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Knowledge Management: (Potential) Future Research Directions

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At the conclusion of this Handbook, it is useful to make some overarching comments regarding potential future research directions for the field of knowledge management (KM). Undertaking such an analysis is always a subjective process, as it is shaped by the insights, experiences and perceptions of the individual scholar. Thus, what is outlined here is not intended to be an objective analysis of probable future trends in the field of KM. Instead, it represents our perceptions of what we regard as important issues and topics that could facilitate the development of the field. The remainder of the chapter is structured around these themes.

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Bridging the Theory–Practice Gap

This issue is largely inspired by the conclusion of Heisig et al.'s (2016) analysis on perceptions of the relationship between investments in KM systems and activities and their impact on business performance. This theme also links to a broader issue of the extent to which academic work on KM is linked to and shapes KM practices in the non-academic world.

In terms of a causal link existing between investments in KM and improvements in organisational (or individual worker) performance, this represents one of the canonical assumptions of the KM field. However, Heisig et al.'s (2016) analysis, based on an extensive survey of KM academics, concluded that despite the many claims made about this linkage, further research was necessary to more fully and rigorously substantiate it. Further, this is despite the claims of many papers to provide evidence of such a linkage. There are a significant number of papers whose analysis identifies a link between various knowledge processes (knowledge sharing, knowledge absorption, knowledge utilisation) and various types and levels of performance improvement (such as individual-level work performance, team or organisational innovation). Thus, examples of such work are not difficult to find (for example, Amin and Aslam 2017; Cheung et al. 2016; Han and Li 2015; Henttonen et al. 2016; Leal-Rodriguez et al. 2013; Lee et al. 2010; McIver and Lepisto 2017; Yang 2013). However, arguably, due to the type of data that is typically collected and analysed, there are weaknesses in the claims being made in such papers. The intention here is not to single out any specific writers for making unsubstantiated claims, or having undertaken a problematic analysis, but to highlight the general challenges that exist in attempting to make a linkage between investments in KM, or worker engagement with KM activities, and some type of performance improvement.

In general terms, papers which present data on this relationship use survey-based research methods. One of the biggest challenges is attempting to quantify and measure activities, such as knowledge sharing, which are inherently subjective and ambiguous. For example, in processes of knowledge sharing, where two people interact and exchange some knowledge or information, there are challenges in attempting to quantify the relevance and/or quality of any knowledge that is shared, as well as identifying whether any shared knowledge is used by people in carrying out their work, and finally, whether the use of such knowledge has changed or improved people's work performance in a noticeable way.

These measurement challenges relate not only to the quantification of KM activities, but also to measuring and quantifying the performance improvements

such activities are meant to produce. Whether the interest is in individual-level worker performance, team-level performance, organisational-level innovation or organisational-level performance improvements, challenges exist in measuring such variables. This is to a large extent due to the challenges of measuring performance quality. For example, at the level of individual worker performance, for virtually every job, performance improvement is not simply about increasing the number of times something is done (how many customers served, how many problems solved), but also with the quality of people's work performance. Finding measures to reliably quantify such issues is extremely challenging.

With survey-based research, such challenges are often addressed by collecting self-report data on people's perceptions, such as people's perceptions of their engagement with KM activities, and people's perceptions of performance levels (individual-level productivity). This is the case with virtually every one of the papers listed above, which claim to provide evidence of a linkage between participation in KM activities and performance improvements. In reality, what has been demonstrated is a linkage between people's perception of their engagement with KM activities and their perception of work performance.

Many of these performance challenges arguably arise out of too many individual-level performance metrics. One of the many issues with both KM and related studies of strategic human resource management (HRM) systems is the excessive focus on performance at the individual level. As noted in the Introduction section of this Handbook, this is despite scholarly advocacy for the emergence and complementarity of resources at the level of the human capital resources (HCR) (Barney and Felin 2013; Felin 2012; Nyberg et al. 2014). The basis of this approach is that resources are accumulated and compiled from the individual level to the HCR as firms aggregate up individual knowledge, skills and other skills (KSAOs). Nyberg et al. (2014) suggest that while KSAOs are unique because of the way they are constituted at the individual level of analysis, at 'the collective HCR level, they manifest different types of the HCR such as knowledge based HCR versus a skills-based HCR' (2014: p. 321). The methods by which firms develop dynamic capabilities from the HCR deserves much greater attention in the KM literature despite recent research (e.g., Helfat and Martin 2015) drawing from previous work in the field (e.g., Eisenhardt and Martin 2000). Thus, much of this research has been focused by and large on strategic development rather than KM. One useful question relates to why KM scholars should also shift their attention to dynamic capabilities (DCs). Put simply, if it can be proven that DCs arise from the HCR, then it follows that knowledge stocks and flows (Bontis et al. 2002) are likely to be

transformed. That is, existing knowledge stored and used is not simply exploited one more time; rather, through a process of exploration, new knowledge is acquired that increases a firm's existing stocks of knowledge. This is because, as strategy scholars contend, DCs are fashioned by the way resources are recombined, reconfigured, accumulated, coevolved and transitioned (Dierickx and Cool 1989; Eisenhardt and Martin 2000; Maritan and Peteraf 2011; Ployhart et al. 2014). To us, this sounds very much like a KM transformation process (e.g., see Chap. 24 by Mohsen and Syed in this Handbook).

Similarly, scholars have called for a different focus on social capital (SC) research. For instance, Nyberg et al. (2014), Ployhart et al. (2014) and Ployhart and Moliterno (2011) suggest that 'future research should consider more explicitly the validity of social capital as a socially derived building block of the Human Capital Resource (HCR) that is conceptually equivalent—if empirically distinct—from the psychologically derived KSAOs that have predominated in the HCR literature' (Nyberg et al. 2014: p. 335). Murray (see Chap. 2) suggests that much SC research has focused on highly dependent idiosyncratic environments and the degree to which firms can build trusting relationships in establishing external social capital (ESC) collaborations. Furthermore, the distinction between internal social capital (ISC) and ESC is not well explained in much of the literature. In fact, there is not a seamless integration and transformation of SC resources at the HCR level, because all firms learn and acquire knowledge at different rates, reflecting the reality that both ISC and ESC measurements will be dissimilar depending on the many contexts in which study constructs are used. Similarly, because existing KM research acknowledges the downsides of time and space, trust and commitment in developing ESC relationships (Adler and Kwon 2002; Granovetter 1973; Nahapiet and Ghoshal 1998), SC transactions tend to be consummated over longer periods of time (Coleman 1988: p. 91). Thus, a concept such as ESC cannot be considered at a certain point in time and space as a reliable antecedent of performance (see Murray, Chap. 2). Accordingly, we call on scholars to consider longitudinal studies of SC, how relationships are formed, how they change and how they are maintained over time; more precisely, how they create value given concerns about opportunistic behaviour (Panico 2016). Further, given the many interconnecting ontologies in proximate fields, for example, strategy and Strategic Human Resource Management (SHRM), future research ought to examine the relationship between KM and SHRM, and KM and strategy.

A further challenge with the type of survey research undertaken on these topics is that a snapshot approach is adopted as noted above, with survey data on all topics being collected at a single point in time. With such analysis, while it is possible to identify a relationship between variables, it is not possible to establish any form of causality. Thus, while KM activities and performance levels may be linked, this does not prove that the engagement in KM activities is causing the performance improvement, as the opposite may be the case.

Overall, therefore, one potential challenge for the KM field is to further investigate the link between investment in KM and engagement in KM activities, and their impact on performance levels. The challenges of doing so are not insignificant; however, more comprehensively proving the value of KM activities to organisational or individual performance is important, partly in order to demonstrate the value of KM to the non-academic world. This leads to the related challenge for the KM field: a potentially significant theory–practice gap.

A number of analyses of the KM field suggest that practical utilisation of academic work in the non-academic practitioner domain is somewhat limited; for example, Serenko and Bontis (2013) talk about it having a 'limited direct impact on practice', and Ragab and Arisha (2013) refer to a 'theory–practice gap'. One indicator of this is that as the field has evolved and matured, the level of practitioner involvement in academic publications has declined significantly. More anecdotally, there has also been a significant reduction of interest in the topic among management consultants. Thus, the high level of early interest shown by large consultancies such as KPMG during the early growth period of interest, in the years immediately following the mid-1990s, has not been sustained, with their level of interest in providing KM solutions being significantly reduced. This decline of practitioner engagement and interest has occurred at the same time as the domain has matured into an established academic field of interest.

The risk associated with this level of practitioner engagement is that KM becomes a purely academic field, with limited practical relevance. For a largely applied field, such an outcome would be a shame, as the practical relevance of much academic research in this domain is significant. As the current Higher Education (HE) context is characterised by increased demands for practitioner relevance, engagement and impact, this provides a further incentive to ensure adequate levels of practitioner engagement. Thus, a significant challenge for those actively involved in this field is to reverse this historical trend of declining practitioner engagement, and ensure that the insights developed from academic research in this field are seen as relevant beyond the domain of academia.

The Human–Technology Interface

From the late 1980s until the mid-2000s, the primary focus of scholars and practitioners was on the information technology (IT) side of KM and the related aspects of data processing and storing. This trend continued into the 2000s, with much attention paid to IT to capitalise on knowledge. There was, however, some attention given to other dimensions of KM. For example, in their book titled *Knowledge Creating Company*, Nonaka and Takeuchi (1995) highlighted the need to consider the human side of managing knowledge. Prior to that, Nonaka (1991) had highlighted the role of organisational structures and processes in producing knowledge and creating innovation. However, it took more than a decade before this advice was paid due attention. For example, in his important piece in the *Journal of Knowledge Management*, Bhatt (2001) examines KM by focusing on the interactions between technologies, techniques and people.

Nonaka and Takeuchi (1995) introduce the SECI approach, focusing on socialisation, externalisation, combination and internalisation, which has guided much of the subsequent thinking about KM. The SECI approach focuses attention on the way knowledge is generated among people in order to establish a process to enable knowledge creation, sharing and socialisation in organisations. This is a people-focused approach which is particularly useful to convert tacit knowledge to explicit knowledge.

The future of KM is likely to benefit from the IT and human focus of the previous decades as well as a focus on critical and ethical aspects of knowledge for specific outcome-driven actions in a responsible manner (Chen and Huang 2009; Rechberg and Syed 2013). It is likely to focus on connectivity, collaboration and co-creation, thus integrating the information and socialising aspects of managing knowledge. Instead of discarding IT, the future KM will use technology to assist in socialising, connectivity and collaboration in order to create and co-create knowledge. It will thus make use of several forms of the latest technology, such as artificial intelligence, 3D printing, robotics, wearables and cognitive technology, to enable individuals to share, learn, co-create and co-use knowledge (Fovero 2016).

For example, IBM's Watson system integrates natural language processing and machine learning to understand and analyse various data sources. It has the ability to combine diverse data of artificial intelligence. It analyses natural language and merges it with statistical analysis of vast, unstructured piles of text to offer useful information. Clearly, such a system has a diverse range of applications. For example, in medicine, Watson is being used to conduct robust analysis of vast amounts of information to doctors who would have to

otherwise undertake many hours or weeks of learning to correctly process information (Fovero 2016). Watson for Oncology analyses a patient's medical information against a vast array of data and prescribes a choice of evidence-based treatment. In particular, once an oncologist enters all of the clinical information into the computer system, Watson will then review all of the data and recommend treatment options based on the latest evidence and guidelines. Once the oncologist makes the expert decision, this information may also be sent to the health service provider or insurance company for approval (Doyle-Lindrud 2015). While the final decision still remains with the human, the quick and relevant data processing enables an efficient integration of human and IT-based knowledge. Therein lies the future of KM.

Berry (2013) highlights the importance of individual employees and managers in the efficient and effective use of knowledge. He cites a survey to note that the lowest performers in customer service satisfaction include industries that are expected to have access to the latest technology, such as internet service providers, internet social media, wireless phone carriers and airlines. While this technology–service mismatch indicates a trade-off between satisfaction and efficiency, it also indicates the need for more engaged and skilled employees and managers to use knowledge technology to achieve organisational outcomes.

Berry (2013) argues that organisations with modern technology but poor outcomes may be failing because of their inability to harness the multitude of information that is available to them, for example, to help them understand their customers and provide solutions to their challenges. Berry (2013: para.7) argues:

> Companies have piles of information within multiple channels, locked away in silos—different systems, different departments, different geographies and different data types, making it impossible to connect the dots and make sense of critical customer information.

The enormity of data and the organisational inability to locate, correlate and leverage information across channels ultimately affects organisational efficiency and poses challenges for knowledge workers. This means that KM practitioners will have to start learning about new technologies and will need to have the flexibility to adapt to their job descriptions. Similarly, there is yet another aspect of KM where technologies such as virtual reality may be used to enable individuals to have virtual 'face-to-face' meetings without needing to be at one location. Such technology is particularly useful for sharing or applying knowledge in remote or risky situations such as pipeline or

radioactivity inspections, remote surgery and cost-effective meetings. Videoconferencing through Skype or Videolink is the most common example. Perhaps a future version of such meetings will be offered by 3D hologram meetings.

In the current era of social media, intranet and internet, technologies and databases of knowledge may remain neither unique nor inimitable for an indefinite amount of time. However, the ability of humans to make use of such data and associated technologies is something that will be a source of strategic competitive advantage.

Taking Account of the Changing Nature of Work

The world of work and employment appears to be changing in multiple, diverse, significant directions. First, the ongoing development and evolution in digital technologies via social media, smartphones and tablet computers (among others) are transforming the way people work and communicate. Second, processes of globalisation are ongoing, requiring increasing numbers of workers to travel regularly, work in diverse locations, and collaborate and communicate with collaborators who are geographically dispersed. Third, various changes are impacting on the nature of the workplace, and the locations from which people work. These include an increased use of hot-desking, an increase in the proportion of people who work at home and an increase in the proportion of people whose work requires them to regularly be mobile, working from diverse locations, including while they travel (see point 2). Fourth, developments in automation and artificial intelligence have the potential to transform the nature of many jobs, automating routine tasks, and requiring workers to utilise and collaborate closely with these technologies.

These changes are not only affecting the nature of people's work activities, and the types of skills and knowledge necessary to carry out work activities, but are also transforming the way people communicate and collaborate with colleagues. For example, increasingly fewer workers work full time in static corporate locations, where much communication with colleagues occurs face to face. The relevance of such changes to the domain of KM is that they are likely to impact on the ways in which workers and organisations use, manage and share knowledge. For example, how an office-based worker, who travels little and collaborates largely with local colleagues face to face, uses and shares knowledge is likely to be different from how a worker who is often home-based or mobile, and who is required to utilise a range of information and communications technologies (ICTs) to communicate with their colleagues

and collaborators, shares knowledge. Thus, a key challenge for the domain of KM is to make sense of such organisational change and to account for how it is impacting on the domain of KM.

Following this line of thought, one emerging challenge for KM researchers lies in the area of harnessing business intelligence and analytics in the era of big data, which also has a 'big' impact on knowledge discovery, among other things (Chen et al. 2012). Recent research confirms that the analysis of big data (or any data) using the 'people' dimension may prove to be a challenge due to technology limitations and data privacy issues. Organisational analytics capabilities must be developed so that the strategic impact of human capital can be measured for better KM (Boudreau and Ramstad 2006). However, existing practices of analytics have been criticised for failing to deliver strategic value; for instance, in the area of human resource management, analytics use finance (cost-driven) and engineering (process-driven) perspectives for people management issues (Angrave et al. 2016). Significant issues of privacy and ethics must be addressed, particularly for personally identifiable information, as they could be more vulnerable to information security breaches; for example, a US citizen may be identified based on their gender, date of birth and zip code (Sweeney 2000). Furthermore, given our earlier thoughts on the human capital stock of knowledge, researchers can no longer think of the HCR as a static resource. Given the nature of changes and potential of big data, KM researchers ought to turn their attention to how to realise the opportunities of big data analytics in the HCR and how these big data capabilities are accessible as a complementary set of resources for managers (Nyberg et al. 2014).

There are several opportunities for assimilating big data on people; however, HR analytics based on people may be implausible. Social media and automated sensors collect authentic and relevant data on people (e.g., actual events that people attend) rather than self-reported activities (e.g., lists of events that people may claim or plan to attend). However, real-time, people-centric analytics from automated systems can potentially lead to negative outcomes. For example, when employees were given a target time for order fulfilment in a warehouse management system, efficiency was achieved due to staff performance improvement. However, further analysis revealed that the employees were engaged in unsafe practices in an attempt to meet the deadlines, resulting in a work health safety issue (McAbee et al. 2017).

Key barriers to the adoption of big data analytics by knowledge workers include the consequences of thinking about people in terms of labour cost metrics. The silo thinking within knowledge areas also prevents sharing of knowledge stocks with other determinants of performance (Angrave et al.

2016). For example, in the area of HRM, people data has transparency and transferability challenges, for example, restrictions on migrating employee data across countries for multinational companies (Cappelli 2017). One recommendation is to transform the current people-based analytics model to an analytics model based on KM, such as competence. For example, people knowledge on selection and assessment of IT service management processes for improvement can be automated to develop an organisational capability more transparently, thereby facilitating innovation (Chap. 25 by Shrestha, Kong & Cater-Steel; Shrestha et al. 2015). Therefore, individual competencies can be accumulated to build dynamic capabilities that may lead to a competitive advantage in factor markets depending on how they are used (Helfat and Martin 2015).

To sum up, as a result of compiling this Handbook, we have recognised many challenges from the knowledge–practice gap, the technology interface to the future of work and many more. Future research should seek to address the 'why and how' of KM in practice with a stronger emphasis on robust forms of measurement. Too much emphasis, for instance, on one type of KM, such as homogeneous attributes of individual knowledge linked to performance and/or how knowledge routines lead to better routines, are not only tautological but may offer very little to practising managers. An excessive focus on internalisation or some other antecedent, for instance, without reference to context is often criticised in the literature (Nahapiet and Ghoshal 1998; Hsu and Wang 2012). Similarly, common measurement fallacies are committed when seeking to generalise some empirical studies across industries. It may be more worthwhile for scholars to focus instead on empirically validating the practice(s) of KM within a specific industry before such generalisations occur. For example, it is extremely difficult to generalise the SC construct as a form of knowledge generation across both internal and external organisation functions simultaneously, mostly because both the latter have different causal properties (Adler and Kwon 2002; Hsu and Wang 2012). This Handbook accordingly addresses these and many other contemporary issues of KM by developing new lenses and methodologies by which to measure KM practices. We encourage scholars to consider the excellent chapters of empirical work, related case studies, theoretical reviews and conceptual ideas that are available. However, we also call on scholars to consider the challenges and opportunities for future research as we have discussed here. To this end, we hope that the Handbook provokes much thought within the KM space and serves as a highly relevant and practical resource going forward.

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