (e.g., Kinnunen, Feldt, Siltaloppi, & Sonnentag, 2011).

Moreover, our study highlights the importance of contextual performance for determining knowledge worker's overall contribution. Apparently, managers and HRM professionals no longer should solely be focused on in-role or individual performance. Nowadays, organizations can be successful only if their employees collaborate and help each other. Because doing business has become a team sport, old-fashioned performance measurement and individual reward systems need to be adjusted in order to promote prosocial behaviour within the organization.

Finally, the conducted study suggests a heterogeneous impact of task and social characteristics of work design on different individual performance dimensions. While the former set of work characteristics load more strongly on traditional metrics of in-role performance, the latter set primarily boost extra-role performance, thereby having certain implications on organizational performance. Although we found that work characteristics have a distinctive effect on work performance of

knowledge workers, it should not be an argument for or against "task" and "social" enrichment, but rather a call for their mutual adjustment and refinement, in order to enhance overall work performance.

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TABLE 1
Research instrument overview and reliability

	Category	Variable	Source	Number of items	Cronbach Alpha
WORK CHARACTERISTICS	**Task characteristics (TASK)**	*Work autonomy* (AUTON)	WDQ**	3	.765
		Task variety (VARIETY)	WDQ	3*	.704
		Task significance (SIGNIF)	WDQ	4	.700
		Task identity (IDENTITY)	WDQ	4	.844
		Nature of the task (NATURE)	-	3	.604
	Knowledge characteristics (KNOW)	*Job complexity* (JCOMPLEX)	WDQ	3	.676
		Skill variety (SKILVAR)	JDS	2*	.737
		Job specialization (JOBSPEC)	WDQ	4	.861
		Problem solving (PROBSOLV)	WDQ	4	.653
		Information processing (PROCINF)	WDQ	4	.851
		Skill utilization (SKILUTIL)	JDC	5	.763
	Social characteristics (SOCIAL)	*Task interdependence* (INTERDEP)	WDQ	6	.773
		Interaction with others (INTERACT)	WDQ**	4	.711
		Group cooperation (GROUPCO)	Campion et al. (1993)	3	.838
OUTCOMES	**Work performance**	*Task performance* (TASKPERF)	Befort & Hattrup (2003)	6	.846
		Contextual performance (CONPERF)	Befort & Hattrup (2003)	9*	.868

Note: * Original scale adjusted due to construct reliability requirements
** Original scale adapted by authors

TABLE 2
Correlation matrix

	Variables	*Mean*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1	AUTON	3.67	.76	-															
2	VARIETY	4.16	.69	.31**	-														
3	SIGNIF	3.29	.76	.24**	.37**	-													
4	IDENTITY	3.83	.73	.30**	.18**	.15**	-												
5	NATURE	3.83	.69	.30**	.31**	.40**	.29**	-											
6	JCOMPLEX	3.82	.75	.29**	.37**	.22**	.17**	.21**	-										
7	SKILVAR	4.08	.71	.35**	.53**	.35**	.26**	.41**	.41**	-									
8	JOBSPEC	3.67	.81	.28**	.41**	.34**	.25**	.38**	.32**	.68**	-								
9	PROBSOLV	3.51	.71	.19**	.35**	.22**	-.05	.20**	.25**	.44**	.38**	-							
10	PROCINF	4.29	.61	.29**	.57**	.35**	.19**	.36**	.45**	.63**	.56**	.44**	-						
11	SKILUTIL	3.75	.62	.42**	.45**	.31**	.40**	.33**	.29**	.45**	.41**	.29**	.50**	-					
12	INTERDEP	501	.63	.22**	.22**	.27**	.05	.30**	.13**	.30**	.29**	.24**	.19**	.31**	-				
13	GROUPCO	464	.68	.27**	.26**	.16**	.29**	.22**	.10*	.22**	.20**	.27**	.45**	.14**	.13**	-			
14	INTERACT	3.62	.79	.23**	.30**	.40**	.09*	.41**	.18**	.35**	.24**	.18**	.33**	.32**	.22**	.18**	-		
15	TASKPERF	4.15	.49	.32**	.29**	.12*	.27**	.24**	.28**	.33**	.31**	.19**	.30**	.42**	.16**	.31**	.13**	-	
16	CONPERF	4.01	.51	.37**	.40**	.25**	.23**	.27**	.28**	.40**	.38**	.32**	.47**	.47**	.25**	.36**	.30**	.64**	-

Note: Significance-level (two-tailed): *** $p < 0.01$; ** $p < 0.05$

TABLE 3
Reflective model quality

	AVE	Composite Reliability	Cronbach's Alpha
Task performance (TASKPERF)	.569	.887	.846
Contextual performance (CONPERF)	.510	.895	.868

TABLE 4
Bootstrap standard errors and significance levels of formative indicator weights

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
AUTON → TASK	.351	.344	.087	.087	4.041***
VARIETY → TASK	.623	.618	.075	.075	8.363***
SIGNIF → TASK	-.185	-.179	.090	.090	2.056**
IDENTITY → TASK	.271	.264	.077	.077	3.510***
NATUR → TASK	.223	.221	.092	.092	2.417**
JCOMPLEX → KNOW	.161	.162	.059	.059	2.738**
SKILLVAR → KNOW	.124	.130	.095	.095	1.302 ns
JOBSPEC → KNOW	.056	.052	.078	.078	.718 ns
PROBSOLV → KNOW	.071	.071	.066	.066	1.087 ns
PROCINF → KNOW	.354	.343	.081	.081	4.347***
SKILUTIL → KNOW	.543	.541	.069	.069	7.833***
INTERDEP→ SOCIAL	.266	.259	.081	.081	3.289***
INTERACT → SOCIAL	.449	.441	.094	.094	4.799***
GROUPCO → SOCIAL	.687	.681	.080	.080	8.565***

Note: Significance-level (two-tailed): *** $p < .001$; ** $p < .01$; ns = not significant

TABLE 5
Analysis of predictive power and effect sizes

	R^2		f^2	
	TASKPERF	CONPERF	TASKPERF	CONPERF
Full model	.240	.402	-	-
Task characteristics (TASK)	.229	.380	.014	.037
Knowledge characteristics (KNOW)	.192	.311	.063	.152
Social characteristics (SOCIAL)	.232	.374	.011	.047

TABLE 6
Analysis of predictive relevance

	CV redundancy (Q2)	CV communality (q2)
Task performance (TASKPERF)	.129	-
Contextual performance (CONPERF)	.187	-
Task characteristics (TASK)	-	.153
Knowledge characteristics (KNOW)	-	.293
Social characteristics (SOCIAL)	-	.015

TABLE 7

Bootstrap standard errors and significance levels of path coefficient estimates

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
TASK → TASKPERF	.153	.157	.058	.058	2.629**
TASK → CONPERF	.081	.091	.050	.050	1.640ns
SOCIAL → TASKPERF	.058	.064	.047	.047	1.235ns
SOCIAL → CONPERF	.176	.177	.041	.041	4.302***
KNOW → TASKPERF	.336	.338	.050	.050	6.784***
KNOW → CONPERF	.460	.456	.043	.043	10.618***

Note: Significance-level (two-tailed): *** $p < .001$; ** $p < .01$; ns = not significant