Evidence-Based Management in Context

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Introduction

Trends in digitalization have led to an increase in data availability within organizations (Beath et al., 2012). In a recent study, 97.2% of organizations reported having invested in data and artificial intelligence initiatives (New Vantage, 2023). Netflix, for instance, has reported that generating insights from data saves one billion dollars per year on customer retention (Petrov, 2023). The idea of generating value from data has also been discussed in the management literature. However, rather than arguing that more data always leads to better and high-quality decision-making, some scholars have considered the boundaries and restrictions to managers' use of data in decision-making. The theory of bounded rationality proposed by Simon (1982) states that the rationality of decision-making is bounded by internal limitations (e.g., human cognition) as well as external limitations (e.g., time and quality of information available). Thereby, this theory offers a more critical view of how the quality of decision-making can be enhanced. Within this framework, scholars have argued that despite possessing imperfect information, incorporating data into management decision-making can enhance the effectiveness and efficiency of decisions (Sahakian, 2020; Kroon, 2021). This approach is known as Evidence-Based Management (EBMgt); it refers to collecting data from various sources (e.g., workforce-related data, scientific literature, etc.), evaluating its quality, and incorporating it in decision-making (Barends et al., 2014). By focusing on the quality of the evidence used in decision-making, EBMgt encourages the use of more effective practices, consequently improving decision-making, and thereby, organizational performance (Kovner & Rundall, 2006; Walshe & Rundall, 2001).

However, despite the increase in data availability, it has been argued that managers mostly rely on intuition and experience when making decisions due to their inability to work with data (Starkey et al., 2009; Angrave et al., 2016). Consequentially, scholars have aimed to understand the type of skills that managers need to practice EBMgt and to make use of the

increasingly available data. According to the Future of Jobs Report, cognitive skills such as analytical skills, creative thinking, and systems thinking are within the top 20 skills needed for managerial jobs in the future, with analytical skills and creative thinking being in the top two (WEF, 2023). Similarly, Daouk-Öyry et al. (2020) examined the knowledge, skills, and abilities needed for managers to practice EBMgt. Specifically, they found research knowledge and skills (RKS), which refers to managers' knowledge and use of data analytics, to be an important factor for the success of EBMgt. This is not surprising as managers' RKS has been previously considered within EBMgt literature (Barends et al., 2015; Liang & Howard, 2011). However, they also identified several cognitive skills (e.g., critical thinking, systems thinking, and creativity) that are relevant to the practice of EBMgt. According to Daouk-Öyry et al. (2020), cognitive skills allow managers to critically evaluate and analyze information (i.e., critical thinking), consider the implications of decisions both in the short and long term (i.e., systems thinking), and find creative solutions even when facing resource scarcity (i.e., creativity). However, it is still not clear how these EBMgt competencies (e.g., cognitive skills and RKS) lead to better quality decision-making and more effective organizational practice (Sahakian, 2020; Arndt & Bigelow, 2009; Reay et al., 2009; Swan et al., 2012). Therefore, this paper aims to provide clarity on this process by studying the possible relationship between cognitive skills, RKS, and managers' performance. As the nature of decision-making varies from case to case (Schlenker, 2017), this paper uses individual performance (IP) as a proxy. Moreover, as decision-making is a core task of managers (Liang et al., 2012; Barends et al., 2017), enhanced decision-making is expected to also improve managerial performance.

The idea that cognitive skills enhance people's ability to process information, make better decisions, and perform better has been previously confirmed by scholars (Heidari & Ebrahimi, 2016; Hill, 2002). Yet, within the context of EBMgt, the possible relationship between cognitive skills and managers' RKS has not been studied before (Sahakian et al., 2020).

Daouk-Öyry et al. (2020) state that their EBMgt competency model is dynamic in the sense that some competencies (e.g., cognitive skills) may be necessary pre-requisites to the specific technical competencies (e.g., RKS). Considering scholars have criticized managers' lack of ability and willingness to use data and analytics in daily practice (Angrave et al., 2016), one could argue that possessing certain cognitive skills such as critical and systems thinking is needed for managers to understand the value of data analytics and put effort into developing and using RKS. Moreover, managers who are creative with finding solutions even when faced with resource scarcity are more likely to consider collecting new data in ways that are not overly costly (Daouk-Öyry et al., 2020). These arguments can be supported by Vroom's expectancy theory (1964) which argues that people tend to be more motivated toward a goal if they perceive that their efforts will eventually generate positive outcomes.

Furthermore, EBMgt literature has received criticism for not considering how EBMgt decisions are made in different contexts where contingencies such as personal interests and politics are at play (Sahakian, 2020). Scholars have argued that ignoring contextual factors such as organizational politics assumes that managers are always willing and able to make decisions based on evidence (Morrell et al., 2015). Yet, perceived organizational politics (POP) can negatively influence managers' decision-making process despite their cognitive and research skills (Kroon, 2021). Indeed, the concept of POP entails that employees perceive that it is not facts that drive decisions but protecting individuals' self-interest (Porter et al., 1983). Accordingly, managers working in highly political organizations may not use their RKS as they do not trust that the findings will be considered or appreciated by higher management. Therefore, this paper also aims to study the effect of POP on the possible relationship between cognitive skills, RKS, and IP. Specifically, to answer the following research question: *To what extent do managers' research knowledge and skills mediate the relationship between*

cognitive skills and individual performance, and does perceived organizational politics moderate this relationship?

This paper contributes to the EBMgt literature in the following ways. Firstly, by studying the relationship between various EBMgt competencies (e.g., RKS and cognitive skills) this paper can facilitate a better understanding of the process through which EBMgt can lead to positive performance outcomes (Sahakian, 2020). Secondly, finding a significant moderating effect of POP would confirm the idea that contextual factors can influence EBMgt and, therefore, should be taken into consideration.

The findings of this paper could also be beneficial for (HR) practitioners. Considering that lack of RKS among managers has been identified as a barrier to EBMgt (Barends et al., 2015; Liang & Howard, 2011), identifying predictors of RKS would help practitioners select candidates accordingly. With this, organizations can more easily acquire the competencies needed in today's data-driven world.

In the next section, the interconnectedness of the variables comprising the research question will be explained using the bounded rationality theory and the expectancy theory.

Theoretical Framework

Cognitive Skills and IP

The theory of bounded rationality was first proposed by Simon (1982) as a reaction to the rational choice theory which assumes that people are rational agents and can make decisions with the best outcome (Kroon, 2021). The bounded rationality theory, however, states that the rationality of decision-making is limited by the information available, the time allotted to decision-making, and human cognitive abilities (Jayles, 2017). However, despite people having limitations to their cognitive abilities, some people score higher on cognitive skills than others (Boudreau et al., 2001). Thereby, this theory implies that the extent to which the quality of decisions is limited can vary depending on one's cognitive abilities. Indeed, within EBMgt,

which refers to the practice of gathering, evaluating, and incorporating data into decision-making, thereby, improving organizational performance (Barends et al., 2014; Kovner & Rundall, 2006), certain cognitive abilities have been argued to facilitate overcoming these limitations and making better decisions. According to Daouk-Öyry et al. (2020), cognitive skills relevant to EBMgt comprise three competencies; critical thinking, systems thinking, and creativity. Critical thinking refers to managers' ability to reflect on, evaluate, and analyze information (Moon, 2007). Managers with a high degree of critical thinking ability have intellectual curiosity and are analytical; they dissect problems while comparing and synthesizing information (Amer, 2005). Accordingly, someone with critical thinking skills may be better able to evaluate and analyze available information and thereby, make better use of existing information. In addition, critical thinkers are more likely to question whether the information they possess supports the decision they are making. The second competency, systems thinking, refers to the ability to perceive an organization as a whole, while recognizing that different parts interact together (Katz, 1955). Additionally, this competency entails considering the implications of decisions for different stakeholders as well as thinking of both, the short and long-term implications of decisions (Daouk-Öyry et al., 2020). Moreover, bounded rationality highlights that decisions can be imperfect due to time pressures (Jayles, 2017). Indeed, quick fixes (i.e., decisions made without thorough investigation) have been argued to elicit negative consequences in the long term (Briner, 2007; Kroon 2021). However, managers with systems thinking abilities are not likely to be swayed by time pressures, understanding the long-term implications of day-to-day decisions. Another reason that the quality of decisions is bounded is due to the limited information that managers have (Jayles, 2017). Indeed, looking for additional information can be costly and complex in practice (Kroon, 2021). However, managers who possess creativity, which entails generating new ideas and creative solutions even when they experience resource scarcity (Daouk-Öyry et al., 2020), are

likely to find creative ways of collecting data (e.g., connections with other departments, externals,) and incorporate this additional information into their decision-making. Therefore, managers who possess these cognitive skills are likely to be better able to gather, evaluate, and incorporate data into their decision-making and improve the quality of their decisions.

According to Schlenker (2017), the content and nature of decision-making can vary from case to case, which makes it difficult to measure it with a general scale. Taking this into consideration, this paper uses individual performance (IP) as a proxy. IP is defined as the extent to which individuals engage in work behaviors that contribute to the achievement of goals associated with their jobs (Astin, 1964; Murphy, 1989; Campbell, 1990). Considering that making decisions is one of the core tasks of managers and highly affects manager performance outcomes (Liang et al., 2012; Barends et al., 2017), the discussed cognitive skills are expected to improve managerial performance.

Empirical evidence conducted in the medical field suggests that critical thinking abilities improve decision quality and performance (Heidari & Ebrahimi, 2016; Hill, 2002). Research outside of clinical settings is in line with this, finding that critical thinking plays an important factor in the decision-making process as it guides managers in making higher-quality decisions (Haase, 2010). Furthermore, research shows that systems thinking is a relevant skill for managers to possess when making decisions within complex situations as it entails considering relevant contextual information before deciding on a direction (Yurtseven & Buchanan, 2016). Regarding creativity, scholars argue that decision quality tends to be higher when decisions are based on combining diverse information that stems from non-redundant, heterogeneous sources (Burt, 2004; Perry-Smith, 2006). Moreover, creative thinking was identified as a unique predictor of leader performance, while controlling for general cognitive abilities (Shipman et al., 2010; Zaccaro et al. 2015). As managers vary in their cognitive skills (Boudreau et al., 2001), it is likely that managers who score higher on cognitive skills are better

able to analyze, access, and incorporate relevant information into their decision-making process and, thereby, enhance their performance. In line with this, the following hypothesis is suggested:

H1: Managers' cognitive skills are positively related to individual performance.

The Mediating Role of RKS in the Relationship Between Cognitive Skills and IP

Cognitive Skills and RKS

Within Daouk-Öyry et al.'s (2020) EBMgt capability framework, a core technical skill is one's research knowledge and skills (RKS), which the authors define as knowledge and skills necessary for conducting research (e.g., searching, understanding, and analyzing data, and generating actionable insights) and the ability to apply this knowledge to practice. However, considering the gap between scientific findings and management practice, scholars have highlighted managers' resistance toward data analytics (Starkey et al., 2009; Angrave et al., 2016; Rynes & Bartunek, 2017). Specifically, managers have been criticized for not possessing data analytics skills which are needed in today's data-driven world (Angrave et al., 2016). However, as the paper by Daouk-Öyry et al. (2020) concludes, managers should not only have these skills but also apply them to daily practice to generate value from these skills. Managers who find no value in EBMgt, may not have the motivation to develop nor use research skills, while a certain degree of motivation would be expected to invest effort in acquiring, and thereby, having and using RKS. A theory that addresses motivation is Vroom's expectancy theory (1964). Despite its focus on economic rewards, expectancy theory has been used to explain why people put effort into achieving better performance (Shweiki et al., 2015; HemaMalini & Washington; Gopalan & Bakar, 2017). Hence, this theory could explain why some managers would be motivated to develop and utilize RKS to improve their decision-making. According to the expectancy theory, motivation is the outcome of the valuableness of a reward (i.e., Valence), the likelihood that effort will lead to better performance (i.e., Expectancy), and the belief that better performance will lead to a reward (i.e., Instrumentality).

Thereby, individuals are more likely to be motivated to pursue a goal if they value the expected reward, expect that their efforts will lead to better performance, and expect their performance to be recognized and rewarded (Vroom, 1964). Rewards that managers may value can be tangible (e.g., bonus, raise, etc.) and intangible such as recognition (Gopalan & Bakar, 2017). The idea that managers value financial rewards, promotion opportunities, and recognition has been studied and confirmed by scholars (Bussin et al., 2017; Smith et al., 2015). Nowadays the practice of tying rewards to performance, rather than seniority is very common in organizations and has been considered to be a best practice (Kim & Park, 1997; Martin & Ottemann, 2015). Therefore, within the context of this paper and the expectancy theory, it can be assumed that managers are likely to value the rewards expected from showing better performance (i.e., Valence). However, managers' likelihood of actually using RKS to an extent depends on the belief that they will be successful in utilizing RKS to show better performance. Namely, scholars have argued that using data to inform decision-making does not always automatically improve performance (Khan & Millner, 2020). Rather, Khan & Millner (2020) argue that the value of data analysis comes from focusing on actionable questions, connecting data with relevant contextual information, and taking action to improve organizational practices. Having certain cognitive skills such as critical thinking and creativity, may therefore be required to use data and analytics in a way that leads to positive outcomes such as better decision-making and performance. Therefore, the criterion of Expectancy is especially relevant in explaining how cognitive skills can enhance managers' willingness to invest in, and use RSK. Specifically, if managers are expected to have and use RKS, they need to be convinced that their efforts will lead to better performance. Using RKS can be complex for managers with no background in statistical analysis. However, the idea that cognitive skills enhance people's learning speed and ability has been widely confirmed by scholars (Hunter, 1986; Plomin 1999). Therefore, it could be argued that managers with high cognitive skills, may have more confidence that they can

acquire RKS and believe that their efforts will lead to improved performance. Furthermore, Daouk-Öyry et al. (2020) argue that managers with systems and critical thinking may value conducting in-depth analysis and weighing different sides of an issue before taking action, hence, they are likely to see the value that data collection and analysis can bring to decision-making. Moreover, collecting and analyzing data in a dynamic organizational environment can be difficult as this process often goes parallel with daily business operations and requires time and financial resources (Daouk-Öyry et al., 2020). Consequentially, one needs to have sufficient confidence in gathering and analyzing data despite facing organizational limitations. In this regard, managers who are creative and resourceful are likely to have different ideas on how to find and gather data even when organizational resources such as finances are scarce. Accordingly, a positive relationship between managers' cognitive skills and RKS is likely, whereby managers who score high on cognitive skills are more likely to score high on having and using RKS.

While empirical studies have not focused on the antecedents of RKS (Daouk-Öyry et al., 2020), there is evidence that indirectly supports the idea that managers with certain cognitive skills are more likely to possess and use RKS. Specifically, Gatzoulis et al. (2004) found that students with high cognitive skills have stronger technical skills than students who score low on cognitive skills. Considering the competency of RKS is technical (Daouk-Öyry et al., 2020), people with cognitive skills may also score high on RKS. Furthermore, insufficient levels of critical thinking have been associated with a preference for intuitive decision-making and a preference for intuition over scientific evidence (Dawes, 2008). Moreover, Maani and Maharaj's (2004) study showed that students with systems thinking abilities aimed to better understand a problem before they took action. In addition, according to Salmons (2022), creative and critical thinking are core skills needed in every stage of designing and conducting research studies. Examples include critically selecting relevant

questions and needed data, and coming up with creative ways to collect data or use existing data (Salmons, 2022). Regarding creativity, the qualitative study of Daouk-Öyry et al. (2020) suggested that whenever resources are scarce, evidence-based managers need to have the creativity to find other ways of gathering data.

In short, the logic of expectancy theory combined with existing scientific studies suggests that managers who score high in cognitive skills are likely to possess and use RKS. Therefore, the next hypothesis is the following:

H2: Managers' cognitive skills are positively related to their research knowledge and skills.

RKS and IP

Supporters of EBMgt argue that incorporating data in decision-making can enhance the quality of decisions and, thereby, the level of performance (Kroon, 2021). Using the theory of bounded rationality, scholars have argued that despite having imperfect information (i.e., limited knowledge), decisions can be effective if the decision-maker considers various sources of data and tries to base decisions on what the data shows instead of solely relying on experience or instinct (Bazerman, 2009; Kroon, 2021; Sahakian, 2020). Specifically, making decisions haphazardly, without analyzing underlying causes has been argued to reduce the quality of decisions made (Briner, 2007). Conversely, managers with RKS may be better able to correctly collect, evaluate, and incorporate data into their decision-making and as a result, have better performance.

Scientific reviews support the idea that gathering and analyzing data improves the quality of decisions made by managers (Green & Britten, 1998; Baba & HakemZadeh, 2012, Pullin & Knight, 2003). Moreover, the systematic review by Orton et al. (2011) showed that despite barriers to the effective use of scientific findings (e.g., managers' perceptions of the data, the culture in which decision-makers operate, etc.), managers who did use scientific insights experienced improved decision-making outcomes. Furthermore, a longitudinal study

by Varkevisser et al. (2001) investigated the effect of evidence-based practices on decision-making quality and found that managers who received training on improving their RKS skills made decisions that led to significantly lower mistakes than managers who did not receive training. In short, managers who possess and utilize RKS may be able to incorporate data into their decision-making and show better performance. Hence, the following hypothesis:

H3: Managers' research knowledge and skills are positively related to individual performance.

The Partial Mediating Role of RKS

Relying on the previously mentioned arguments and empirical evidence, this paper goes a bit further in arguing that the relationship between cognitive skills and IP is partially mediated by RKS. Specifically, while managers with certain cognitive skills (e.g., critical thinking, systems thinking, and creativity) are likely to perform better because of their ability to understand the complexity of decision-making and its consequences in the long term, a part of this positive relationship could be explained by these managers' RKS. Specifically, a reason that cognitive skills enhance managers' performance may not only rely on their ability to gather and analyze an issue using information from various sources but also because having certain cognitive skills would increase managers' motivation to develop and use RKS as they are more likely to value the additional insights that data analysis can provide for their decision-making and performance (i.e., Expectancy). RKS consequentially, would allow managers to determine what data needs to be collected, dive deeper into the data and understand the underlying causes of a problem, target interventions at the underlying causes, and improve their performance.

Scientific literature shows support for this proposed partial mediation. Maani and Maharaj's (2004) experimental study showed that the relationship between systems thinking and performance was mediated by students' understanding of the problem. Namely, students with systems thinking abilities aimed to first get a better understanding of the problem before they took action, and this was only the case with high-performing students. This indeed seems

to support the idea that systems thinking may facilitate managers' use of RKS to make better quality decisions. However, the generalizability of the findings should be considered with caution taking into account that this study focused on students. Furthermore, Leslie et al. (2018) argue that for data to provide value, its implications should provide meaningful and actionable insights. Thereby, it could be argued that it is not the consideration of additional sources, but one's RKS such as collecting relevant data, and using the right type of analyses that can help generate valuable insights and improve decision-making (Khan & Millner, 2020; Leslie et al., 2018). Hence, this study proposes the following hypothesis:

H4: The expected positive relationship between cognitive skills and individual performance is partially and positively mediated by managers' research knowledge and skills.

The Moderating Role of Perceived Organizational Politics

While the adoption of the EBMgt has been widely promoted (Konver & Rundall, 2006; Walshe & Rundall, 2001), some scholars have criticized the EBMgt literature for not considering the influence of contextual factors such as organizational politics in the practice of EBMgt (Arndt & Bigelow, 2009; Morrell et al., 2015). The concept of organizational politics is divided into objective and perceived organizational politics (POP). The former refers to informal organizational behavior aimed to protect the self-interest of individuals or groups irrespective of factual information (Porter et al., 1983), while the latter represents people's perceptions regarding informal organizational behaviors (Kozlowski & Farr, 1988). Considering people's perceptions are argued to be better predictors of behaviors compared to objective measures (Shore & Wayne, 1993; Ahn et al., 2014), this paper will concentrate on POP. Generally, individuals who perceive organizational politics within their organization to be high, agree that it is not evidence that drives decision-making but an individual's self-interest and their ties with influential people within the company (Bouckenooghe et al., 2009). While opinions on the effects of POP are mixed (Bouckenooghe, 2012), many view POP as a

dysfunctional and negative aspect of the work environment (Ferris et al., 1989). Specifically, meta-analyses by Chang et al. (2009) and Miller et al. (2008) showed that POP had significant negative relationships with job satisfaction, organizational commitment, task performance and positive relationships with stress, and turnover intention. Therefore, scholars have suggested incorporating such contextual factors as POP, by examining the influence of such factors on EBMgt (Kroon, 2021). The expectancy theory (Vroom, 1964) can be used to consider the influence of POP on managers' motivation for developing or using RKS. Namely, the criterion of Instrumentality, which refers to managers' faith that their performance will lead to positive outcomes (Vroom, 1964) becomes especially important when considering the possibility of organizational politics. Specifically, if managers perceive that within their organization it is not critical analysis, collection of data, and use of evidence but individual interests and networks that are appreciated, they may get discouraged from using RKS as they may not expect to receive positive outcomes through better performance. Moreover, considering the argument that in political organizations data is not always well received (Porter et al., 1983), it is likely that despite having evidence in favor of certain choices, top management may still not take these facts into consideration, which is likely to demotivate managers to further develop or utilize their RKS in the future.

Current empirical evidence supports the idea that political environments can reduce the quality of managers' decisions, and thereby their performance. For instance, Mirfakhar et al. (2018) have argued that managers do not aim for best practices partly due to conflicting interests within organizations. Specifically, within the field of HRM, scholars have found that many areas of decision-making (e.g., performance management, selection, etc.) are often political (Ferris & King, 1991), and managers face difficulties operating in environments with conflicting needs and interests (Trullen et al., 2020). Furthermore, Spiers et al. (2016) examined leaders' evidence-based decision-making process within the healthcare sector and

found that political and financial criteria were often prioritized over patient needs. The authors concluded that EBMgt is highly influenced by organizational politics in terms of information availability, setting priorities, and decision-making.

In short, managers may not be motivated to develop and use RKS when they perceive that their organization has a strong political climate, and rather rely on their intuition which, in turn, can hinder their performance. Hereby, the following hypotheses:

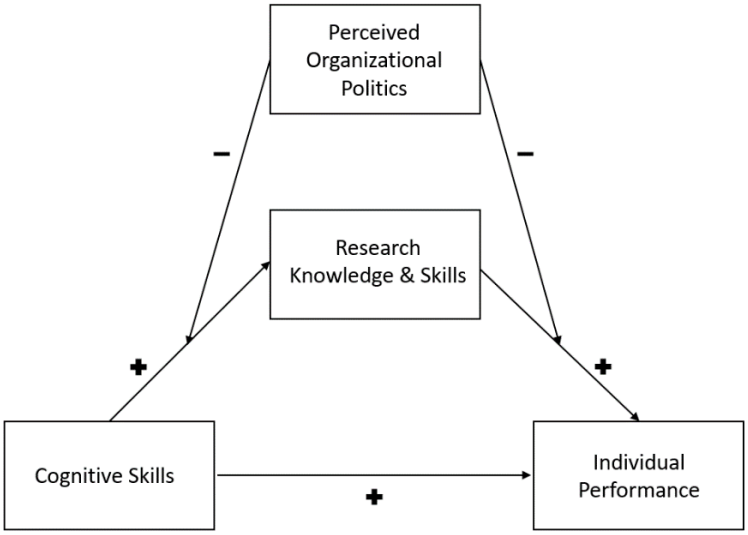
H5: Perceived organizational politics moderates the positive relationship between cognitive skills and research knowledge and skills, such that this relationship is weaker when the level of perceived organizational politics is high.

H6: Perceived organizational politics moderates the positive relationship between research knowledge and skills and individual performance, such that this relationship is weaker when the level of perceived organizational politics is high.

Figure 1 illustrates the summary of the hypothesized relationships between Cognitive Skills, RKS, IP, and POP.

Figure 1

Conceptual model



Methods

Research design

A cross-sectional, quantitative design was used to examine the proposed hypotheses. The data was collected through self-reported online questionnaires. The questionnaire included more variables than those relevant to this study because this study is part of a larger research project that aims to validate the Evidence-based Management Competencies Questionnaire, a measure of the Evidence-Based Competency Model (Daouk-Öyry et al., 2020). However, only variables included in the conceptual model of this study were considered for this case.

Sample

As this study focuses on EBMgt competencies, the sample comprised experienced European (92.8%), Asian, and Middle Eastern (7.2%) managers who held managerial positions two years or longer in various industries such as Healthcare (9.8%), Construction (9.8%), Manufacturing (9%) and Banking (6.3%). The initial number of respondents was 219. However, after removing respondents who had less than two subordinates, and who filled in

only the demographics, the number was reduced to 112. The sample contains 42% female and 58% male participants with an average age of 48.5 years. The majority of managers (69.6%) worked at medium-sized (i.e., 50-249 employees) and large enterprises (250 or more employees). Regarding education, 63% of the managers had at least a Bachelor's degree of which 44.6% also had a Master's degree, and 6% held the title of PhD.

Procedure

The data was collected from September to the end of October of 2023 by students of Human Resources Studies from Tilburg University. Participants were selected through convenience and snowball sampling methods. Convenience sampling is a method where participants are selected from cases that are conveniently available (e.g., personal connections), while snowball sampling refers to participants providing referrals to recruit more subjects (Straits & Singleton, 2018). Personal networks and professional social media sites (e.g., LinkedIn) were used as ways of contacting managers, providing information about the project, and inviting them to participate. After receiving the managers' agreement to participate in the study, online questionnaires were sent by e-mail. Questionnaires included a cover letter; informing participants about the expectations of the researchers and that they can stop at any moment without facing any consequences. Furthermore, the confidentiality and anonymity of the research was emphasized to ensure informed consent. Lastly, the participants were provided with an e-mail address to communicate possible concerns or questions about the questionnaire. The proposal for this research was approved by the Ethics Review Board of Tilburg University before the start of data collection.

Measurement instruments

Questionnaires were used to measure the following five variables: cognitive skills (i.e., critical thinking, systems thinking, and creativity), research knowledge and skills (RKS), individual work performance (IP), and perceived organizational politics (POP). The

questionnaires were provided in English and Dutch to reach Dutch as well as international managers. All items were translated to Dutch with the back translation process, which entails a Dutch speaker translating an item from English to Dutch and asking another Dutch speaker to translate the Dutch version of the item back to English. The original item was then compared to the translated item to ensure that they both contain the same meaning. In addition, all items were tested on construct validity and reliability, and scales were constructed with Principal Axis Factoring (PAF) and reliability analysis.

The assumptions for PAF were tested. Namely, Bartlett's Test of Sphericity had to be significant (p<.05), and the Kaiser-Meyer-Olkin (KMO) index had to be larger than .6 to get accurate results (Barlett, 1954; Kaiser, 1974). Both assumptions were met across the scales, indicating that PAF was a suitable validity test for variables included in the hypotheses (Pallant, 2013). Furthermore, the scree plot was used when selecting the number of factors. The reliability of the scales was evaluated using COTAN guidelines for individuals. Namely, Cronbach's $\alpha < 0.7$ as 'insufficient', Cronbach's α between 0.7 and 0.8 as 'sufficient', and Cronbach's $\alpha > 0.8$ as 'good' (Evers et al., 2010).

Cognitive Skills

To measure cognitive skills (hereafter referred to as CS), the research team of the larger project formulated new items and supplemented some with existing items from the literature that represent the definitions of CS from the EBMgt competencies model (Daouk-Öyry et al., 2020). CS which comprises three competencies (i.e., critical thinking, systemic thinking, and creativity) was measured using 34 items. The items were measured on a 5-point Likert scale ranging from "completely disagree" (1) to "completely agree" (5). A sample item is "I am curious to know as much as possible about a problem I am trying to solve".

The PAF analysis showed a KMO score of 0.812 and the significance of Bartlett's test of sphericity (χ 2 (561) = 1870.950, $p<0.001$). Initially, PAF indicated a six-factor solution

when eigenvalues were set to be greater than 1, even when using rotations (i.e., Varimax and Oblimin). This was the case despite the scree plot indicating a large drop after the first factor. As this study was not aiming to validate the questionnaire, and the conceptual model was based on a one-factor solution, factor loadings were forced into a one-factor solution (see Appendix A). This solution explained 27.6% of the total variance with an eigenvalue of 9.384. To find the overall score for CS, a mean score of the items was calculated. Scale reliability was good ($\alpha = .916$).

Research Knowledge and Skills

To measure RKS, the research team of the larger project formulated new items and supplemented them with existing measures of evidence-based practice in nursing (Paul et al., 2016) and research self-efficacy (Bieschke et al., 1996; Phillips & Russell, 1994). The scale measuring RKS consisted of 18 items. The items were measured on a 5-point Likert scale ranging from "completely disagree" (1) to "completely agree" (5). A sample item is "I collect data from different sources to solve problems at work". The PAF analysis showed a KMO score of 0.784 and the significance of Bartlett's test of sphericity ($\chi 2\ (153) = 885.871,\ p<0.001$). The PAF indicated a three-factor solution, despite the scree plot showing a considerable drop after the first factor. A forced one-factor extraction was conducted, with an eigenvalue of 5.320 and a 29.6% explained variance (see Appendix A). Scale reliability was good ($\alpha = .867$).

Individual Performance

The Individual Work Performance Questionnaire by Koopmans et al. (2014) was used to measure performance. This questionnaire measured Task and Contextual performance. Task performance was measured by five items, and Contextual performance was measured by eight items. All items were measured on a 5-point Likert scale (1 = seldom, 5 = always). All questions prompt the manager to reflect on their performance in the past three months. A sample item measuring Task performance is "I kept in mind the results that I had to achieve in

my work". An example of an item measuring Contextual performance is "I took on extra responsibilities". Results of reliability analyses have indicated acceptable reliability coefficients ranging between 0.74 to 0.85 (Koopmans et al., 2014). The PAF analysis showed a KMO score of 0.773 and the significance of Bartlett's test of sphericity ($\chi 2$ (78) = 598.167, $p<0.001$). The PAF indicated a three-factor solution. However, considering existing research has used this scale as a one-factor (Ramos-Villagrasa et al., 2019), a forced one-factor extraction was conducted, with an eigenvalue of 4.843 and a 37.3% explained variance (see Appendix A). Scale reliability was good (α = .879).

Perceived Organizational Politics

To measure POP, the three-item scale from the Organizational Change Questionnaire-Climate of Change, Process, and Readiness (OCQ–C, P, R) was used (Bouckenooghe et al., 2009). While Politicking (i.e., political climate) is only one of the 11 dimensions of the OCQ–C, P, R questionnaire, this dimension has been used as a separate scale by Bouckenooghe (2012) and thereby has been confirmed to be a reliable and valid tool for measuring POP. All items were measured using 5-point Likert-type scales that range between ''strongly disagree'' (1) to ''strongly agree'' (5). A sample item is "In our organization, favoritism is an important way to achieve something". The PAF indicated a one-factor solution with an eigenvalue of 2.268 and an explained variance of 75.6% (see Appendix A). The PAF analysis showed a KMO score of 0.701 and the significance of Bartlett's test of sphericity (χ 2 (3) = 183.056, $p<0.001$). Scale reliability was good (α = .898).

Control Variables

Considering that managers' RKS can be influenced by their level of education (Pravikoff et al., 2005), this study used prior education as a control variable. In addition, managers' gender and age have also been shown to correlate with performance (Bai

et al., 2019; Cavazotte et al., 2012; Derue et al., 2011; Strang & Kuhnert, 2009). Therefore, these variables were also controlled to prevent finding spurious effects.

Analysis

The data analysis was performed using IBM SPSS statistics 29. To clean the data a missing value analysis was conducted by inspecting the frequencies table for each variable. Firstly, respondents who had not filled in the questionnaire past the demographics or did not have at least 2 subordinates in their team, were removed from the sample (i.e., 107 managers). Moreover, a pattern of dropping the questionnaire at various points was found for 16 managers. Considering the length of the questionnaire (i.e., 25- 45 minutes) it was deemed likely that managers did not have the time to fill in the questionnaire. According to Little (1998), if none of the variables in the data set are related to missingness, then the data can be deemed to be missing completely at random (MCAR). To test whether this was the case, Little's MCAR test was conducted (see Appendix B) and the hypothesis that the missing data is not at random was rejected (χ^2 = 4.90, df = 11, p = .936). In MCAR situations listwise deletion and replacing missing scores with the mean score (i.e., imputation) are commonly practiced (Kang, 2013). Considering the sample was already not large, the choice was made to impute the missing scores of the 16 managers with the mean score of each item, before computing the scales. Other than this group, no missing scores were identified.

Next, items with a negative direction were reverse-coded before computing them into scales. Furthermore, the variable gender was coded as female (1) and male (0), to make the interpretation of the variable easier. In addition, the categorical variable education level was coded into two categories (i.e., 1 = BSc, MSc + Ph.D; academic educational institutions teaching research skills, and 0 = high-school, pre-vocational education, and applied sciences; less research-focused institutions).

To test the conceptual model, Hayes' Process Macro was used. However, as this model does not check for the assumptions of regression analysis, the assumptions were manually checked before using the process model. Specifically, after confirming the validity and reliability of the scales, assumptions of linearity, homoscedasticity, normality, and multicollinearity, were checked. First, the distribution of all variables was tested. All variables were normally distributed. Next, the assumption of a linear relationship between the independent variables and the dependent variable was confirmed with Pearson's correlation. The correlation coefficients were below the threshold criterion of .9, thus, the assumption of no multicollinearity was met. Furthermore, through an initial linear regression analysis, the assumptions for linearity, homoscedasticity, and normal distribution of residuals for IP were checked. These assumptions were met. Lastly, the histograms of the all variables were studied and no outliers were detected in the distribution of scores.

After checking the assumptions, Hayes' Process Model 58 was used to test the hypotheses. This model allows testing the (partial) mediating effect of RKS on the possible relationship between CS and IP. In addition, the model allows testing for the moderating effect of POP on the relationship between CS and RKS as well as RKS and IP respectively. Bootstrapping 5000 was applied to examine the moderation effect. The level of significance was set to alpha = 0.05 (McKinnon et al., 2007) with a 95% confidence interval (Hayes, 2018). To test the hypotheses all variables, including control variables, were entered into the process model. The possible direct effect of IV (i.e., CS) on DV (i.e., IP) would be confirmed if the *p* value of the standardized coefficient is smaller than 0.05 while controlling for managers' age, gender, and education level. Moreover, the hypothesized partial mediation effect would be deemed significant if the *p* value of the standardized coefficient is lower than 0.05 when M (i.e., RKS) is regressed on IV, DV is regressed on M, and when the effect of IV on DV is still significant. Lastly, to check for the moderating effect of POP the pairwise contrasts between

the interaction effects will be checked; if at least one of the bootstrap intervals does not contain 0, it can be concluded that POP has an interaction effect on the relationship between CS, RKS, and IP.

Results

Descriptive statistics

In Table 1, the standard deviation, the mean, and the correlations of the study variables are displayed. Variables CS, RKS, and IP have a mean ranging from 3.7 to 3.9, which means that in the sample on average people report having fairly high CS and RKS as well as moderately high performance. On the other hand, POP has a mean of 2.6, which indicates that on average the perception of organizational politics in this sample is on the lower side.

The correlation matrix shows a significant positive correlation between the scales of CS and RKS (r = .529, p <.001), CS and IP (r = -.593, p <.001), and between RKS and IP (r = .386, p <.001). This indicates that high scores of CS correlate with high levels of RKS and IP, as well as high levels of RKS being correlated with high levels of IP.

Table 1

Descriptive Statistics: Mean (M), Standard Deviation (SD), and Correlations (N=112)

	M	*SD*	1.	2.	3.	4.	5.	6.	7.
1. Gender	.42	.50	-						
2. Age	48.49	11.7	-.081	-					
3. Education level	.65	.48	-.100	-.073	-				
4. CS	3.9	.41	.155	.086	.052	-			
5. RKS	3.9	.48	-.012	.011	.107	.529**	-		
6. POP	2.6	.93	-.018	-.327**	.238*	-.032	.077	-	
7. IP	3.7	.55	.201*	.029	-.137*	.593**	.386**	-.099	-

**p < .001, *p < .05

Hypothesis testing

In this section, the findings of the tests concerning all hypotheses are presented. With Model 1 (see Table 2) the effect of CS on RKS, and the interaction effect between CS and POP was tested while controlling for age, gender, level of education, and POP. This model showed that controlling for other variables, CS had a significant positive effect on RKS (b = .621, p <.001*)*. Based on the results, hypothesis 2, which expected a positive relationship between CS and RKS, was accepted. On the other hand, no significant direct effects of POP and other control variables on RKS were found. In addition, the expected negative interaction effect of POP was insignificant for the relationship between CS and RKS (b = -.122, p = .292). Therefore, hypothesis 5 which argued that POP has an interaction effect on the relationship between CS and RKS, was rejected.

Next, with Model 2, the possible direct effects of RKS and CS on IP were tested along with the interaction effect between POP and RKS. While CS had a significant positive effect on IP (b = .693, p <.001), this was not the case for RKS (b = .154, p = .134). Thereby, hypothesis 1 was accepted, indicating that in this sample managers' high performance can be partly explained by their level of cognitive skills, while hypothesis 3 which argued for a positive relationship between RKS and IP was rejected. Moreover, the expected negative interaction effect of POP was insignificant for the relationship between RKS and IP (b = -.043, p = .642). Therefore, hypothesis 6 which argued that POP has an interaction effect on the relationship between RKS and IP, was rejected.

Lastly, the indirect conditional effect of CS on IP through RKS was insignificant for all three levels of POP (see Table 3). This finding was expected considering the insignificant direct effect of RKS on IP, as well as the insignificant effects of the POP as a moderator. Thereby, hypothesis 4 which stated that RKS plays a (partial) mediating role between CS and IP was also rejected.

Table 2

Model Coefficients of the Conditional Process Model (N = 112)

		Consequent				
		M (RKS)			Y (IP)	
Antecedent	*B*	*SE B*	*p*	*B*	*SE B*	*p*
Constant	0.011	.194	.954	3.902	.206	<001
Gender	-0.098	.081	.223	0.112	.086	.198
Age	-0.001	.004	.977	-0.002	.004	.567
Education Level	0.052	.085	.540	-0.177	.090	.052
CS	0.621	.100	<.001	0.693	.125	<.001
POP	0.049	.046	.295	-0.038	.049	.434
RKS	-	-	-	0.155	.104	.139
POP x CS	-0.122	.1153	.292	-	-	-
POP x RKS	-	-	-	-0.043	.092	.642
R^2		.301			.406	
F for change in R^2		7.416,			10.174	
p-value		<.001			<.001	

Table 3

Conditional Indirect Effect of Cognitive Skills on IP

		Indirect Effect		
POP (W)	*Effect*	*BootSE*	*LLCI*	*ULCI*
-.934	0.011	.086	-.046	.306
.000	-.098	.072	-.033	.251
.934	-.001	.106	-.107	.317

To gain a better understanding of the relationship between RKS and IP, a post hoc hierarchical regression analysis was conducted (see Table 4). In Model 1, IP was regressed on the control variables and RKS. In Model 2, POP was added as a predictor variable and in Model 3 CS was added as the last predictor. Interestingly, Model 1 showed a positive significant effect

of RSK on IP (b = .464, p<.001). However, after adding CS in Model 3 this effect became insignificant, indicating that when controlling for CS, RKS has no significant relationship with IP. In the following section, the results will be discussed and possible explanations for the findings will be provided.

Table 4

Summary of the Post hoc Hierarchical Regression Analysis for Variables Predicting IP (N = 112)

Variable		Model 1			Model 2			Model 3	
	B	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
Gender	0.213	0.096	.192	0.211	0.096	.190	0.115	0.086	.103
Age	0.001	0.004	.026	0.000	0.004	-.004	-0.002	0.004	-.044
Education Level	-0.185	0.100	-.159	-0.160	0.102	-.139	-0.179	0.900	-.155
RKS	0.464	0.990	.404**	0.471	0.990	.410**	0.158	0.153	.137
POP				-0.056	0.055	-.095	0.040	0.048	-.069
CS							0.698	0.124	.514**
R^2		.217			.225			.405	
F for change in R^2		7.416**			1.042			31.865**	

**p < .001, *p < .05

Discussion

With the increase in data availability, and evidence showing that data can help organizations make better-informed decisions (Petrov, 2023), scholars have argued that incorporating data into management decision-making can enhance the effectiveness and efficiency of decisions (Sahakian, 2020; Kroon, 2021). This approach is known as Evidence-Based Management (EBMgt) and refers to managers collecting data from various sources (e.g., workforce-related data, scientific literature, etc.), evaluating its quality, and incorporating it in

decision-making and thereby, improving organizational performance (Barends et al., 2014; Kovner & Rundall, 2006). In recent years, there has been a growing interest in understanding which skills managers are required to have to make high-quality decisions using EBMgt. While specific skills required for EBMgt have been identified by scholars (Daouk-Öyry et al., 2020), there is still a lack of understanding about the process through which EBMgt leads to better decision-making and performance (Arndt & Bigelow, 2009). This paper aimed to provide some insights into the nuances of this process. However, considering the nature of decision-making varies from case to case (Schlenker, 2017) and that decision-making is one of the core tasks of managers (Liang et al., 2012; Barends et al., 2017), individual work performance was used as a proxy of decision-making. Specifically, using cross-sectional data collected from managers working in various industries, this paper focused on the possible relationships between cognitive skills (CS), research knowledge and skills (RKS), and individual performance (IP). In addition, EBMgt has been criticized for not considering contextual contingencies, such as power relations and organizational politics, that can influence managers' decision-making as well as their motivation behind their decisions (Morrell et al., 2015). To account for contextual factors that could buffer the effect of cognitive and research skills on performance (Kroon, 2021), perceived organizational politics (POP) was considered as a moderator. Using the bounded rationality theory (Simon, 1982) and expectancy theory (Vroom, 1964) six hypotheses were formulated and tested with a sample comprising managers employed in various industries. Results showed support for two hypotheses, the findings are discussed below.

The theory of bounded rationality argues that people's ability to make rational decisions is dependent, among other factors, on their cognitive abilities (Simon, 1982). Drawing from this theory, the argument was made in the current study that managers who score higher on certain cognitive abilities, specifically, critical thinking, systems thinking, and creativity, are likely to make high-quality decisions. The results of this study provided support for the

hypothesis suggesting that managers who are critical about the information they possess; consider both short and long-term implications of their decisions and are creative in finding new information even when facing time and financial constraints, perform better than managers who score low on these skills (i.e., H1). This finding is consistent with the existing literature claiming that cognitive skills enable managers to make higher-quality decisions and perform better (Haase, 2010; Yurtseven & Buchanan, 2016; Zaccaro et al. 2015).

Furthermore, the hypothesis suggesting that managers who score higher on CS are more likely to utilize their RKS (i.e., H2), was also supported by the data. This hypothesis was based on Vroom's expectancy theory (1964), which argues that people are more likely to be motivated to put effort into something when they expect that their efforts will bring them closer to their goal. Indeed, the current study finds that managers who have a critical view on trusting information at face value and try to dig deeper before basing their decisions on existing information would value additional insights that (advanced) data analysis and scientific research can bring to their decision-making and their performance (Maani & Maharaj, 2004), and be better able to collect data even when facing environmental constraints (Salmons, 2022). On the other hand, the hypothesis stating that a manager's RKS is positively linked with IP (i.e., H3) and that thereby, RKS would partially mediate the relationship between CS and IP (i.e., H4), was not supported by the data. The finding that RKS is not positively linked with higher IP is counterintuitive to arguments that incorporating scientific insights and statistical analyses into decision-making can enhance the quality of decisions made (Kovner & Rundall, 2006; Walshe & Rundall, 2001). However, the post hoc analysis provided some insights that could explain why no significant effect was found between RKS and IP. The hierarchical regression analysis with RKS included as the main predictor of IP indicated a positive and significant direct relationship between these variables. It was only when CS was added to the model and thus, was controlled for, that the effect of RKS on IP became insignificant.

Considering that using RKS requires having specific kind of cognitive abilities (i.e., hence the positive direct effect of CS on RKS), it could be argued that without having essential cognitive skills such as being critical of which information to trust, looking at an issue from multiple perspectives, and having the ability to gather additional data, solely using and analyzing data, will not guarantee better quality decisions and higher performance (Salmons, 2022; Kroon, 2021). While discussing relevant EBMgt competencies, Rousseau and Gunia (2016) argue that certain cognitive skills such as critical thinking are required for managers to evaluate the quality of external and internal evidence (e.g., scientific papers, internal data quality, etc.) in order to decide whether it can be used to facilitate their decision-making. This paper briefly touched on this previously by highlighting Khan and Millner's (2020) argument that solely using additional data to inform decision-making does not guarantee improved performance. The results of this paper seem to support this idea.

However, there could be another explanation for the insignificant effect of RKS on IP. Namely, the EBMgt literature argues that external and internal research and data can enhance managers' decision-making (Kovner & Rundall, 2006). While this paper used IP as a proxy for decision-making, these two do differ conceptually. When considering enhanced decision-making, EBMgt scholars refer to the quality of information based on which decisions are based, as well as the effectiveness of these decisions in improving organizational outcomes (Sahakian, 2020). On the other hand, the measure of IP focuses on managers' perceptions of their performance, meeting their goals, and managing their time (Koopmans et al., 2014). This conceptual difference could explain why RKS has no robust effect on IP. Considering this, future research should focus on identifying better measures for effective managerial decision-making. Perhaps a more fitting measure of decision-making is the Decision-Making Questionnaire (DMQ) by Frankovsky et al. (2017) which among other factors, focuses on managers' sources of information on which their decisions are based. Moreover, the questions

tap into the process of decision-making in a non-specific manner, thereby, providing the possibility to measure decision-making across various industries.

A rather surprising finding was that POP had no significant moderating effect (i.e., hypotheses 5 and 6 were rejected) as well as no direct effects and no significant correlations with CS, RKS, and IP. This finding was quite unexpected, as many scholars have argued that the quality of decision-making is likely to be affected by the political context in which decisions are made (Sahakian, 2020; Morrell et al., 2015). Vroom's expectancy theory could be used to explain this finding. Using this theory, the argument was made that to put effort into a goal, people should believe that their efforts will lead to positive outcomes for themselves (i.e., instrumentality). However, managers working in a high political environment would not be motivated to use their research skills as in political environments subjective matters tend to override factual information (Porter et al., 1983). However, while the political environment is one contextual factor that can influence manager's attitude toward EBMgt, it is not the only one. Namely, the EBMgt literature has also been criticized for not considering the managers' personal interests, assuming that managers are always impartial technical experts with no personal interests in the researched topics and the evidence being gathered (Morrell et al., 2015). Thus, while this paper assumes that managers are willing to use their RKS impartially, this is not necessarily the case for all managers. It may be likely, that some managers with high POP use their RKS in a way that benefits them and their team. Considering, this paper does not measure manager's political behavior, this statement cannot be tested. However, future research could benefit from including measures of managerial political behaviors to be able to account for its possible effect. Future research could also consider managers' workload when studying EBMgt competencies. The fact that managers report having an unattainably high workload, has been discussed for many years (Marsh & Blau, 2007; Pires et al., 2019). This

lack of time could also limit their ability to conduct external and internal research, despite their willingness and ability to do so.

However, the finding that POP does not have any significant correlations with the RKS and IP could be related to this specific sample. Specifically, considering the overall level of POP was quite low in the sample (i.e., M = 2.7; with 76 percent of managers scoring between 1 and 3) as well as the fact that the data is based on self-assessed scores, there are two additional explanations for the fact that POP did not have any significant relationships with the main variables.

First, while organizational politics is usually considered to be a facet of an organization's culture, it is reinforced by the people in power who play along with it (i.e., make decisions based on personal gain and preference rather than for the well-being of the organization). Although employees at all levels can use organizational politics for their benefit (Ozler & Buyukarslan, 2011), people who are better at gaining power and people who already have power are more likely to use political games to protect their position (AIHR, n.d.). Thereby, the practice of organizational politics tends to be common among middle and higher-level managers who tend to use power politics to secure positions or control their environment (Buchanan, 2008). Considering 71 percent of this sample comprised managers older than 40, and the fact that 30 is on average reported to be the age where people get their first managing position (PM, 2023), it could be argued that the majority of this sample is at a senior management or higher level. Hence, it is possible that managers who themselves are responsible for misusing their power, do not respond with transparency on items relating to organizational politics.

Second, in this sample, managers' age had a significant negative correlation with POP (r = -.327, p < .001), suggesting that higher age of managers is correlated with lower POP and vice versa. While this finding is in line with the previous argument, another explanation could

be that senior managers are less susceptible to being negatively affected by organizational politics and, hence report lower scores of POP compared to younger and less experienced managers. In support of this, Khan et al. (2020) found that younger employees tend to experience more negative outcomes of POP than older and more experienced employees. Moreover, Dello Russo et al. (2017) argue that discrepancies in POP between less experienced and more experienced employees are due to younger employees being more worried about their career progression than older employees. Hence, it is likely that older managers are less sensitive to organizational politics than their younger peers.

Of course, as the exact tenure and experience were not measured in this research, these explanations must be taken with caution. Future research could benefit from including measures for tenure, management level, and experience in a specific field to be able to test these hypotheses.

Limitations

In this section, the limitations of this paper are discussed and additional suggestions for future research are provided. As mentioned previously, this study was part of a larger project that aims to validate the EBMgt questionnaire by Daouk-Öyry et al., (2020). Although the authors have based the formulation of items on interviews conducted with managers as well as existing scientific literature, it is still likely that some items are less effective in measuring what they are meant to measure. This assumption was confirmed when conducting scale analyses for RKS. Specifically, the inter-item correlation between RKS items was quite low (i.e., $r < .3$), and some were even negative despite being positively formulated (see Appendix A and C). Because of this possible reliability issue, results from other papers using the same variables may vary. However, in the future, when the project of validating the questionnaire is concluded, it would be interesting to see whether other scholars find similar relationships between the variables studied in this paper.

Another limitation of this paper was the sampling method. Due to time constraints, this research group chose to find respondents through convenience and snowball sampling methods. While these methods can be efficient, they have been argued to increase sample bias and limit the generalizability of the findings (Emerson, 2015). This concern is reflected in this paper as well as 71 percent of the managers included in this sample were above the age of 40. This limits the diversity of the sample and with that, the extent to which the findings of this paper can be generalized to a broader group of managers. Future research could account for this limitation, by studying the relationships between CS, RKS, IP, and POP with a more reliable and generalizable sampling method such as probability sampling to ensure that the sample results in a statistically balanced selection among managers.

Lastly, as the main questionnaire included several variables relating to the overall research questions of the project, the time required to fill in the questionnaire was quite long (i.e., 25-45 minutes). Considering that the research group was aiming to reach managers (i.e., people who usually have busy schedules), the risk of not many people filling in the questionnaire due to its length was high (Andreadis & Kartsounidou, 2020). Indeed, more than half of the participants dropped out before filling out the questionnaire. This could mean that managers who may have had interesting insights to share yet, could not afford to lose 25 to 40 minutes of their day, were unintentionally selected out of the sample. In addition to causing dropout, long questionnaires might cause participants to answer questions randomly, which is common in studies using Likert-scale ratings (Joshi et al., 2015). To avoid these side effects, future research is advised to shorten the survey by focusing on only a few measures at a time. Alternatively, the questionnaire could be shortened after rounds of validation and exclusion of redundant items.

Theoretical and practical relevance

By studying the relationship between various EBMgt competencies (e.g., RKS and CS) this paper provided additional clarity on how certain EBMgt can lead to positive performance outcomes. Specifically, while no mediation effect of RKS was found, the positive direct effect of cognitive skills on research skills and performance, suggests that having high levels of critical thinking, system thinking and creativity allows managers to perform better. Furthermore, findings also support the suggestion of Daouk-Öyry et al., (2020) that some EBMgt skills (e.g., CS) are fundamental in terms of being pre-requisites for other EBMgt skills (i.e., RKS). Moreover, the finding showing that RKS has no significant effect on IP when CS is controlled supports the idea that to enhance decision-making, solely possessing research skills and incorporating data into decision-making does not guarantee enhanced performance (Salmons, 2022). Rather, managers need to critically evaluate the external and internal evidence that they use to support their decisions (Rousseau & Gunia, 2016).

The findings of this paper could also be beneficial for (HR) practitioners. Considering that lack of RKS has been identified as a barrier to EBMgt (Barends et al., 2015; Liang & Howard, 2011), the finding that certain cognitive skills (i.e., critical thinking, systems thinking, and creativity) are required for managers to successfully use their research skills, could help practitioners select candidates accordingly. Specifically, as scoring high on specific cognitive skills increases managers' likelihood of having and using RKS, as well as their likelihood of showing higher performance, practitioners are advised to consider these cognitive skills when hiring and selecting managers. With this, organizations can more easily acquire the competencies needed in today's data-driven world.

Conclusion

To conclude, this study focused on the possible relationships between cognitive skills, research knowledge, and skills (i.e., identified by Daouk-Öyry et al., 2020) and individual

performance. To account for contextual factors that could potentially buffer the effect of cognitive and research skills on performance (Kroon, 2021), perceived organizational politics was considered as a moderator. The study found support for the hypothesized direct relationships between cognitive skills and research knowledge and skills, and cognitive skills and individual performance, suggesting that cognitive skills are fundamental for EBMgt and needed for the effectiveness of other EBMgt skills as well (i.e., research knowledge and skills). On the other hand, no significant mediating effect of research knowledge and skills nor a moderating effect was found for perceived organizational politics. However, rather than viewing these effects as conclusive, this study suggests future researchers continue studying these relationships while accounting for the limitations of this paper.

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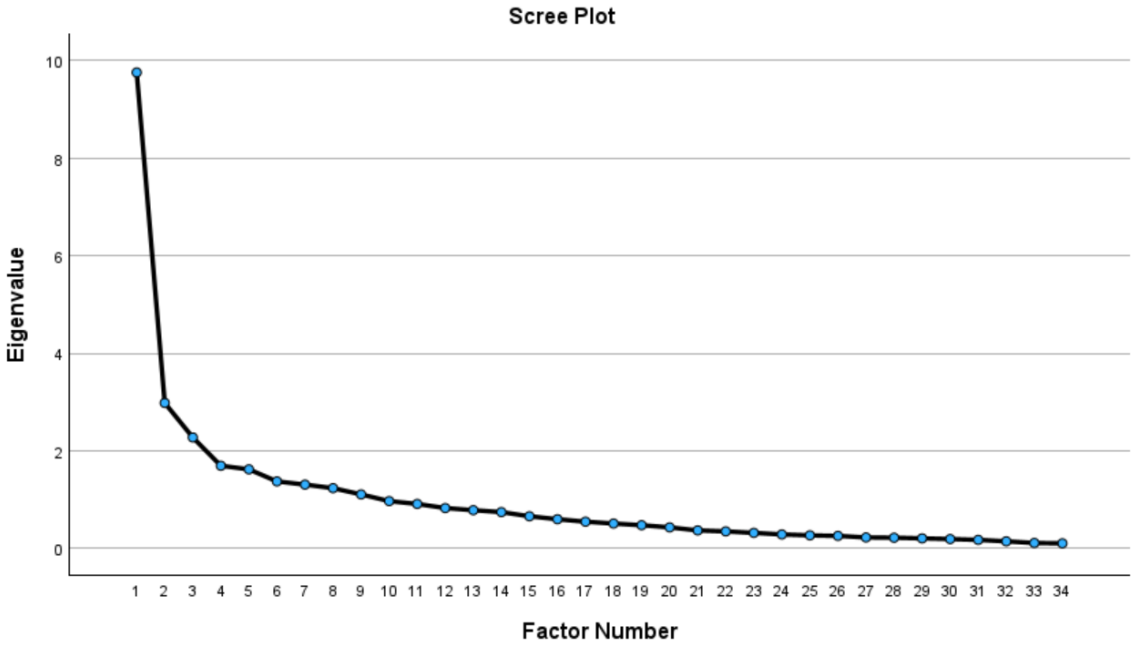
Appendix A

PAF and reliability analysis for Cognitive Skills

Extraction method: Principal Axis Factoring

a. One factor extracted



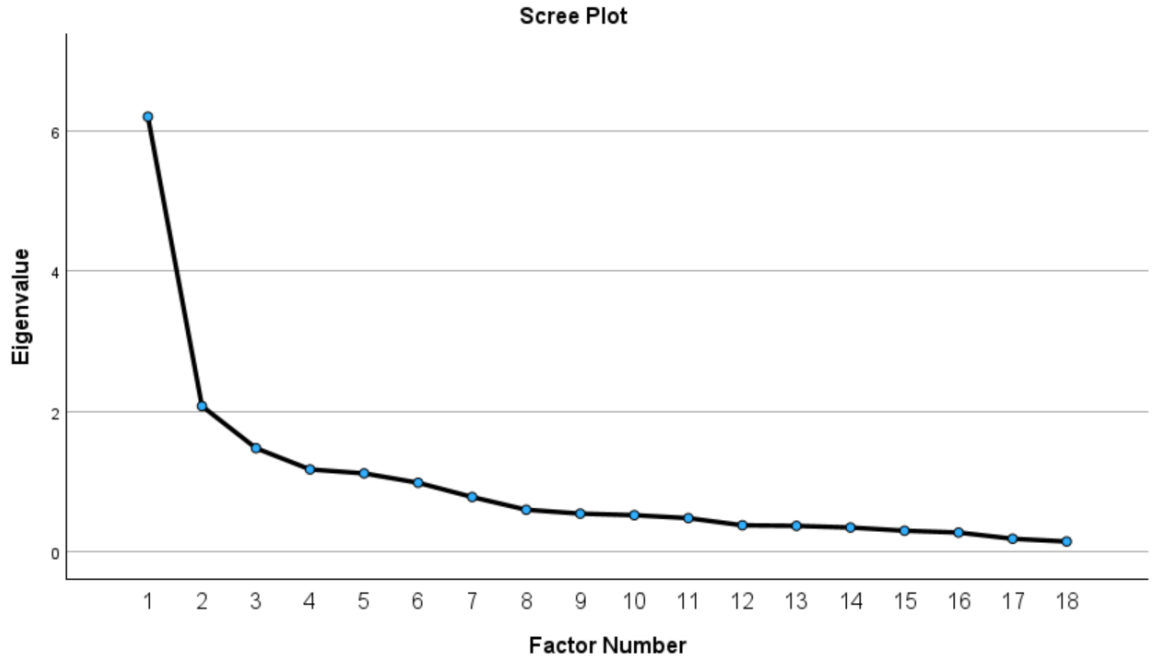
Cognitive Skills	Factor loadings
1. I am curious to know as much as possible about a problem I am trying to solve. (Critical Thinking)	.556
2. I keep asking follow-up questions to find out more about a problem.	.671
3. I keep asking for more information to clarify confusing problems.	.609
4. I keep seeking information until I understand complex problems.	.648
5. I find it exciting to look at problems from multiple perspectives.	.545
6. I evaluate the strengths and weaknesses of arguments.	.555
7. I try to identify if an argument represents the entire picture.	.610
8. I compare data and information from different sources about a problem.	.558
9. I integrate data and information from different sources about a problem.	.549
10. I look for discrepancies in data and information I collect.	.599
11. I look for patterns in data and information I collect.	.588
12. I breakdown complex problems into more manageable parts.	.616
13. I differentiate key elements of a problem from irrelevant ones.	.516
14. I follow a detailed plan when embarking on a project.	.361
15. I carefully record incidents or problems I observe in my work setting.	.362
16. I make lists of things to do before starting a project.	.299
17. I start doing the job right away rather than wasting time on planning. (Reverse coded)	.206
18. I set goals based on what I need to achieve in my work.	.292
19. I consider the implications of my decisions for different parts of the organization. (Systems Thinking)	.599

20. I develop interventions that consider the whole system not just the individual problem.	.528
21. I consider the interrelationships among parts of the organization when making decisions.	.613
22. I consider the implications of my decisions for different organizational stakeholders.	.449
23. I think of solutions to daily problems that are in line with the long-term goals of my organization.	.631
24. I consider the long-term implications of solutions meant to resolve daily problems.	.683
25. I anticipate the potential future consequences of my decisions at work.	.676
26. I consider the organization's long-term purpose when making decisions.	.551
27. I challenge traditional ways of thinking and doing things at work. (Creativity)	.388
28. I look for solutions for work problems outside my area of expertise.	.337
29. I generate new solutions to old problems.	.555
30. I stick to traditional ways of doing things.(Reverse coded)	.312
31. I identify new opportunities to acquire necessary resources.	.519
32. I develop innovative solutions to overcome resource scarcity.	.501
33. When data about a managerial problem is not available, I explore new possibilities to gather data.	.432
34. I identify different ways to access data if I do not have access to it.	.451
Eigenvalue	9.384
Cronbach's Alpha	.916

PAF and reliability analysis for Research Knowledge and Skills

Extraction method: Principal Axis Factoring

a. One factor extracted



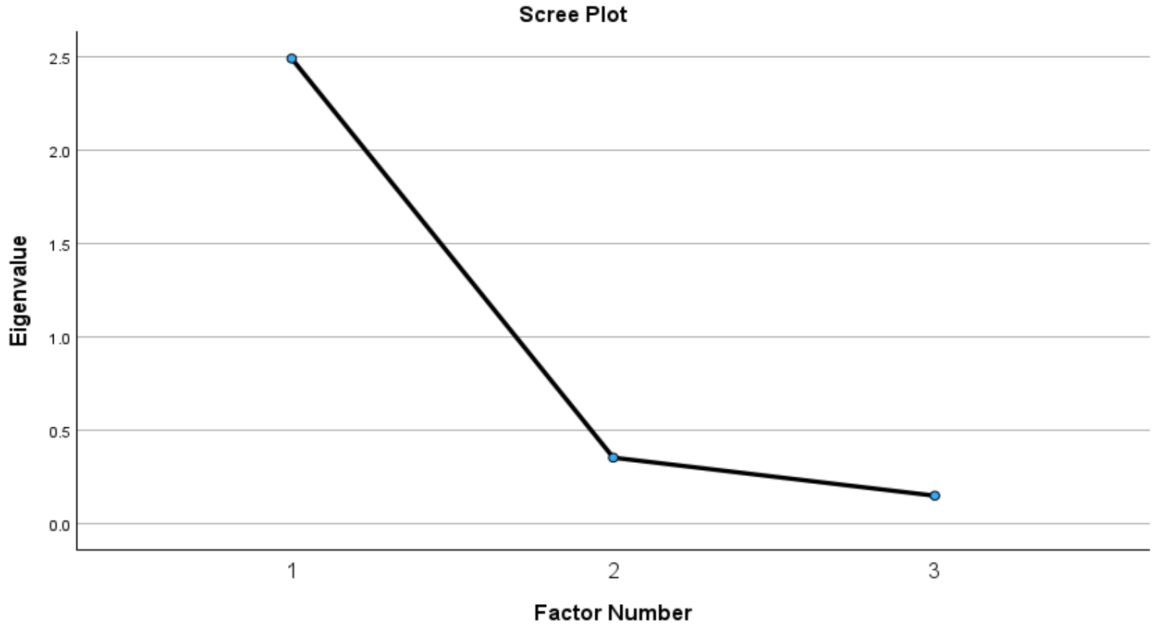
Research Knowledge and Skills	Factor loadings
1. I know how to search for scientific articles.	.333
2. I know how to search for data in my department to solve operational or other managerial problems.	.562
3. I review the literature on topics relevant to my work.	.305
4. I search for scientific articles to help me solve work problems.	.219
5. I search for data within the organization to help me solve work problems.	.449

6. I have difficulty understanding scientific articles. (Reverse coded)	.600
7. I have difficulty understanding the internal data gathered in my department/organization. (Reverse coded)	.407
8. I know how to collect data to solve a work problem, if this data doesn't exist already.	.678
9. I can identify the information I need to collect to solve a work problem.	.621
10. I collect data from different sources to solve problems at work.	.593
11. I know how to analyze data to answer a managerial question.	.711
12. I can use simple statistics (e.g., correlation, t-test etc.).	.645
13. I know how to use existing computer software to analyze data such as Microsoft Excel or other software.	.441
14. I understand the results of statistical analyses.	.531
15. I know how to present results visually (e.g. using graphs) in a meaningful way.	.636
16. I know how to analyze data from interviews or customer reviews.	.538
17. I know how to identify themes in data about a problem to get a better understanding of it.	.496
18. I can integrate different types of data about a problem to get a better understanding of it.	.700
Eigenvalue	5.320
Cronbach's Alpha	.867

PAF and reliability analysis for Perceived Organizational Politics

Extraction method: Principal Axis Factoring

a. One factor extracted

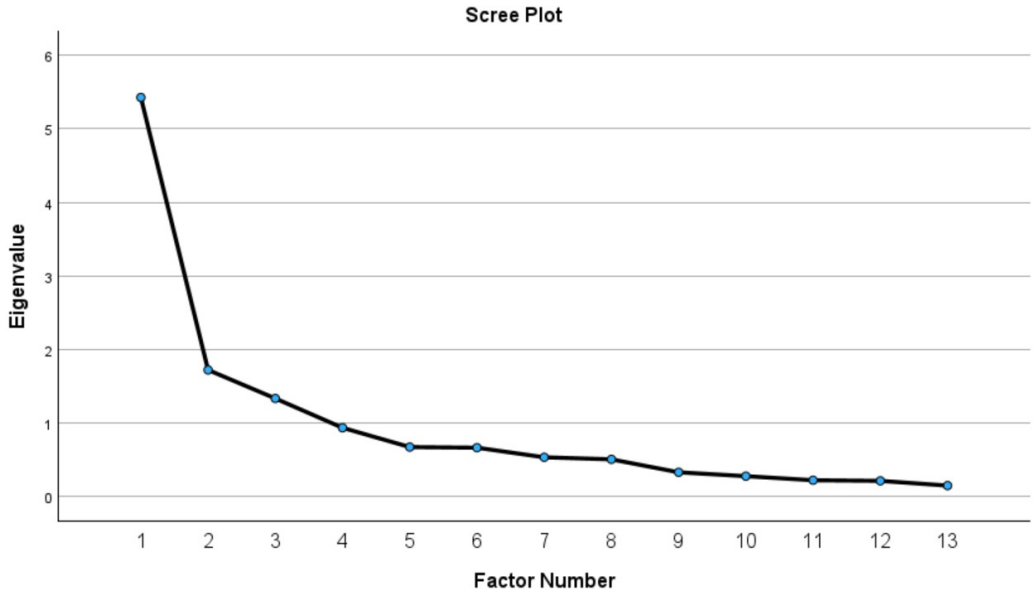


Perceived Organizational Politics	Factor loadings
1. Within our organization, power games between the departments play an important role.	.773
2. Staff members are sometimes taken advantage of in our organization.	.846
3. In our organization, favoritism is an important way to achieve something.	.978
Eigenvalue	2.268
Cronbach's Alpha	.898

PAF and reliability analysis for Individual Performance

Extraction method: Principal Axis Factoring

a. One factor extracted



Individual Performance	Factor loadings
In the past three months...	
1. I managed to plan my work so that it was done on time.	.364
2. My planning was optimal.	.435
3. I kept in mind the results that I had to achieve in my work.	.606
4. I was able to separate main issues from side issues at work.	.669
5. I was able to perform my work well with minimal time and effort.	.510
6. I took on extra responsibilities.	.655
7. I started new tasks myself, when my old ones were finished.	.753
8. I took on challenging work tasks, when available.	.744
9. I worked at keeping my job knowledge up-to-date.	.547
10. I worked at keeping my job skills up-to-date.	.544
11. I came up with creative solutions to new problems.	.591
12. I kept looking for new challenges in my job.	.717
13. I actively participated in work meetings.	.661
Eigenvalue	4.843
Cronbach's Alpha	.879

Appendix B

Little's MCAR test

Univariate Statistics

	N	Mean	Std. Deviation	Missing Count	Missing Percent	No. of Extremes[a] Low	No. of Extremes[a] High
RKS	111	3.6947	.40040	1	.9	2	0
CS	106	3.8679	.38992	6	5.4	1	0
POP	98	2.6769	1.01247	14	12.5	0	0
Perf	96	3.7187	.59770	16	14.3	2	0

a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).

EM Means[a]

RKS	CS	POP	Perf
3.6949	3.8695	2.6822	3.7091

a. Little's MCAR test: Chi-Square = 4.904, DF = 11, Sig. = .936

Note: the scales included in this analysis were computed based on a one factor solution before conducting PAF and reliability analysis. This is because the MCAR analysis allows a limited number of variables to be included (i.e., 25), and considering I had in total more than 25 items, the decision was made to compute the items into variables. However, after confirming that the missing values are at random, imputation was done on item level, after which scales were computed again. Because of this there are slight differences in the mean scores.

Appendix C

Inter-Item Correlation Matrix

	Research Know.&Sk._1	Research Know.&Sk._2	Research Know.&Sk._3	Research Know.&Sk._4
Research Know.&Sk._1	1.000	.295	.170	.353
Research Know.&Sk._2	.295	1.000	.311	.236
Research Know.&Sk._3	.170	.311	1.000	.533
Research Know.&Sk._4	.353	.236	.533	1.000
Research Know.&Sk._5	.264	.535	.274	.215
Research Know.&Sk._6	.475	.275	.279	.246
Research Know.&Sk._7	-.064	.163	.120	-.065
Research Know.&Sk._8	.223	.415	.234	.146
Research Know.&Sk._9	.147	.403	.168	.005
Research Know.&Sk._10	.166	.390	.341	.388
Research Know.&Sk._11	.173	.488	.066	-.053
Research Know.&Sk._12	.162	.377	.101	.070
Research Know.&Sk._13	.008	.035	.061	-.016
Research Know.&Sk._14	.008	.222	.097	.076
Research Know.&Sk._15	.185	.167	.084	.113
Research Know.&Sk._16	.123	.245	.160	-.007
Research Know.&Sk._17	.199	.231	.038	-.012
Research Know.&Sk._18	.286	.367	.136	.131

Inter-Item Correlation Matrix

	Research Know.&Sk._5	Research Know.&Sk._6	Research Know.&Sk._7	Research Know.&Sk._8
Research Know.&Sk._1	.264	.475	-.064	.223
Research Know.&Sk._2	.535	.275	.163	.415
Research Know.&Sk._3	.274	.279	.120	.234
Research Know.&Sk._4	.215	.246	-.065	.146
Research Know.&Sk._5	1.000	.267	.135	.327
Research Know.&Sk._6	.267	1.000	.379	.330
Research Know.&Sk._7	.135	.379	1.000	.268
Research Know.&Sk._8	.327	.330	.268	1.000
Research Know.&Sk._9	.290	.318	.285	.561
Research Know.&Sk._10	.382	.236	.180	.461
Research Know.&Sk._11	.383	.281	.300	.567
Research Know.&Sk._12	.279	.359	.237	.491
Research Know.&Sk._13	.013	.250	.127	.398
Research Know.&Sk._14	.205	.273	.280	.257
Research Know.&Sk._15	.155	.460	.323	.385
Research Know.&Sk._16	.142	.373	.294	.207
Research Know.&Sk._17	.105	.416	.334	.179
Research Know.&Sk._18	.201	.430	.216	.474

Inter-Item Correlation Matrix

	Research Know.&Sk._9	Research Know.&Sk._10	Research Know.&Sk._11	Research Know.&Sk._12
Research Know.&Sk._1	.147	.166	.173	.162
Research Know.&Sk._2	.403	.390	.488	.377
Research Know.&Sk._3	.168	.341	.066	.101
Research Know.&Sk._4	.005	.388	-.053	.070
Research Know.&Sk._5	.290	.382	.383	.279
Research Know.&Sk._6	.318	.236	.281	.359
Research Know.&Sk._7	.285	.180	.300	.237
Research Know.&Sk._8	.561	.461	.567	.491
Research Know.&Sk._9	1.000	.495	.551	.271
Research Know.&Sk._10	.495	1.000	.534	.323
Research Know.&Sk._11	.551	.534	1.000	.543
Research Know.&Sk._12	.271	.323	.543	1.000
Research Know.&Sk._13	.284	.147	.286	.384
Research Know.&Sk._14	.233	.265	.316	.520
Research Know.&Sk._15	.387	.286	.404	.452
Research Know.&Sk._16	.209	.256	.338	.394
Research Know.&Sk._17	.257	.137	.293	.277
Research Know.&Sk._18	.464	.424	.502	.362

Inter-Item Correlation Matrix

	Research Know.&Sk._13	Research Know.&Sk._14	Research Know.&Sk._15	Research Know.&Sk._16
Research Know.&Sk._1	.008	.008	.185	.123
Research Know.&Sk._2	.035	.222	.167	.245
Research Know.&Sk._3	.061	.097	.084	.160
Research Know.&Sk._4	-.016	.076	.113	-.007
Research Know.&Sk._5	.013	.205	.155	.142
Research Know.&Sk._6	.250	.273	.460	.373
Research Know.&Sk._7	.127	.280	.323	.294
Research Know.&Sk._8	.398	.257	.385	.207
Research Know.&Sk._9	.284	.233	.387	.209
Research Know.&Sk._10	.147	.265	.286	.256
Research Know.&Sk._11	.286	.316	.404	.338
Research Know.&Sk._12	.384	.520	.452	.394
Research Know.&Sk._13	1.000	.486	.523	.144
Research Know.&Sk._14	.486	1.000	.394	.321
Research Know.&Sk._15	.523	.394	1.000	.452
Research Know.&Sk._16	.144	.321	.452	1.000
Research Know.&Sk._17	.209	.363	.309	.695
Research Know.&Sk._18	.374	.397	.511	.418

Inter-Item Correlation Matrix

	Research Know.&Sk._17	Research Know.&Sk._18
Research Know.&Sk._1	.199	.286
Research Know.&Sk._2	.231	.367
Research Know.&Sk._3	.038	.136
Research Know.&Sk._4	-.012	.131
Research Know.&Sk._5	.105	.201
Research Know.&Sk._6	.416	.430
Research Know.&Sk._7	.334	.216
Research Know.&Sk._8	.179	.474
Research Know.&Sk._9	.257	.464
Research Know.&Sk._10	.137	.424
Research Know.&Sk._11	.293	.502
Research Know.&Sk._12	.277	.362
Research Know.&Sk._13	.209	.374
Research Know.&Sk._14	.363	.397
Research Know.&Sk._15	.309	.511
Research Know.&Sk._16	.695	.418
Research Know.&Sk._17	1.000	.392
Research Know.&Sk._18	.392	1.000

Note: Items are numbered in the same order as in appendix A and can be interpreted accordingly.