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Untangling knowledge fields and knowledge dynamics within the decision-making process

Dynamics of
knowledge
fields

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Abstract

Purpose – The purpose of this paper is to analyse the influences of different types of knowledge and their inherent dynamics on the effectiveness of the decision-making (DM) process. Knowledge dynamics (KD) is envisioned through the lens of the knowledge fields theory while effective DM process is objectivised via organisational appreciation and reward, higher business performance, sustainable partnerships and managerial satisfaction with previous achievements.

Design/methodology/approach – A questionnaire-based survey was conducted with 275 middle managers from companies operating in the business consulting field. The conceptual and structural model was tested using the partial least squares structural equation modelling technique.

Findings – The study advances novel insights into the significant positive influences of various knowledge fields on KD on the DM process within real-life business environments. Even though rational knowledge exerts a noteworthy effect on DM, its influence is exceeded by the KD, which proves that integrating emotional and spiritual knowledge in the decisional equation may become a pivotal input to making good managerial decisions regardless of the level of regulation and standardisation in the field.

Research limitations/implications – The research relied on threefold knowledge fields as predictors for the DM process, thus providing a starting point for the development of more complex models.

Originality/value – The study emerges as a groundbreaking approach via the integration and application of the knowledge fields theory within a more comprehensive and empirical outlook on the DM process. Simultaneously, it places DM beyond the unidimensional outcomes of rationality and intuition by urging its intricate and interactional nature.

Keywords Knowledge fields, Knowledge dynamics, Decision-making, Rationality, Intuition, Middle management

Paper type Research paper

Introduction

Decision-making (DM) process constitutes the core of any managerial work. Regardless of the hierarchical position, managers should decide in relation to specific conditions, make viable decisions, communicate with the stakeholders appropriately and monitor their translation



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into action (Drucker, 1993; Mintzberg, 2004). Managers are effective in solving well-structured problems and routine activities by following logical pathways. However, under time constraints and high levels of uncertainty, managers use non-rational approaches such as heuristics and their own intuition to solve problems (Tversky and Kahneman, 1974; Simon, 1967, 1987; Patton, 2003; Okoli and Watt, 2018).

Researchers in psychology consider that the human brain supports two fundamental thinking systems. System 1 is related to our unconscious activity and is rather automated and very fast. It supports intuitive DM. System 2 is related to our conscious activity and is logical and rather slow. It supports rational DM (Price and Norman, 2008; Betsch and Glöckner, 2010; Kahneman, 2011). In real life, decisions are neither fully rational nor fully intuitive. There is an overlap between intuitive and logical decisions, which is supported by the interaction between the two thinking systems (Grove, 1999; Hill, 2008; Isaacson, 2011; Heath and Heath, 2013). Switching between the two thinking systems with a view on adapting to the given task and business environment is a complex and mostly unknown process due to the transition from the unconscious to conscious zones of our brain and from intuition to rationality, respectively, and thus it deserves a thorough insight (Price and Norman, 2008; Damasio, 2012). A possible way to understand the dynamics in DM is to consider the underlying process of knowledge dynamics (KD) and its multifield structure, integrating three types of knowledge – rational knowledge (RK), emotional knowledge (EK) and spiritual knowledge (SK) (Bratianu, 2015). The rational DM is based on processing RK, which is expressed as explicit knowledge (Hastie and Dawes, 2001; Jackson, 2019; Nonaka *et al.*, 2008). Intuition processes information and knowledge generated through direct experience, which has a tacit dimension (Polanyi, 1983) and an emotional nature (Fauconnier and Turner, 2002; Västfjäll and Slovic, 2013). Researchers explored so far rational or intuitive DM as individual and somehow opposed processes but not the dynamics between them. Moreover, DM is based on a system of cultural values that forms the dimension of spirituality (Barrett, 2010; Lange and Washburn, 2012; Moosmayer, 2012), a dimension that is not explicitly considered in the theories of DM. Thus, there is a gap between the complexity of the managerial DM processes, which integrates rational, emotional and spiritual dimensions, and the literature where rationality and intuition are treated as different modes of DM without a clear transition between them and without an overarching framework of cultural values.

In order to avail of a more comprehensive approach to the extant research gap, the present paper aims to analyse the specific influences of different types of knowledge and their inherent dynamics on the effectiveness of the DM process. In this front, the KD is considered through the lens of the knowledge fields theory (Bratianu and Bejinaru, 2019), while the effective DM is objectivised via organisational appreciation and reward, higher business performance, sustainable partnerships and managerial satisfaction with previous achievements. The knowledge fields theory is based on the property of heterogeneity of knowledge and the idea of reflecting the rational, emotional and spiritual dimensions of the knowledge concept. As Nuruzzaman *et al.* (2019a, b) remark, “The underlining premise is that executives are influenced by their backgrounds and, thus, develop expectations, preferences, mindsets, values and behaviours based on experiences they encounter” (p. 95).

A quantitative research operationalised through a questionnaire-based survey was conducted with 275 companies operating in the business consulting field with a view towards capturing the influences exerted by different types of knowledge on the DM process of middle managers. The choice for a sample coming from well-regulated fields like financial consulting, insurance consulting, accountancy consulting, audit services and asset management was perceived as a challenge for testing the theory of the knowledge fields and KD in relation to the DM process.

The paper was organised as follows. Section 1 consists of a literature review of the DM process, focussing on the roles of both rationality and intuition and on the exploration of the

main concepts and ideas of the theory of knowledge fields and KD in relation to the DM process. The research hypotheses are inferred, and the conceptual model is advanced. Section 2 depicts the method and materials, accounting for the usage of the partial least squares structural equation modelling (PLS-SEM). The next section integrates the results and their discussion from a multilevel perspective.

Theoretical developments and hypotheses formulation

Knowledge dynamics

The theory of knowledge fields. The theory of knowledge fields is based on metaphorical thinking (Lakoff and Johnson, 1999; Andriessen, 2008). Metaphors are semantic constructs that use analogies to map attributes from a known object placed in the source domain onto a less known one placed in the target domain.

Knowledge is an abstract concept without any reference in the physical world and its understanding depends on the metaphor people use. Its attributes are mapped from the known object placed in the source domain, based on the experience people have in interpreting them. The mapped attributes have a direct contribution to shaping the semantic field of knowledge, which also implies its boundary or limitations. For instance, the first generation of metaphors explaining the concept of knowledge used – in the source domain – *objects, stuff, stocks or resources* (Sullivan, 1998; Davenport and Prusak, 2000; Borgo and Pozza, 2012). The second generation of metaphors used in entities like *flows* and *stocks-and-flows* in the source domain (Davenport and Prusak, 2000; Nissen, 2006; O'Dell and Hubert, 2011; Oliver, 2013). Fluid flows are well-known phenomena that are easy to understand and explain. However, all of these metaphors use physical objects and their attributes in the source domain, which induces the idea of linearity of the Newtonian dynamics and that of tangibility, although knowledge is intangible.

Nonaka and Takeuchi (1995) use the iceberg metaphor extensively for knowledge. It is a very simple and intuitive metaphor. The authors make the analogy between the visible part of the iceberg with explicit knowledge and the analogy between the iceberg's hidden part under the water with tacit knowledge. Explicit knowledge is rational because it is a result of reflection, and it can be expressed by using a natural or symbolic language (Davenport and Prusak, 2000; Russell, 2009). Tacit knowledge is created through experiential learning (Kolb, 2015), and it is not formalized. "Subjective insights, intuitions and hunches fall into this category of knowledge. Furthermore, tacit knowledge is deeply rooted in an individual's action and experience, as well as in the ideals, values or emotions he or she embraces" (Nonaka and Takeuchi, 1995, p. 8). Being solid, the iceberg cannot support the idea of KD of the transformation of one form of knowledge into another one, respectively. Also, tacit knowledge appears like a mixture of ideals, values and emotions, which means an overlapping of emotional and spiritual dimensions of the human experience and learning processes (Bateson, 2000; Hibbert et al., 2016; Nonaka et al., 2008). That is a limitation that creates difficulties in understanding knowledge sharing and knowledge flows in multinational companies (Anderson et al., 2015; Gaur et al., 2019) with complex inter unit boundaries and multicultural value systems. Similar limitations may appear in understanding knowledge creation in innovation processes (Nuruzzaman et al., 2019a, b).

To overcome the limitations of linearity, tangibility and KD, Bratianu and Andriessen (2008) introduced the metaphor *knowledge as energy*, which places the concept of energy in the source domain. From the source domain of this metaphor, three main attributes of energy can be mapped onto the target domain where we place the concept of knowledge:

- (1) Energy is a field.
- (2) Energy manifests in different forms (i.e. mechanical, electrical, thermal, etc.).
- (3) One form of energy can transform into another form of energy.

The first attribute completely changes the interpretation of knowledge: from an object or a fluid flow, knowledge is considered now a field, an intangible entity. The second attribute leads us to the idea of considering several forms of knowledge, each form representing a different result of information processing and learning mode. Based on this criterion, we may consider the following forms of knowledge: RK, EK and SK (Bratianu and Bejinaru, 2019).

RK is a result of rational thinking and practically is represented by explicit knowledge, mainly founded on the capture, sharing and transformation of data and information into knowledge. It is the knowledge the humans express by using a natural or symbolic language, and it is used in rational DM by System 2 of thinking (Kahneman, 2011). Nonaka and Takeuchi (1995, p. 8) emphasized the importance of explicit knowledge in our lives and in the Western philosophical tradition: "One is explicit knowledge, which can be articulated in formal language including grammatical statements, mathematical expressions, specifications, manuals and so forth. This kind of knowledge thus, can be transmitted across individuals formally and easily." RK is fundamental for social interaction (Bell, 1999; Spender and Strong, 2014) and because of its property of being expressed in a natural or symbolic language, it can be more easily processed, codified, stored, retrieved, shared, transferred and used than other forms of knowledge (Boisot, 1998; O'Dell and Hubert, 2011; Stacey, 2001).

Going further to rational DM, a *decision* is deemed as a choice of action (Baron, 2000) with respect to a certain goal one may have. It is a choice amongst several alternatives that may offer a solution to a problem. For managers, DM represents the core of their daily activities, the way they think and construct solutions for hundreds and thousands of problems confronting their organisations (Drucker, 1993).

Rational DM is based on the idea of *rational choice*, which is by far the most widespread thinking model amongst economists and managers (Simon, 1979, 1996; Goodwin and Wright, 2004). Because the scarcity of all economic resources is a central fact of life, economists developed *rationality* as an instrument of allocating them effectively in the production processes. Rational DM is based on the assumption that the business environment is stationary or in a steady-state of equilibrium (Simon, 2000), which implies a deterministic and linear thinking model, with complete information and knowledge about each possible alternative and its associated consequences. Also, from an economic point of view, rational thinking assumes perfect competition on the market. Any deviation from the idealised rational choice theory may be called *bounded rationality*, a concept developed in economics by Herbert Simon (1979, 1996, 2000). The bounded rationality model switches to probabilistic thinking with incomplete information and a market with imperfect competition (Takahashi, 2015; Lodge and Wegrich, 2016; Güth and Kliemt, 2017). From the best solution for a given business context, bounded rationality provides a good enough solution, which can be satisfying for managers and firms (Hallen and Pahnke, 2016; Lohrke et al., 2018). Rational DM is based on information and knowledge, which is considered objective and on a set of rules or mathematical models of deterministic or probabilistic nature.

In the managerial practice, time becomes a constraint and uncertainty, a psychological barrier so that most managers try to use their experience to simplify the problems to be solved by recognising patterns in their previous solutions or by replacing the initial complex problem with a simpler one. These thinking shortcuts are called *heuristics* (March, 1994; Baron, 2000; Wickham, 2003; Bryant, 2007; Kahneman, 2011).

EK is generated by emotions and feelings (Gladwell, 2005; Hill, 2008; Damasio, 2012). It is the result of System 1 of thinking (Kahneman, 2011) and contributes directly to intuitive DM. EK is a part of the tacit knowledge (Nonaka and Takeuchi, 1995; Polanyi, 1983), which can be expressed through emotions without any words. It is the simplest form in which the wordless knowledge emerges mentally. "The body and the surrounding environment interact with each other, and the change caused in the body by that interaction are mapped in the brain.

It is certainly true that the mind learns of the outside world via the brain, but it is equally true that the brain can be informed only via the body” (Damasio, 2012, p. 97). EK is created while we interact directly with the external natural and social environment (Fouconnier and Turner, 2002; Greenberg, 2013; Nonaka *et al.*, 2008). EK contributes directly to intuitive DM. EK is processed by emotional intelligence and contributes to the development of emotional competence. As defined by Goleman (1998, p. 24), “An emotional competence is a learned capability based on emotional intelligence that results in an outstanding performance at work.” In practice, there are already many tests and procedures to evaluate emotional intelligence and emotional competence, which integrate EK (Sparrow and Knight, 2006).

In many practical situations, when the pressure of time is overwhelming, and there is a significant shortage of information and knowledge about a given problem, and yet a decision must be made, managers search unconsciously in their experience to find similar situations or common configurations and make decisions based on pattern recognition. This process is generically called *intuition* or *intuitive DM* (Andersen, 2000; Dane and Pratt, 2007; Kahneman, 2011; Matzler *et al.*, 2014; Malewska, 2015).

Gladwell (2005) states metaphorically that intuition is “thinking without thinking” due to its unconscious nature. The key element in this decision process is *pattern recognition* and its interpretation. From this perspective, “intuition is a genuine enough phenomenon which can be exploited rather simply: most intuitive leaps are acts of recognition” (Simon, 1996, p. 89).

However, due to many psychological phenomena (Gladwell, 2005; Kahneman, 2011; Dorfler and Stierand, 2017), intuition is not a reliable process. It must be checked by System 2 of thinking, which is the rational thinking process. Klein (2003, p. 28) explains that the intuitive DM works like this: (1) the initial phase implies some cues which stimulate pattern recognition; (2) the recognised patterns activate some action scripts; (3) action scripts are assessed through mental simulation and (4) mental simulation is driven by mental models. Although this explanation looks logical and sequential, intuition is not a linear process like rational thinking. It is nonlinear and based on emotions and feelings which generate EK (LeDoux, 1999; Gladwell, 2005; Damasio, 2012; Bratianu and Orzea, 2013).

SK represents the values we believe in and the way we relate them to our existence (Zohar and Marshall, 2004). SK is contained in tacit knowledge, where it is mixed up with EK. It is processed by spiritual or existential intelligence (Gardner, 2006) and the result may lead to enhanced wisdom (Maxwell, 2007). SK is fundamental in developing organisational culture and organisational justice (Eberlin and Tatun, 2005; Ericson, 2010; Abatecola, 2014). As Zohar and Marshall (2004) emphasize, “We know today that human beings are by definition primarily creatures of meaning and value (that is, of ‘self-actualization’). We need a sense of meaning and driving purpose in our lives. Without it we become ill or we die” (p. 17). SK becomes an important ingredient of DM, especially in corporate social responsibility and transformational leadership (Barrett, 2010; Bass and Riggio, 2006; Lange and Washburn, 2012). Zohar and Marshall (2004) present in their book about spiritual capital a practical approach of measuring motivation, which integrates both fields of emotion and spirituality.

Corroborating these knowledge types with the already inferred influence of rational and intuitive thinking on effective DM processes (operationalised via organisational appreciation and reward, organisational higher performance, sustainable partnerships and managerial satisfaction with previous achievements), we presume that:

- H1. Rational knowledge exerts a positive influence on effective decision-making.
- H2. Emotional knowledge exerts a positive influence on effective decision-making.
- H3. Spiritual knowledge exerts a positive influence on effective decision-making.

Knowledge is a complex concept which can be understood as a spectrum of three fundamental fields: RK, EK and SK fields. At the individual level, as well as at the organisational one, these three fields coexist in continuous interaction and dynamics.

This composite structure of the organizational knowledge is indicative of a deep level of *knowledge heterogeneity*, a complex phenomenon explored systematically by Tsai (2016, 2018) and Tsai *et al.* (2014, 2019). Knowledge heterogeneity is a state of knowledge which influences, through its dynamics, the organizational performance (Lanza *et al.*, 2008; Rodan and Galunic, 2004; Yang and Wang, 2017). In this respect, knowledge heterogeneity is defined by Tsai (2016) as a state of “a collective structure of an organizing unit in which the members configure knowledge of various attributes (e.g. tacit vs explicit) from different disciplinary, managerial or technical areas by utilizing different processing methods” (p. 1165).

The complexity of knowledge heterogeneity can be approached through its dimensions of “domain”, “process” and “context” (Tsai, 2016) whose corroboration reveals a broad spectrum of implications. Here, knowledge heterogeneity directly impacts the organizational knowledge entropy and stimulates creativity and innovation, as Yang and Wang (2017) also posited. Further, the knowledge heterogeneity created by the RK, EK and SK fields majorly contributes to the process of KD, conferring it substance and relevance within wider frameworks.

Knowledge dynamics through the lens of thermodynamics. The thermodynamics lens introduces the meaning of transformation. One form of energy is transformed into another form of energy. For instance, through friction between two solid bodies, a part of mechanical energy is transformed into thermal energy.

Considering this thermodynamics lens in knowledge as energy metaphor, we get the idea that one form of knowledge can be transformed into another form of knowledge. RK can be transformed into EK and SK (Bratianu and Bejinaru, 2019). EK can be transformed into spiritual and RK. SK can be transformed into EK and RK. These transformations happen almost instantaneously in our conscious and unconscious brain and they are irreversible. This process of KD reflects the interaction between cognition and emotion and is fundamental in DM and building up the intellectual capital and dynamic capabilities for achieving competitive advantage (Schiuma, 2009; Teece, 2009).

If System 1 of thinking is based on processing EK and is supporting intuition, and System 2 of thinking is based on processing RK and is supporting rational DM, we can ask ourselves: *how is the transition between the rational decision-making and intuitive decision-making made when dealing only with explicit knowledge and tacit knowledge?* The famous SECI model (Nonaka and Takeuchi, 1995) cannot fully explain this transition. Further, the cognitive continuum theory (CCT) (Dunwoody *et al.*, 2000; Cader *et al.*, 2005) proposes a transition between intuitive and rational DM through several models with different degrees of rationality and intuition. However, these models are difficult to identify in real life and to explain them by using only explicit and tacit knowledge, because tacit knowledge is like a black box. Unlike CCT, KD is supported by multifield knowledge and entropic transformations already explored by cognitive scientists (Damasio, 1999, 2012; LeDoux, 1999; Kahneman, 2011). Hence, the theory of knowledge fields can provide an answer via the entropic processes amongst the three forms of knowledge (i.e. rational, emotional and spiritual). “Because knowledge is subjective, process-relational, and aesthetic, it can only be created in the actual practice of dealing with each particular situation” (Nonaka *et al.*, 2008, p. 13). Thus, the context influences the practical way in which RK, EK and SK enter the KD and may influence through the DM process. This outlook is consistent with the approach by Simeone *et al.* (2017) according to which the knowledge format and content are liable to involve a myriad of reconfigurations, interpretations, combinations and transformations in order to suitably adapt to people, contexts, challenges and uncertainty conditions.

The fact that each form of knowledge can be transformed into another, entailing an entropic process of KD was also captured by [Akügn *et al.* \(2012\)](#), [Georgescu-Roegen \(1999\)](#), [Fowle and Wood \(2009\)](#) and [Kahneman \(2011\)](#) when addressing the irreversibility of knowledge transformations. Either implicitly or explicitly, the authors acknowledge the integrative knowledge processes apposite for DM and their inherent dynamics. A more articulate framework on these intricate interrelations is brought forward by [Bratianu and Bejinaru \(2019\)](#) in a recently published study, where they clearly advance that “The transformations between emotional knowledge and rational knowledge are governed by experience and expertise. The transformations between emotional knowledge and spiritual knowledge are governed by culture and those between rational knowledge and spiritual knowledge by wisdom. Thus, we obtain a holistic view of knowledge dynamics” (p. 8).

A related empirical perspective in support of the relationship between KD and DM is offered in the study by [Bratianu, Văţămănescu and Anagnoste \(2018\)](#) which concluded that the correlation between the two constructs is higher than the ones between each type of knowledge field (i.e. rational, emotional and spiritual) and the DM process. The analysis brought evidence that the underlying “combinations correlate with the decision-making processes and practices to a great extent in business frameworks” (p. 109). Shortly put, managers who rely their decisions on complex foundations, as knowledge kernels intertwining facts, figures, intuition, values, etc., are more likely to attain positive outcomes in their practices and strategies.

By conflating all these considerations, we infer that:

H4. Rational knowledge exerts a positive influence on knowledge dynamics.

H5. Emotional knowledge exerts a positive influence on knowledge dynamics.

H6. Spiritual knowledge exerts a positive influence on knowledge dynamics.

H7. Knowledge dynamics exert a positive influence on effective decision-making.

By corroborating the seven main relationships previously inferred, an integrative conceptual model was conceived.

Material and method

Sample and data collection

A questionnaire-based survey on the issue of KD and the DM process was conducted between March and July 2018 with 275 middle managers from Romanian companies acting in the business consulting field (i.e. financial consulting, insurance consulting, accountancy consulting, audit services and asset management). The key informants were selected using a facilitator – a top manager of a multinational corporation operating in the same professional area. According to the guidelines of [Chin \(1998\)](#), the suitable sample is given that the number of subjects exceeds the minimum size ($10 \times$ the number of maximum arrows pointing to a latent construct), as required by PLS criteria. Further, the adequacy of the sample size ($N = 275$) was supported by the results of the a-priori power analysis performed with G*Power software, in line with [Faul *et al.* \(2009\)](#), which required a minimum sample of 129 participants for detecting a moderate effect at 95 per cent power in a four-factor model estimated with a probability of 0.05 error.

The great majority of the companies included in the sample (70 per cent) had over 250 employees and a turnover above 11 *m* euro in 2017. Most subjects were male (53 per cent), aged between 24 and 34 years (61.4 per cent) and had a master's degree (73.45 per cent).

The key informants were invited via email to fill in a questionnaire concerning the way they perform the DM process in relation to different types of knowledge sources and various manners of knowledge processing and harnessing.

Constructs	Indicators	References
Rational Knowledge (RK) [reflective construct]	RK1. I use to take action starting from objective, evidence-based arguments RK2. I analyse things in detail with respect to different business situations RK3. I rely on rational thinking when I am confronted with new business challenges	Bratianu and Andriessen (2008); Kahneman (2011); Bratianu and Vătămănescu (2017)
Emotional Knowledge (EK) [reflective construct]	EK1. I use to trust my feelings when dealing with different business issues EK2. My intuition generates many good business ideas EK3. I trust my emotions when I am confronted with new business challenges EK4. I rely on my senses in many business situations	Gladwell (2005); Hill (2008); Bratianu and Andriessen (2008); Damasio (2012); Bratianu and Orzea (2013); Kahneman (2011); Bratianu and Bejinaru (2019)
Spiritual Knowledge (SK) [reflective construct]	SK1. I am open to establish sustainable agreements with business partners sharing the same cultural values SK2. I use to collaborate with business partners who embrace the same business vision	Zohar and Marshall (2004); Eberlin and Tatun (2005); Maxwell (2007); Bratianu and Andriessen (2008); Ericson (2010); Abatecola (2014)
Knowledge Dynamics (KD) [formative construct]	KD1. Whenever I have a strange feeling about a situation, I analyse the data more systematically KD2. Whenever I collaborate with trustful business partners, I am very committed KD3. I often analyse external data through my business experience and expectations KD4. I often share the lessons learnt with my business partners in order to ensure a common approach on the issue KD5. I use to learn what is good or bad in different business situations by analysing the results of my previous actions KD6. My personal values guide me in interpreting data and distinguishing between solutions KD7. Working with business people sharing the same values and principles makes me feel comfortable	Damasio (1999, 2012; LeDoux (1999); Bratianu and Andriessen (2008); Kahneman (2011); Bratianu <i>et al.</i> (2018)
Decision-Making (DM) [reflective construct]	DM1. I have been often congratulated on my good business decisions by my team DM2. My business decisions often resulted in the firm's higher performance DM3. My business decisions often led to sustainable partnerships DM4. I am satisfied with the outcomes of my previous business decisions	Authors' own elaboration

Table I.
Constructs and indicators

Measurements

The advanced measurements relied on: (1) the theoretical developments previously described and (2) on the authors' prior exploratory studies. The research instrument consisted of 28

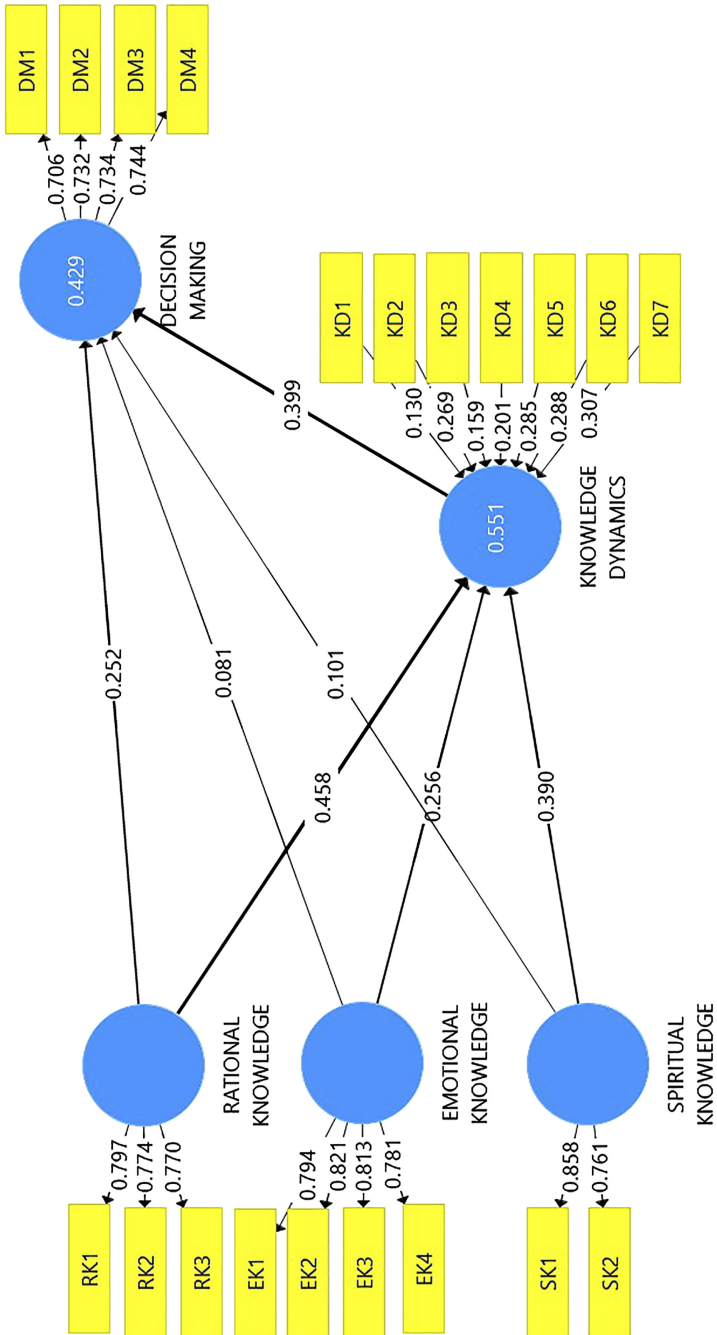


Figure 1. Structural model with path coefficients

items, including sociodemographic questions. Four reflective constructs (i.e. RK, EK, SK and DM) and a formative construct (i.e. KD) were developed (as illustrated in Table I). The composite nature of the latter was accounted for given the inclusion of indicators that explained in aggregate the overall dimension and allowed modelling causal relationships within their nomological net. The items were measured on a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree).

Methods and procedures

The research model was tested using the PLS-SEM in line with recommendations of Chin (1998) and the updated guidelines indicated by Henseler *et al.* (2016) and Hair *et al.* (2017). SmartPLS 3 (Ringle *et al.*, 2015) statistical software for PLS-SEM was used to analyse the relationships considered in the proposed research model properly. PLS-SEM was chosen as a unique method for both measurement model validation and structural model analysis, as it ensures a statistical assessment of models mixing composite and reflective constructs (Henseler *et al.*, 2016).

Before performing the evaluation of the structural model, the global goodness-of-model fit (GoF) and the validity and reliability of the measurement model were conducted. A bootstrapping procedure with 5,000 re-samples was then employed to determine the path coefficients and their significance within the framework of the inferred model.

Results

Model fit and measurement appraisal

The statistical analysis showed that the proposed model fulfils the GoF criterion of Standardized Root Mean Square Residual (SRMR) < 0.08, the retrieved values (SRMR = 0.076 for the saturated model and SRMR = 0.076 for the estimated model) confirming a good model fit.

The measurement model (Figure 1) and the constructs (detailed in Table I) were developed according to the specialised literature (Hair *et al.*, 2017), whereas the adequacy of the measurement was supported by the validity and reliability tests given that the composite reliability (CR) exceeds the 0.7 threshold (ranging between 0.793 and 0.882), and the average variance extracted (AVE) values are above the 0.5 threshold for each reflective construct comprised in the measurement model (ranging between 0.531 and 0.657).

The discriminant validity of the measurement model was investigated via the criterion of Fornell and Larcker (1981) and via the heterotrait–monotrait ratio of correlations, HTMT.85 criterion advanced by Henseler *et al.* (2016) – the values displayed are lower than the 0.85 threshold of Kline (2011), ranging between 0.155 and 0.676. In what concerns the AVE values, the squared correlations are lower than the diagonal entries as Fornell and Larcker (1981) requirements contend, while the outputs corresponding to the HTMT ratio of correlations are below the 0.85 threshold established by Kline (2011), the results also being consistent with the recommendations of Henseler *et al.* (2016).

Effect	β coefficient	Mean	Standard deviation	T	p value	2.5% C.I.	97.5% C.I.	f^2	Hypothesis
RK → DM	0.252	0.244	0.064	3.927	0.000	0.116	0.368	0.074	Supported
EK → DM	0.081	0.079	0.052	1.541	0.123	−0.024	0.182	0.009	Not supported
SK → DM	0.101	0.095	0.056	1.820	0.069	−0.013	0.202	0.012	Not supported
RK → KD	0.458	0.457	0.054	8.435	0.000	0.347	0.558	0.453	Supported
EK → KD	0.256	0.257	0.045	5.734	0.000	0.169	0.344	0.130	Supported
SK → KD	0.390	0.390	0.052	7.520	0.000	0.287	0.491	0.293	Supported
KD → DM	0.399	0.415	0.069	5.798	0.000	0.277	0.550	0.125	Supported

Table II.
Effects

The absence of multicollinearity amongst the constructs of the measurement model was confirmed via the analysis of the inner variance inflation factor (VIF) values (between 1.033 and 1.973), complying respectively with [Diamantopoulos and Siguaw's \(2006\)](#) limit (3.3).

Given the fact that all measurement criteria were met by the research model, the assessment of the hypothesised relationships was evaluated.

The evaluation of the relationships

The relationships amongst constructs were assessed by resorting to a PLS analysis with 5,000 re-samples bootstrapping procedure, which allowed the estimation of the direct and indirect effects (β -path coefficients) and their statistical significance, in line with [Hair et al. \(2014, 2017\)](#).

The results of the relationship assessment (depicted in [Figure 1](#) and [Table II](#)) indicated that the proposed model explains 42.5 per cent of the variance in respondents' DM and 55.2 per cent of the variance in KD (see R -square values in [Figure 1](#)).

As shown in [Table II](#), five out of the seven hypotheses were supported by the empirical analysis. The findings confirmed that the RK exerts a positive influence on effective DM processes (RK \rightarrow DM relationship: $\beta = 0.252$, $t = 3.927$, $p < 0.001$; $f^2 = 0.074$ – H1 is thus supported) whereas neither the EK nor the SK proved to have direct meaningful effects on the managerial decision (EK \rightarrow DM relationship: $\beta = 0.081$, $t = 1.541$, $p > 0.05$; $f^2 = 0.009$ – H2 is not supported; SK \rightarrow DM relationship: $\beta = 0.101$, $t = 1.820$, $p > 0.05$; $f^2 = 0.012$ – H3 is not supported).

Focussing on the relationships between different knowledge types and KD, the results brought to the fore that each of them exerts a significant influence on the latter, as follows: RK on KD (RK \rightarrow KD relationship: $\beta = 0.458$, $t = 8.435$, $p < 0.001$; $f^2 = 0.453$ – H4 is supported), EK on KD (EK \rightarrow KD relationship: $\beta = 0.256$, $t = 5.734$, $p < 0.001$; $f^2 = 0.130$ – H5 is supported) and SK on KD (SK \rightarrow KD relationship: $\beta = 0.390$, $t = 7.520$, $p < 0.001$; $f^2 = 0.293$ – H6 is supported).

In what concerns the last inferred relationships – the effect of KD on effective DM – the findings indicated a significant influence, thus confirming H7 (KD \rightarrow DM relationship: $\beta = 0.399$, $t = 5.798$, $p < 0.001$; $f^2 = 0.125$).

Discussion and conclusions

Summary and discussion of the findings

The investigation of the seven research hypotheses in the context of the Romanian business consulting companies has brought forward several key issues.

First, five out of the seven proposed hypotheses were supported by the data analysis; thus, entirely confirming the meaningful effects of different types of knowledge on KD, understood as an entropic process ([Bratianu and Vătămănescu, 2017](#)). The evidence is in line with previous studies ([Bratianu and Orzea, 2013](#); [Bratianu et al., 2018](#)) discussing the relationships between RK, EK and SK and KD.

Second, the results partially confirm the significant effects of different types of knowledge on effective DM. For instance, out of the three knowledge fields, only the RK exerts a significant positive influence on DM; therefore, providing further evidence for prior research contending the effect ([Drucker, 1993](#); [March, 1994](#); [Goodwin and Wright, 2004](#); [Yanoff et al., 2014](#)). On the contrary, EK and SK do not have significant direct influences on the DM process, these findings contrasting the conclusions drawn by previous studies which have either systematically or tangentially supported the presumed relationships ([Dane and Pratt, 2007](#); [Kahneman, 2011](#); [Matzler et al., 2014](#); [Malewska, 2015](#); [Bratianu and Orzea, 2013](#); [Abatecola, 2014](#)). The current configuration of the effects pertaining to the knowledge fields on the DM at

the middle management may be explained via the specificity of the sample, the particular profile of the companies operating in the business consulting, that is, financial consulting, insurance consulting, accountancy consulting, audit services and asset management. Given the characteristics of this specialised field – the regulatory overlay, a high level of standardisation of the financial policies and procedures, the propensity towards planned and deliberate strategies vs emergent strategies, etc. – it comes out naturally why RK becomes of prime importance while EK and SK only play a peripheral role. Still, when shedding light on the relationship between emotional intelligence and financial DM, Bouzguenda (2018) apprehended the “partial’ influence of emotional intelligence on financial decisions and the detection of a potential to be upgraded” (p. 273), thus opening up a new outlook on the influence of “using one’s emotions to solve problems” on the objective outcomes of financing decisions. In this respect, the author recommends the sustained development of an emotional intelligence capital via articulate organizational policies. Analogously, Hall and Adriani (2003) discussed the knowledge construct as an organic blend of organizational culture, intuition, skills, reputation and codified information with a direct influence on human behaviour and thought, irrespective of the frame of reference, an approach which hews the path for further studies to untangle the knowledge fields in specific sectors.

This perspective is supported to some extent through the lens of the meaningful influence of KD on effective DM, considering the fact that the KD construct integrates the transformations of one knowledge field into another. A possible interpretation of the findings may be that all transformations happen almost instantaneously in individuals’ conscious and unconscious brains and feature underlying entropic processes. Immordino-Yang and Damasio (2007, p. 8) suggested a “large overlap between cognition and emotion” which they call *emotional thought*. As KD mirrors subtle interactions between cognition and emotion within the framework of social, cultural and organisational values, its scope transcends a cumulative formula while its impact on DM becomes prominent. Another supporting idea in favour of this hypothesis confirmation comes from the study of Gao and Xu (2019), according to whom decisions in the stricter sectors (e.g. investment decisions) rely on “concrete data such as historical prices, trading volumes, and macro indicators, and the less structured data such as analyst opinions, market sentiment, and government policies” (p. 226), an implicit process of RK, EK and SK transformations. Likewise, as Davenport and Prusak (2000) urged knowledge and, inherently, knowledge-centric decisions remain a mixture of contextual data, framed and experts’ experience and value that engenders innovation and organizational growth.

Research originality and implications

The present study envisioned bringing to the mainstream two different research layers. On the one hand, it provided novel insights into the relationships between various knowledge fields and KD, the DM process within actual business environments insofar as most of the studies on this topic primarily regarded academic realms (Bratianu and Vătămănescu, 2017). On the other hand, the selection of 275 companies operating in the business consulting field and the appraisal of the DM process through the eyes of middle managers was settled from the onset as a challenge provided that the key informants work in well-regulated fields like financial consulting, insurance consulting, accountancy consulting, audit services and asset management. Testing and validating the theory of the knowledge fields and KD in relation to the managerial decision succeeded in providing fresh outlooks on the relevant predictors, supporting the presumed influence of KD in this specialised sector.

The findings have compelling implications for both research and practice. In what concerns the former, the study avails new exploration paths conducive to the intricate nature

of the DM process, to the underlying factors and their specific influences. From a polarization temptation of considering DM a rational or an intuitive process, our research suggests a dynamic approach that is based on a continuous transformation of one form of knowledge into another one and influencing DM through a synergetic effect. Also, by analysing the structure of the decisional context, researchers can reveal the dominant form of knowledge and its influential power. For instance, in well-standardized and procedural business domains, RK remains central with respect to EK and SK. In arts, marketing and medical domains, the EK becomes central with respect to RK and SK, while in transformational leadership and corporate social responsibility, the central position is taken by SK. These are new challenges for research stimulated by the present study.

In what regards the latter, managers are invited to reflect more on their decisions, to go beyond facts and figures and to assume the existence of knowledge transformations as a significant antecedent of DM effectiveness. Even though RK preserves its relevance in this context, its influence is exceeded by the one pertaining to the KD which proves that integrating EK and SK in the decisional equation may become a pivotal input to making good managerial decisions regardless of the level of regulation and standardisation in the field. Managers are dared to reassess the invisible part of their final decisions, by admitting that a more comprehensive and dynamic DM style can strengthen the impact of knowledge management processes on organizational performance. In-depth reconsideration of the business complexity and multiplexity is entailed in an effort to surpass the borders of the bounded rationality and the relevance of the underlying drivers of human emotions and values. Talent management, innovation management and knowledge sharing require a profound understanding of EK and KD in stimulating creativity and building up trust. Strategic thinking and sustainable business development ask for more implications of SK and spiritual intelligence. Also, cultural intelligence in multinational companies stresses the importance of value systems and the way these values contribute to the DM processes.

Research limits and future directions

The present argumentative and empirical undertaking has certain limitations and, therefore, would benefit from further improvements.

Firstly, the conceptual and structural model envisioned – i.e. the knowledge fields and KD in the framework of DM – may be expanded. In this front, future research may encompass other relevant factors, explicitly disentangling between stationary vs turbulent business contexts. Secondly, the findings are indicative of a specialised field, as previously described. Thus, new examinations and assessments of the research model in other fields would be beneficial for rounding off the general implications. Thirdly, the research instrument comprised only self-reported answers, hence subjective measures for all constructs, a fact that should be thoroughly considered in other methodological designs, especially when measuring the effectiveness of the DM process.

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