

# Systems Thinking: Analysis of Electronic Patient Records Implementation and Knowledge Transfer Practice. BP Trust in the UK, NHS

*Firas Masri,  
Professor Trevor Wood-Harper, and  
Professor Peter Kawalek*

Alliance Manchester Business School, University of Manchester,  
United Kingdom

**Abstract:**

This paper aims to enlighten a new approach to study the Knowledge Transfer (KT) through Systems Thinking (ST) in relation with the implementation of Knowledge Management System (KMS) at the practice of the healthcare. Thus, integration between the KT and ST aims to open a door for a new literature about Knowledge Management theory in the healthcare context. This paper used many key philosophical concepts drawn from the ST theory and KT to investigate deeper understanding of the issues around KMS implementation practically in the context of the hospitals. In favour of these objectives, this paper conducted a case study on the implementation of the Electronic Patient Record (EPR) at BP Trust in the UK. Base on the business case of the project, EPR is perceived as a representative of KMS initiative project in the Trust.

The paper reviewed the literature on ST, KM, and KT to proposal of new KT approach. In the fieldwork, qualitative approach and case study was conducted in order to collect empirical data through a series of in-depth, interviews with different stakeholders, including management board, IT specialists and healthcare professionals as actual users. In order to have a comprehensive understanding of the case, and to validate the findings, direct observation was used and documents related to implementation were reviewed. The observation was taken place in the A&E department to see the actual interaction between the people and technology, and to understand the EPR in practice. The primary and secondary data were analysed by using template analysis method and approach.

Received: 14 Jan 2017

Revised: 3 Feb 2017

Accepted: 17 Feb 2017

ISSN 2056-757X

<https://doi.org/10.18646/2056.42.17-009>

The case study considers that ST provides beneficial understanding(s) alongside with the decision and sense making for implementing EPR project. The case study shows that understanding KT practice contributes to the integration of complex nature of healthcare practice. Furthermore, this paper argued that implementing EPR requires not only a particular intellectual conceptualization, but rather learning through reflection on the actual practice. Learning by doing and studying KT practice allows an implementation to become more adaptive and responsive along with day to day practice and contingencies. Thus, the findings outline for the decision makers, many important aspects to be considered, such as distributed leadership, flexibility, and practice analysis and end-user involvement.

This paper is limited on single case study, and more comparative case studies in complex situation would help to improve the study model. Therefore, this study suggests doing more studies around communication technologies and strategies in relation with KT practice by testing more communications tools and methods in the healthcare and in other context(s).

**Paper Type:** Case Study

**Keywords:** Systems Thinking, Knowledge Management, Healthcare, Knowledge Transfer, Electronic Patient Record

## **1. Introduction**

Applying Knowledge Management System (KMS) to make knowledge easily transferable within healthcare organisations has been regarded problematic, and prone to failure. Particularly, this was the case of a few hospitals that, ten years ago, initiated implementation of such technologies in their healthcare systems (Gastaldi *et al.*, 2012). In addition, there are many researchers tested and specified many reasons in relation with this issue. Hansen *et al.*, (1999), for example, had argued that the difficulties happened because the gap between the theories of KMS initiatives and their implementation empirically. In more recent Maier and Remus (2003) discussed that this problem was because of the lack of agreed methods for implementing KMS initiatives. In addition, Edwards (2009) claimed that the implementation decision to arrange KMS initiatives is not the same as to the actual making. This thought persists today in the healthcare community. Many researchers argued that applying Systems Thinking approach to the knowledge management (KM) and knowledge transfer (KT) practice can provide a pathway to comprehend KMS initiatives in more deep details (e.g. Edwards and Kidd, 2003; Parent *et al.*, 2007; Rubenstein-Montano *et al.*, 2001) However, these revisions have been conducted neither empirically nor in the healthcare field. This study aims to enhance our understanding of the KT in healthcare, by focusing on KMS implementation from a Systems Thinking perspective. The general purpose is to grasp new understandings on how to implement KMS in healthcare effectively. In particular, this research focuses on exploring the onsite enactment processes of an Electronic Patient Record (EPR). An exploratory research is aimed to study something that is not or cannot be fully known in order to gain awareness and analytical comprehension into deeper aspects of the subject area (Collis and Hussey, 2013).

This paper offers an examination of in-depth case study of one hospital Trust in the NHS. The overall aim of this paper is to explore the implementation of an EPR from different perspectives across various ‘stakeholders’ (i.e., strategic managers, change managers, technicians, and end-users). The paper is organized as follows. The first part illustrates a literature review that discusses previous studies on KM and KT, ranging from Systems Thinking to KM. A review of implementing KMS with specific reference to healthcare is exposed too. The second part shows the research approach and methodology to collect and to analysis data. The third part discusses a case study. Lastly, the paper offers a conclusion and recommendations for more practical works and further theory development.

## **2. Literature Review**

### **2.1. Systems Thinking**

Systems Thinking could be defined as a theoretical framework for ‘*problem solving*’, which attempts to incorporate different scientific disciplines and multi-perspectives. *Problem solving* tries to reduce and fragment a system into sub-systems in order to study how each part functions. The term “system” was enacted in most scientific fields as an iterative practice of discussion around problem-solving. Systems Thinking originated from framing problems as a whole (Senge, 1990; Hall, 1999). System

thinkers offer a worldview of entities organised into or by systems and sub-systems, and they use the term “system” to interrelate each and every entity within an all-inclusive reality (Parent *et al.*, 2007). The system-perspective of the world is founded by the characteristic of the universe as a dynamic incorporated complexity, where all is interdependent and interconnected. Thus, any system and its subs cannot be understood without considering and understanding its relationship to other systems and to the environment around it. In contrast, the mechanistic understanding of the universe entails a static worldview and determinism. This long-standing approach tries to break parts down in order to understand the functionality of mechanisms. Systems Thinking, as a dynamic model, tries to understand the changing of the world through recovering the connections or relationships that existed among systems and their sub-systems. For Rubenstein-Montano *et al.*, (2001: 6), “*problem-solving in this way involves a pattern finding to enhance an understanding of, and responsiveness to, the problem*”.

In short, as an introduction of what will be discussed below, Systems Thinking is needed in healthcare to enhance KMS initiatives and KT practice (De Savigny and Adam 2009). It allows for understanding the complexity of a given environment and its dynamic processes (Schlange, 1995). Accordingly, Systems Thinking provides an overseeing framework that helps insure a robust definition of the system to be referred to, along with its boundaries, through KT practices.

## **2.2. Systems Thinking and KT model**

Being a greatly complex environment, healthcare system functions as an intensive generator of knowledge and information across many disciplines. Each interplaying discipline requires high creativity and autonomy. KM and KT models encourage Systems Thinking to advance a basic framework. This framework helps identify the main elements required by social system(s), to produce, articulate and apply new knowledge in order to achieve a desired outcome (e.g., quality of care). However, KM and KT has become an increasingly extensive area of study. Therefore, these areas require a Systems Thinking approach in order to identify opportunities for improvement within healthcare organizations. It could be argued that when the holistic approach of Systems Thinking is applied, KT would be considered as a link between and among systems and their sub-systems, including the relationships with processes and goals. Systems Thinking consents a viewing KT from both the capacities the system possesses for KT to succeed (to achieve the goals), and the way in which knowledge is transferred (the process). This approach should consider the restrictions within which KT typically occurs, since all systems have limits. Overall, to apply Systems Thinking in KM and KT research, thinkers must consider the integration of organisational strategy, technology, learning and culture.

## **2.3. Knowledge Management and Knowledge Transfer**

Definitions of knowledge, KT practices and KM vary from the broad conceptual approach to the practical engagement. This paper, due to the space limitation, cannot provide a full discussion about the whole spectrum of positions here. Nevertheless, for the purposes of this research, any piece of information is regarded, along with a specific objective, and leading to an action within an organisation, as knowledge. “KT

practices” is seen as an important approach to facilitate knowledge acquisition, knowledge sharing, and knowledge application to achieve desired outcomes (Argote *et al.*, 1990). To frame KM in healthcare, the definition of Healthcare Information and Management Systems Society in the United Kingdom the Healthcare Information and Management Systems Society (HIMSS) is adopted. According to Guptill (2005: 11), HIMSS defines KM as the “*aligning of people, processes, data and technologies to optimise information, collaboration, expertise, and experience in order to drive organisational performance and growth.*”

In other words, KM is an approach that helps associate all knowledge in the health organisations to deliver best-quality patient care. In such organisations, professional specialists, who operate in different, hierarchical arrangements across organisational units, are responsible for delivering patient care. Thus, the delivery of patient care is fragmented (Van Beveren, 2003). This unique characteristic of health organisations, regarding the operational arrangement, has a deep effect on the ability of these organisations to create and transfer knowledge. However, there are two concerns emerged from the KMS and IS literature in relation to KT. First, KMS is not only a technology to facilitate knowledge sharing/transfer, but rather an approach to consider other key factors, such as the workplace culture and practices. Secondly, imposing technology could inhibit the development and growth power of knowledge and KT practices. Therefore, the strategies for the implementation of KM and KMS are aimed to respond to knowledge flow, or what is referred to as KT.

#### **2.4. Knowledge Transfer and Healthcare: The Main Issues**

Knowledge Management, in general, and Knowledge Transfer, specifically, are emerging as a potential solution to encourage learning and distributing knowledge. They can encounter many barriers and challenges in the healthcare system (Mitton *et al.*, 2007, Pentland *et al.*, 2011; Tabrizi and Morgan, 2014). In healthcare, improving the quality of care in medical areas is a dominant strategy of most organisations. However, KT in healthcare becomes complicated by subjective approaches to medical knowledge, dynamic contingencies in the medical practice, and professional boundaries among staff members, in addition to time pressure and shift work in the hospital environment.

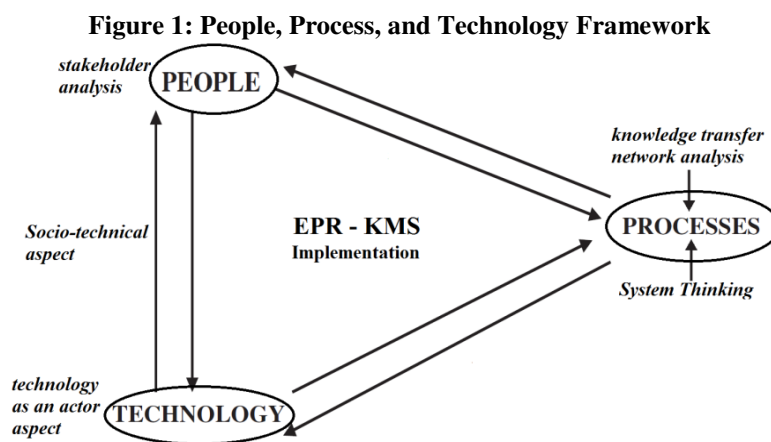
Nevertheless, KT approach offers a dynamic framework to deal with complexity in medical settings (Pentland *et al.*, 2011). The importance of KT in healthcare is regarded from many angles. First, the healthcare environment is complex and knowledge-based. Therefore, providing high quality healthcare requires accessibility to the right knowledge at the right time by providers, in order to make the decisions right and more efficient (Lin and Chang, 2008). Secondly, knowledge in healthcare organisations is dynamic, highly fluid, and at times sticky (Von Hippel, 1994; Szulanski, 1996). Providers use knowledge to be shared by different actors from multiple sources. This sharing of knowledge requires a specific ability, such as dissemination and absorption among professionals (Pentland *et al.*, 2011; Singh *et al.*, 2010). Lastly, Knowledge Transfer during the staff’s shifts is considered the most important aspect about healthcare organisations. These reasons to use KT in healthcare orient the scope of this study.

## 2.5. Implementation

In early work on KM, Tenkasi and Boland argued that “*the current tradition of information systems lacks a strong basis of what it is to integrate differentiated knowledge and expertise and facilitate mutual learning*” (Tenkasi and Boland, 1996: 80). Nearly two decades later, the issue of integrating knowledge absorbed from external sources with the internal one remains as a challenge (Almeida et al., 2011: 395). The implementation of KMS should not be treated as an information system; rather, it should be studied along with KT practices (Galliers, and Leidner, 2014). For the purpose of this study, the EPR system could be defined as an IT system which allows clinicians to “*capture, share, and use information digitally*” (Intellect, 2013: 4) and thus, it is regarded as a KMS, according to the descriptions cited before. The characterisation of knowledge integration as a perspective-taking in this research is relevant to consider an EPR as a decision support system, rather than as a traditional information system.

The structure of healthcare organisations in the UK usually imposes information technologies to be set up in a rigid way, instead of a more tolerant or flexible to apply KT practice or any bottom-up methodology (Alderwick *et al.* 2016; Pentland *et al.* 2011). There are many studies being conducted around KMS in healthcare. For instance, Ghosh and Scott (2007) examined KM practises and organisational factors, which they associated with effective KMS within clinical nursing societies. In addition, Fahey and Burbridge (2008) used the implementation and development of a KMS in a hospital with the aim to explain the transmission of modernization practices, as well as to understand how and why most implementations of KMS initiatives fail. Earlier studies of technology-based KMS in healthcare include Pedersen and Larsen (2001) and Davenport and Glaser (2002) who overlooked Systems Thinking. Additionally, they did not examine EPR system in relation with the KT practice, despite the fact that lately EPRs have become the backbone of all active systems in hospitals.

This paper discusses the relationship between KMS, knowledge transfer (network analysis) and Systems Thinking. The articulation of this issue is illustrated in Figure 1. This shows a representation of a KMS, where the elements people, processes and technology are linked and interact in a reciprocal relationship with one another.



Adapted from: Edwards (2009)

### **3. Methodology**

Exploratory research usually is used to study new phenomena or to investigate a current problem more clearly in order to develop the final design (Schutt 2011). Schutt (2011) suggested that exploratory research provides a flexible approach, when the fieldwork is complex and the approaching the problem are difficult. He argues that case studies and/or in-depth interviews would be good methods in the exploratory research.

This research aims to understand better how to implement KMS effectively in a complex system, such as healthcare, by applying Systems Thinking. In particular, this study aims to apply Systems Thinking analysis of KMS implementation to provide an in-depth understanding of how EPR could be developed in hospitals. Based on the complexity of the healthcare system, and the KT practice phenomena, an exploratory and qualitative inductive approach was chosen for this investigation. This is an exploratory qualitative case study, which draws on stakeholder analysis of KMS implementation and KT practice in the BP Trust, United Kingdom. This research approach helped explore and examine relationships and concepts, including the assumptions of the researchers (Eisenhardt, 1989). It can be argued that all National Health Service (NHS) hospitals have a certain similarity, which becomes evident due to the nature and structure of the U.K. NHS. The health secretary Jeremy Hunt announced in the *modernisation* agenda of the NHS that all hospitals need to meet the target of being (arguably) paperless in 2018 (Mooney 2016; Iacobucci 2015; Intellect, 2013). All hospitals in United Kingdom were expected to implement EPR based on the 2018 digital vision, and many of them have already complied (Intellect, 2013; Mooney 2016).

This case study explores how a large NHS Foundation Trust, with reasonable experience of implanting EPR, invested the last 5 years to deploy the NHS's program. According to Yin (2014), a single case study can provide an access to obtain a comprehensive understanding of empirical data. Precisely, when the case study is approached as a situated real-life phenomenon, the exploration of system development and implementation became more comprehensive and sensitive to its many workaday contingencies and possibilities. The new EPR was to be integrated with most existing information systems, such as (1) the Patient Administration System (PAS), (2) pathology order system, (3) Electronic Document Management System (EDMS), (4) GP system, (5) theatre information system, and (6) A&E system. Development and implementation stages were supervised by both an administrative board and operational board, which included a mix of senior managers, technicians and clinical consultants.

#### **3.1. Data Collection**

This study employs participant observation and in-depth interviews as methods central for data collection. The interviews focused on registering the individual point of view of participants, seventeen in total. The sample aims to cover mainly three aspects of

the stakeholders as follows; 8 health professionals to represent the end-users, 3 technicians, and 6 project managers.

As the research was conducted in the NHS, the first step in the data collection is to get the ethical approval by meeting the criteria of the Health Research Authority (2016). Thus, the researchers went through all the processes of getting the required ethical approval. Also, this research committed to have a personal approval from each participant to be recorded. Thankfully, all the participants agreed during the interviews.

In addition, empirical accounts of their experiences in EPR implementation and development, as well as of their interactions with others in shaping KT practices in the particular hospital were included. Questions also collected answers about the participants' role in the EPR implementation and KT practices, views of using materials as tools, the context of healthcare, stakeholders and the role of structures and leadership. The average duration of the interview was one hour and half. Each interview was accompanied with field notes and fully recorded, and later fully transcribed.

### **3.2. Data Analysis**

After collecting the empirical data, full transcription of interviews was accomplished, by using the so-called Transcriber software, with the aim to get a better insight into on the many details and dimensions of the data. The main tool in data analysis was template analysis. According to King and Horrocks (2010), template analysis is a thematically qualitative analysis of data, regarded as a middle pathway between Matrix Approach and Grounded Theory. Alongside template analysis, the data analysis was drawn based on interpretation approach. Interpretation in the case of this research means the stage at which "*the researcher transcends data and cautious analyses and begins to probe into what is to be made of them*" (Wolcott, 1994: 36). Interpretation in this study was attained through a process of inference and inductive reasoning, with reference to analytical frameworks, literature review, peer-group checks, member checks, and the researcher's personal involvement in the situated study (Lincoln and Guba, 1985; Wolcott, 1994; Patton, 2002).

Detailed close reading of field notes and interview transcripts led to assign codes, which later were categorised as first-order, second-order and third-order themes (similar to the analytic approach of Strauss and Corbin, 1998). These thematic procedures include open themes, axial themes and selective themes (Seale, 2004). The overall process of data analysis and reporting involved the interpretation of the findings was completed by revisiting the interview transcripts and field notes. A Systems Thinking of practice, as an analytical framework, to think about the socio-technical nature of the strategizing process in healthcare, has been applied in this study (Checkland 1981; De Savigny and Adam 2009; Wood-Harper and Wood 2005). Therefore, the following section of this paper reports findings from the study as structured by analytical instruments of Systems Thinking for KMS implementation.



## **4. Case Study: The Electronic Patient Record System in the BP Trust**

All NHS hospitals have a certain similarity, which is due to the nature and structure of the U.K. National Health Service (NHS). For instance, according to the modernisation in the NHS, all hospitals need to meet the target of becoming (arguably) paperless in 2018. Therefore, all hospitals are to get EPR implemented before the due date. Today, many of them have already accomplished this agenda. The case study (BP Trust) has been selected to represent a large NHS Foundation Trust with reasonable experience in implementing EPR for the last five years. This hospital aimed to integrate the new Electronic Patient Record (EPR) system with the operative information systems. To analyse the case study, organizational theories, such as KM and KT, utilize Systems Thinking in order to consider the integration between organisational strategy, technology, learning and culture. Therefore, based on the literature and emerged themes, this study breaks down these elements into the following four themes: initial implementation issues; facilitating the movement of knowledge; culture, conflict and staff involvement; and flexibility and distributed leadership.

### **4.1. Initial Implementation Issues**

In 2009, the management board of BP Trust decided to begin modernising the patient administration system (PAS) through a two-year EPR implementation. This aimed as a response to the NHS's modernisation strategy. The hospital's board prepared a business case, and study different tenders to choose the most convenient. They selected ALERT Life Sciences Computing as a provider, which is a Portuguese company. In November 2010, they went live and they decided to start the strategy of implementation as a *Phased Approach*.

The project plan shows high level of complexity that EPR as a project has many sub-projects such as order communication system in the lab, scheduling system, E-prescribing, patient administration system, picture archiving and communication system (PACS), and theatre management system. Also, each- project has sub-systems, for example, Theatre Management System includes:

1. Theatre Resource Management
2. Theatre Scheduling,
3. Utilisation and Patient Tracking
4. Integration with other systems
5. Electronic Operation Notes and Coding, and
6. Stock Control

The system went live first in the A&E department in which 10 places were associated with different conditions. In the beginning of the implementation, the system struggled, since it was designed to be more suitable for the Portuguese Healthcare system, as the manager of the Informatics Department in BP Trust said. Other manager, from the Alert Company, and the clinical consultant decided to undergo a major change in Alert. They sought to simulate the work in the A&E department, and then to reflect the result of the experimental simulation within the system.

*“What we developed was: we designed the system, and we felt that will work. We actually setup a false A&E department, if you like and brought*

*imaginary patients in. So we could see the things people do, that the system could do, and handle it. And, we had about five hours. It was me and another consultant who setup cases, and hazel them to the nurses and doctors staff. These staff had to do all the processes that the patient would have to do by using only EPR, to make it do what we could do on paper.... So, what we said was that we are not ready to put the product in use until these will be fixed.” (Informatics Department Manager)*

The clinical team saw that the system did not fit the purpose of the department:

*“When they came with the product, they were intending to deliver something that was going to be the final package. What we said was, “what you designed is very clever and very useful, but I said too much.” I said, “you have a lot of stuff in here that we will not use, and actually what we need to do is to develop a system that has only one pigeon holes,” and I continued, “you gave me actually something that has three thousand pigeon holes, but I need only six. Why did you provide a stuff which we do not need? You have just designed for us what we do not have access.” (Clinical Team Manager)*

After all, they decided to follow up a process that they called “tracking,” which is the ability to locate patients, and to look at them in a specific area. The “tracking” process needs to tell the staff essential information such as:

- Who is in the department?
- Where are they?
- How long had they been there? Who is seeing them?
- What are they waiting for?
- What results are available?
- What investigations had been requested?

Therefore, the primary focus was about getting the tracking system right, and before the hospital deployed Alert, they used to have several systems, such as *Maxims* for tracking, other systems for blood results, and another system for X-rays. The main aim of the new system was to have all of the previous systems centralised. Alert started to implement these requirements by adjusting the main product. This modification took almost eighteen months to be developed in the A&E alone, and time was running out, since the remaining systems still had to be implemented in other departments. The company then started to rush the implementation, which caused many resistances. And, then, after four years, Trust decided to finish the contract with Alert.

#### **4.2. Facilitating the Movement of Knowledge**

The practice analysis shows that EPR in the hospitals tends to be task-based and neglects the other aspects of KT practice. However, the observation and participants in the level of practice confirms that Alert (i.e. EPR) had been designed to address how the work flows could have happened without consideration of contextual factors that influence KT activities. EPR could be considered as a prescriptive system and without feedback loop.

*“We agreed to implement EPR division by division, and then we started from A&E department.... It took us up to 12 months to restructure the system around our practice just in A&E without ending that fully... We did not do the same with rest of the Trust as time was running out.”*  
(Informatics Depart Manager).

As this issue confirms the importance of the actual practice of transferring the knowledge, it opens the door for more required investigation about the role of the technology and practice representation.

### **4.3. Culture, Conflict and Staff Involvement**

Nowadays, most of the reporting in hospitals happens manually with paper-based systems. In this context, EPR in NHS is considered a transformational project. From a managerial perspective, managers have to train the staff in new skills through specific practices, and at the same time forget about the previous system, which is what we can call de-learning. In addition, managers strongly emphasise the importance of de-learning and forgetting old habits. Usually, users do not question, based on their own old experience with different systems, that the credibility of the electronic system is very low. Likewise, to defend this view, they provide comparative examples, pointing out situations in which the electronic system failed to meet their needs, on the one hand, and how paper-based as an alternative was more helpful, on the other hand.

*“The problem is in the locating and organizing of the system, and also that Alert was developed for a different kind of healthcare system, which is Portuguese, and I believe that they only looked at it in a very ideal situation, such as a small hospital, or by building the hospital around the system.... Because we have Alert from a different country, which means they should have a development team and they should have a training team. So, obviously, you will get logistics and language barriers. For instance, Alert is a Portuguese system, so we have to get people from Portugal to Britain to develop and teach us. So, you have to host them, and, obviously, the language.”* (Laboratories Director Manager)

Furthermore, Trust struggled with getting the staff to be considered as the main user. They also fought to adopt the EPR they had been ignoring during the procurement and implementation stage.

*“[B]ut, I want the end-user to be involved. I think this is the main and major problem from my point of view. I think this issue is not isolated, but it is very linked to the structure of the organization, the policy of the organization, to the environment and the atmosphere, to the culture (internal and external culture), and sometimes to the governmental direction. So, there are political and social issues as well.”*  
(Laboratories Director Manager)

The system was accepted by some users, but only after significant changes that were made according the way it was being used in practice. Moreover, the main conflict was between the management board and end-user perspectives. The former was trying to find a system that could save money, whereas the latter was looking forward to working with a friendly and beautiful system that could make their life easier. This

situation shows clearly a pattern of conflict between two different perspectives around the implementation of the system, which eventually became recurrent.

*“And, I think the mistake that they made when they went around procuring this piece of product, they were looking over to save cash. “Oh, we got an electronic record system. Let’s look for making 70-80 medical secretaries redundant.” (Nurse 3)*

*“We are going to save a lot of money, but we actually should spend more time looking at what users need, how it is going to impact on the business and how this piece of software is going to work when we admit the patient. How does it actually work... typing the stuff in real time? I have the impression that the EPR would be in the real time, as you would not do it retrospectively.” (Doctor 4)*

#### **4.4. Flexibility and Distributed Leadership**

This approach is aimed to understand how leadership in a complex environment takes place among different people (Bolden, 2011). The complexity of the healthcare in the UK, alongside with the hierarchical nature of the public sector keeps the question of the leadership style opened. Fitzgerald *et al.* (2013), in their study in the NHS adopt the relational theory in leadership shows that changes should be understood based on the dynamic interactions and context from an individual level to a collective level. This view emphasizes that leaders have to be perceived through the coordination of the social processes. This study is in agreement with Fitzgerald *et al.*, by studying the issue of the change management and leadership from different angles. For example many participants discussed that managers’ engagement in the practice is very low, because the role of the manager in the NNS is more monitoring and directing than engaging and coordinating. For example, one of the middle manager had criticized the top management from this point of view by saying:

*“We have a gap between the management board [top management of the Trust] and operational practice, I can tell why!! I do not think previously that our managers went down to the operational level. They went to the manager level rather than to actual operators and to the people supervising the operational areas. I think our previous leaders generalized this, and it is not like this. And, I do not believe they UNDERSTOOD how complex the organization is.”(Laboratories Director Manager)*

The overwhelming of the professionals i.e. nurses and doctors they call it a gap between two places (e.g. place to take decisions and place to practice the actions). So, they had agreed that the gap between these places affect the ways taking the change in practice. For example one nurses said:

*“They [managers] do not understand how the A&E is busy, they enforce the change and they expect it to success!!” (Nurse 4)*

The same group of the stakeholders had attributed this to the lack of the practitioners’ engagement in the decision making. For example, doctor in the A&E said

*“They asked us to choose which one we prefer, but the decision was already made. I think the professional engagement should be in the decision making not only in the way of application” (Doctor 2)*

One the other hand, this issue all the time was justified by the organisational structure and lack of the resources from the managerial perspective which. This resources scarcity had prevented more engagement and leadership distribution. The systems thinking reveal that the different perspectives analysis would provide deeper understanding of distributed leadership that requires senior leaders who have capability to support change, and practitioners who would be motivated to be engaged in the change. This is because the complex system would not only work through transmission, but also it needs to facilitate the interacting relations.

## **5. Conclusion and Recommendations**

In conclusion, awareness of KT practices can strongly influence the integration of care delivery. The implementation of KMS calls for theoretical awareness as well as practical awareness, in order to ease the implementation process. The Systems Thinking provides fundamental capacities in order to bridge the gap between the KT practice and KMS in such complex context, i.e. healthcare. The EPR implementation reveals high level of problem complexity that requires equivalent level of awareness and analysis of different perspectives of the stakeholders. Systems Thinking, therefore, by looking at the knowledge as product of interaction between actors within social system has remarkable potentials to improve the capacities of the social networks and KT practice. Improving the social networks can enhance the level of the creativity and saving the practice autonomy. Systems Thinking opens the capacity of the social networks to transfer the knowledge from one system to another without affecting the practice in both systems. In other words, when the holistic approach of Systems Thinking is applied, KT would be considered as a link between and among systems and their sub-systems, including the relationships with processes and goals. Thus, Systems could encourage KM and KT models to advance a basic framework which perceives the organisation as inert place where KT processes only take place.

In addition, the findings unravel the significance of flexibility, distributed leadership and end-user involvement, as well as the importance of communication technologies and strategies having a strong focus on transparency, including both structured and unstructured communications tools and methods. In terms of healthcare, it was found that hospitals are required to implement their own KMS, such as EPR to support their existing information systems that required upgrading. In the case of BP Trust hospital, the new EPR was meant to be integrated with existing systems, such as Patient Administration System (PAS), Electronic Document Management System (EDMS), GP system, and A&E system for efficiency and to safe cost. Furthermore, this system aimed to centralise all of the existing systems at the hospital for the sake of better convenience. Through observing the EPR, these systems are often task-based, and they tend to disregard aspects of KT practice.

Despite the new EPR system intending to help hospitals save money, as well to encourage the existing hospital staff to work with a more user-friendly and efficient

system, making their life easier, it seems, however, that the new system causes more problems than solutions. This assumption stems from the subsequent additional requirement upon the hospital to retrain staff so that they become familiar with the new system, whilst forgetting the traditional routines of the old system. A further complication is that the credibility of the electronic system results very low among the users. A number of users shared some personal accounts telling with careful detail how these systems could fail at any time. Based on the above points, it can be concluded that gaining trust in the new system from the side of the hospital users has proved to be quite challenging. Although some users did embrace the system, significant modifications were needed due to the ways in which it was currently being used in practice. Raising users' awareness of the EPR system is vital, so that they can learn to embrace it and lessen the rejection to it. As a conclusion, awareness programs could be held to boost users' awareness of the system, as well as the use of such systems in the healthcare field. These programs could also educate users in the potential benefits of the system. And finally, for the hospital, it could be recommended to hire highly skilful IS instructors to further raise users' awareness of the system, provide additional training and train them into the use of such systems in the healthcare context.

In sum, the decision maker and professionals in the healthcare can see that Systems Thinking consents a viewing KT practice from both the capacities the system possesses for KT to succeed (to achieve the goals), and the way in which knowledge is transferred (the process). However, this approach should consider the restrictions within which KT typically occurs, since all systems have limits. Overall, to apply Systems Thinking in KM and KT research, decision and policy makers ought to consider the integration of organisational strategy (e.g. systems of control), technology (e.g. systems of tools), learning and culture (e.g. systems of actions).

However, this paper is limited on single case study, and more comparative case studies in complex systems will help to enrich the model. Therefore, this paper suggests doing more studies around communication technologies and strategies in relation with KT practice by testing more communications tools and methods in the healthcare and in other context(s).

## **6. References**

1. Alderwick, H., Dunn, P., McKenna, H., Walsh, N. and Ham, C. (2016), *Sustainability and transformation plans in the NHS*. London: The King's Fund.
2. Almeida, P., Hohberger, J. and Parada, P. (2011), "Informal Knowledge and Innovation", in: Easterby-Smith, M., and Lyles, M. A. (Eds.). *Handbook of organizational learning and knowledge management*. New Jersey: John Wiley and Sons, pp. 383-402. <https://doi.org/10.1002/9781119207245.ch18>
3. Argote, L., Beckman, S.L. and Epple, D. (1990), "The persistence and transfer of learning in industrial settings", *Management Science*, Vol. 36, No. 2, pp. 140- 154. <https://doi.org/10.1287/mnsc.36.2.140>

4. Bolden, R. (2011), "Distributed leadership in organizations: A review of theory and research", *International Journal of Management Reviews*, Vol. 13, No. 3, pp. 251-269. <https://doi.org/10.1111/j.1468-2370.2011.00306.x>
5. Checkland, P. (1981), *Systems thinking, systems practice*, Chichester: John Wiley.
6. Collis, J., and Hussey, R. (2013), *Business Research: A practical guide for undergraduate and postgraduate students*, 3<sup>rd</sup> ed., London: Palgrave Macmillan.
7. Davenport, T. H., and Glaser, J. (2002), "Just-in-time delivery comes to knowledge management", *Harvard Business Review*, Vol. 80, No. 7, pp. 107-111.
8. De Savigny, D. and Adam, T. (2009), *Systems thinking for health systems strengthening*, France: World Health Organization.
9. Edwards, J. S. (2009), "Business processes and knowledge management", In: Khosrow-Pour, M. (ed.) *Encyclopedia of Information Science and Technology*, 2<sup>nd</sup> ed., Hershey: IGI Global, pp. 471-476.
10. Edwards, J. S. and Kidd, J. B. (2003), "Knowledge management sans frontiers", *The Journal of the Operational Research Society*, Vol. 54, No. 2, pp. 130-139. <https://doi.org/10.1057/palgrave.jors.2601419>
11. Eisenhardt, K. M. (1989), "Building theories from case study research", *Academy of management review*, Vol. 14, No. 4, pp. 532-550. <https://doi.org/10.5465/AMR.1989.4308385>
12. Fahey, D.F. and Burbridge, G. (2008), "Application of diffusion of innovations models in hospital knowledge management systems: lessons to be learned in complex organizations", *Hospital topics*, Vol. 86, No. 2, pp. 21-31. <https://doi.org/10.3200/HTPS.86.2.21-3>
13. Fitzgerald, L., Ferlie, E., McGivern, G. and Buchanan, D. (2013), "Distributed leadership patterns and service improvement: Evidence and argument from English healthcare", *The Leadership Quarterly*, Vol. 24, No. 1, pp. 227-239. <https://doi.org/10.1016/j.leaqua.2012.10.012>
14. Galliers, R.D. and Leidner, D.E., (2014), *Strategic information management: challenges and strategies in managing information systems*. 3<sup>rd</sup> ed., UK: Routledge.
15. Gastaldi, L., Lettieri, E., Corso, M. and Masella, C. (2012), "Performance improvement in hospitals: leveraging on knowledge asset dynamics through the introduction of an electronic medical record", *Measuring Business Excellence*, Vol. 16, No. 4, pp. 14-30. <https://doi.org/10.1108/13683041211276410>
16. Guptill, J. (2005), "Knowledge management in health care", *Journal of health care finance*, Vol. 31, No. 3, pp. 10-14.
17. Hall, M. (1999), "Systems thinking and human values: towards understanding the performance of social systems", in: Parra-Luna, F. (Ed.) *The Performance of Social Systems*. New York: Springer, pp. 15-24. [https://doi.org/10.1007/978-1-4615-4251-3\\_2](https://doi.org/10.1007/978-1-4615-4251-3_2)

18. Health Research Authority (2016), *NHS site set-up in England*, [Online] available from: <http://www.hra.nhs.uk/resources/nhs-site-set-up-in-england/> [Accessed on 2 Feb 2017].
19. Iacobucci, G. (2015), “Patients promised online access to their medical records by 2018”, *British Medical Journal*, Vol. 351, No. 9, p. h4740. <https://doi.org/10.1136/bmj.h4740>
20. Intellect (2013), *Digitising the NHS by 2018: Intellect response*, London: Intellect, [Online] available from: <http://www.jac.co.uk/files/Digitising-the-NHS-by-2018.PDF> [Accessed on 2 Feb 2017].
21. King, N., and Horrocks, C. (2010), *Interviews in qualitative research*. Cornwall: Sage.
22. Lin, C., and Chang, S. (2008), “A relational model of medical knowledge sharing and medical decision-making quality”, *International Journal of Technology Management*, Vol. 43, No. 4, pp. 320-348. <https://doi.org/10.1504/IJTM.2008.020554>
23. Lincoln, Y. S., and Guba, E. G. (1985), *Naturalistic inquiry*, Thousand Oaks: Sage.
24. Maier, R. and Remus, U. (2003), “Implementing process-oriented knowledge management strategies”, *Journal of Knowledge Management*, Vol. 7, No. 4, pp. 62 – 74. <https://doi.org/10.1108/13673270310492958>
25. Mitton, C., Adair, C. E., McKenzie, E., Patten, S. B., and Perry, B. W. (2007). “Knowledge transfer and exchange: review and synthesis of the literature”, *Milbank Quarterly*, Vol. 85, No. 4, pp. 729-768. <https://doi.org/10.1111/j.1468-0009.2007.00506.x>
26. Mooney, H. (2016), “Patients are being let down by lack of electronic health records, finds review”, *British Medical Journal*, Vol. 353, No. 6, p. i3131. <https://doi.org/10.1136/bmj.i3131>
27. Parent, R., Roy, M., and St-Jacques, D. (2007), “A systems-based dynamic knowledge transfer capacity model”, *Journal of Knowledge Management*, Vol. 11, No. 6, pp. 81-93. <https://doi.org/10.1108/13673270710832181>
28. Patton, M. Q. (2002), “Two decades of developments in qualitative inquiry a personal, experiential perspective”, *Qualitative social work*, Vol. 1, No. 3, pp. 261-283. <https://doi.org/10.1177/1473325002001003636>
29. Pedersen, M. K., and Larsen, M. H. (2001), “Distributed knowledge management based on product state models—the case of decision support in health care administration”, *Decision Support Systems*, Vol. 31, No. 1, pp. 139-158. [https://doi.org/10.1016/S0167-9236\(00\)00124-X](https://doi.org/10.1016/S0167-9236(00)00124-X)
30. Pentland, D., Forsyth, K., Maciver, D., Walsh, M., Murray, R., Irvine, L. and Sikora, S. (2011), “Key characteristics of knowledge transfer and exchange in healthcare: integrative literature review”, *Journal of advanced nursing*, Vol. 67, No. 7, pp. 1408-1425. <https://doi.org/10.1111/j.1365-2648.2011.05631.x>
31. Rubenstein-Montano, B., Liebowitz, J., Buchwalter, J., McCaw, D., Newman, B., Rebeck, K., and Team, T. K. M. M. (2001), “A systems thinking framework for



- knowledge management”, *Decision support systems*, Vol. 31, No. 1, pp. 5-16.  
[https://doi.org/10.1016/S0167-9236\(00\)00116-0](https://doi.org/10.1016/S0167-9236(00)00116-0)
32. Schlange, L. E. (1995), “Linking futures research methodologies: an application of systems thinking and metagame analysis to nuclear energy policy issues”, *futures*, Vol. 27, No. 8, pp. 823-838. [https://doi.org/10.1016/0016-3287\(95\)00047-Z](https://doi.org/10.1016/0016-3287(95)00047-Z)
33. Schutt, R. K. (2011), *Investigating the social world: The process and practice of research*, Thousand Oaks: Sage Publications.
34. Seale, C. (2004), “Generating grounded theory”, in: Seale, C. (Ed.), *Researching society and culture*, 2<sup>nd</sup> ed. Oxford: Sage Publications, pp. 239-248.
35. Senge, P. M. (1990), *The fifth discipline*, New York: Currency Doubleday.
36. Singh, R., Gernaey, K. V., and Gani, R. (2010), “An ontological knowledge-based system for the selection of process monitoring and analysis tools”, *Computers and chemical engineering*, Vol. 34, No. 7, pp. 1137-1154.  
<https://doi.org/10.1016/j.compchemeng.2010.04.011>
37. Strauss, A., and Corbin, J. (1998), *Basics of qualitative research: Procedures and techniques for developing grounded theory*. 2<sup>nd</sup> ed., London: Sage Publications.
38. Szulanski, G. (1996), “Exploring internal stickiness: Impediments to the transfer of best practice within the firm”, *Strategic management journal*, Vol. 17, No. S2, pp. 27-43. <https://doi.org/10.1002/smj.4250171105>
39. Tabrizi, N. M. and Morgan, S. (2014), "Models for Describing Knowledge Sharing Practices in the Healthcare Industry: Example of Experience Knowledge Sharing ", *International Journal of Management and Applied Research*, Vol. 1, No. 2, pp. 48-67. <https://doi.org/10.18646/2056.12.14-004>
40. Tenkasi, R. V. and Boland R. J. (1996), “Exploring knowledge diversity in knowledge intensive firms: a new role for information systems”, *Journal of Organizational Change Management*, Vol. 9, No. 1, pp. 79–91.  
<https://doi.org/10.1108/09534819610107330>
41. Van Beveren, J. (2003), “Does health care for knowledge management?”, *Journal of knowledge management*, Vol. 7, No. 1, pp. 90-95.  
<https://doi.org/10.1108/13673270310463644>
42. Von Hippel, E. (1994), “Sticky information and the locus of problem solving: implications for innovation”, *Management science*, Vol. 40, No. 4, pp. 429-439.  
<https://doi.org/10.1093/0198296045.003.0004>
43. Wolcott, H. F. (1994), *Transforming qualitative data: Description, analysis, and interpretation*, Thousand Oaks: Sage Publications.
44. Wood-Harper, T. and Wood, B. (2005), “Multiview as social informatics in action: past, present and future”, *Information Technology and People*, Vol. 18, No. 1, pp. 26-32. <https://doi.org/10.1108/09593840510585918>
45. Yin, R. K. (2014), *Case study research: Design and methods*. 5<sup>th</sup> ed., Thousand Oaks: Sage publications.