Optimizing Knowledge-Work through Personal Knowledge Management – The Role of Individual Knowledge-Workers' Motivation, Ability and Opportunity

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ABSTRACT

Knowledge-work is a discretionary behavior, and knowledge-workers should be viewed as investors of their intellectual capital. That said, effective knowledge-work is mostly dependent on the performance of individual knowledge-workers who drive the success of knowledge-intensive organizations. Therefore, the study takes the perspective of personal knowledge management in enforcing the effectiveness of knowledge-work activities. This study empirically demonstrates that knowledge-workers' behaviors are dependent on their motivation, ability and opportunity to perform knowledge-work activities. This study provides insights and future directions for research on knowledge-work as a discretionary behavior in organization and the factors influencing it. Scholars can investigate the effect of empowerment of individuals on their tendency to knowledge-creation, knowledge-sharing and knowledge-application. Since personal-knowledge often raise the issue of knowledge ownership, further attention to ethical issues may bring valuable insights for KM in organizations.

Keywords: Knowledge Management, Knowledge Work, Knowledge Worker,

Motivation, Ability, Opportunity, Human Resource Management

INTRODUCTION

Scholars are increasingly highlighting the role of knowledge management (KM) in achieving better decision making and problem solving (Alavi & Leidner, 2001; Hoq & Akter, 2012). Most authors agree that there is a discernible trend in the workplace toward requiring employees to engage in some form of higher-level thinking, or cognitive processes, and to analyze information before undertaking action (Jacobs, 2017). Research in KM has acknowledged that individuals drive knowledge processes. The spotlight is on knowledge workers, who are the true source of knowledge and are seen as the height of competitive

advantage through continuous learning and innovation (Carleton, 2011). Nonetheless, there remains limited attention to the role of individuals in the discourse on KM (Rechberg & Syed, 2014; Carleton, 2011).

Extant literature has mostly focused on factors influencing KM effectiveness. The most prominent literature on KM has viewed it as an organizational initiative - emphasizing the importance of organizational factors that influence KM effectiveness. Within this paradigm, KM is emphasized as a system that aims to improve organizational effectiveness (Jennex, Smolnik & Croasdell, 2009). Accordingly, KM success is a function of technological, organizational and environmental factors; including strategy, leadership/management support, knowledge content, processes, technology and structure (e.g.Yew Wong, 2005; Jennex & Olfman, 2005; Jennex et al., 2009; 2012; Basu & Sengupta, 2007; Lin, 2014; Sedighi, van Splunter, Zand & Brazier, 2015). The literature lacks a framework for measuring KM effectiveness at the individual level, where individuals' participation will, directly or indirectly, affect organizational performance (Muhammed, Doll & Deng, 2009; Hoq & Akter, 2012; Rechberg & Syed, 2014). Therefore, a new paradigm is needed that recognizes knowledge workers as valued human assets; not as expendable cost centers (Serrat, 2017; Carleton, 2011; Turriago-Hoyos, Thoene & Arjoon, 2016).

Traditionally KM focused on explicit knowledge (knowledge-codification) and organizational knowledge. That said, the focus was less on the role of individual employees in the KM discourse (Muhammed et al., 2009; Hoq & Akter, 2012). Linking the individual-knowledge perspective to organizational success suggests a shift from traditional KM to personal KM (PKM) – focusing on individual and tacit knowledge (Cheong & Tsui, 2011; Muhammed et al., 2009). From the PKM perspective, knowledge is primarily created by individuals and then shared among a community of knowing (Nonaka & Konno, 1998; Ambulkar, Blackhurst & Cantor, 2016; Muhammed et al., 2009). Knowledge workers add value to organizations due their tacit-knowledge and their ability to transfer it into work activities (Davis, 2002). They depend on their personal-knowledge more than the organizational-knowledge in work activities (El-Farr, 2009). Thus, knowledge workers are the ones who are engaged in knowledge-work activities, and within them resides KM success (Hoq & Akter, 2012).

How to manage, improve and measure knowledge-work became central in the literature - arguing that effective knowledge-work activities such as knowledge creation, sharing and application are core goals for effective KM systems (Timonen & Paloheimo, 2011; Palvalin, Vuolle, Jääskeläinen, Laihonen, & Lönnqvist, 2015). Therefore, the continuous improvement of knowledge work performance is a key challenge for contemporary organizations – where their competitive advantage is derived from their ability to do so (Palvalin et al., 2015). That said, effective knowledge-work is mostly dependent on the performance of individual knowledge workers who drive the success of knowledge-intensive organizations (Drucker, 1998; Rao, 2006; Palvalin et al., 2015) and it explores major challenges to human resource management (HRM) in managing knowledge workers (Thite, 2004). Therefore, effective HRM is one a major critical factor for attaining successful KM (Kuo, 2011).

A typology of knowledge workers definitions, roles and knowledge-work actions could be deduced from the literature. Knowledge-work often is defined as a discretionary behavior and a system of activities that knowledge workers opt to do. Thus, knowledge workers are viewed as volunteers, investors, valuable resource, self-directed learners and individual innovators and performers (Muhammed et al., 2009; Efimova, 2004; Kelloway & Barling, 2000; Drucker, 1998; Davenport, 2010; Ho, 2008). The idea involves giving the knowledge worker more responsibility for how work is done, thus, the knowledge worker has more autonomy and flexibility to choose how, when and where the results are created (Palvalin, 2017). Therefore, managing knowledge-work should be mostly focusing on establishing conditions that increase the likelihood of knowledge workers to make the "right" choices. Knowledge workers make voluntary choices of when, how much and where to invest their knowledge and energy at work (Efimova, 2004). They are likely to engage in knowledge-work to the extent that they have the motivation, ability and opportunity to do so (Kelloway & Barling, 2000). In other words, an effective knowledge worker needs to have clear goals (as a motivating factor) and the ability to perform the work flexibly in time and space (Van Iddekinge, Aguinis, Mackey & DeOrtentiis, 2017; Palvalin, 2017). Moreover, knowledge workers need to be engaged and have ownership of work, and their contributions need to be sustainable and are highly dependent on their ability and discretion (Kompaso & Sridevi, 2010). Muhammed et al. (2009)

pointed that KM success depends upon the KM practices used by individuals. DW Rechberg and Syed (2014) highlighted the need for individuals' participation as a mandate for achieving a successful KM strategy. In fact, lack of individuals' participation in KM may not only hinder knowledge creation, but may also lead to a decline in organizational knowledge. Emphasizing the PKM perspective – Ambulkar et al. (2016) believe that the organizational ability to effectively manage knowledge is dependent on motivation, ability and opportunity (MAO).

More recently, researchers have drawn upon the MAO model of HRM and suggest that employee performance is a function of those three essential components (Hutchinson, 2013; Jiang et al., 2012; Okorogu, 2015). The MAO framework has successfully explained how and why motivation, ability and opportunity affect a wide range of organizational behaviors, among those are knowledge-work behaviors (Argote, McEvily & Reagans, 2003). Therefore, focusing on PKM from an organizational behavior perspective and emphasizing the role of the individual in KM success has a lot of potential in the KM literature.

Moreover, Wright (2005) noted that individual workers apply knowledge processes to support their day-to-day work activities. Especially, as highest centers of learning, universities need to build information infrastructure and create a favorable atmosphere where teaching and non-teaching staff can take part in various KM activities. Most university employees could be considered as knowledge-workers; they are expected to have major roles in formulating the strategies and processes of modern universities. Moreover, university employees have an active role in changing universities' organizational cultures and individual behaviors relative to knowledge-work (Davenport & Prusak, 1998; Hoq & Akter, 2012). Therefore, the study context is university employees – a good representation of knowledge-workers.

Based on the preceding review, this study takes the perspective of PKM. It examines independent individual-level drivers (MOA) of knowledge-work. This perspective is based on the authors believe that Knowledge-workers are the ones responsible of creating, sharing and applying knowledge at work.

This chapter has three major objectives. The first is to understand the nature of knowledge-work and knowledge-workers. The second is to explain the impact of intrinsic and extrinsic motivation on knowledge-work, and the mediating role of ability and opportunity in this relationship. The third is to discuss the results and their impacts, emphasizing contributions to the improvement of knowledge-work as an organizational behavior.

THEORATICAL BACKGROUND AND HYPORTHESES

KM at the individual level

Success factors for effective KM systems are often confused or interchanged. Most of the literature focused on factors influencing the KM system – including information systems and their supporting formal and informal organizational mechanisms. For example, Yew Wong (2005) claimed that effective KM implementation of KM is controlled and facilitated by management and leadership support, culture, IT, strategy and purpose, measurement, organizational infrastructure, processes and activities, motivational aids, resources, training and education, and HRM. Consistently, Jennex et al. (2009) also highlighted that KM success is a multidimensional construct. Jennex and Olfman (2005) surveyed the literature on KM and identified twelve KM success factors. Later on, Jennex, et al. (2009; 2012) utilized a survey, based on an extensive literature review, to propose success factors, and validate them. Based on their findings, the definition and measure of KM success is a factor of various dimensions; business processes, impact on KM strategy, leadership/management support and knowledge content.

The exploratory study of Basu and Sengupta (2007) showed that integrated technical infrastructure, organizational culture, motivation and commitment of users and senior management support, all proved to contribute to the KM effectiveness. In addition, Lin (2014) showed that technological, organizational and environmental factors have different effects on KM adoption and implementation stages. Specifically, IT support has the strongest effect on the KM adoption stage, while a culture of knowledge-sharing has the strongest effect on the KM implementation stage.

The literature review shows that among all KM success factors, few studies have examined the role of the individual and accounted for the personal-knowledge perspective in KM success (Zhang, 2009). Muhammed et al. (2009) pointed that KM success depends upon the KM practices used by individuals. DW Rechberg and Syed (2014) reviewed the KM practices to examine the attention (or lack thereof) paid to the individual in managing knowledge in organizations. It showed an increased attention to the individual is essential to enhance the KM effectiveness in organizations. The review shows that existing KM practices may be improved through an increased focus on the role of individuals in designing and implementing KM in organizations. They proposed an individual-centric approach to KM that incorporates individuals' views in the design and implementation of KM practices. Without the participation of individuals, knowledge cannot be processed and KM may not be practiced. For KM to be effective, the focus has to be on individuals as their knowledge, skills, abilities, and other characteristics, and the way in which they create, share and put knowledge into action, will determine organizational performance. Accordingly, Reinhardt, Schmidt, Sloep and Drachsler (2011) presented a typology of 13 knowledge-work actions related to the roles of knowledge-workers. The knowledge-worker roles' typology include the following: controller, helper, learner, linker, networker, organizer, retriever, sharer, solver, and tracker. Knowledge-work activities related to those roles include acquisition, analysis, authoring, co-authoring, disseminating, expert search, delivering feedback, information organization search, monitoring, learning and networking. Davis (2002) proposed three types of knowledge-work tasks: job-specific, knowledge-building and maintenance, and work management. Knowledge-workers have job specific tasks that produce outputs of value to the organization. Also, Knowledge-workers are valued for their knowledge and expertise, but this will decay over time. Therefore, knowledge-workers need to engage in frequent knowledge building and knowledge maintenance. Work management tasks support self-management of knowledge-work. Knowledge-workers tend to be better at managing the use of their time, attention, and motivation. Moreover, Wright (2005) focused on how individual workers apply knowledge processes to support their day-to-day work activities – broadly characterized as problem solving and learning practices.

Therefore, some emerging literature highlights the importance of PKM in improving individual performance. Organizations should help individuals to be more effective at the personal level, organizational level and various social environments. Also, firms should assist in developing knowledge-workers' self-awareness of their abilities and limits (Cheong & Tsui, 2011). According to Barth (2001), "KM cannot succeed unless every knowledge-worker takes personal responsibility for what he or she knows and doesn't know" (cited in Tsui, 2002, p. 4). This paper takes the PKM standpoint; focusing on the role of the individual, the knowledge-worker, in achieving effective KM activities.

Understanding Knowledge-work and knowledge-worker

Knowledge-work first appeared as a term in the late 1950s-during the first decade of commercial use of computers, and it owes its origins as much to Fritz Machlup as to anyone (Cortada, 1998). Toffler (1970) foresaw the emergence of highly educated individuals who could be labeled as knowledge-workers. From Toffler's perspective, knowledge-workers were individuals who were primarily involved in research and development-related occupations, and who were responsible for creating, processing, and enhancing information as their primary work outcomes. Toffler's perspective on the exclusive nature of who uses knowledge in the workplace would have a lasting effect on how scholars define knowledge-work. Later, Drucker (1992) discussed the importance of knowledge as a contributor to the wealth of capitalist societies in which knowledge serves as a value-added component to work (cited in Jacobs, 2017). Drucker (1969) and Bell (1968) were the main influencers when the concept emerged in the scientific discussion from 1974 to 1992. After this period, we can distinguish a slow diffusion period from 1993 to 2003, when the concept started to gain attention, and a fast diffusion period from 1999 to 2003, when the research proliferated. Based on the variety of existing definitions, many scholars claim that both concepts, knowledge-work and knowledge-workers, are still ambiguous (Timonen & Paloheimo, 2011). Todericiu and Serban and Dumitrascu (2013) noted that a wide range of definitions of knowledge-work from "those who create knowledge" to "those who use knowledge" are almost universally accepted. Despite the diversity of perspectives on how to conceptualize knowledge-work (Hislop, 2008; Armano, 2011), a clear definition

has not yet been established. The problem with defining knowledge-work is the argument that knowledge is a mandate to achieve any work activity (Palvalin et al., 2015). That said, classifications of knowledge-work could be deduced from the literature, and they are discussed in following.

a) *Knowledge-work as a profession.* This perspective is the dominant traditional perspective in the literature. Through the 1990s the common definition of knowledge-workers was that they were highly educated, well skilled and were differentiated based on information technology criteria (Rao, 2006). Knowledge-work is conceptualized as overlapping significantly with professional occupations that are dominated with knowledge-intensive tasks including scientists, engineers, professors, attorneys, physicians and accountants (Hislop, 2008). In alignment, Olsen (2016) claimed that "professional work" is commonly found in research within occupational groups, such as lawyers, accountants, consultants, and medical professionals. In this perspective, knowledge-work is identified by broad measures such as job titles or education levels (Mládková, 2015; Cooper, 2006 cited in Widmann, 2013). Knowledge-intensive work can either be based on scientific knowledge, such as in research and development occupations, high-technology engineering, or can be considered as professional work, such as lawyers and accountants (Widmann, 2013). It sounds that this approach is dependent on job content and industry driven approaches, identifying knowledge-workers as employees within a specific set of occupations and those who work in particular organizations or in particular sectors or institutions (Mládková, 2015). This approach is rooted in the tayloristic tradition of separating 'thinking' and 'doing' in organizations (Hislop, 2008; Bosch-Sijtsema, Fruchter, Vartiainen and Ruohomäki, 2011; Armano, 2011). Knowledge in this context is the technical knowledge that has the power to improve the "can-do" attribute (Turriago-Hoyos et al., 2016).

This perspective has been criticized due to its constrained view of knowledge-work (Cortada, 1998). Knowledge-work cannot be only deduced through looking at job titles or educational levels (Brinkley et al., 2009). Thompson, et al. (2001) suggests that the emphasis on abstract theoretical knowledge leads to the neglect of other important types of knowledge required to accomplish tasks. An example is tacit-knowledge that does not necessarily reflect high levels of formal education or the occupation of knowledge-intensive professions (cited in Hislop, 2008). Tacit knowledge is embedded in the behavior, attitude, perception, ideology and beliefs of individuals (Hoq & Akter, 2012). Knowledge-workers add value to organizations due their tacit-knowledge and their ability to transfer it into work activities (Davis, 2002).

b) Knowledge-work as an individual activity. In this approach. Knowledge-work is defined in terms of the balance of 'thinking' and 'doing' activities (Kelloway & Barling, 2000). The context of knowledge-work was introduced by Drucker (1959) when he used it as a term to separate knowledge-work from manual work. Drucker proposed that knowledge-workers are the ones who their work tasks primarily have to deal with information or knowledge-workers are the ones who develop and use knowledge at workplace (Palvalin et al., 2015). Drucker (1998) defines knowledge-work as comprising those jobs in which incumbents work more with their heads rather than with their hands. In fairness Drucker does not specify the differences between knowledge and service workers, as service workers are not equivalent to knowledge-workers. Whereas, Collins (1997) has pointed out that some differences could be the diversity in knowledge and skills, responsibility level, social status and pay. Based on this perspective, all workers are knowledge-workers to a certain extent, depending on the nature and intensity of the possessed skills and working knowledge, rather than just claiming it as the possession of a minority group.

c) Knowledge-work as a dimension of work. From this perspective, knowledge-work is not a category and is not an occupation, but is a dimension of work. It is thus clear that knowledge-work lacks any occupational identity and cannot be classified under the traditional occupational categories (Thite, 2004). According to Kelloway & Barling (2000), knowledge-work is defined as a discretionary behavior focused on the knowledge usage. In this regard, Davenport (2010) takes a "process" perspective on knowledge-work. He suggests that the process orientation differs by whether workers create knowledge, share it, or apply it. According to Davenport's (2010), the primary purpose of knowledge-workers' contribution involves the creation, distribution, or application of knowledge. Based on Drucker's (1999) knowledge productivity theory, Knowledge-workers are said to be involved in defining the scope of their work, being self-managed, searching for new ways of doing things, continuously learning and teaching others, and emphasizing both the quality and quantity of the outcomes (Jacobs, 2017). Knowledge-work

productivity depends on good self-management. For example, productive knowledge-workers should be able to self-manage productivity, self-motivate themselves and identify any need for attention (Davis, 2002). In other words, "managing oneself" and being autonomous are central features of work in the knowledge society insofar as a knowledge-worker needs to become aware of personal strengths via feedback analysis, self-examination, and building self-awareness (Drucker, 2005 cited in Turriago-Hoyos et al., 2016).

Turriago-Hoyos et al. (2016) addressed the role of knowledge-workers' virtues within the knowledge society according to the late Peter Drucker's management theory as synthesized by Maciariello (2009). They identified prudence, effectiveness, excellence, integrity, and truthfulness as the knowledge-worker's intellectual virtues, whereas practical wisdom, responsibility, cooperation, and courage are seen to constitute the knowledge-worker's moral character. Based on this perspective, all workers are knowledge-workers to a certain extent, depending on the nature and intensity of the possessed skills and working knowledge, rather than just claiming it as the possession of a minority group (Collins, 1997). In this view, knowledge-work is not a category and is not an occupation, but is a dimension of work.

Knowledge-workers have value because of their knowledge and their abilities to apply it in work activities. They are expected to possess formal knowledge consisting of general principles, concepts, and procedures related to classes of problems and domains of work. They also have some procedural knowledge about typical procedures, forms, and rules governing a domain of work (Davis, 2002). According to Jacobs (2017) Knowledge-based tasks are the units of work that require individuals, in the presence of complex work situations, to call upon relevant sets of information, to decide which actions they should take based on the information, and to engage in those actions that will accomplish the unit of work. In this view, a more useful way to distinguish knowledge-based tasks is through the complexity of the work. That said, a knowledge-worker's organizational advantage is defined by tacit knowledge, effective information processing, superior soft skills, and creative problem solving abilities (Carleton, 2011).

When we shift our attention from knowledge to knowledge-work, new dimensions emerge. If knowledge-workers give us the sustainable competitive advantage, we need to understand who they are and if and how they are different from the other so-called non-knowledge-workers (Thite, 2004). Thus, knowledge-work is defined as a set of employee activities. In this regard, Davenport (2010) takes a "process" perspective on knowledge-work. He suggests that the process orientation differs by whether workers create knowledge, share it, or apply it. According to Davenport's (2010) definition, knowledge-workers have high degrees of expertise, education, and experience. Moreover, the primary purpose of their jobs involves the creation, distribution, or application of knowledge.

In this paper, we apply the term knowledge-workers within the broader category of highly skilled workers. Based on perceiving knowledge-work as individual activity and as a dimension of work, knowledge-work is characterized by self-management (Davis, 2002) and knowledge-workers are best described as investors. As investors, employees choose the time and extent of investing their knowledge and often have the power to resist being told what to do (Davenport, 2010; Kelloway & Barling, 2000). Moreover, Davenport (2010) defined knowledge-work within three different activities: knowledge-creation, knowledge-sharing and knowledge-application. Each of these activities is seen as a discretionary behavior. Employees are likely to engage in knowledge work to the extent that they have the motivation, ability and opportunity to do so (Kelloway & Barling, 2000). Hence, the implicit assumption of this study is that the success of knowledge-work depends on motivation, ability and opportunity of knowledge-workers to create, share and apply knowledge.

Motivation, Ability and Opportunity to Knowledge-work

The MAO framework is a well-established model for explaining work performance. Initially proposed by Bailey (1993) and developed by Appelbaum et al. (2000), MAO has become a commonly accepted framework to explain how human resource (HR) policies might influence employees' performance (cited in Hutchinson, 2013). This model suggests that a person's "capacity to work", "will to work" and "opportunity to perform" jointly determine the level of performance (Kelloway & Barling, 2000; Tuuli, 2012). The MAO framework also has been successfully employed to explain a wide array of behaviors such as consumer behavior, commercial information process and public relations (Hallahan,

2001), and firm-level decision-making and social capital activation (Binney, Oppenheim & Hall, 2006). More recently, MAO has been used as a conceptual framework for explaining knowledge sharing behaviors (e.g., Chang, Gong & Peng, 2012; Siemsen, Roth & Balasubramanian, 2008). Therefore, MAO might help in explaining how and why certain contextual individual properties affect KM outcomes.

Motivation to knowledge-work

Motivation is "an unobservable force that directs, energizes, and sustains behavior" most definitions refer to the idea that work motivation directly affects the direction, intensity, and duration or persistence of effort. Motivation is reflected in the choices workers make about whether to expend effort, the level of effort they expend, and how much they persist in that level of effort (Van Iddekinge, et al., 2017). In the context of the MAO theory, motivation to knowledge-work refers to heightening arousal so that employees could be ready, willing, or interested in implementing knowledge-work (Hallahan, 2001; Leung & Bai, 2013). They cannot be enforced to share their knowledge but can be motivated to willingly do so. KM initiatives' failure or success depends to a high extent on the knowledge-workers' willingness to adopt new practices and tools (Hussain, Ahmed & Si, 2010; Efimova, 2004). Ajmal, Helo and Kekäle (2010) revealed that the absence of incentives for employees who engage in KM initiatives was the most significant barrier to the success of KM initiatives in project-based firms. According to Yew Wong (2005) if individuals are not motivated to practice KM activities, then no amount of investment, infrastructure and technological intervention will make KM effective. Gumusluoglu and Karakitapoglu-Ayglin (2010) observed that knowledge-workers were generally attracted to careers that allowed them to develop their potential, stimulated their personal and intellectual capacity, and encouraged them to develop their career goals.

In examining motivation, Ryan and Deci (2000) distinguished between extrinsic motivation and intrinsic motivation. Research has emphasized the crucial role of intrinsic motivators in enforcing knowledge-work behaviors such as knowledge-sharing, transfer and contribution (e.g. Lin, 2007; Cruz, Pérez & Cantero, 2009; Huang, Chiu & Lu, 2013). Incentives help to stimulate and reinforce positive employee behaviors and culture needed for effective KM (Yew Wong, 2005). Ajmal et al. (2010) revealed that the absence of incentives for employees who engage in KM initiatives was the most significant barrier to the success of KM initiatives in project-based firms. According to Yew Wong (2005) if individuals are not motivated to practice KM activities, then no amount of investment, infrastructure and technological intervention will make it effective. Hence, one of the important factors is to establish the right incentives, rewards or motivational aids to encourage individuals to share, create and apply knowledge. Liu (2012) showed that knowledge incentive mechanisms promote the psychological ownership by the knowledge owner, so that he or she actively carries out knowledge innovation. This implies that knowledge incentive mechanisms stress private proprietary characteristics of employees who possess real ownership when they innovate. This will deem such innovation as an extension of self; giving rise to a protective or defensive mindset, which then has an impact on individual knowledge creation behaviors because of the psychological ownership of knowledge. According to Jones and Chung (2006), Knowledge-workers are more motivated with intrinsic motivators as compared to extrinsic motivators. They identified examples of intrinsic motivators, such as providing challenging work assignments, personal recognition, and realistic promotional opportunities. Farr and Brazil (2009 as cited in Widmann, 2013) provided some intrinsic motivators of engineers, including opportunities for self-actualization, learning, and continued professional development. Welschen, Todorova & Mills (2012) proposed a model that examines the role of intrinsic motivation in knowledge sharing. The results show self-efficacy, meaningfulness and impact are important motivators of attitude towards knowledge sharing, which in turn impacts intention to share knowledge. Accordingly, mixtures of rewards are needed to motivate knowledge-workers (Runar Edvardsson, 2008)

That said both intrinsic and extrinsic rewards are important to increase employees' willingness to share their knowledge, especially tacit knowledge (Huang et al., 2013). Thus, this study applies expected organizational rewards and reciprocal benefits as extrinsic salient determinants and self- efficacy and enjoyment in helping others as employees' intrinsic salient determinates to explain knowledge-work behavior. The theory of planned behavior posits an obvious argument: intention, which is assumed to

capture intrinsic and extrinsic motivational factors determines behavior, hence action (Serrat, 2017). Intention refers to the individual's motivation and willingness to engage in a particular behavior as long as the behavior is under the control of the actor (Ajzen, 1991 cited in Mafabi, Nasiima, Muhimbise, Kaekende, & Nakiyonga, 2017). The theory of planned behavior (TPB) as developed by Ajzen (1991) is one of the best social-psychological frameworks that explains and predicts human behavior (.

Hypothesis One: Intrinsic and Extrinsic motivation will be positively related to knowledge-work, such that employees performing knowledge-work are more motivated by intrinsic motivators than extrinsic motivators.

Ability to knowledge-work

Ability relates to performance primarily through job knowledge, such that high-ability workers tend to demonstrate higher performance because they are better able to acquire and use job-relevant knowledge, compared to those who possess lower levels of ability (Van Iddekinge et al., 2017). Ability refers to the extent to which individuals have the necessary resources (e.g. knowledge, intelligence, money) to make an outcome happen (Leung & Bai, 2013). It refers to individuals' skill or proficiency at solving problems or their knowledge of how to act (Binney et al., 2006). This view is based on the notion that people will not act if their actions do not serve relevant goals, and that when the ability to act is absent, the existence of a goal cannot lead to the intended result; and it suggests that the relationship between motivation and performance is stronger the higher the ability level.

Accomplishing knowledge-work is a result of personal capability, such as skills, experience, or intelligence. According to Argote et al. (2003) individual abilities are partially innate, but they are also enriched through training and experience; formal and informal mechanisms of accumulating personal human capital. Individuals' embedded ability to create meaning of things, reflect and interpret situations has a crucial role in effective KM (DW Rechberg & Syed, 2014).

Several studies have also recognized the role of ability in knowledge sharing (Siemsen et al., 2008). Hussain et al. (2010) showed that individuals who possess more personal-knowledge capabilities are more effective in performing KM activities and ensuring KM success. Therefore, if knowledge-intensive organizations are the ones that attain their competitive advantages based on the uniqueness of embedded knowledge within their individual employees, then their knowledge-workers' abilities are the essential determinate for organizational success.

In this study, the employees' ability to conduct knowledge-work refers to the extent of their embedded personal-knowledge and skills that enable them and are required to implement knowledge-work activities and tasks (Siemsen et al., 2008). Thus, highly able or knowledgeable individuals are presumably more capable of creating, sharing and applying knowledge than individuals with low-ability.

Hypothesis Two: Ability is positively related to knowledge-work such that this relationship will be stronger for employees of high-ability than those with low ability.

Since motivated employees make use of their cognitive, affective and conative abilities to achieve organizational goals (Kaur, 2015; Binney et al., 2006), thus it seems motivation has impact on knowledge-work through ability as a mediator variable.

Hypothesis Three: ability has a mediator role in the relationship between motivation and knowledge-work.

Opportunity to knowledge-work

Opportunity in the MAO framework refers to the situational factors that can either enhance or impede information processing. MacInnis and Jaworski (1989) identified several situational factors such as time availability, attention paid, and number of distractions (cited in Leung & Bai, 2013). Chang et al. (2012) stated that knowledge does not easily transfer unless the knowledge-transfer agents have sufficient motivations and opportunities to transfer knowledge. In addition, Argote et al. (2003:578) argue that "ability

and extra effort are even more valuable when coupled with opportunity". Siemsen et al. (2008) stated that one of the most important operational constraints among coworkers is time. Cleveland and Elli (2015) revealed that knowledge seeking behaviors depend to a large extent on the perceived time available to the knowledge seekers. In this study, we define time availability (TA) as the degree to which an employee has slack time available to participate in knowledge-work activities.

Hypothesis Four: Opportunity is positively related to knowledge-work such that this relationship will be stronger for employees of high- time availability than those low in time availability.

The precise inter-relationship among the MAO variables and how they interact to influence performance behaviors still remain largely unclear. Three competing models, a multiplicative, linear and constraining-factor model (CFM), reflect different levels of complementarity and interaction among motivation, ability and opportunity, and their impact on performance behaviors are specified (Tuuli, 2012). This multiplicative model predicts that when individuals possess little or no motivation, they will demonstrate similarly low levels of performance regardless of their ability level. Various theoretical background support the multiplicative model empirically, logically, and psychologically, it is convincing. (Van Iddekinge et al., 2017). Van Iddekinge et al. (2017) tested the interactive, additive, and relative effects of cognitive ability and motivation on Performance using a Meta-Analysis. A triangulation of evidence based on several types of analyses revealed that the effects of ability and motivation on performance are additive rather than multiplicative. Ability and motivation were similarly important to job performance.

Some studies have found support for the interaction, others have not and one study even found a negative interaction. The existing evidence for an interaction between motivation and ability in determining performance is extremely weak. For example, Campbell and Pritchard (1976) stated: "The attempts to account for additional variance in performance by some multiplicative combination of motivational and ability variables have been singularly unsuccessful" (p. 91). One reason for these inconsistent findings is the low statistical power in detecting interaction, which is associated primarily with the low reliability of the product term and with the small residual variance of this term when the main effects are controlled for (Ganzach, Saporta & Weber, 2000). Thus, Ganzach et al., (2000) showed that the interaction was positive when a logistic model was used and negative when a linear probability model was used. The reason for the difference in the results of the two models is examined, and the conditions under which this difference occurs are discussed.

While there is some theoretical evidence to suggest that MAO are complementary in driving behavior, existing empirical evidence from work-performance theories suggests that little explanatory power is gained by adding interaction terms (Siemsen et al., 2008). This paradox leads Siemsen, et al. (2008) to propose an alternative model referred to as CFM. The central notion of this model is that in the absence of any of the MAO variables, no action will take place, but it does not additionally impose a continuous change in the size of the effect. From this perspective, multiplicative model does not exhibit a significantly improved fit over a linear model. Also, Minbaeva (2013) stated that none of the studies simultaneously considered the interaction effects among motivation, ability and opportunity. There is limited empirical evidence available about the joint effects and roles of motivation, ability and opportunity on knowledge-work activities.

Hypothesis Five: the multiplicative interaction among motivation, ability and opportunity will not explain significantly more variance than the linear model.

METHOD

Participants

This study was conducted at Ferdowsi University of Mashhad (FUM) using a quantitative methodology - utilizing a survey instrument to collect data. We sent the survey to 1,245 staff of FUM. A total of 350 completed questionnaires were returned. The response rate was 28.11%. A total of 170 participants were females (48.6 percent) and 180 participants were males (51.4 percent). Most participants

have high-level education. The average work tenure was 14.75 years. Basic information of respondents and companies are depicted in Table 1.

'place table one here'

Measures

Measurement items were developed on the basis of a comprehensive review of the literature and modified to suit the KM context. Knowledge-work was assessed with 11 items based on Chennamaneni et al. (2012), North and Gueldenberg (2011), and Siemsen et al. (2008). The items measured the extent to which employees create, share and apply knowledge during their day-to-day work activities. Motivation was measured by 22 items that are adapted from Lin (2007), Cruz et al. (2009), and Kankanhalli, Tan & Wei (2005). The items reflect the extent to which employees believe that they will receive extrinsic and intrinsic incentives through their knowledge activities. A total of 3 items measuring opportunity were adapted from Siemsen, et al. (2008), measuring the extent of time that employees spend to create, share and apply knowledge. Finally, ability of employees to create, share and apply knowledge and experience was assessed by 4 item adapted from Siemsen et al. (2008) and Lee, Lee & Kang (2005).

Analytical Procedures

The data was analyzed based on structural equation modeling (SEM) techniques. The SEM process centers around two steps: validating the measurement model and fitting the structural model. The former is accomplished primarily through confirmatory factor analysis using LISREL, a software package based on SEM techniques. The latter is accomplished primarily through path analysis with latent variables analysis (Garson, 2008). We used partial least squares (PLS). PLS assesses the structural model - relationships among constructs. Moreover, the multiplicative interaction among MAO in hypotheses 4 was tested by using hierarchical linear modeling. Since the data was self-reported, all construct items were subjected to principal components factor analysis. The results indicated that multiple factors emerged to explain the data variance. Therefore, CMV does not appear to be a serious concern for this study.

RESULTS

Correlations and Statistics information

The descriptive information of the variables is reported in Table 2. Correlations were computed among variables. The results suggest that correlations were statistically significant between all variables, with the exception of opportunity and Extrinsic Motivation, sharing knowledge. The correlations of KM with Intrinsic Motivation, Extrinsic Motivation, Ability and opportunity were statistically significant. Highest correlations are seen between the Intrinsic Motivation and KM, $r = +.72$, $p < .01$, two-tailed. Lowest correlations are seen between the opportunity and KM, $r = +.19$, $p < .01$, two-tailed.

'place table two here'

Measurement Model

The measurement model is that part of a PLS model which deals with the latent variables and their indicators. The measurement model of all constructs was evaluated to demonstrate the quality of the measurement. In this study, the measurement model with all four constructs (knowledge-work, motivation, ability and opportunity) was assessed using confirmatory factor analysis. Table 3 shows loadings and the corresponding t-values of indicators in the measurement model. Overall, all loadings exceed 0.6 and each indicator is significant at 0.05 levels. Also, the reliability of the constructs (composite reliability), and the average variance extracted were used as the measures for convergent validity. The composite reliability should be greater than 0.5 and the average variance extracted should be at least 0.6., but we can accept 0.4. (Fornell & Larcker, 1981). Hence, the measurement model seems to possess adequate convergent validity.

'place table three here'

The measurement model exhibited a good level of model fit. For knowledge-work construct, the chi-square/degrees of freedom ratio is 245.58/87. The GFI is 0.93, AGFI is 0.96, NFI is 0.93, CFI is 0.91, and RMSEA is 0.082. For motivation construct, the chi-square/degrees of freedom ratio is 4745.39/1793. The GFI is 0.93, AGFI is 0.95, NFI is 0.91, CFI is 0.92, and RMSEA is 0.078. For ability construct, the chi-square/degrees of freedom ratio is 5.29/2. The GFI is 0.97, AGFI is 0.91, NFI is 0.92, CFI is 0.94, and RMSEA is 0.082. For opportunity construct, the chi-square/degrees of freedom ratio is 29.19/9. The GFI is 0.93, AGFI is 0.90, NFI is 0.91, CFI is 0.89, and RMSEA is 0.077. Goodness of fit measures for the constructs of research model presented in table 4.

'place table four here'

Structural Model

The structural model analysis was conducted to examine the hypothesized relationships among constructs. The results from the structural model are shown in table 4 and Figure 1. The results provided support for all the first four hypotheses. All of the path coefficients were statistically significant ($p < 0.05$) and greater than 0.30, which is considered meaningful. The relationship between motivation and knowledge-work is statistically significant; thus, intrinsic and extrinsic motivation will be positively related to knowledge-work. That said, intrinsic motivation has more influence on knowledge-work than extrinsic motivation. Linear regression results showed that Self-efficacy (b= 0.70, SE= 0.032, p<.05) and enjoyment in helping others (b= 0.46, SE= 0.029, p<.05) as intrinsic motivation indicators have positive impact on knowledge-work more than organizational rewards and reciprocal benefits as extrinsic motivation indicators.

The R^2 indicates the amount of variance explained by the model. R^2 value determines the prediction power of the model. As showed in table 5, approximately 72.5% of the changes in knowledge-work are explained by motivation, ability and opportunity, and 44.3% of the changes of ability are explained by motivation.

'place table five here'

'place figure one here'

We tested hypothesis 5 by using hierarchical linear modeling to examine the multiplicative interaction among MAO on knowledge-work. The multiplicative term between motivation and ability was computed and introduced in the regression equation as a predictor at level 3. Thus, in final model, their interaction effects (M×A: b= -0.245, SE= 0.075, p>.05; M×O: b= 0.627, SE= 0.089, p>.05; M×O×A: b= 0.356, SE= 0.234, p> 05) were entered, implying that adding interaction terms could not significantly improve the predictive power of the model (ΔR^2= 0.005).

To confirm the results, we used K-means clustering method, and the data was classified into three clusters including low-MAO, middle MAO and high-MAO. Cluster analysis is a statistical technique used to group cases into homogeneous subgroups based on responses to variables. The results revealed that the greatest extent of knowledge-work performance is related to the group that simultaneously has the high amount of motivation, ability and opportunity. Also, ANOVA showed that the difference between those three groups (low-MAO, mode MAO and high-MAO) was significant (F= 82.90, df = 2). Figure 2 gives a graphical representation of comparison groups.

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DISCUSSION

We undertook this study based on the behavioral perspective of knowledge-work at the individual-level. Without a doubt, KM has much to do with behavioral change. For that reason, high-performance organizations seek to minimize the drag of old mental models and help embed knowledge behaviors (Serrat, 2017). The individual's behavioral intention is believed to process his or her ability to share knowledge into actual knowledge-sharing (Mafabi et al., 2017).The results provide strong support to the proposed hypotheses. Findings confirm that knowledge work is influenced by motivation, ability and opportunity. Our research model demonstrates good explanatory power for knowledge work, with over 0.725 of the variance explained (R^2= 72.5%). The strongest direct determinant of knowledge work is motivation (.57 vs. .37 for ability and .09 for opportunity). The result also found that intrinsic motivators tend to be the most influential drivers in knowledge work, as compared to extrinsic motivators. This is consistent with previous findings that highlighted the crucial role of motivation, especially intrinsic motivators, in improving KM activities (e.g. Cruz et al., 2009; Lam & Lambermont-Ford, 2008; Huang et al., 2013). However, establishing the right incentives such as rewards or motivational aids to encourage people to share and apply knowledge is one of the important factors (Yew Wong, 2005). Argote et al. (2003) argued that motivation is one of the causal mechanisms to participate in KM processes. Ajmal et al. (2010) revealed that the absence of incentives for employee who engage in KM initiatives was the most significant barrier to the success KM initiatives.

According to Carleton (2011), some ways to motivate and retain knowledge workers include: providing challenging and meaningful work, enabling learning and career development opportunities, ensuring adequate resources, recognizing contributions, and creating a supportive environment. Results also found that motivation has indirect effects on knowledge work. As the model showed motivation explains 44 percent of the variance in ability. Hence, it seems ability plays the role of a mediator variable between motivation and knowledge work. Consistent with Kaur (2015), motivated employees makes use of their cognitive, affective and conative abilities to achieve organizational goals. According to DW Rechberg and Syed (2014) individuals have the ability to create meaning of things, reflect and interpret situations. Several studies (e.g. Siemsen et al., 2008; Binney et al., 2006) have also recognized the role of ability in KM outcomes. This means, individuals who possess more personal-knowledge capabilities are more effective in performing KM activities and ensuring KM success (Hussain et al., 2010).

The result also found that the time availability as opportunity to perform knowledge work activities has significant path in the model. In contrast with motivation and ability, this effect is weaker in influencing knowledge-work. Contrary to Siemsen et al., (2008), Hallahan (2001), and Cleveland and Elli (2015), time availability is not the most important operational constraints. Ability and motivation is relatively more important to performance in general, as well as in different contexts (Van Iddekinge et al., 2017). The present study also improves our understanding of the relative importance of ability and motivation. Considering the nature of knowledge work, knowledge workers are best described as investors. They choose whether or not to invest their skills in a given company. They often have the power to resist being told what to do. Therefore, they choose to engage in knowledge work to the extent that they have the motivation, ability and opportunity to do so (Davenport, 2010; Kelloway & Barling, 2000). Moreover, results revealed that the greatest extent of knowledge work is related to the group that simultaneously has high motivation, ability and opportunity.

According to Wiig (1993) the organization's success is directly related to the quality and relevance of these activities; particularly knowledge workers' expertise and their willingness to use that expertise to their employers' advantage. This argument implies that workers' behaviors are different depending upon their proficiency level (Yoon, 2012). Individual knowledge innovation and performance make organizations more productive (Muhammed et al., 2009). The performance of an individual knowledge worker drives the success of knowledge-intensive organizations. Therefore, the improvement of knowledge-work performance is a key challenge of modern economy (Palvalin et al., 2015).

Knowledge-intensive firms need to leverage their individual knowledge assets via knowledge sharing to create collective knowledge resources. This process is, however, under the control of the knowledge worker (Swart, Kinnie, Rossenberg & Yalabik, 2014).

However, successful KM is dependent on a well-functioning HRM and the employees' perceived behavior in knowledge creation, knowledge sharing and knowledge application (Lord & Farrington, 2006 cited in Kuo, 2011). Certainly, knowledge workers require managers that act as facilitators, not controlling bosses. Knowledge workers also needs leaders that inspires and motivate knowledge-workers to perform based on agreed standards. Also, those new-era managers need to assess their workers' ability to perform. Since the process of influencing the performance of knowledge workers is mainly developmental, they need also to hone skills in appraising, coaching, mentoring, and providing feedback. One measure of their effectiveness will be the quality of the relationships (internal and external) that they create (Serrat, 2017). Of course, not only the managers of knowledge workers can help stimulate their productivity (Carleton, 2011). A key implication of the behavioral perspective is that HR systems composed of different supportive HR practices are likely to foster the MAOs of different employees based on their role behaviors required for alternative organizational strategies (Collins & Kehoe, 2017). The HR function in organizations deals with individuals directly. It can therefore greatly impact the effectiveness of KM. According to Pauleen (2009), it is individuals who are meant to be responsible for their own knowledge development, and the HR ought to help them on this journey (Rechberg & Syed, 2014).

Closely linked with knowledge-workers' performance and motivational methods, is development (Carleton, 2011).This study has some limitations that should be recognized to help produce higher quality research in this area. First, the research methodology is purely quantitative. This limits capturing the richness, complexity, and depth needed to understand organizational and personal constructs influencing knowledge-work effectiveness. Future qualitative research will allow deep examination of the relationships among the aforementioned variables. For example, interviews with knowledge workers can reveal many constructs that are imbedded in the organizational culture. Second, opportunity measurement was limited to time availability, while there are other measurements of opportunity that future research can consider. Third, the sample is taken from one university in Iran; therefore the context is geographically limited and industry-specific. In order to generalize the results, further studies should be conducted at different contexts. Particularly, the national and organizational cultures might have high impact on individual constructs that affect knowledge-work activities.

IMPLICATIONS

This paper presents an empirically validated MAO framework to improving knowledge work. In this context, knowledge workers must be treated as a valuable resource, which is a view consistent with Kelloway and Barling (2000), Drucker (1998) and Davenport (2010). Knowledge work is a discretionary behavior, and knowledge workers should be viewed as investors of their intellectual capital. Their behavior is dependent on their motivation, ability and opportunity to perform knowledge-work activities.

"You can lead a horse to water, but you can't make it drink" is an adage of universal application. It signifies that you can give someone means and opportunity but cannot force that person to avail of them. The relationship between motive, means (or ability), and opportunity—and what happens where it is not close— explains much human behavior by dint of reasoned action (Serrat, 2017). However, it is very important for managers to measure how the changes in MOA can impact on knowledge work productivity.

The results also have implications for other human resources practices that attempt to affect, or are influenced by, ability and motivation, including training and incentive practices (Van Iddekinge at al., 2017). Results demonstrated the usefulness of the MAO model in explaining knowledge work activities. Although, some researchers have focused on the role of motivation, our findings indicate that in addition to motivation, ability and opportunity have a significant influence on knowledge work behaviors. In addition, ability plays the role of a mediator variable. As stated by Yew Wong (2005: 273), "employee development is seen as a way to improve and enhance the personal value of individuals. The skills and competences of knowledge

workers need to be continuously developed in order for them to produce valuable contributions to a company. If not, as with other tangible assets, their value will depreciate".

The findings focused on the success of KM practices by individuals. An important implication on human resource practices is that they should aim to help individuals to be more effective at a personal-level by enhancing their ability and motivation. As stated by Davenport and Volpel (2001), "managing knowledge is managing people; managing people is managing knowledge" (cited in Yew Wong, 2005: 212). In this regards, managers should formulate an attractive incentive package to motivate employees to engage in KM initiatives. Such an incentive system should also encourage them to perform their activities to the best of their ability. Certainly, it is important to provide opportunities for employees especially time availability for engagement in knowledge work activities.

Our study provides insights and future directions for research on knowledge work as a discretionary behavior in organization and the factors influencing it. Scholars can investigate the effect of empowerment of individuals on their tendency to knowledge-creation, knowledge-sharing and knowledge-application. Since personal-knowledge often raise the issue of knowledge ownership, further attention to ethical issues may bring valuable insights for KM in organizations.

CONCLUSION

Although previous research has suggested the existence of significant organizational and technological factors of KM success, few studies have highlighted the role of the individual and its related constructs in KM success. This paper has highlighted the impact of motivation, ability and opportunity on knowledge work. In contrast with traditional KM research, this study adopted the PKM perspective. In alignment, knowledge work is defined as a discretionary behavior that is a function of motivation, ability and opportunity - independently.

The findings of this study supported the hypotheses that employee's motivation, ability and opportunity affect knowledge-work activities. In addition, when it comes to motivation, knowledge workers are more intrinsically motivated than extrinsically when it comes to knowledge-work. Particularly, this is important as motivation has the highest impact on knowledge-work. Moreover, second in ranking, ability has a high impact on knowledge work. It is also recognized that motivation has a high correlation with ability, which indicates that motivation has also an indirect impact and ability seems to play the role of a mediator between motivation and knowledge-work. Opportunity is found to have a significant yet lesser impact on knowledge-work when compared to motivation and ability.

Improving knowledge-work by motivation, ability and opportunity requires different levels of complementarity among these three variables. As shown, the greatest extent of knowledge-work performance is related to the group that simultaneously has high levels of motivation, ability and opportunity. The contribution of this article is to provide empirical data from employees in university to illustrate how motivation, ability and opportunity can influence on knowledge-work.

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Table1. Basic information of Participants

Participants Characteristics	Frequency	Percent
Gender		
Male	180	51.4
Female	170	48.6
Education Level		
Diploma		
B.A.	47	13.4
M.A.	167	47.7
Ph.D.	118	33.7
Years of tenure		
<5		
5-10	43	12.3
10-15	71	20.3
15-20	56	16
20-25	48	13.7
>25	83	23.7
Occupation		
Administration	22	6.3
academic and graduate affairs	38	10.9
research and technology	45	12.9
cultural and student affairs	21	6
finance	51	14.6
planning and budgeting	59	16.9
faculty	99	28.3

Note*:* *n*= 350

Table 2. Correlations and statistics table

	1	2	3	4	5	6	7	8	N	M	SD
1. Intrinsic Motivation	1								350	2.25	0.48
2. Extrinsic Motivation	0.357**	1							350	3.30	0.54
3. Ability	0.690**	0.265**	1						350	2.45	0.45
4. Opportunity	0.250**	0.073	0.173**	1					349	2.92	0.3
5. Sharing	0.535**	0.542**	0.372**	0.067	1				350	2.75	0.53
6. Creation	0.539**	0.316**	0.596**	0.157**	0.357**	1			349	2.38	0.77
7. Application	0.682**	0.373**	0.567**	0.270**	0.495**	0.623**	1		350	2.4	0.57
8. K-Work	0.722**	0.518**	0.625**	0.194**	0.807**	0.765**	0.849**	1	350	2.55	0.49

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

Table 3. The measurement model

constructs	Indicators	Items	Factor Loading	t-value	Std. Error	Composite Reliability	Average Variance Extracted (AVE)
Knowledge work	Knowledge creation	Q1	0.832	32.846	0.025	0.843	0.643
		Q2	0.768	27.826	0.028		
		Q3	0.765	18.646	0.041		
		Q4	0.691	13.322	0.052		
	Knowledge application	Q5	0.676	10.922	0.062		
		Q6	0.813	32.952	0.025		
		Q7	0.717	16.217	0.044		
		Q8	0.694	15.812	0.044		
	Knowledge sharing	Q9	0.642	4.510	0.142		
		Q10	0.741	7.307	0.101		
		Q11	0.752	13.060	0.058		
Motivation	organizational rewards	Q12	0.734	9.707	0.076	0.754	0.500
		Q13	0.804	26.550	0.030		
		Q14	0.722	15.320	0.047		
		Q15	0.889	51.624	0.017		
		Q16	0.747	12.069	0.062		
		Q17	0.834	26.923	0.031		
		Q18	0.698	7.810	0.089		
		Q19	0.729	9.661	0.075		
		Q20	0.632	6.479	0.098		
	reciprocal benefits	Q21	0.732	11.241	0.065		
		Q22	0.741	10.058	0.074		
		Q23	0.725	11.855	0.061		
	enjoyment in helping others	Q24	0.754	15.027	0.050		
		Q25	0.706	12.979	0.054		
		Q26	0.722	16.926	0.043		
		Q27	0.695	15.110	0.046		
		Q28	0.742	16.582	0.045		
	self- efficacy	Q29	0.657	12.820	0.051		
		Q30	0.671	10.873	0.062		
		Q31	0.737	17.948	0.041		
		Q32	0.671	12.064	0.056		

		Q33	0.763	26.424	0.029		
Opportunity		Q34	0.951	5.857	0.162	0.793	0.567
		Q35	0.725	3.529	0.206		
		Q36	0.422	2.682	0.251		
Ability		Q37	0.730	15.095	0.048	0.816	0.527
		Q38	0.798	25.228	0.032		
		Q39	0.710	14.078	0.050		
		Q40	0.658	12.092	0.054		

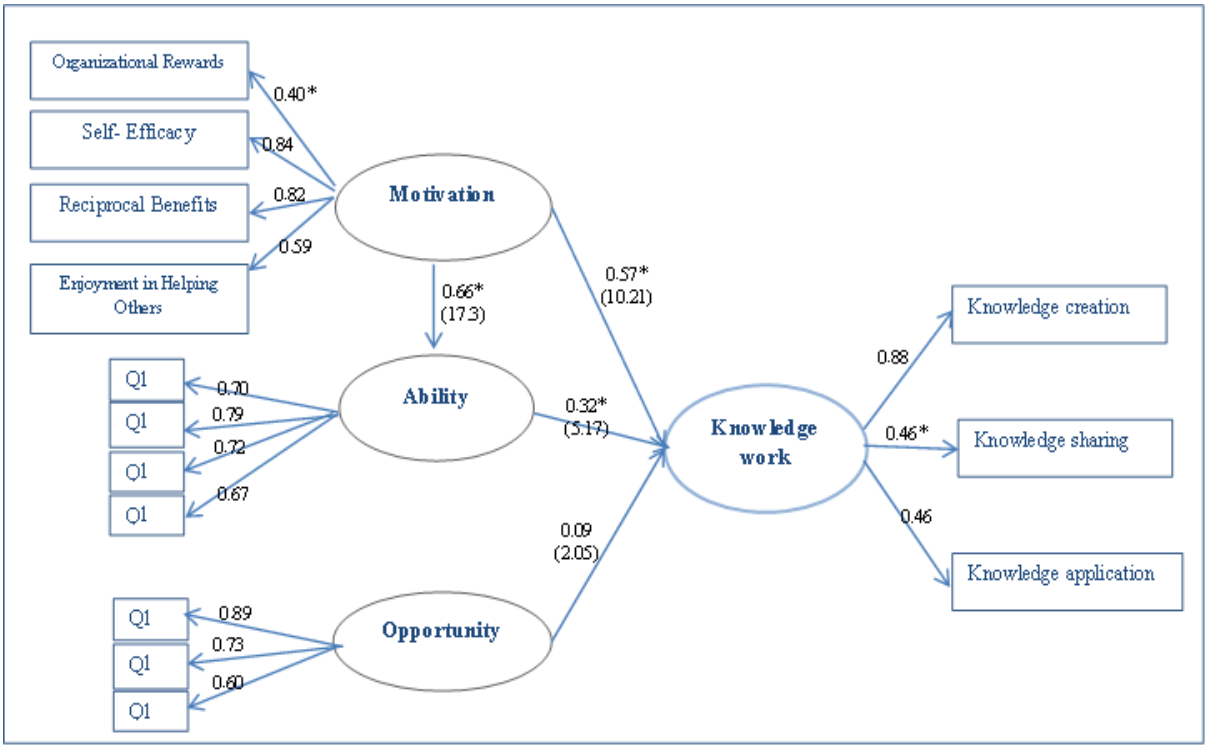
Table 4. Goodness of fit measures for the constructs of research model

constructs	χ2/df	GFI	AGFI	NFI	CFI	RMSEA
Knowledge work	245.58/87	0.93	0.96	0.93	0.91	0.082
Motivation	4745.39/1793	0.93	0.95	0.91	0.92	0.078
Opportunity	29.19/9	0.93	0.90	0.91	0.89	0.077
Ability	5.29/2	0.97	0.91	0.92	0.94	0.082

Table 5. R^2 Value, Path Coefficients and Significance Levels of the model constructs

Constructs	R^2	Path Coefficients	Std. Error	T Value	hypothesis
Motivation> KW	0.725	0.571	0.056	10.20	supported
Opportunity>KW		0.089	0.043	2.05	supported
Ability>KW		0.327	0.063	5.174	supported
Motivation>ability	0.443	0.665	0.038	17.308	supported

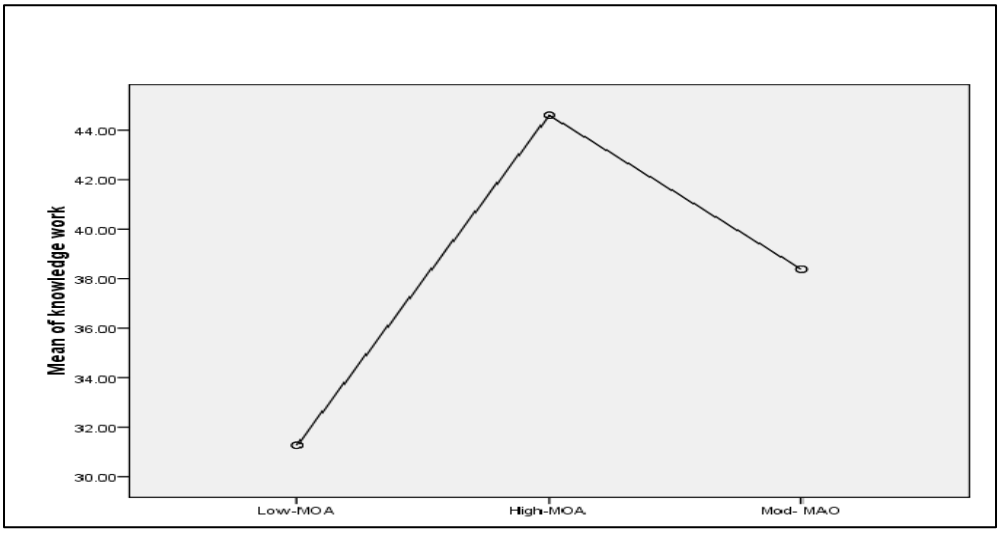
Figure1. Path coefficients for MAO modeling to knowledge work



Note: The model shows path coefficients and corresponding t-value in parentheses.

*Significant at $p < 0.0001$

Figure 2. K-means Cluster analysis of MAO effect on knowledge work



Note: Low-MAO (N=45): ability (M=12), motivation (M=58.18) and opportunity (M=10.38)
Mod-MAO (N=153): ability (M=14.67), motivation (M=76.99) and opportunity (M=11)
High-MAO (N=151): ability (M=17.83), motivation (M=93) and opportunity (M=11.61)