Getting better at Knowledge Management: Integrating individual skills and organisational capability.

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Abstract: This paper arises from a work in progress academia/industry collaborative research project to develop a Knowledge Management (KM) maturity model as a component (critical capability) of the IT Capability Maturity Framework (IT-CMF). KM is understood as an organisational capability i.e. the effective mobilising of the resources of people, processes and technology to support the achievement of an organisation's objectives. The research questions addressed are as follows: what are the challenges for organizations in developing an effective KM capability?; what are the respective roles of individual skills and organisational capability in developing a KM capability?; how can individual skills and organizational KM capability be integrated to help organisations get better at doing KM? The key finding is that an important challenge for KM in terms of developing capability is the potential for processes and technology to both enable and block how well people manage knowledge. The role of learning is important and the link between individual learnings and organisational capability is key, but challenging to manage. Initial data indicates that combining a skills-based approach with an organisational capability approach might be a helpful practice for organisations and some suggestions are provided on how to synthesise this challenging field into tools and guidelines that practitioners can use.

Key words: organisational capabilities; competences; learning; skills; maturity models; knowledge management; human resource management; human capital management; IT-CMF; SFIA.

1. Introduction

This paper arises from a work in progress academia/industry collaborative research project to develop a Knowledge Management (KM) maturity model as a component (critical capability) of the IT Capability Maturity Framework (IT-CMF) (Curley et al., 2015). It takes as a theoretical model that KM is best understood as an organisational capability i.e. the effective mobilising of the resources of people, processes and technology to support the achievement of an organisation's objectives (Peppard and Ward, 2004). Developing a holistic understanding of KM to include individual and organisational perspectives is important both from a theoretical and practice development perspective. Our paper shares insights in synthesising this challenging field into tools and guidelines which practitioners can use. It discusses a question of great current interest in KM in terms of how to maximise the benefit of individual learning through creating the correct organisational context.

This paper is structured as follows. Firstly, we describe our research questions and the methods we use to address them. We then introduce the context of our discussion, the IT-CMF and its KM critical capability. Next a short literature review is presented to provide an overview of capability and its potential connection to KM before we proceed to address the research questions one by one in different sections. Finally, we outline our approach to providing tools for practice guidance through combining IT-CMF and a skills framework, the Skills Framework for the Information Age (SFIA, 2017).

1.1 Research Questions

The research questions we address in this paper are as follows:

- What are the challenges for organizations in developing an effective KM capability?

- What are the respective roles of individual skills and organisational capability in developing a KM capability?

- How can individual skills and organizational KM capability be integrated to help organisations get better at doing KM?

The methods used to address these questions include conceptual analysis of the academic and practitioner KM literature and an engaged research process through regular meetings with KM practitioners where ideas were discussed and guidelines developed and validated. Our approach to mapping and combining IT-CMF and SFIA was also validated in a workshop of practitioners involved in IT capability improvement.

1.2 IT-CMF and the scope of its KM-related capability

IT-CMF is an action-oriented IT capability maturity model of 36 IT-related critical capabilities (one of which is KM) developed by the Innovation Value Institute (IVI) research centre. Each capability is divided into a series of categories and associated capability building blocks, and for each capability, a series of management insights, maturity roadmaps, assessment instruments, and improvement guidelines has been developed. The framework's five-level maturity curve, ranging from initial to optimizing, enables organisations to systematically assess and understand their current IT capability maturity, strategically prioritize specific capabilities, and move toward their desired target maturity state (Curley et al, 2015). This work is supported by a diverse international consortium of organisations, government agencies, and academic institutions, that aim to address the challenges faced in optimizing the business value derived from the application of IT through an open innovation, collaborative design science approach (Curley et al, 2015) that incorporates the insights of workgroups of subject matter experts from both industry and academia.

IVI is currently in the ongoing process of updating the IT-CMF body of knowledge to develop and increase its relevance to the continually evolving digital environment. The outcome is to accurately show the characteristics of a high maturity state for the different aspects of the KM capability in the digital age and this activity is discussed in a previous ECKM paper by the authors (Thornley et al, 2016).

The table below outlines the conceptual model we developed for the KM capability which consists of some generic categories and more specific capability building blocks. As outlined in section 1.1, these concepts were derived through an engaged research process involving KM industry and academic subject matter experts.

Category	Capability Building Block
Capability model	Culture
	Structures/Relationships
	Organisational Cognition
	People
	Processes
	Tools and Technologies
Harvesting the capability	Strategy Development, Review, and Target-Setting
	Knowledge Discovery and Capture
	Knowledge Asset Organisation/Classification and Access
	Knowledge Analysis
	Knowledge Sharing
	Governance

Table 1: KM capability building blocks

2. Literature review

This literature review focuses on the meaning of capability and how it can be connected to KM. This introduces the capability concept which will then be analysed further in our discussion where we address the research questions under consideration.

As discussed in section 1 improving capability or, in other words getting better at something, is normally understood as working on the three major components of capability which are processes, people and technology (Ross, Beath and Goodhue, 1996). For example, improving processes could include process streamlining and/or standardisation, improving people could consist of training and awareness raising and, finally, improving technology could consist of ensuring that reliable and appropriate technology is in place to support organisational activities. If capability is to reliably improve, all three components need to be worked on in a coordinated way. As an extreme example to illustrate this point, there is no value in having highly trained surgeons in a sterile operating theatre (both made possible by training people and effective cleaning processes), if the lights go out half way through the operation because there is an unreliable power source with no back up.

Capabilities are not static and Teece and Pisano (Teece and Pisano, 1994) introduced the term 'dynamic capabilities' which are defined as 'the subset of the competences/capabilities which allow the firm to create new products and processes, and respond to changing market circumstances (p.541)' . A dynamic capability is particularly relevant in the highly digitized business landscape as in order to remain competitive, organizations need to continually re-configure the capabilities they have developed over time (Teece, Pisano and Shuen, 1997) (Zahra, Sapienza and Davidsson, 2006). This reflects how capabilities must anticipate and adapt to the environment and has clear links to knowledge management (Teece, 1998). This connection has since been further developed in the literature, for example, by (Prieto and Easterby-Smith, 2006) in terms of its connections with organizational knowledge. Capability is also linked to change and knowledge by (Orlikowski, 2002) whose "view of organizational knowing as an enacted capability suggests that core competencies or capabilities of an organization are not fixed or given properties (p.270)". In terms of changing and improving capabilities she argues that people learn to know and do things differently in complex reciprocal processes in which they will use "whatever means, motivation, and opportunity they have at hand to reflect on, experiment with and improve their practices (p.253)." The environment in which organisations now operate is much more volatile and erratic than when the KM discipline was established, and organisations need capabilities to operate and react to these changes (Kaivo-oja et al, 2015). This means that the impact of digital transformation and the increased pace of change has enhanced the importance of capability as key aspect of KM. The major change for KM is not so much in terms of managing knowledge content, as technology has developed to deal with this to an extent, but in terms of how people can effectively respond to, learn from and apply that content. Learning is becoming even more important and continuous informed adaption is now crucial (Lee et al, 2012).

This ability to effectively use and apply knowledge to actually make a positive difference to an organisation is key to gaining value from knowledge and was influentially discussed, introducing the term 'absorptive capacity', by (Cohen and Levinthal, 1990). The concept of absorptive capacity was first defined as a firm's "ability to recognize the value of new information, assimilate it, and apply it to commercial ends (p.128) ". It was defined in terms of capability "we label this capability a firm's absorptive capacity and suggest that it is largely a function of prior knowledge. (p.128)". Factors which they argue make this more likely are continual (not intermittent) investment in research and development and the recruitment of diverse teams. A more developed definition, building on this original work was produced at a later date which has even clearer links to capability. (Zahra and George, 2002) defined absorptive capacity as "a set of organizational routines and processes by which firms acquire, assimilate, transform and exploit knowledge to produce a dynamic organizational capability" p.186. Developing an IS capability has been found to support effective innovation and exploitation of knowledge in some cases (Cepeda-Carrion, Cegarra-Navarro and Jimenez-Jimenez, 2012)They also suggest that ability of both individuals and organisations to forget old knowledge and practices in order to innovate is also crucial for absorptive capacity. This is a challenge to the original idea of absorptive capacity in that it was closely linked to adding to prior knowledge. We have now introduced the key concepts of capability and how it may connect to KM and in the next section will consider the research questions within this context.

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3. Research Question 1: What are the challenges for organizations in developing an effective KM capability?

Knowledge is perhaps one of the most individual and personal attributes an employee will have, as well as probably the most valuable, so sharing it effectively for use in an organisation is always going to be a potentially complicated and conflicted activity. If we see improving capability as improving people, processes and technology then we also need to consider how these three components relate to each other in terms of KM. KM is complex as our view of knowledge is that it is essentially something possessed by a person and that processes and technology can provide a means to share knowledge but do not themselves create it. They can, however, help enable changes in behaviour and outcomes that will result in an improved knowledge management capability. The question of how exactly this happens and what is the best way for organisations to facilitate it remains a challenge. For KM to have significance and impact it requires the transfer of individual knowledge to appropriate actions and insights that can benefit the organisation or it just remains knowledge rather than knowledge management.

There are both conceptual and practical challenges in developing an effective KM capability. KM, in so far as it involves learning from knowledge to operate more successfully, is an essential tool for improving capability. Hence, it is a requirement for capability improvement as well as a desired outcome. The evidence on the actual improvements brought about by effective KM is difficult to reliably quantify but this ability to transfer knowledge to appropriate action has emerged as a key critical success factor (Serenko and Dumay, 2015). Thus, the problem of not just gaining knowledge but being able to use it effectively to improve the organisation is a long-term issue in KM. This has also been shown in work examining the respective roles of learning orientation, market orientation and organisational performance revealing that absorptive capacity mediates the relationship between learning orientation and market orientation (Kharabsheh, Ensour and Bogolybov, 2015). They use the term absorptive capacity to describe a combination of basic skills, related prior knowledge, and research and development infrastructure.

3.1 IT

Another challenge for KM in terms of developing capability is the potential for technology and processes to both enable and block effective knowledge management by people and the complexity of factors that influence the kind of effect they have on KM. The use of IT to share knowledge has not always been positive in terms of information overload and the over formalisation of processes can also sometimes block rather than enable knowledge transfer. The increased availability of information has not necessarily resulted in an increase in knowledge and learning. The term information overload came to prominence with the rise of internet enabled information sources but its negative effects remain poorly understood (Bawden and Robinson, 2009) in terms of how it actually affects information behaviour and performance. The constant availability of information 'updates' leads to increased interruptions to workflow and learning and the longer term effects are not yet known (Bannister and Remenyi, 2008) and can appear inconclusive. More recent work has shown that by carefully distinguishing between different types of interruption it becomes clearer why it can sometimes have positive and sometimes negative effects (Addas and Pinsonneault, 2015). Communications through IT can also have indirect effects on KM in terms of increasing stress and demotivating employees, which in turn makes knowledge sharing less likely (Raisiene, 2012). Some researchers have argued that IT can damage our ability to learn and gain knowledge through the loss of focus and distraction (Rosen and Samuel, 2015). In their work the authors offer differing advice on whether learning to switch off from digital input is best or to 'fight fire with fire' and manage it with filtering technologies. This disagreement, though perfectly valid, also ranges challenges for those trying to develop guidelines on KM best practices.

3.2 Processes

Research on KM and human resources practices has shown mixed and inconclusive results (Andreeva and Sergeeva, 2016) on what processes actually do encourage knowledge sharing amongst staff. Different results have been shown in various organisations with the same HR processes to encourage knowledge sharing such as rewards, increased opportunities etc. They also suggest that processes may not incrementally improve knowledge sharing but may sometimes act against each other in a counterproductive fashion. Thus, from an organisational perspective developing a collection of processes to encourage knowledge sharing may or may not work depending on how the individuals concerned perceive those processes and how the processes may interact together. They conclude that 'more is often not better' even if HR practices on knowledge sharing are closely

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aligned to organisational strategy. For example, they find that offering opportunities for knowledge sharing is often positive but that offering rewards for knowledge sharing, at the same time, can reduce the effectiveness of providing the sharing opportunities. Different approaches will also be more or less effective depending on the culture and norms of the organisation. Strong ties and low cost to benefit ratio as well as cultural norms were important in promoting knowledge sharing behaviour (Marouf, 2016) when looking at the library context but it still varied between different libraries. Another perspective on knowledge sharing which took as its focus the opposite behaviour of knowledge hiding and what processes and technologies either encouraged or discouraged this behaviour is discussed in the work of (Serenko and Bontis, 2016). They found that the availability of KM systems and knowledge policies had no impact on reducing knowledge hiding. Rather it was found that knowledge hiding was a form of rationalised behaviour driven by a complex range of personal factors. It is a deliberate activity by employees, not simply an act of omission caused by a lack of knowledge sharing opportunities. Addressing the problem requires a strong focus on improving the overall knowledge culture which then would create norms that reduced knowledge hiding behaviour.

3.3 Organisational context

The role of organisational context (Sergeeva and Andreeva, 2016) is also found to be important in terms of what organisational strategies and related processes will be effective. Their work emphasised the importance of carefully aligning KM with an organisational overall strategy and that different approaches will work depending on the context in which the knowledge will be used and how. It is not possible for one approach to KM to work in most cases but careful work must be done to make sure it is appropriate. This is clearly a wider organisational capability issue which must be in place before KM can be effective. This context can also be understood to extend to issues of regulatory or legal context as, depending on the type of organisation and its associated knowledge, different regulations will apply with implications for KM governance.

3.4 Conflicts

Finally, a fundamental issue with getting better at KM is the contradictory forces at play. Improving KM generally involves promoting positive practices that can have negative effects if carried out to a certain degree or in a particular context. Knowledge sharing is generally positive but, in some situations, can be catastrophic for an organisation. Knowledge sharing and information security can often be in conflict but are generally not considered in a coordinated fashion by organisations (Ahmed, Ragsdell and Olphert, 2014). Information security is often seen as an IT problem though it is often human behaviour which is the cause of knowledge leakage rather than IT failures. There is also a risk in reducing knowledge sharing through overzealous information security measures so effective practices need to carefully respond to these potentially conflicting requirements.

4. Research Question 2: What are the respective roles of individual skills and organisational capability in developing KM capability?

The previous discussion has shown that improving KM capability is a complex mix of individual knowledge and how that can most effectively be shared and used in an organisation. Knowledge is inextricably linked with the concept of learning in terms of gaining, accumulating, and assimilating knowledge. The link between an individual's knowing or learning and how to most effectively 'translate' that into improved organisational knowledge has been an area of long standing discussion in KM. For KM to improve and have an impact, employees both need to get better at learning and the organisation needs to get better at managing and using that learning in a focussed way. Since the 1990s it has been found that for individual learning to translate to increased organisational capacity, people must have shared goals rather than fragmented learning for no clear purpose (Kim, 1993) and that improved capabilities come about based on the extent to which expertise is structured, coordinated, and communicated (Zander and Kogut, 1995). More recently we see continued evidence of the theme in the work of (Nieves and Haller, 2014) on the importance of both individual and collective skills as a basis for developing dynamic capabilities and by (Vargas, Lloria and Roig-Dobón, 2016) on the importance of deliberate intervention by management via enablers or drivers for individual learning to actually improve organisational performance. The effective use of individual learning requires strategic high-level input and it needs to be channelled towards important areas of the organization that need to improve (Chen et al., 2014). It must also be coordinated in a holistic way to ensure it effectively supports the needs of the organization (Fink, 2011).

The literature then would appear to support the view that to improve the impact of KM an organisation needs to both focus on the skills of its individual employees and focus on organisational supports necessary, such as processes and technology, to coordinate and focus those skills for the benefit of the whole organisation. Digital transformation is impacting on the both the importance and nature of this activity. Work by (Schumann and Tittmann, 2015) argues that digital transformation requires a re-orientation of learning culture and the acquisition of new fundamental concepts. If these are successfully integrated into the processes and the vision of the company, then this creates enormous potential value. Getting this right will become more important within the digital context with the increased pace of change requiring both continual learning by employees and continual flexible methods of managing this by the organisation to facilitate dynamic capabilities.

5. Research Question 3: How can individual skills and organizational KM capability be integrated to help organisations get better at doing KM?

The previous discussion has placed KM within the context of organisational capability and highlighted the ways in which individual learning and skill development needs to be coordinated at an organisational level. Since knowledge resides in people it is both important to manage that knowledge carefully but also important to try and retain the people. As (Serenko and Bontis, 2016) observe, the best strategy for reducing risk of knowledge loss through staff turnover is to keep your staff. At present within the market place there exists some IT capability and process improvement frameworks, for example IT-CMF (Curley et al., 2015) and Capability Maturity Model Integration (CMMI)(Software Engineering Institute, 2002), and a range of skills frameworks, for example the Skills Framework for the Information Age (SFIA) (SFIA, 2017) and the e-Competency Framework (e-CF) (CEN, 2014). However, there is no method in place to effectively combine the organisational approach with the individual skills level approach.

Our current research involves piloting an approach of using both skills frameworks (the Skills Framework for the Information Age (SFIA)) and an organisational IT capability management framework, (the IT Capability Maturity Framework (IT-CMF)) to simultaneously combine both skills development and capability improvement in organisations. We have developed an approach, which has been validated in workshop and workgroup settings, and will shortly be piloted within an organisation. The first step will be to conduct an overall IT capability assessment within the organisation which would indicate the critical capabilities within IT-CMF that the organisation needs to improve as critical to its mission. The second step is to identify the relevant sections of SFIA that relate to these capabilities in terms of relevant skills through a skill to capabilities mapping process. The result of this process will be a matrix as shown below with a summarised example showing one KM capability building block and the associated SFIA skills that would need to be improved to enhance this building block.

Critical Capability	Capability Building block	SFIA Skills needed to deliver improvement
Knowledge Management	Knowledge Analysis	
The goal of the capability is centred on getting the right knowledge, to the right people, at the right time, and thereby improving the quality of decision-making.	To establish and implement processes, skillsets, tools and linkages (e.g. to tacit knowledge) to seek and derive insights and intelligence from the organisation's existing/accumulated knowledge resources to facilitate informed decision-making. This may arise both in response to general guidelines as prescribed by the KM strategy, and specific enquiries arising from within the organisation'.	Analytics
		Data analysis
		Data base design
		Systems design
		IT infrastructure
		Information Management
		Business analysis

This provides a starting point to assess the desired skill levels for the capability improvement needed and SFIA can provide tools to both assess current and target skills, as well as provide pointers to available training and development opportunities. The result should be focussed skills development targeted to specific organisational objectives and progress can be assessed by doing a later capability maturity assessment to determine how things have improved. The advantage over using only a capability approach is that a targeted skills development programme to enable that improvement in terms of people can be put in place. The advantage over using only a skills improvement approach is that there is now a high degree of confidence that the skills being developed will improve important strategic capabilities and that simultaneously, work is being done to improve technology and processes around those capabilities. As an example of how this will be piloted by IVI we will be trialling this approach with one of IVI's members who have already done considerable work on capability improvement using IT-CMF but who want to build on improvements by targeting appropriate skill development.

5. Conclusions and future research

There is much evidence from the literature that organisational and individual skills and learning need to be carefully coordinated to realize effective KM. However, there is not much availability of tools and approaches that have been coordinated to assist managers in implementing this. Our specific contribution is to show how to operationalize the known link between organisational capability and individual skill development through the use of existing frameworks which can be carefully integrated as a practical tool for practitioners.   This provides both a new tool for KM practitioners and a new way to build our understanding of what exactly is happening when learning is managed in this way. These findings will provide a new level of detail in the data available to build organisational learning theory for KM.

Our future work will be based on piloting the approach within different organisations with different capability priorities. In particular, we will look at any challenges arising in of simultaneously managing organisational capabilities and individual skills and plan to develop methods and tool to help organisations overcome them.

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