A Systems Failure Perspective on Knowledge Management

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Abstract— Research in Knowledge Management has encountered challenges in defining what constitutes a failure, identifying potential causes, and cautiously attempting to predict such failures. This paper aims to introduce a methodology that reveals causal relationships, improves predictability, and guides practitioners in managing and learning from failures in Knowledge Management through a more rigorous analysis framework. Building on previous studies in Information Systems and Knowledge Management, the authors suggest that insights gained from the limitations of Information Systems failures can be beneficial when examining Knowledge Management failures. To accomplish this, we employ a systems failure approach. Although maintaining focus throughout this multi-phased methodology can be challenging, the practicality of the systems failure approach lies in the balanced framework it offers. The proposed method for addressing Knowledge Management failures is expected to surpass the existing simplistic factoring approach, providing practitioners with a clearer and more actionable roadmap compared to a complex interpretive method.

Index Terms- Knowledge Management Failures, Systems Failure Approach, Knowledge Management failure analysis, failure analysis methodology, lessons from failures.

I. INTRODUCTION

The Knowledge Management (KM) literature has, not surprisingly, tended to focus on Knowledge Management's positive implications for organisations. This has, however, opened a gap for others to investigate the downside of KM, as some researchers have indicated that failure is far from being a nontrivial issue by claiming that "A large proportion of [KM] initiatives will fail" (Storey and Barnett 2000), or by challenging Knowledge Management deliverables " It is common knowledge that a high percentage of all Knowledge Management programs will fail to have any real impact"(Gal 2004). Existing work has typically looked at KM failure in terms of identifying barriers and enablers to success, rather than by detailed failure analysis. This paper approaches knowledge management failure by capitalising on the much larger literature of information systems failures. This is not to claim that information systems are the only important aspect in Knowledge Management, but merely that information systems has contributed to Knowledge Management evolution and that some of the issues in the two fields are similar. To this extent, a systems failure approach is adopted, which allows Knowledge Management researchers to take both a systemic and systematic path in examining Knowledge Management failure. Finally, our proposition might be considered as an interaction of what Gregor (2006) identifies as type IV theory (theory for explaining and predicting) and type V theory (theory for design and action).

This paper is presented in the following order: the next section briefly sets out some different contemplations on what constitutes Knowledge Management. The third section looks at how the KM literature treats KM failure. These approaches vary from a simple, not to say simplistic factoring approach to a non-practitioner user-friendly interpretive approach. It is argued that this leaves an intriguing gap for a Systems Failure Approach (SFA) to cover, noting that in adopting an Information Systems (IS) approach precautions need to be taken against overly relying on Knowledge Management technological aspects. The rest of the paper maps out a Systems Failure Approach for Knowledge Management through using the Accenture case as reported by Werr and Stjernberg (2003), and Paik and Choi (2005), ending with concluding remarks and implications for research and practice are drawn.

II. KNOWLEDGE MANAGEMENT PERSPECTIVE

Meso and Smith (2000) categorized technological KM components into: groupware, messaging, Web browsers, document management, search and retrieval, data mining, visualization, group decision support, and intelligent agents. Keeping on top of these technologies and systems captured a considerable amount of KM scholars' attention in the 1990s and in very early 2000s; however, Knowledge Management literature has established now that KM is not merely another face for IT, ICT, or IS. On the contrary, Malhotra (2005) has indicated that the more sophisticated KM technology gets, the higher the reported number of KM technology implementation failures, attributing the rise of failures to the technology-push model. Edwards and Kidd (2003) give a rationale for thinking about Knowledge Management from a contingent process approach, as organisations develop the will to manage their own knowledge. Along with this process view comes the emphasis on a key distinction of KM, as it includes the knower Edwards et al (2005) as opposed to mere information systems or technology. Lee and Choi (2003) builds an integrative KM model around enablers, processes, and organisational performance from a process perspective, their results show that technology can support only knowledge combination. To sum up KM views Edwards, Handzic et al.(2003) reveal the respective importance of different KM aspects as perceived by KM academics to be: people, culture, tasks / processes, performance / outcome measurement, structure, and technology.

III. KNOWLEDGE MANAGEMENT FAILURE

3.1 KM failure definition:

Different epistemologies and research questions have effected how knowledge failure is acknowledged in the literature. For instance, Beech, MacIntosh et al (2002) look at failure from the perspective of circumstances that fail to enhance knowledge creation. Gal (2004) explains the reward system effects that have driven a firm to abandon economically beneficial KM initiatives, implicitly assuming that initiative abandonment rather than outcome is what causes failure. From a different perspective, (Pech and Durden (2004) suggest that failure is caused by stakeholders' unwillingness or inability to entirely and objectively utilise existing knowledge. Alternatively, researchers may overlook mentioning failure by focusing on KM challenges, problems or inhibitors (Storey and Barnett 2000; Fischer and Ostwald 2001; Malhotra 2004), which gives to a certain extent an idea about failure as a consequence of certain conditions. There seems to be no clear realisation in much of the literature that understanding the conditions that might lead to failure is one thing, and defining what is meant by failure is another. Thus most research has been placing more attention on failure conditions rather than examining the nature of failure. Our understanding of failure leans towards that of Chua and Lam (2005) who identify failure to be a KM project that does not exhibit the eight features of successful KM as identified by Davenport, De Long et al. (1998), KM failure would thus include no growth in resources and knowledge usage, survival without one or two individuals is highly unlikely, no evidence of positive return from KM. Such a definition gives a manoeuvre space for a number of possible perspectives on failure that is argued for in this paper, adopting SFA looks at failure as an identifiable part (even parts or whole) of KM initiative that is responsible for a transformational process causing a certain output, or lack of output.

3.2 Studying KM failure approaches:

Studies on failure factors vary from universal factors, which apply to a wide range of circumstances, to those affecting a certain class of firms or certain types of KM initiatives. Fahey and Prusak (1998) draw from observations of more than 100 KM initiatives in the mid 1990s to compile a list of organisations' KM mistakes, along with advice on how to avoid such KM mistakes. A more recent study following the same line of thought is by Chua and Lam (2005) who analyse five case studies from the literature to examine reasons leading to failure. Moving to more specific studies, Wong (2005) develops a set of factors to avoid KM failure in SMEs. By the same token Alavi and Tiwana (2002) identify the challenges of knowledge integration in virtual teams, which is arguably one aspect of KM. Paik and Choi (2005) report on Accenture as an example of global KM, KM that pertains to a multinational firm, pointing to barriers and lessons from this case. All of these studies take a

positivist approach, in which there is strong causality between sets of conditions and failure outcomes.

On the other hand, Storey and Barnett (2000) develop a narrative case study to divulge failure causes, and ambitiously try to set their case specific results in the wider context of the KM constraints literature. Marshall and Thomas (2001) offer another example of interpretative work, as they map out Habermas's insights on three case studies emphasising their social construction and identifying barriers associated with groups' power, politics, and interests pertaining to KM. While Beech, MacIntosh et al.(2002) present a multi-perspective examination of knowledge management failure, they avoid a realist epistemology through hermeneutically scrutinizing three perspectives in their investigation, namely: psychodynamics, social construction, and complexity theory. Thus, they conclude an interpretative understanding of barriers to knowledge creation. To sum up, interpretative KM failures studies show signs of rich context specific results, which arguably convey holistic understanding of the failure situation complexity. Apart from Storey and Barnett (2000) the studies mentioned do not aim to produce generalisable propositions explaining failures. Moreover, practitioners are expected to face a challenging situation when trying to adopt this approach, as it requires an extensive knowledge of the underlying interpretive related work and theories, such as: narratives, Habermas, and social construction. Based on the shortcomings of the two preceding approaches in examining KM failure, we propose a systems failure approach as a clear road map to analyse the dynamics of failure. Such a way to examine KM failure is grounded in the overlap between KM and IS, as in the following sub-section.

3.3 KM and IS

Considering an approach that has been developed for Information Systems failures for Knowledge Management has to be rationalised in the light of the limitations on considering Knowledge Management solely from a technological perspective Edwards, Handzic et al.(2003). Many KM projects – but by no means all of them – involve the implementation of a Knowledge Management System, which in a narrow sense can be described as "IT-based systems developed to support and enhance the organisational knowledge creation, storage/retrieval, transfer, and application"(Alavi and leidner 2001). Concepts from IS are thus clearly relevant to Knowledge Management Systems.

A second reason is that some strands in the literature on IS projects also go beyond a focus on the technological. Ewusi-Mensah (1997) lists the following IS project features, all of which appear relevant to KM: group related activities, conceptual in nature, difficulties associated with determining risks and uncertainties, require intensive capital investments, and represent socio-technical systems.

On the other hand, some discrepancies exist, most noticeably that IS projects often implicitly assume that data and information has a fixed value depending on its qualities (i.e. timing, relevancy, completeness, and accuracy), while a KM perspective would assess knowledge in a given context, thus the notion of absolute value does not carry much weight. This again points to the knower element of KM, or to be more exact the tacit knowledge of the knower. Bearing in mind these differences and similarities between IS and KM, we introduce a systems failure approach to examine KM failure.

IV. SYSTEMS FAILURE APPROACH

The systems failure approach is not unique to IS, but is rooted in the study of catastrophes such as construction accidents, construction projects, emergency planning, and policing (Fortune and Peters 2005). Its inclusion of various aspects of systems thinking makes SFA quite useful in examining KM failures as a dynamic and complex phenomenon, consistent with the holistic perspective on KM set out earlier in the form of a process perspective on knowledge. It is this view that enables the researchers to use SFA on a non-computer based KM process. That is to say, by identifying input functions, processes' tasks, output functions, and knowledge customers, a clear "knowledge management system" is recognised. Whether this system include computer-based component or not does not matter for the purpose of this paper. This is a wider conception of a knowledge management system than that of Alavi and Leidner as mentioned earlier, and is close to the "middle way" of Holsapple (2002).

The essence of SFA (see figure 1) is a process that begins by capturing the reality of current situation, as it represents a potential failure, through studying the contextual elements of knowledge. (Blackler 1995; Thompson and Walsham 2004) provide additional insights into knowledge contexts. Abstracting reality in the form of diagrammatic representation helps narrowing down the quest for failures' processes or systems. The identified troubling systems are then modelled to closely monitor the nature of prospective failure. Drawing an ideal knowledge model (Formal Systems Model) is undertaken in order to portray a clear realisation of reality against the ideal situation, which in turn informs the researcher / practitioner on what extra information is needed to complete the analysis and provide recommendations. To illustrate the possible use of SFA, the Accenture case study as reported by (Paik and Ghoi (2005) will be used as an example.

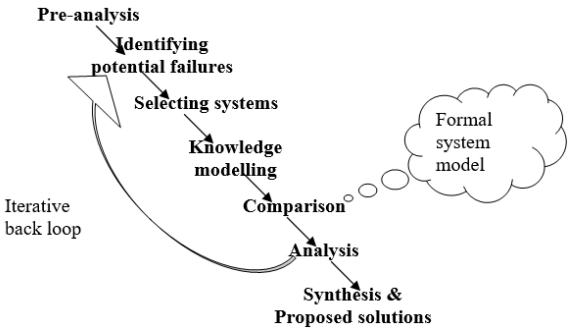
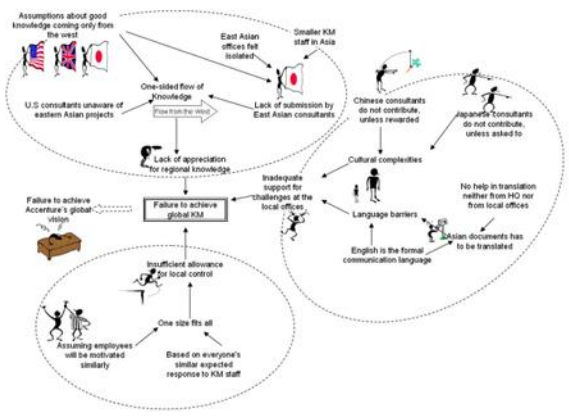


Figure 1: Systems Failure Approach: adapted from Fortune & Peters 2005

4.1 Pre-analysis

The aim of this step is to determine the potential failure scale and scope with regard to the KM initiative. Hence, only doubtful aspects of KM are forwarded for further analysis. (Peters & Fortune) advise on taking the following into consideration: purpose of the study, different viewpoints and perspectives crucial to the study, to be specified, and information about the situation as well as history to be gathered and brought together. They also identify techniques that may be beneficial to pre-analyse the potential failure –note the term *potential* failure here as the approach is expected to examine troubling initiatives before KM abandonment. The techniques fall into two groups: diagrammatic, including spray diagrams, rich pictures, relationship diagrams, and multi-cause diagrams; and non-diagrammatic, including lists, databases, and charts. Here, a rich picture diagram is used to demonstrate the interactive and complex nature of Accenture KM failure (see Figure 2).

The rich picture is a tool developed for Soft Systems Methodology (Checkland 1999), essentially it portrays the work context for people, which might include their relations, structures, and concerns. As shown in Figure 2, different cartoon images are used to represent people within such a context,(Monk and Howard 1998). Both conceptual and real pictures are only a fractional part of what Mingers and Taylor (1992) noticed when compiling a list of possible ways to construct rich pictures analysis, including: personal construct, cognitive kinetics, strategic assumption surfacing and testing, scenarios, group mind map using hexagons, real and conceptual pictures, cognitive mapping, rich questions. We have used the conceptual rich picture analysis here because of our limitation to secondary data sources, as it would be difficult to construct other analyses without interacting with the work place and stakeholders.



The salient KM features at Accenture are depicted diagrammatically in Figure 2. As a pre-analysis, the technique has taken into consideration the purpose of the study through emphasising Accenture's failure to achieve global KM by placing it as a highlighted square at the centre of the picture. Different viewpoints about global KM have been incorporated in the analysis: for instance, views from KM staff in East Asian countries like Japan and China are presented, while pointing out the specified variations. To complete the requirements of pre-analysis as

suggested by Fortune and Peters, we incorporated situation related data to the extent that would give the reader a sense of what is KM like at Accenture.

As described in Figure 2 Accenture's global vision cannot be delivered by failing to sustain global KM; this relationship was established through employee interviews in the original study. Three main areas of concern have emerged, all of which were consistent with the study aim: lack of appreciation for local knowledge, inadequate support for challenges at the local offices, and insufficient allowance for local control. Local knowledge appreciation was undermined by a set of assumptions (good knowledge comes from the west), facts (smaller number of KM staff in Asia), and negative emotions (East Asian offices felt isolated). Ignoring local challenges came into existence through the lack of awareness of cultural differences between western, Chinese, and Japanese consultants' motivational conditions. To make matters worse, translation was considered a barrier that Accenture's headquarters and local offices failed to deal with. Finally, the one size fits all type of strategy enforced a rigid KM that was not able to address the local environments. This insufficient allowance for local control implicitly assumed fictional rather than realistic conditions, such as: employees are both motivated and expected to respond similarly.

4.2 Identifying potential failures and selecting significant failures.

Keeping in mind that KM failure is a multi-faceted phenomenon, we advocate a broad failure definition rather than a set of precise criteria. Absence of successful KM implementation as described by Davenport, De Long et al (1998) will serve to draw general guidelines on what can or cannot be considered a failure. Identifying potentially troublesome systems fosters a more fruitful analysis in the following stages; this was done, in figure 2, by grouping the rich picture elements into three main areas of concern (potential failures). One issue here, as pointed out by Fortune and Peters (2005), is the situation might have already been labelled as a failure, otherwise it is arguable that the SFA would not have been used. The pressure on KM failure analysts to be non-biased agents then soars, as stakeholders surrounding such an approach usage will implicitly carry a general impression of failure. Analysts applying the failure definition developed above will find declaring a failure under such a loose term to be a lesser issue, as they can contemplate a (partially) successful Knowledge Management and bypass the controversial failure announcement issue; alternatively, they have to focus on specifying the boundaries of the system, reasons, and remedies for failure.

4.3 Systems Modelling.

The systems model must provide the essential information to smoothe the process of switching between different levels of analysis, as well as representing structures and processes to be used in the following comparison stage (Fortune and Peters, 2005). Possible techniques here include input-output diagrams, systems maps, and influence diagrams. For Accenture, the translation system (this is a set of procedures and interactions) is depicted using an input-output diagram of the current system (Figure 3). Note that this tool can also be used to develop a diagram for what the system would be like. The most important point is to develop appropriate models at suitable levels of detail to fit the needs of analysts for comparisons later on.

To expand on figure 3, consultants are required to complete their working projects on time, whilst translating the finished documents into a foreign language. To make things more complicated for them, neither headquarters, nor local offices offered any support for consultants who might lack both time and English proficiency. The translation system was built around the assumption that English is the formal communication medium for Accenture, which makes knowledge available for KM users around the globe, but little was done to overcome challenges facing global offices in delivering this one language knowledge platform. The translation system malfunctioning clearly indicates a substantial language barrier that was ignored by the global KM vision.

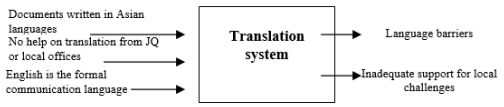


Figure 1: Input-output diagram for the current translation system

4.4 Comparison.

A Formal System Model is created as a benchmark against which the actual system, the one conceptualised from failure, is compared. Control, communication, and interfaces between sub-systems are all measured on various hierarchical levels. The Formal System Model shown in figure 4 represents an overall view of Accenture knowledge system. Four hierarchical levels (environment, wider systems, system, and sub-system) come together to form a coherent knowledge flow. The wider system for KM at Accenture is affected by the internal and external environments, which prompt the wider system to announce a KM vision (or amend it) and allocate resources for its execution. The "global KX" Knowledge Management initiative in turn illustrates the interaction between the composing subsystems; this is evident through making clear expectations, by the retrieval subsystem, according to environmental and wider system effects. The documentation sub-system reflects on the new expectations which are again combined with the effects of the environment to deliver under the new requirements. Finally, the update and translation sub-system has to consider the new limitations or opportunities to envisage the demand for knowledge under different conditions. This state highlights the need for continuous communication and control flows to ensure a flexible KM project that can deliver under different conditions due to its ability to adjust through building a two-way communication medium, and imposing a control mechanism to the overall direction of the initiative.

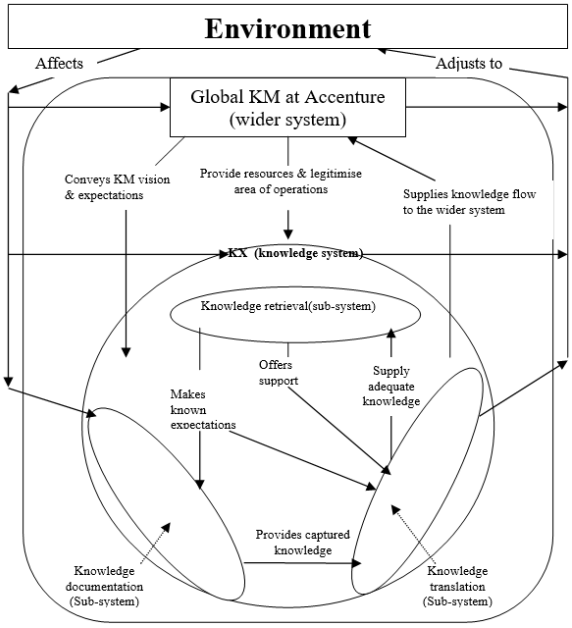


Figure 2: formal system model for KM at Accenture

Werr and Stjernberg (2003) describe the usage of knowledge within the boundaries of KM at Accenture "*Documentation produced in previous projects (that is, old cases) provided a second source for the consultants in all project phases. When designing a proposal for a new project, the consultants began by consulting the knowledge database to obtain examples of how proposals had been designed in previous similar projects. In later phases of the project, inspiration for formulating meeting agendas or organisational solutions could also be obtained from previous cases*". This study was conducted in Sweden where the translation system was not mentioned, yet the general KM features are the same as reported by (Paik and Choi 2005). Both of them fit neatly into the formal system model developed above.

V. ANALYSIS AND SYNTHESIS

Although the iterative loop in Figure 1 appears to follow the comparison stage, Fortune and Peters (2005) acknowledge the fact that, depending on the situation, iteration may be required between or within stages earlier in the process. During the analysis phase a critical review of the potential alternative solutions to rank them according to the perspectives identified previously in the pre-analysis stage is crucial, as what might seem as the best solution for a European office,

may be regarded as an ambitious or off putting plan by East Asian offices.

Moreover, analysts might discover that additional data are needed to pursue significant problems revealed through analysis, for example: according to Figure 4 the FSM indicates that global KM initiatives should provide support and resources, but going back to Figure 2 the rich picture reveals that the local East Asian initiatives never received such a legitimising support which might be partly responsible for the lack of employee involvement in these projects. This control flow linking two hierarchies together (i.e. wider system and system) is only one way to analyse the knowledge system. In practice, at this stage several iterations of the SFA may take place, to capture different perspectives and examine different systems levels.

The final outcome of the SFA will be influenced by the researchers' purpose and available solutions, which in turn affect the design of the solution and changes to be adopted leaving the researchers with knowledge about failure and how to deal with it. In practice this means that a valuable synthesis will be built upon the different findings resulting from remodelling or reworking the Systems Failure Approach at various key systems levels. It is useful at this stage to consider the future plan alternatives as explained by Edwards (2004): 1) Continuing the *status quo*. 2) Incremental change 3) Radical change. In contrast to his ideas about the equivalency of the first two options regarding their consequences on KM, in the systems failure approach context the adoption of the first option would mean that no action is taken to prevent the continuation of the failure. On the other hand radical changes represent a higher risk approach. Thus, an incremental carefully thought out change is arguably the most likely to deliver, perhaps in the form of the staged approach advocated by Edwards and Kidd (2003). This plan should be in accordance with the approach findings which will enable the researchers and practitioners to build up a compilation of lessons that can help further implementations.

CONCLUSION

The concept of knowledge management (KM) failure presents challenges, as it involves a judgmental assertion regarding a phenomenon that lacks a universally accepted definition. The situation is further complicated by the involvement of various stakeholders, whose expectations, resources, and experiences influence both the phenomenon and the subsequent reflections on it. This paper introduces a revised Systems Failure Approach, which suggests a systematic method for addressing failure by initiating a pre-analysis phase that facilitates a comprehensive understanding of the circumstances. A combination of systems tools and techniques is employed to pinpoint the processes and systems that contribute to the failure. As a case study, Accenture's translation system is identified as a concerning sub-system within the company's global KM initiative, although a deeper examination may uncover additional issues. A comparison between the intended functions of the system and its actual performance underscores the necessity for further exploration of the vulnerabilities present in both communication and control mechanisms. The analysis presented is preliminary and tentative, as the authors have relied solely on secondary data from existing literature. Nonetheless, it is asserted that this approach demonstrates practicality and relevance in investigating KM failures. Future research is recommended to assess the applicability of the Systems Failure Approach to KM and to evaluate the validity of the findings obtained.

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