# An Exploration into Knowledge Transfer Practice in the Development of an NHS Hospital Electronic Patient Record: a Case Study

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# TABLE OF CONTENTS

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# List of Tables

## List of Figures

# Abbreviations

| | |
|---|---|
| **ANT:** | **Actor Network Theory** |
| **A&E** | **Accident and Emergency Department** |
| **CCGs** | **Clinical Commissioning Groups** |
| **CoP:** | **Community of Practice** |
| **CQC** | **Care Quality Commission** |
| **CRP** | **Cardiopulmonary Resuscitation.** |
| **CSUs** | **Commissioning Support Units** |
| **DH** | **Department Of Health** |
| **EPR:** | **Electronic Patient Record** |
| **ERP:** | **Enterprise Resource Planning** |
| **GPs** | **General Practitioners** |
| **HSCIC** | **Health and Social Care Information Centre** |
| **ICDR** | **Integrated Care Digital Record** |
| **ICE** | **Integrated Clinical Environment** |
| **ICT:** | **Information Communication Technology** |
| **IS:** | **Information system** |
| **IT:** | **Information Technology** |
| **KM:** | **Knowledge Management** |
| **KMS:** | **Knowledge Management System** |
| **KSGM:** | **Knowledge Sharing Governance Mechanisms** |
| **KT:** | **Knowledge Transfer** |
| **LAS** | **Laboratory System** |
| **MIS:** | **Management Information System** |
| **NHS:** | **National Health Services** |
| **NHS-FYFV** | **NHS Five Year Forward View** |
| **NICE** | **National Institute For Health And Care Excellence** |
| **NIGB** | **National Information Governance Board for Health and Social Care** |
| **NPfIT** | **National Program For IT** |
| **OL:** | **Organisational Learning** |
| **Order-comms** | **Order Communication System** |
| **PAS** | **Patient Admiration System** |
| **RAS** | **Radiology System** |
| **SA:** | **Stakeholder Analysis** |
| **SSM:** | **Soft System Methodology** |
| **STS:** | **Science Technology Studies** |
| **TMP:** | **Technical, Managerial, And Professional Perspectives** |
| **TOP:** | **Technical, Organisational, and Personal Perspectives** |

# Abstract

This study explores Knowledge Transfer (KT) in practice along with Knowledge Management (KM) and Organizational Learning (OL) in the professionalized context of an NHS Trust. This research studies how KT-practice unfolds through relational interactions among varying actors in a healthcare-setting. The scope of the research inquiry centres on the use of the Electronic Patient Record (EPR). This exploration addresses a multidisciplinary transversal inquiry that draws from within the everyday experience of the EPR project. Intrinsically, this study addresses the following research inquiry: "*How do different actors perceive and conduct the Knowledge Transfer practice, from different managerial, technical and professional perspectives*?" Through developing this question and pursuing answers for it, this research delves into the relational interactions between human artifacts and practices, where collective knowledge is co-produced in the healthcare-situation. In so doing, this thesis draws on Systems Thinking, Communication and Practice-Theory. Accordingly, this study is intended to contribute to a better understanding of how healthcare-settings are (re)arranged through the professional and the informational practices supported by a communication technology. This research aims to unleash a dynamic conflictive view into the KT-practice that incorporates information systems, professional practices and business orientation. Since healthcare faces continued uncertainty, this inquiry aims to account the KT-practice in action, in order to render the contingency of healthcare context in the deeper-and-broader analysis of its sociotechnical complexities.

This research carries out this KT-practice accountability through a multiple-perspective analytical lens and a qualitative case-study approach, with a focus on the EPR-project in the healthcare. Each perspective informs about specific dimensions of *knowledge-in-practice* in the healthcare, by which the KT-practice is enacted in the course of this research. The study finds that the EPR-design dismissed many contingent issues such as professional boundaries and inter-professional conflicts. Some actors were not entirely aware and not necessarily willing to use the EPR as part of their daily routines. For example, doctors engaged a pragmatic attitude when using their position to delegate mundane tasks to nurses. In cross-functional teams, coordination between nurses and doctors often depend on existing relationships rather than on the contingent relationships entailed by the EPR project. Therefore, this study found that the circulation-of-knowledge in the healthcare is not conflict-free. Gradually co-produced by humans and the EPR, what this context requires is facilitating and enhancing the interactive networks at play rather than implementing and transforming-through advanced technology. In other words, the operations of the EPR were designed to *integrate* 'knowledge' through *isolating knowledge-in-practice* from the context. These operations were also engineered through extracting 'objectively' the *knowledge-in-practice* from the core of the daily relational interactive networks of processes, activities, capacities, professionals and occupations. This research found that the *transformational* strategy of the EPR was not able to meet and fulfil the needs, interests and expectations of the much more complex reality of the professional practice.

Through connecting the dots of this reality differently, this dissertation elaborates an empirical philosophy around three 'onto-epistemological' propositions regarding different understandings of the knowledge-in-practice. These propositions synthesise together the possibility of the implementation and KT-processes, the potentiality of the material, and the intentionality of humans and their roles in contemporary networked societies. As a central contribution to transdisciplinary studies of KM, this research thoroughly examine the multi-faceted views of the KT practice and the medical practitioners, as well as how these professionals perceive knowledge-in-practice in their healthcare setting. Relevant to KM, the empirical research of the thesis fills an epistemic gap between how knowledge is actually managed and how knowledge could be managed. It illustrates how the networks of the EPR become animate. It clarifies how the EPR turns into a channel for information flows that are shaped by the socioeconomic dynamics following different perspectives. This research also demonstrates how the craft knowledge is produced on an everyday basis among professionals and technologies along the empirical threads of multiple perspectives from the micro- to the macro-levels.

In conclusion, the onto-epistemological propositions of this doctoral thesis further the current understanding on the transformational agency of knowledge-in-practice in the healthcare. This creates an agency that is able to integrate activities to help utilise the EPR to upgrade the NHS organisational innovation. In brief, this research extends the knowledge-circulation studies by articulating the transformational agency of knowledge-in-practice to generate a new prospect of navigating complexity of healthcare in a time of uncertainty.

**Part of this thesis were been disseminated in the publication as follow**

**Journal Papers**

Masri. F, Wood-Harper, T. Kawalek, P. (2017), "Systems Thinking: Analysis of Electronic Patient Records Implementation and Knowledge Transfer Practice. BP Trust in the UK, NHS", *International Journal of Management and Applied Research*, 4, (2), 105-121.

**Papers Under development**

Masri. F, Wood-Harper, T. Kawalek, P. (2016). A Conceptual model of Knowledge Transfer Mechanism-Processes and Factors (Enablers and Barriers). Submitted to *The International Journal of Management and Business*, *IJMB*, ISSN 1949-2847.

Masri. F, Wood-Harper, T. Kawalek, P. (2016). An exploration of stakeholders in healthcare situation: identify, power and priorities the NHS, UK. Submitted to *Advances in Health Care Management*.

**Conference papers**

Masri. F, Wood-Harper, T. Kawalek, P. (2017). Technology as an agent can be dump, case study CH Trust in the NHS. *Proceeding of the UKAIS 2017 Conference Programme*, Oxford. UK.

Masri. F, Wood-Harper, T. Kawalek, P. (2016). Understanding Electronic Patient Record and Knowledge Transfer Practices through Systems Thinking. *Proceeding of the 17th European Conference on Knowledge Management (ECKM 2016),* Belfast, Northern Ireland, UK.

Masri. F, Kawalek, P. Wood-Harper, T. (2016). An Understanding of Knowledge Management System Implementation and Knowledge Transfer Practices through Systems Thinking: Case Study, An Electronic Patient Record (EPR) In A Hospital In NHS. *Proceeding of the UKAIS 2016 Conference Programme*, Oxford. UK.

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Mari, F. (2016). Sociomateriality and the practice based perspective on Knowledge Transfer in healthcare: Bridging multi-views of stockholders analysis through a Bourdieuan lens. *Proceeding of the 21st OLKC Conference*. St Andrews. UK.

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بسم الله الرحمن الرحيم

وَمَنْ أَحْيَاهَا فَكَأَنَّمَا أَحْيَا النَّاسَ جَمِيعًا

صدق الله العظيم

**If anyone saved a life, it would be as if s/he saved the life of all mankind.**

Quran Chapter (5), Verse No. (32)

**Dedicated**

**To**

**My Beloved**

**Parents: Hasan and Hifaa**

**Brothers: Mostafa, Mohamad, Rbye, Husam, Yousef, Abdel Rahman and Ayham**

**All my family members**

**And to all people affected by wars**

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# Chapter 1: Introduction

## 1.1. Research Background

This research springs from exploring emerging questions on Organisational Learning (OL) Knowledge Management (KM), Knowledge Transfer (KT), and Communication in action, in the context of the articulation of knowledge together with technology and practice in a healthcare-setting. Based on the continuity between knowing and doing, doing and learning, and learning and knowing, the purpose of this research is to present methodologically the relational field constituted by the KT-practice and the transformational Electronic Patient Record project (EPR) by looking from inside the following inquiry: '*How do different actors perceive and conduct the knowledge transfer practice, from different managerial, technical and professional perspectives?*' This study is also intended to enhance the understanding of how healthcare-settings are shaped and reshaped through the professional and informational practices. This research explores how the motives and the challenges of KM systems and KT-practice shape the sustainable inclusion of professional reality in a dynamic and multidisciplinary environment such as the healthcare-setting.

Exploring KT at the level of practice in healthcare encounters five key elements, namely: knowledge, actors, communication relationships, communication methods and technology, and the healthcare environment. Recently, the EPR has been acting as a project of interoperability that can provide appropriate forms of knowledge to support care-delivery in hospitals. Regarding the complexity of the healthcare-context, the KT-practice constantly changes and grows through organic networks that require dynamic adaptive systems. Thus, the appropriate transformation of a compelling system, in accordance with different disciplines, requires help to reconcile diverse and heterogeneous, economic and social, technical and cultural aspects, and maintain a high quality of care-delivery.

From a theoretical perspective, the KT-practice addresses knowledge in healthcare through the lens of the contextual reality, which emerges through the process of examination, and connects one activity to another (i.e. *knowledge-in-practice*). Thus, this research, drawing on different perspectives, endeavours to understand the interactions and the intersections between human artifacts and practices as a mode of collective knowledge by doing. This thesis is inspired by Systems Thinking, and multiple-perspective analytical approach. This study explores the KT-practice along with healthcare KM and learning at an NHS hospital (BP-Trust).

This study uses the research model of Framework, Methodology and Area of Concern (FMA), to set up this introduction chapter and the subsequent chapters. FMA model was proposed by Checkland and Holwell, (1998) to explain the Systems Thinking approach to research, as shown in Figure 1.1 "A" refers to the area of application/concern across disciplines to include diverse situations; "F" refers to the framework of ideas by which researchers can define such situations; and "M" refers

to the methodology or the system-inquiry that scholars apply to produce their outcomes. Using this technique helps the author to not break the link between the Systems Thinking groups. The research framework for this study combines Communication Theory, KM, OL, and Systems Thinking. This research uses an interpretive case-study approach as the methodology that helps guide the researcher through the research problem in the healthcare-context and the KT-practice as the main area of concern. This will also prove beneficial for the concluding remarks in Chapter 8, following the analysis and discussion in Chapters 6 and 7.
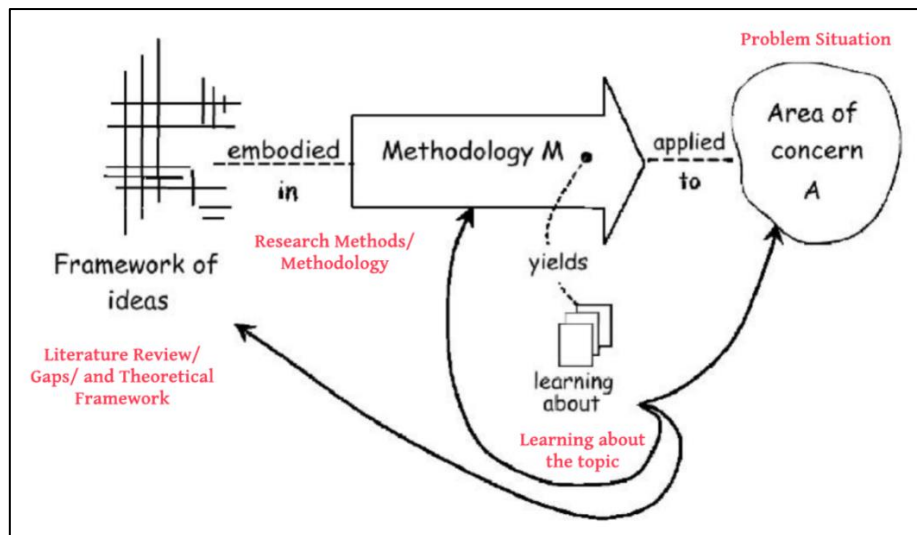


**Figure 1.1. An overview of how to conduct a research**
*Source: Checkland and Holwell, (1998)*

## 1.2. The Area of Concern

Integration of healthcare information technology into healthcare knowledge flow and circulation is crucial. It can also contribute to favourable workflow effects. On the other hand, many studies show how most of IT projects in healthcare have reported unfavourable knowledge and practice flow effects (Bose, 2004; Lee et al., 2012; Park et al., 2012; Park et al., 2015). These issues, for example, include the wrong allocation of the PCs, and adding many tables in the record with no need in practice, and so on. Thus, these issues lead to difficulty in utilising systems and mismatching between medical practice and technology requirement, which may lead to unintended consequences arising from its very utilisation. When a mismatch between the IT and KT practice occurs, the organisation could face increased documentation, redundancy or duplication of works, workaround and circumvention strategies, and increasing of medical errors (Park et al., 2015; Hughes, 2008). Since KM systematically considers how advanced information technologies can be used to leverage and create knowledge, KT practice can elucidate reshaping and crystallising these technologies.

In the light of the aforementioned points, this research aimed to explore KT practice in healthcare by reflecting on EPR project. This study was intended to provide an in-depth understanding of an emergent KT practice by studying information artefacts within socio-technical and multiple perspective analyses. In other words, I have examined the EPR as a 'mirror' being held to reflect the practices of Knowledge Transfer by studying multiple professional, technical, and managerial perspectives. This standpoint is used to elaborate on the interaction between humans, technology, and practice (Aarts and Gorman, 2007).

This research explores how the multiple motives and the challenges of KM systems and KT-practice shape the sustainable inclusion of professional practices in the dynamic and multidisciplinary environment of a healthcare-setting at an NHS-England Trust. Recently, EPR is performed as a project of interoperability, which enables the required forms of knowledge to support care-delivery in practice (Greenhalgh *et al.*, 2009; McCracken and Edwards, 2016). Due to the dynamic reality of the healthcare-context, the KT-practice is constantly transforming and developing through relational interactions that entail ever-adaptive synergies (De Savigny and Adam, 2009; Weinbaum, 2015; Juarrero, 2010; Sweeney and Griffiths, 2002).

### 1.2.1. Why is Knowledge Important?

Explaining why knowledge is important represents another major research area in the Organisational Learning and KM-literature. Basically, these theories are underpinned by a deep-seated assumption that knowledge adds value to the organisation and that it can improve organisational performance (Felin and Hesterly, 2007; Eisenhardt and Santos, 2002; Grant, 2002). Thus, knowledge is viewed as an internal resource that organisations need to manage. This argument is strongly inspired by classic economics theories and strategic management theories, such as the Theory of the Growth of the Organisation, the Resource-Based View (RBV) (Conner and Prahalad, 1996), Absorptive Capacity (Cohen and Levinthal, 1990), Dynamic Capability (Teece *et al.*, 1997), and the Knowledge-Based View (KBV) (Barney, 1991; Pee and Kankanhalli, 2016; Felin and Hesterly, 2007). These theories will be discussed in detail in Chapter 2.

### 1.2.2. Can Knowledge Be Managed?

The aforementioned issues comprise an important research area in the KM-literature, almost since its inception in the late 1990s, questioning the overall field of KM. More precisely, some scholars were sceptical whether knowledge could ever be managed (Jasimuddin *et al.*, 2005). In their view, there was an inherent paradox around the notion that knowledge could be managed. Many scholars, nevertheless, claimed that knowledge could be managed and transferred (Grant and Baden-Fuller, 1995; Davenport and Prusak, 1998; Nonaka, 2008; Nonaka and Peltokorpi, 2006; Nonaka, 1994; Spender, 2015). Other scholars argued that managing knowledge is controversial using several

arguments, as following, to support their claims (Alvesson, 2012; Lave and Wenger, 1991; Brown and Duguid, 2001).

First, they argued that tacit knowledge is contextual and difficult to be articulated and replicated. Second, knowledge is *sticky*, which means that KT depends on organisational and professional boundaries (Araujo and Novello, 2004; King *et al.*, 2015). Finally, KT becomes difficult when there is a lack of trust and power differences between the members of a communication network or of a particular organisation (Duguid, 2005b; Duguid, 2005a; Szulanski, 1996; Szulanski *et al.*, 2016). Thus, managing knowledge suffers from many problems, such as ontological incoherence and vagueness. In addition, managing knowledge involves tensions between regarding knowledge as being objective and or subjective. For example, researchers often argue that tacit knowledge could be transformed into explicit by using appropriate techniques (Voelpel and Szulanski, 2006; Nonaka and Von Krogh, 2009; Nonaka, 2008; Nonaka and Peltokorpi, 2006; Nonaka, 1994). One of the techniques mentioned is based on Nonaka's model of knowledge-creation and conversion (Nonaka, 1994). This model, known as the Socialisation Externalisation Combination and Internalisation (SECI) model, offers a blueprint for managers to turn tacit knowledge into explicit knowledge. It is one of most cited works in the KM-literature. Yet, this model was contested because of the lack of empirical evidence to support such a theoretical framework (Gourlay, 2006). Gourlay, (2006) argued that SECI focuses only on the managers' subjectivity and behaviours, and it ignores different kinds of knowledge created by different behaviours (e.g. this model often uses only a specific context). In this regard, commentators were not convinced that SECI could be applied outside the national boundaries of Japanese corporations, reputed for their distinct culture or ways of working within organisations (Inkpen and Tsang, 2005; Inkpen and Dinur, 1998). More recently, the literature argues that knowledge is embedded/embodied in all vital and dynamic entities (organisational culture, technology, repositories, structure of the workplace, routines, artifacts, practices and norms) (Argote and Hora, 2017; Argote, 2013; Tsoukas, 2009; Prusak and Davenport, 2013; Brown and Duguid, 2000).

Furthermore, since knowledge is not a tangible resource, and since it is difficult to be articulated and replicated, one can easily dismantle the previous theoretical framework by using the local knowledge argument described above (Lam and Lambermont-Ford, 2010). Lam and Lambermont-Ford, (2010) argue that the circulation of knowledge often relies on specific national mechanisms, which differ from country to country. As a result, the cited work showed that KT, especially tacit knowledge, is strongly dependent upon a context, and less likely to be easy to share across organisations and countries. At the same time, the author showed that specific contexts could create boundaries, in which only certain forms of knowledge would be developed and shared. As Lam, (2002) suggests, "societies with different institutional arrangements will continue to develop a variety of organisational forms and learning strategies that privilege some sectors and discourage

others" (p.67). In all, this section makes a vital addition to the KM-literature (that too often held optimistic views and/or neglected controversial issues around the management of knowledge).

### 1.2.3. Why Healthcare?

In terms of organisational studies, healthcare lacks situated research approaches to understand and to face current challenges, such as elder care, exponential medical innovation, increasing technological development, international organisational standardisation and austerity (Walshe and Smith, 2016; Hume *et al.*, 2014; Pentland *et al.*, 2011). Likewise, the scarcity of empirical studies of both KM and KT-practices in professionalised-contexts orients the justification of this research centring on the healthcare-context. The KM-literature detects four main dimensions of contemporary healthcare KM: knowledge-based, complexity, massive data, and uncertainty (Ferlie *et al.*, 2015; Seely, 2013). These four aspects orientate and motivate the empirical investigation of this thesis work. The healthcare-setting can open opportunities to expand the theory of KT-practice through understanding the socio-professionalised-context.

My research explores the KT-practice alongside with the development of a multidimensional project at a healthcare-context. This healthcare-setting embraces multidimensional activities such as socio-technical, socio-cultural, socio-political and socio-economical. These multidimensional aspects make the act of choosing an appropriate research approach for this context very challenging. Exploring different aspects of the KT-practice, in conjunction with the transformational EPR-project, entails the continuous state of practice and being in relationship with such a problematic situation. The exploration via the present thesis work helps dive into the conflictive states of affairs, and pinpoint the appropriate methodology, by drawing on three TMP complementing perspectives (Technical, Managerial and professional). Since the EPR can be developed from these perspectives, this study explores how my research approach to the KT-practice in action could synthesize these perspectives.

According to Tasselli, (2015), Iyengar *et al.*, (2015) and Siron *et al.*, (2015), the KT-literature presents a wide variety of initiatives and approaches to explore success and failure case studies in healthcare-contexts (Iyengar *et al.*, 2015). The context of the KT-practice in the NHS has been explored as a problematic one. In so doing, the research of this thesis employed different perspectives to analyse the daily views of the KT practitioners, and how they perceived the socio-technical practice in a healthcare-context at one hospital in the NHS. Furthermore, this study analyses the strategic plan in the methodological chapter (Chapter 5).

In the case of the EPR, just after being deployed at the BP-Trust, this project became a problem and was started to be defined from the aforementioned TMP perspectives (technical, managerial, and professional). The KT-practice was introduced to reduce the gap between what was expected and

what was perceived by different actors during the actual transformational implementation. Accordingly, this study draws lessons from the research process, starting from defining the problem situation, identifying the area of concern, selecting the research methodology and ending up with implications including suggestions for future research.

## 1.3. Research Scope and Objectives

By reviewing the literature, the present research aims to explore and identify KM theories in general, and KM practices in healthcare-context, including research gaps. In so doing, this study is designed and intended to contribute to current understandings of knowledge in a networked-society of a healthcare-context, under the influence of a communication technology within an interdisciplinary environment. The aim of the fieldwork of this thesis, carried out in technologically dense environments, is to explore the circulation of knowledge content, which characterises healthcare practice, and the recruitment of communication technology, which have impact on a network of dynamic actors at the healthcare sector. This exploration also aims to demystify the professional boundaries and to help understand the activities and networks as a collective as well as an emergent spatiotemporal artifact that is situated in a specific space-time arrangement. This study aims to reflect on healthcare transformation plans, conflicts and challenges with regard to maintaining and using the KT strategy and technology at the hospital. It also aims to account the KT-practice from multi-perspectives about how it may help understanding the contingency of healthcare-context in a networked society. This research aims to develop a dynamic conflictive view of the KT-practice that incorporates information systems, professional practice and business orientation.

These aims illustrate the perceived challenges and the expected benefits and hence introduce a transformation plan to enhance the sustainability healthcare-system.

## 1.4. Research Questions

Based on the gaps identified in the pertinent literature (Chapters 2 and 3), this study aims to contribute to the fields of KM and KT-practice by addressing a transversal interrogation, as follows: '*How do different actors perceive and conduct the knowledge transfer practice, from different managerial, technical and professional perspectives?*' This research-inquiry was broken down into the following questions:

1. How do healthcare actors practice knowledge transfer?
   1.1. How are the relevant methods of the KT investigated in the context of the healthcare?
   1.2. How are the KT actors identified in the research process?
   1.3. What is the relationship among actors, methods and contexts?
2. What are the issues that affect the approaches in the KT-practice?
   2.1. Which issues affect in particular the KT-practice in the BP-Trust healthcare-context?
   2.2. What is the role of the EPR as a technology in facilitating the KT-practice?

## 1.5. Theoretical Framework

The KT-practice in healthcare requires studying and integrating of all types of knowledge including research, policy and professionals (Butterworth *et al.*, 2011). Building on previous literature of KT and practice, and applying communication and practice theories through multiple perspectives, this research develops a framework to study the KT-practice (i.e., a model of actors such as humans, technologies and knowledge in the professionalised-context). The framework of this research is inspired by Systems Thinking as an analytical lens to understand the processual dimensions of healthcare organisations and KM. Systems Thinking has four main features (hierarchy, emergency, communication and control) (Checkland, 1988; Rothschild *et al.*, 2005). This study finds these domains the more appropriate analytical means to explore the complex, uncertain, and knowledge-based environment of the NHS. Likewise, Systems Thinking is applicable to understand the system and the sub-systems of the KT theory and practical applications. I advocate in this thesis that following the circulation of knowledge-in-practice through a multiple-perspective approach helps track the varying stages of knowledge-inquiry and application at the same time that helps account for the changing arrangements of the contextual aspects of knowledge.

Systems Thinking along with the healthcare complexity and a multiple-perspective approach motive to distinguish between knowledge inquiries in terms of 'knowing-what' and 'knowing-how' (Ryle, 2009). These situated inquiries help re-formulate the original research question, from '*What are the enablers and the barriers of the knowledge transfer practice in the healthcare-context?*' into, '*How do different actors perceive and conduct the knowledge transfer practice, from different managerial, technical and professional perspectives?*' The multiple-perspective research approach helps release the dynamic intents of the system and the sub-systems, which would be inaccessible by means of other known research approaches (Linstone, 1989). Taking seriously every perspective helps unfold the different understandings of the technology and the conflicts that derived from the real-life interactions among the human and inanimate actors comprising the complexity of the healthcare practice in England. By approaching complexity in this context, conflicts become the raw material by which humans experience reality, react to reality and ultimately organise the phenomenal world.

The KT-practice serves to analyse knowledge in action. As such, it helps identify challenges and understand ways of improvement. In addition, it allows individuals and the organisation to learn by doing. The KT-practice requires accumulating intentional meaning that is assigned by the processes of actualisation and or reification (Hartley, 2012; Liyanage *et al.*, 2009; Burgess, 2005). In other words, it shapes the experience of knowing by producing outcomes through participation, which involves interactions and mutual gratitude among people. Human actors are defined as someone that produces an effect on the relational interactions based on their model of intentionality (Malle and

Knobe, 1997) (see Figure 1.2). Drawing on the social constructionist and interpretivist views of healthcare situation, the framework of this research adds a crucial role to human intentionality or purposefulness, which could justify the direction of the transformation (Meckler and Baillie, 2003; Checkland, 1988; Hartley, 2012; Malle and Knobe, 1997).
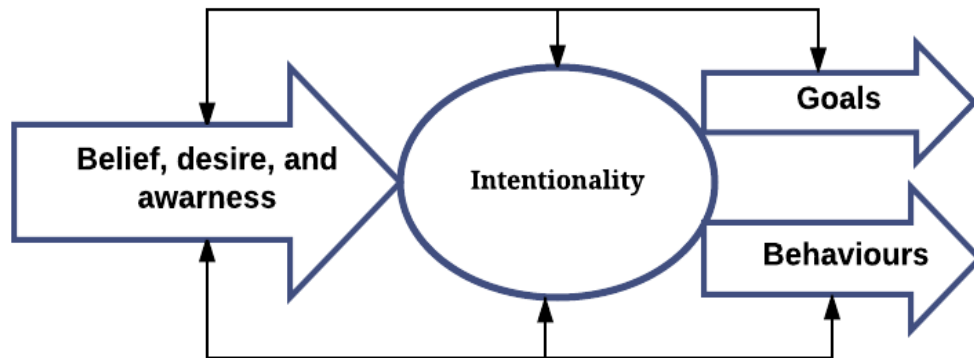


**Figure 1.2. The Model of Intentionality**

*Source: Malle and Knobe, (1997)*

The value-based orientation of healthcare considers human actors to perform intentionally through many forms, such as actions, discourses and writings. Moreover, technology (non-human actor/s) assembles, under human control, the methods and techniques that are used by human actors in order to assimilate and circulate their knowledge. Thus, technology connotes potentiality and involves an agential role in the way in which the outcome of healthcare practice unfolds (Greenhalgh *et al.*, 2009; Jensen and Aanestad, 2007b). The actors in the KT-practice, what can be deliberately called source-and-receiver, are expected to act interdependently (Srivastava *et al.*, 2006).

The knowledge source is expected to provide the required knowledge in a way that the receiver can translate it into practice. In practice, the knowledge-source would require answering the knowledge-inquiry according to the capacity of the source and the receiver, through the materiality and/or artefact, whereas the receiver would be required to have the capacity to do the transformation and application of new knowledge. Additionally, the source and the recipient are mostly conceptual entities that hold dynamic roles in any emerging reality (Liyanage *et al.*, 2009; Linden *et al.*, 2007; Nissen and Jennex, 2005).
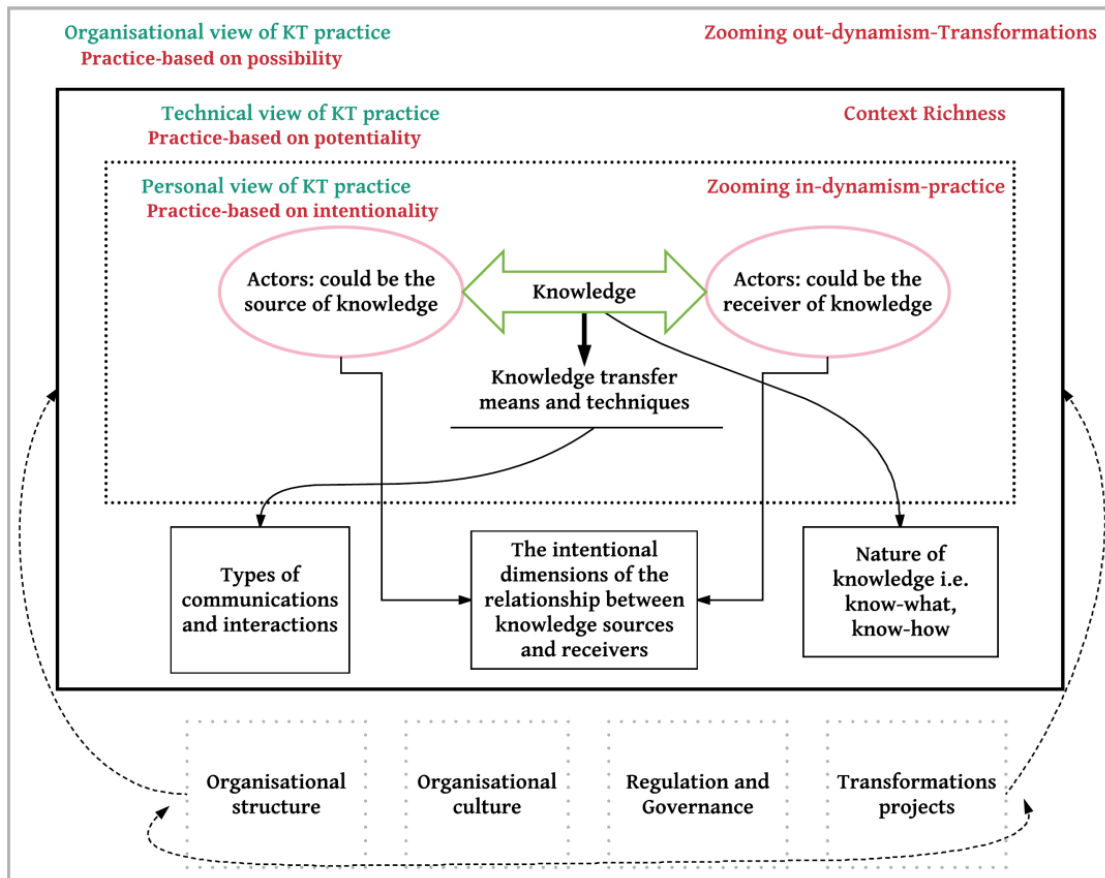
**Figure 1.3. The Theoretical Framework of Knowledge Transfer Practice**

The KT-practice has some mandatory aspects about the actors, such as the question of knowledge, knowledge source, knowledge receivers, knowledge flow and knowledge sharing. These aspects are proposed to bridge the communication gap among different actors and aspects (Jasimuddin *et al.*, 2012; Paulin and Suneson, 2012). Thus, analysing the KT-practice requires studying 'knowing-how' that associates different aspects of the organisation interdependently. These aspects of the KT-practice are illustrated in Figure 1.3. This illustration shows the KT-practice according to the socio-technical approach of technical aspects, organisational aspects and personal aspects (TOP) (Lockett *et al.*, 2008; Linstone, 1989; Richardson and Courtney, 2004; Linden *et al.*, 2007). It also displays that the KT-practice depends on the relational intersections among personal, technical, and organisational views. The personal view (professional) presents a dynamic practice of social intentions and collaborations for KT (zooming-in). The soft part of the technical aspects of organisation can be identified through networks, while the hard part can be identified through the structure, technologies and tools (Wood-Harper and Singh, 2011; Szulanski, 1996; Truran, 1998). The organisational view (managerial) elaborates the organisational elements including organisational structure, organisational culture, and organisational regulations that may synergise to implement the transformations. Likewise, the KT-practice has a dynamic reality that requires a flexible-way interchange and exchange, which affect the intimacy of the knowledge actors (e.g., source/s and recipients) and their relationships

(Tamer Cavusgil *et al.*, 2003). The dynamic and heterogeneous relational processes by the actors (human and non-human) in the healthcare-context support the performative dynamics of the KT-practice, by which the reality emerges and intensively changes in an ongoing fashion.

## 1.6. Methodology

The case-study of this research is designed to deepen the involvement of the data, derived by the KT-practice and decision-making processes at the BP-Trust. Embarking a case-study helps appreciate complex real-world situations (Yin, 2013; Easterby-Smith *et al.*, 2012) as it explores open-ended problems, whose analysis takes them beyond the right-or-wrong types of answers. The case-study was conducted to combine situated observation and generated conversation between the researcher and the participants. Also, the case-study approach fairly motivates coherent and plausible interpretations of the situated-practice and the context embedding such practice and the actors of the practice (Gherardi, 2012). Thus, the main aim is to dive into the processes and analyse the data, and, on the basis of this exploration, the case-study delivers a rich-picture that can help understand and illustrate the investigated phenomena more deeply. The case-study deploys 'Template-analysis' of King and Horrocks, (2010), which helps clarify and deepen the discussion and the dialogue with the interviews alongside the observed context and secondary data. Finally, the case-study is an integral part of the research-strategy, by which the empirical data has been collected and analysed.

## 1.7. Research Significance and Contribution

This research employs different perspectives to analyse the multi-faceted views of the KT-practice and medical practitioners, and how they perceive the daily practice in the healthcare-context. In the case of the EPR, after being deployed, the implementation problem was defined from three perspectives (TMP). The KT-practice was introduced by this research into the BP-Trust with the aim to reduce the gap between what was expected and what was perceived by different actors during the EPR-implementation. My thesis work reveals two theoretical implications for the existing KM-literature. First, the KT-practice needs to be refined, as spotlighted in the KM-literature review (Chapter 3). Second, the KT-practice needs to consider the craft knowledge that is produced on an everyday basis among the professionals and the technologies (humans and non-humans), multiple perspectives, from the micro level to the macro-level. Following the managerial perspective, the technical perspective was determined by the issues of integration, but it ignored the social and the political changes accompanying the EPR development. This perspective covered some economic/financial issues associated with business modelling and value creation at the BP-Trust. The health-professional perspective also addressed special characteristics of the EPR.

### 1.7.1. Theoretical Contribution

This research presents a multiple-perspective approach and a contingent epistemological lens that encompasses the advantages of other system-inquiry offered by the existing KM-literature. This

research shows how Systems Thinking and multiple-perspective theory can be used to build a theoretical framework, which can work as a benchmark for healthcare cases. This multifaceted approach reveals a trilogy between the EPR (as a technology), the managerial, and the professionals' society (McCracken and Edwards, 2016; Håland, 2012; Jensen and Aanestad, 2007b; Rothschild *et al.*, 2005). The organisational perspective (managerial) offers a deeper insight on how the regulators justify their personal interest in an organisational frame, and how they speak as representatives of the society. The multiple-perspective theory helps see the impact of an inclusive system development process, where the dynamic social structure of the professionals shapes and conforms technology. This research has shown the inanimate networks in the EPR as a channel for information *flows* that are shaped by the socio-economic professional dimension. It shows how the KT-practice requires reducing the gap between how knowledge can be managed and the actual management of knowledge. This gap is revealed by studying the EPR as a transformation project, from different angles. In opposition to the KM-literature, this study found that the KT-practice is subject to the intentionality of professionals and professions (subjective and objective positions of professions). It also shows that a transformation project, such as the EPR, aimed at potentially changing the existing culture based on power relationships between professions, may be perceived by influential professions as a threat.

### 1.7.2. Methodological Contribution

The methodological contributions inform other researchers, who have tendency to conduct a research on a similar topic or context, which in addition to all the advantages of using the in-depth case-study and the in-depth analysis of textual and observable data, this research suggests three main methodological contributions. These contributions are stakeholders' analysis, material potentiality and human intentionality. These contributions regard the dynamics of the professionalised-context and dynamic relationship between humans and technologies, with focus on a number of research assumptions pertinent to this study. Different perspectives analyses of the KT-practice suggest that assumptions, such as intentionality and potentiality, need to be added to the qualitative studies, by which future research will figure out the relationship between human and technology more clearly. Chapter 8 examines these contributions in more detail.

### 1.7.3. Practical Contribution

This research shows that common challenges to the EPR in healthcare-setting are related to the lack of a synthesised understanding of the different stakeholders' perspectives. For example, in practice, the decision making for the EPR-implementation is influenced by the modernisation-agenda at the national level as well as by the local governmental agenda. More specifically, the EPR is encouraged by the central management of the NHS, and therefore the BP-Trust decision-makers are influenced by the modernisation guidelines, while they take decisions for implementing the EPR. Likewise, most of professionals perceive the EPR as a facilitation tool able to endorse and embed potential knowledge in the making to the everyday health practice, such as e-prescription, lab

management, and 'order-communication' between the pathologists and lab scientists. Also, the EPR as a communication technology provides instant accessibility to accurate and updated information.

The use of the EPR is intended to help save time considerably when doing office work, but this was not always the case. In spite of this, the management board kept pushing the active enrolment in the implementation process (further details in Chapters 6 and 7). The multiple-perspective analytical approach proves that enabling organisational transformation requires integrating activities that make the EPR upgrade the NHS organisational innovation. In this context, developing a good understanding of the key actors (and their dynamic states, roles and interactions) can contribute to a more-informative decision-making process and to a smoother implementation of the transformational-projects in the NHS. Since the healthcare, in the public sector, is hugely affected by two different managerial perspectives, this study has several implications for in-house managers and policymakers. For healthcare managers, this study shows how the dynamics of knowledge in the healthcare-context requires the managerial practice to be reviewed to facilitate the KT-practice.

This study also shows how evaluating performance could motivate the professional performance by storing all the activities in the electronic platform. Also, this research argues how evaluating performance through the new IT projects (e.g., EPR) can bridge the gap between the original workload and the extra work resulting from the implementation and activation of the new projects. For policymakers, it shows how complexity of the KT-practice in the healthcare situation requires structural reforms to become more flexible and active. It shows the importance of taking into account interactions at an inter-professional level as well as the deep-seated divisions that exist between professions. The study of the KT-practice shows that policymakers can review modernisation policies, aimed at changing career pathways, to be rewarded for using communication methods. It also shows how the health-professionals' involvement and support could be taken into account, and aligned accordingly with their daily practice for much better provision within the NHS.

## 1.8. Thesis Structure

**Chapter 1** gives an overview of the research background, research problem under investigation, the area of concern as well as the research questions and objectives. This chapter also provides an overview of the research methodology, which is designed and employed in this study.

**Chapter 2** is the first of the two chapters that review the literature relevant to this research. It aims to enable the researcher to understand the core concepts and theories (i.e., Organisational Learning, Knowledge Management, Knowledge Transfer, and Communication). More specifically, the aim of this chapter is to review the existing literature of knowledge definitions, KM, OL, and the relationship between the organisational theories and KT.

**Chapter 3** discusses KM and KT concepts in the context of the healthcare (NHS). After reviewing the healthcare literature, this chapter identifies the gaps in recent research and presents the study's research questions. Chapters 2 and 3 address the literature review that sets forth the theoretical framework developed in Chapter 4.

**Chapter 4** elaborates the theoretical framework, which relies on Systems Thinking and the KT-practice multiple-perspective approach. It also discusses the development of the theoretical framework, by drawing on the literature, covering KT research methodologies around complexity.

**Chapter 5** explains the research methodology applied to inquire the research questions of this study and to achieve the research aims. It also illustrates the fieldwork of the BP Trust including data collection methods, the number and positions of the interviewees and the data analysis methods.

**Chapter 6** empirically analyses the fieldwork data of this study, with regards to the research questions, by exploring the KT-practice in the context of NHS modernisation projects (EPR). It also draws the rich-picture of the multiple perspectives that participate in the case-study of the BP Trust.

**Chapter 7** discusses research findings related to the research questions. It also discusses the research findings within the wider literature on KT.

**Chapter 8** recapitulates the main issues of this research. It provides speculative answers to the research questions, a clear statement of the main contributions, evidence, limitations and strengths, concluding remarks, assertions based on the research findings and suggestions for further research.

# Chapter 2: Literature Review: Part 1 Knowledge Management (KM) and Knowledge Transfer (KT)

## 2.1. Introduction

The field of Knowledge Management (KM) has burgeoned since its development by many scholars, including Nonaka, (1994), and Davenport and Prusak, (1998) during the 1990s. Today KM is regarded as a central research topic in organisation and business studies. Outside the academic community, KM is also used in public and governmental studies as well as by executive practitioners. KM is regarded by the media and experts as a field of study where the main focus is on knowledge, regarded as one of the most important assets for improving national and international business (e.g., NHS, information technology, business and data management) (Grant and Baden‑Fuller, 2004; Fuller, 2001; Kazadi *et al.*, 2016). In other words, the KM approach put together and integrate a wide range of concepts, such as KM system initiatives, decision-support systems, and communication networks in a manner that may have a considerable impact on many fields (Swan and Scarbrough, 2001; Easterby-Smith and Lyles, 2011). Here this study provides a critical review of the KM-literature and other assumptions often held in the field.

This chapter examines key approaches to explore knowledge in relation with organisational theories such as KM studies, Organisational Learning (OL), Knowledge Transfer (KT) and practice-based research. This includes the analyses of theories across many academic fields (e.g., sociology, psychology, economics and business studies). First, this analysis identifies philosophical concepts and categories related to the question of knowledge, with the aim of situating KT-practice on the interface of source of knowledge, knowledge actors, and contextual issues. Secondly, it explores KT along with theoretical perspectives of organisations, such as resource-based and knowledge-based reviews, dynamic capabilities and OL. From these theories, associated concepts and orientations are explored (Vera *et al.*, 2011; Iyengar *et al.*, 2015), in an endeavour to place healthcare within the field of management innovation, this research focuses on the core of OL and KM and their confluence. This argument leads to the revision of various definitions and models of KT before the chapter describes five key elements of the KT: 1) the characteristics of knowledge; 2) the characteristics of senders and receivers; 3) the characteristics of relationships between actors/factors; 4) the characteristics of context; and, 5) the characteristics of tools and methods. Finally, this chapter provides an analysis of the aids and barriers associated with each element of the KT.

This is the first of two chapters which review the literature relevant to this research. Subsequently, Chapter 3, after reviewing the healthcare literature, identifies the gaps in the current research and presents the research questions. The review is followed by a discussion on the development of the theoretical framework covering in Chapter 4 research inquiries centring on complexity including Systems Thinking.

## 2.2. Systematic Analysis of the Literature

Before addressing a detailed review of the literature, a number of philosophical concepts have been elaborated around the role of systematic analysis, drawing on Greenhalgh *et al.*, (2004a) and Jesson *et al.*, (2011); a vie that I adopt and advocate in my study. In my view, systematic analysis makes the researcher aware of the current directions taken by relevant fields of study (i.e., KM and healthcare), and by other related disciplines such as OL and IT. The analysis of the literature also helps identify methods and methodologies that were used in those fields, to help articulate research/knowledge gaps. The literature under analysis follows recommendations by several scholars (Jesson *et al.*, 2011; Easterby-Smith *et al.*, 2012; Greenhalgh *et al.*, 2004b; Greenhalgh *et al.*, 2004a).

This overview covers publications released between 2005 and 2015 by international peer-reviewed journals, ranging five fields of study: IT, healthcare, sociology, OL and KM. It focuses on both theoretical and empirical studies, drawing upon papers written in English and considerably cited. For example, relevant articles were retrieved from three KM journals: *Knowledge Management Research and Practice*, *Journal of Knowledge Management*, and *Knowledge and Process Management*. In the field of IT, *Information Systems Research*, Journal of Management Information Systems *Information Systems Journal* and *MIS Quarterly* and other journals were consulted. The three main journals in the healthcare field reviewed were *Health Services Research*, *Health Affairs*, and the *British Medical Journal*. Around 2,500 titles and abstracts were retrieved, and the 159 most relevant papers were studied, with special attention to the healthcare literature. The analytical process is illustrated in Figure 2.1.

In the actual literature review, summarised in Appendix A.1, other published papers and books were considered. I have selectively covered a vast array of key and seminal articles on KM, OL and KT such as the ones produced by Nonaka and Takeuchi, (1995); (Wang and Noe, 2010), Ali *et al.*, (2011), Easterby‑Smith *et al.*, (2008), Kitson, (2009), Mougin *et al.*, (2015), Canestrino and Magliocca, (2016), Brown and Duguid, (1998), Brown and Duguid, (2001), Lave and Wenger, (1991), Senge, (1990), Szulanski, (1996), Minbaeva, (2007), Kogut and Zander, (1992), Kogut and Zander, (1996), Tsoukas, (1996), Tsoukas and Chia, (2002), Grant, (1996), and Argote and Ingram, (2000), among others. The key papers were reviewed along with other articles, referencing these key papers, all of them listed in Appendix A.1. Additional papers that discuss NHS healthcare as context alongside KT are included in the mentioned Appendix, e.g., Foss *et al.*, (2010), Nicolini *et al.*, (2008); Pentland *et al.*, (2011), Pentland *et al.*, (2014), Fazey *et al.*, (2014), Goldner *et al.*, (2014) and Visram *et al.*, (2014). Appendix A.2 presents a visual mapping of this process.
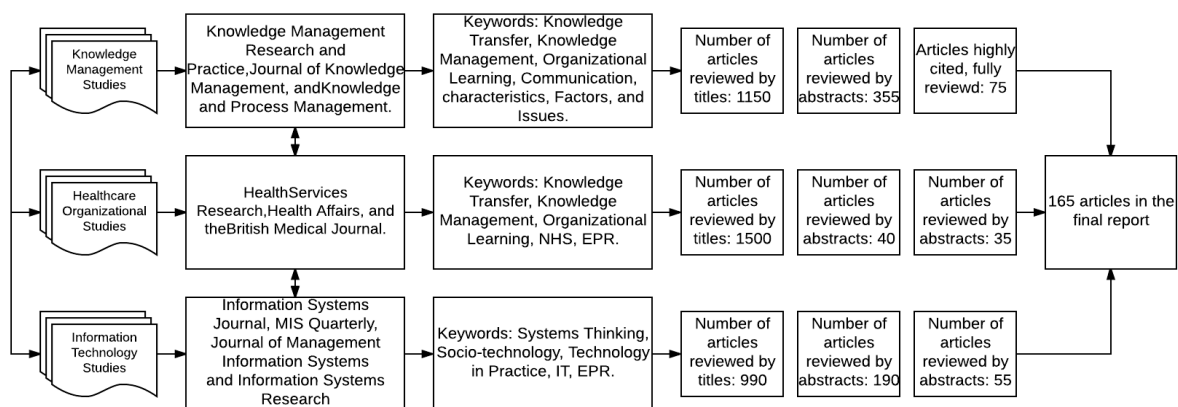
**Figure 2.1. Summary of the selected sources (systematic analysis of the literature review)**

## 2.3. Knowledge Management (KM) and Organisational Learning (OL): Key Areas of Research

KM, OL and KT-practice are usually associated with the competitive advantages gained from learning faster than competitors (Easterby-Smith and Lyles, 2011; De Geus, 1988; Argote and Hora, 2017). The KM and OL literature can be categorised into four essential themes. The first is the question of knowledge, or what knowledge really is (Brown and Duguid, 2001; Zhu, 2008; Ferlie *et al.*, 2012; Davies *et al.*, 2016; Bratianu, 2016). The second theme discusses the relationship between KM and OL, and finding ways to recycle knowledge to improve organisational outcomes (Drucker and Drucker, 1993; Wang and Wang, 2012; Miller, 2016). The third theme is concerned with main elements of the Knowledge Transfer concept (Alvesson and Robertson, 2006; Easterby-Smith and Lyles, 2011).

### 2.3.1. The Nature of Knowledge

Regarding some ontological and epistemological assumptions, this literature revisits a long-standing debate regarding the question of knowledge. The issue seems to be less complex when KM is defined by organisation studies, as systemic management, which creates and distributes information, experience and expertise, to achieve desirable outcomes (Alavi and Leidner, 2001). In addition, Van der Spek and Spijkervet, (1997) defines KM as "the explicit control and management of knowledge within an organisation aimed at achieving the company's objectives" (p. 43). It is a topic that has attracted researchers across many disciplines (e.g., sociology, psychology, economics, business studies, and information technology). Looking at knowledge-circulation, KM and OL are comparatively recent fields in organisational research. Before KM, knowledge as a concept was usually discussed in philosophical debates or economic theories. For example, Peter Drucker (1995) positioned the knowledge worker as central to the improvement of organisational performance and

outcomes. He claimed that this position would entail growth in industrialised economies during the difficult years of the 1970s (Drucker and Drucker, 1994; Drucker, 1995).

KM inspired many research contributions from international management, decision-making and research-strategy (Alkhuraiji *et al.*, 2014; Minbaeva, 2007; Eisenhardt and Santos, 2002). KM scholars believe that knowledge is becoming a central economic resource for organisations and individuals (Eisenhardt and Santos, 2002; Grant and Baden-Fuller, 1995). First, practitioners from many sectors are ready to apply KM because of the underlying economic promises (Spender, 1996; Spender, 2015). Second, knowledge is attractive because KM offers an open opportunity to tie together many concepts in the process of management, such as decentralisation and flexibility, into one single major framework (Grant, 1996; Cohen and Levinthal, 1990; Leonard‐Barton, 1992; Martelo-Landroguez and Cepeda-Carrión, 2016). According to many scholars, in a very short time, KM has become a primal research topic in organisation and business studies, in comparison with other topics such as Business Process Re-engineering (BPR), and Total Quality Management (TQM) (Fuller, 2001; Spender, 2015). Likewise, KM has become popular in the media culture, through which it can evolve not only in organisations but also in society (Alvesson and Robertson, 2006; Sultani, 2016). Put differently, KM is an emerging field through which every social entity and agency can find its way towards desirable outcomes. Del Giudice *et al.*, (2016) argue that many ITs are designed and developed especially to facilitate transfer and integration of knowledge, although empirical studies consider that KM and KT strategies should not be reduced to tools for facilitating knowledge distribution (Soto-Acosta *et al.*, 2016; Rubenstein-Montano *et al.*, 2001; Alavi and Leidner, 2001). KM empirical evidence indicates that people, culture, routines and processes have special effects which govern the success or the failure of KM initiatives (Edwards *et al.*, 2016; Edwards *et al.*, 2005).

KM is a fledgling discipline with emphasis on the power of technology (Spender, 2015). This reduces the power of situated-practice; entailing KM initiatives will mostly deal with declarative knowledge (Alavi and Leidner, 1999; Alavi *et al.*, 2005). The epistemic perspective of KT needs, therefore, to be extended in order to include the question of knowledge, technology, learning, people and social entities and a cultural dimension.

In early organisation studies of KM and OL in particular, the understanding of knowledge became a controversial issue, depending on the ontological and epistemological perspectives of researchers and contexts (Nonaka and Peltokorpi, 2006; Tsoukas, 1996; Tsoukas, 1993; Blackler, 2002; Lave and Wenger, 1991; Dodgson, 1993; Dougherty, 1992). This issue still plays a role in organisation theory and management science (Nonaka and Von Krogh, 2009; Argote and Miron-Spektor, 2011; Volberda *et al.*, 2010). As such, the question of knowledge cannot be discussed from just one angle. What knowledge is, and what it is not, requires a multi-perspective approach (Nissen and Jennex, 2005; Nelson and Winter, 2009; Jennex *et al.*, 2014).

The discussion that follows in the [Appendix A.3](Appendix A.3) is built on three common dichotomies: tacit versus explicit knowledge; local or situated versus general knowledge; and stickiness versus leakiness of knowledge. The Multi-dimensional Nature of Knowledge in organisational studies is then considered. Following the discussion of the question of knowledge, the next section discusses the an overview of KM and OL.

### 2.3.2. Overview of Knowledge Management (KM) and Organisational Learning (OL)

Over the last twenty years, the field of management and organisation has regarded knowledge as a fundamental resource for performance and management. Many studies claim that delivering the right knowledge at the right time is fundamental to success (Nonaka and Takeuchi, 1995; Poston and Speier, 2005; Alkhuraiji *et al.*, 2014; Maruta, 2014). Thus, the ability of organisations to manage their knowledge is crucial to their overall performance. Moreover**,** communities within organisations may be overwhelmed by huge amounts of data and information that are difficult to manage (Carayannis, 1999; Schmitt *et al.*, 2017). Introduction of the business philosophy and KM may be an answer to this problem (Davenport and Prusak, 1998; Spender, 2015). Since knowledge lies at the core of the KM-literature, and given its complex and multidimensional concepts, many definitions of KM have been offered, each with its own focus. Table 2.1 illustrates some of the most common definitions.

Regarding practice as a source of knowledge, scholars not only see knowledge as tacit or explicit, but also they have examined ways in which organisations can learn. Organisation can learn through developing the organisational routine, structure and processes (Becker *et al.*, 2005; Leonardi, 2011; Argote, 2012). Although different purposes and sources of KM suggest different definitions, all agree that KM can help organisations realise the best value from their knowledge assets. KM can enable effective and efficient decision-making, dynamic learning, problem solving and strategic planning (Tiwana, 2000; Argote, 2013). KM is also central to the development of valuable knowledge resources as the process-based assets contribute to decision-making and to knowledge spreading across organisation/s (O'dell and Grayson, 1998; Kongpichayanond, 2009; Kovačič, 2007; Alavi and Leidner, 2001; Sultani, 2016).

**Table 2.1. Selected definitions of KM**

| Definition | Focus | Source |
|---|---|---|
| **KM is getting the right knowledge to the right people at the right time so they can make the best decision.** | Identifying and leveraging collective knowledge | Petrash, 1996 |
| **KM is the formalisation of and access to experience, knowledge and expertise that create new capabilities, enable superior performance, encourage innovation and enhance customer value.** | Exploitation and development of the knowledge assets | Beckman, 1997 |
| **KM is a systematic and integrative process of coordinating organisation-wide activities of acquiring, creating, storing, sharing, diffusing, developing and deploying knowledge by individuals and groups in pursuit of major organizational goals.** | Systematic use of knowledge to maximise effectiveness | Rastogi, 2000 (p. 40) |
| **KM is a method for harnessing corporation knowledge and is a process of capturing a company's collective expertise wherever it resides in databases, on paper, or in people's head and distributing it to wherever it can help produce the biggest payoff** | Helping people share and put knowledge into action by creating access | Wulff and Suomi, 2003 (p. 302) |
| **KM is the explicit control and management of knowledge within an organisation aimed at achieving the company's objectives.** | Furthering organisations' objectives to survive in the business world | Van der Spek and Spijkervet, 1997 (p. 43) |

For example, Alavi and Leidner, (2001) elaborated an application-process model to manage knowledge by means of a constant loop of four functions: knowledge-creation, knowledge storage/retrieval, and KT and knowledge application (see Figure 2.2). Creation in the cited work refers to the essential event that triggers knowledge in a specific situation (e.g., question and/or solution). Storage and retrieval knowledge include gathering knowledge in the form of artifact or databases with a well-designed solution(s). Concomitantly, the transfer of knowledge circulates the latter and makes it available to others. Furthermore, Alavi and Leidner (2001) proposed that the knowledge application refers to performing organisational functions, which is estimated to trigger other inquiries that may in turn lead to new knowledge-creation (Martelo-Landroguez and Cepeda-Carrión, 2016; Alavi and Leidner, 2001; Kovačič, 2007).
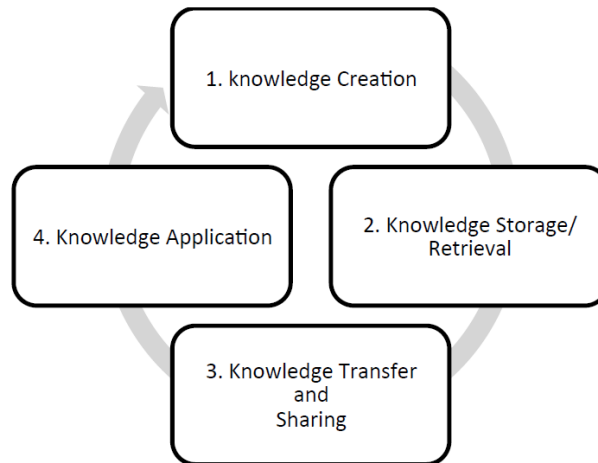
**Figure 2.2. Knowledge Management processes**

*Source: Martelo-Landroguez and Cepeda-Carrión, (2016)*

*and Alavi and Leidner, (2001)*

Indeed, the processes described by (Alavi and Leidner, 2001) are vital, if KM is to provide the right knowledge in the right form, at the right time, to the right people (Alavi and Leidner, 2001). As knowledge is the core of the KM, so Pearlson and Saunders, (2009) and Argote, (2013) argue that KT is the core of the KM; knowledge can only be grown and managed when it is shared and applied. The same point was highlighted earlier by Davenport and Prusak, (1998) that knowledge is limited when it is isolated from practice and only held by individuals.

In this thesis KM is based on understanding the process and practice of 'knowing-how' and 'knowing-what' by involving people, technology and organisational structure. In other words, the organisational studies attempt to understand the multilevel and multiple context(s), process/es and actors/factors involved in managing knowledge to maximise knowledge applicability, and transferability in order to enhance organisations' effectiveness (Chen *et al.*, 2017; Burchett *et al.*, 2013). Exploring the practice of KT, therefore, has potentially added value for understanding organisational performance (Canestrino and Magliocca, 2016). As a result, the main focus of this study is on KT-practice. These will be explained in detail in the following sections. Since the core question of KM is, how can organisations manage knowledge efficaciously? The core is to understand, what knowledge is? The following section will explore different ways of understanding Knowledge Transfer.

### 2.3.3. Knowledge Transfer

The literature considers that the KT-practice depends not only on the capability of the source to provide the necessary knowledge, but also on the question of knowledge-in-practice (Argote and Ingram, 2000; McEvily and Chakravarthy, 2002; Argote, 2012) and the intention and the ability of receivers to absorb and utilise the transferred knowledge (Steensma and Lyles, 2000; Canestrino and

Magliocca, 2016; Ali *et al.*, 2011). Moreover, differences in cultures, structures and goals between the source and their recipients may impede collaboration and/or consequently inhibit the KT-practice (Levina and Vaast, 2008; Barrett and Oborn, 2010; Ali *et al.*, 2011; Williams, 2011a). Thus, analysing the KT-practice requires a degree of prior knowledge on how these aspects would relate interdependently. KT-studies mostly depend on a number of aspects. Figure 2.3 shows KT-practice to be based on the socio-technical approach of technical, organisational and personal aspects (TOP).
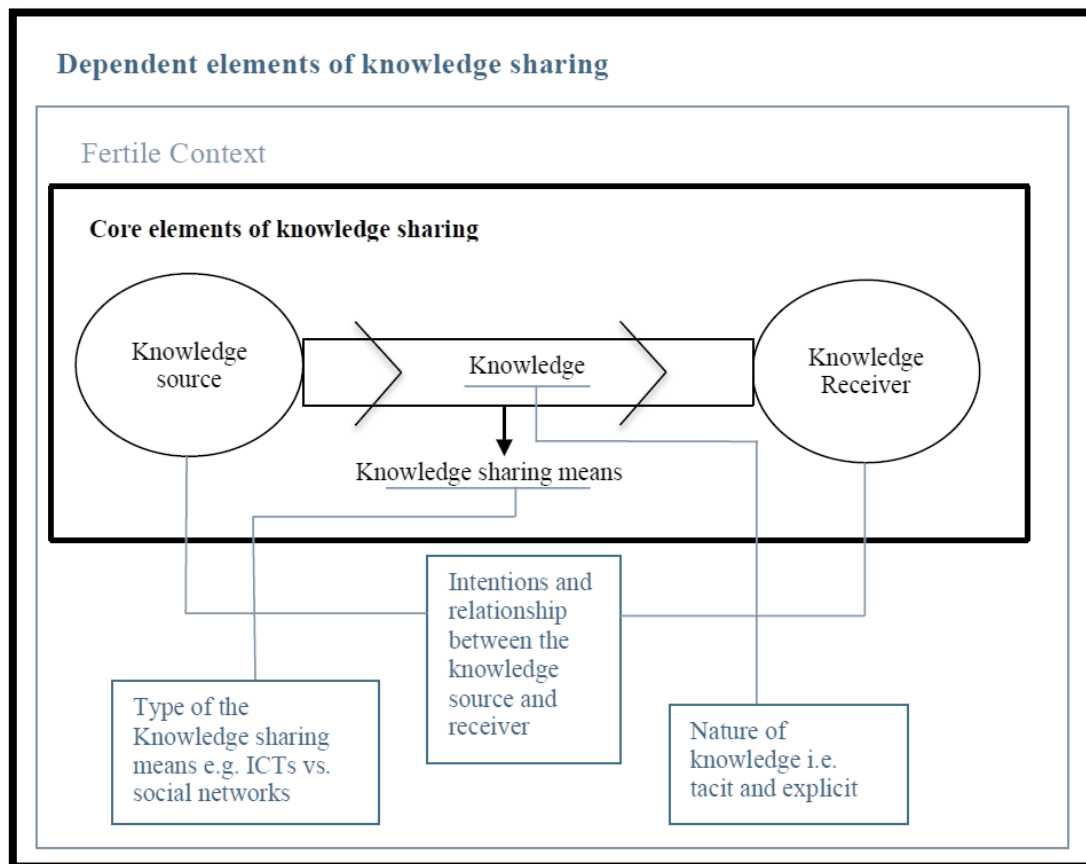


**Figure 2.3. Core elements of Knowledge Transfer**
*Source: (Minbaeva, 2007; Szulanski, 2002; Szulanski, 1996; Wang and Noe, 2010).*

Here, soft aspects can be personal intentions and collaboration and the origin of knowledge. Technical aspects can be identified through networks, and hard aspects can be identified through the structure of organisation, technologies and tools (Wood-Harper and Singh, 2011; Szulanski, 1996; Truran, 1998). The KM-literature points out that the knowledge-based view emerged as a theory from the resource-based theory of the organisation (Spender, 1996; Grant, 1996). The knowledge-based view values knowledge as a source of power, illustrated by people becoming reluctant to share knowledge with others, because they feel it strengthens the legitimacy of their position (Kankanhalli *et al.*, 2005). This issue becomes even more crucial in relation to the KT-practice within the professional context where knowledge inherently seems more personal and tacit (Duguid, 2005b). Moreover, the KT-practice's dynamic ontological status requires a flexible means of interchange and

exchange, affecting the personal intimacy of knowledge actors (sources and recipients) and their relationship (Tamer Cavusgil *et al.*, 2003).

Since effective communication is critical, the KT-practice is constrained by the absence of effective tools and channels (Appleyard, 1996; Fei, 2009; Albino *et al.*, 2004). Therefore, identifying and examining a technological perspective (appropriate KT apparatus) is vital (Bradley *et al.*, 2012; Tabrizi, 2014). Typical means or mediators include direct communication (e.g. face-to-face), verbal or non-verbal communication, observation, *et cetera*. However, these mediators are dependent on the direct access and communication of knowledge between sources and receivers. Many scholars emphasise the role of IT as a valuable means for facilitating KT and communication, reducing time and distance, and consequently increasing the quality and outreach of reliable knowledge (Albino *et al.,* 2004). Therefore, studying people and technological aspects is necessary to understand the requirements of effective KT-practice; the context can provide supportive and motivational conditions for the KT-practice. Consequently, identifying contextual or organisational aspects can encourage and provide supporting settings, where sources and receivers agree to share knowledge. Also, exploring the effectiveness of different KT methods can help reduce the gap between the model of KT and the practical and professional context of healthcare under investigation. Reviewing promising application of the KT-practice can contribute to addressing practice-based healthcare research from multiple perspectives. However, it is equally important to identify issues which remain overlooked and under-articulated in the KT-practice, in order to identify and hence fill specific gaps in the field with regards to the real knowledge processes at work in hospital settings. The KT-practice becomes particularly interesting in knowledge-rich communities such as the healthcare sector. Therefore, in order to determine the current status of research on KT, and in particular in the healthcare industry, a systematic approach to literature analysis was developed and constructed.

## 2.4. Knowledge Transfer and Organisational Theories

This section is double-edged purposed. The first is to review the relevant theoretical streams to justify the fundamental theory of organisations on which this research on KT is constructed. The second is to specify the flow between organisational theory and KT. Therefore, this part will discuss the basic assumptions of organisations and how they support KT.

In the KT-literature, several strands of organisational theory do valuable analytical contributions, chiefly the Growth of the Organisation (Wernerfelt, 1984), the Resource-Based View (Conner and Prahalad, 1996; Barney, 1991), the Knowledge-Based View (Barney, 1991; Pee and Kankanhalli, 2016; Felin and Hesterly, 2007), Organisational Learning (Argote, 2013), Absorptive Capacity (Cohen and Levinthal, 1990), and Dynamic Capability (Teece *et al.*, 1997).

Firstly, in the Theory of the Growth of Organisation, Wernerfelt, (1984) argued that the organisational resources would strongly affect the organisational performance. Resources can be categorised as tangible and intangible. Tangible resources include financial resources, types of capital equipment, properties, location and qualified employees (*Idem*). Intangible resources can be difficult to describe, such as intellectual properties, brand and other soft power (Hall, 1992; Hartley, 2012). The intangible resources can also include key elements, such as Social Capital (Nahapiet and Ghoshal, 1998), patents, networks within a distribution channel, relationships between managers, customers or employees (Hartley, 2012). The adequate use of resources, represented by 'knowing by doing', is vital for the survival of organisations. Thus, this view would consider knowledge to be an intangible resource that can be used to improve organisational performance (Felin and Hesterly, 2007; Eisenhardt and Santos, 2002; Grant, 2002).

Secondly, in the Resource-Based View (RBV), organisational resources are regarded as central to gain competitive advantages in a particular industry. Barney (1991) identified organisational resources as "all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc., controlled by a firm that enable it to conceive of and implement strategies that improve its efficiency and effectiveness" (p. 101). In other words, from the RBV's perspective, organisations are assumed to build and sustain competitive advantage by using crucial unique resources, which are taken by the organisational studies as a unit of analysis. In KT-studies, RBV helps evaluate and understand the full range of resources that the organisation owns and tries to imitate or sustain. Developing knowledge in one organisational unit and then transferring it within the boundaries of the organisation will be a main mission of KT. Table 2.2 reviews the theoretical contributions of RBV to the KT-literature.

### Table 2.2. Theoretical contributions of RBV

| Author(s) | Contribution |
|---|---|
| **Barney (1986, 1991)** | Addressed competitive imperfections in strategic factor markets and argued that first mover advantages and entry barriers exist only under conditions of resource heterogeneity and immobility |
| **Dierickx and Cool (1989)** | Differentiated between resource stocks and flows and argued that strategic assets, those that are necessary for sustainable competitive advantage, must be developed internally and cannot be purchased on the factor markets |
| **Amit and Schoemaker (1993)** | Described the process through which resources are developed and argued that boundedly rational managers make imperfect and discretionary decisions through time that culminate in a given set of organizational capabilities |
| **Montgomery and Hariharan (1991)** | Showed that a firm's diversified expansion is a function of its extant resource base and that firms with established capabilities in marketing and R&D were able to vault entry barriers into industries where these were the critical resource requirements |
| **Montgomery and Wernerfelt (1988)** | Distinguished between corporate expansion that relied on less specific and more specific factors |

*Source: Minbaeva, (2007).*

Thirdly, in organisational studies, Organisational Learning (OL) is defined as a process through which individual knowledge is transformed into collective knowledge, which in turn is determined, shared, interpreted and used collectively throughout the organisation (Argote, 2013). Traditionally, learning theories have related to the individual level. OL is more complex and dynamic than a mere magnification of individual learning (Fiol and Lyles, 1985). In other words, organisations build an infrastructure of learning by developing an environment that facilitates the learning of and for its members and continually develops itself via the development of its constituent (actors) (Juarrero, 2010). Learning occurs, according to Nonaka and Takeuchi (1995), when knowledge is created and shared or transferred by and amongst organisational individuals and then transferred throughout the organisational levels. Therefore, according to the Nonaka, (1994), learning happens by the *dynamic spiralling of interactions* between tacit and explicit knowledge, which occurs at various organisational levels (individual, group and the organisation as whole). He distinguishes between four processes of knowledge-creation: socialisation, externalisation, combination and internalisation. However, an explanation of these functions is beyond the scope of this study.

Fourthly, the Knowledge-Based View (KBV) perspective is currently less well developed. Grant and Baden-Fuller, (1995) referred to it as the theory of "the existence, organisation, and competitive advantage of the firm, which is based upon the role of firms in creating, storing and applying knowledge" (p. 17). However, based on the characteristics of knowledge, KBV has received many criticisms as a theory of organisation. Note here that Grant, (2002) added that "the emerging knowledge-based view of the firm is not a theory of the firm in any formal sense" (p. 135). Put differently, KBV should be seen as a view suggesting that organisations are analysable based on their knowledge resources (Grant, 1996; Grant, 2002), appropriate for the ability of KBV to explain the existence of firms as a result of their effective use of knowledge (Rebolledo and Nollet, 2011). Also, knowledge represents itself in the form of information and know-how, and the organisation's ability to create and transfer this knowledge can result in competitive differentiation (Kogut and Zander, 1992; Argote, 2012). It is significant that knowledge seen from this viewpoint needs to be constructed, and the appropriate processes need to be in place in order to do so.

Since it is not possible for any organisation to produce all their required knowledge in-house, the absorptive-capacity theory recognises that organisations need to enhance their ability to process external knowledge (Cohen and Levinthal, 1990). Eventually, the absorptive-capacity theory may underlie KT across organisations, but without emphasising the importance of the practice level, i.e., the 'level of doing'. Dynamic Capabilities, according to Teece *et al*., (1997), are the competence of a business to intentionally adapt a resource base within an organisation. In other words, the 'Dynamic Capabilities' concept represents "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (*Ibid.*, p. 516). 'Dynamic Capabilities' illustrates the ability of organisations to communicate and learn over time. Thus,

'Dynamic Capabilities' help specify the processual dynamics of the organisation in order to adapt, change, and solve problems. However, this theory still considers the analysis at an organisational level, where the dynamic interaction between the individuals and communities is still to be covered (Nonaka and Peltokorpi, 2006; Easterby-Smith and Lyles, 2011).

**Table 2.3. Empirical studies representing KBV**

| Empirical studies on: | Main assumptions | Significance for future research |
|---|---|---|
| **Knowledge sourcing** | Suggest that knowledge sourcing is an important knowledge process by which managers identify and gain access to relevant knowledge that is being created in the environment | Useful for understanding the linkage of internal and external knowledge sourcing with innovation-related outcomes |
| **Internal knowledge transfer** | Explores how knowledge transfer within an organization depends upon the characteristics of that knowledge, the sender, the receiver and their mutual relationship | Useful for understanding internal knowledge transfer and testing the efficiency of knowledge transfer within organizations (a primary rationale for the KBV) |
| **External knowledge transfer** | Addresses knowledge transfer across firm boundaries through alliances and acquisitions. The studies indicate that knowledge transfer is affected by knowledge characteristics and by the relationship between the sender and the receiver. | Useful for understanding knowledge dynamics in the complex adaptive systems in which different organizations coevolve into specialized roles to form highly adaptive networks |
| **Knowledge integration** | Focuses on how specialized knowledge is integrated from different sources to generate new knowledge or to apply that knowledge to the creation of new products and services | Useful for analysing the challenges of knowledge integration created by the existence of different knowledge, different modes of knowing and different ways of expressing the knowledge. |

*Source: Eisenhardt and Santos, (2002); Minbaeva, (2007).*

In KT-studies, KBV involves both the dissemination and absorption of knowledge. Dissemination is the organisational capacity to integrate new knowledge within existing structures and share it with individuals, and other entities (Eisenhardt and Santos, 2002). Absorption is the organisational capacity to deal with the cognitive and motivational structures of individuals to absorb knowledge (Lichtenthaler and Lichtenthaler, 2009). Thus, KBV can provide the foundation of studying KT-practice through enhancing both dissemination and absorption of knowledge in organisations. Moreover, KBV emphasises the importance of considering characteristics of knowledge such as tacitness, stickiness and ambiguity. KBV also emphasises the importance of considering the characteristics of sender/s and receiver/s, requiring extra organisational efforts to promote the relationships between parties (Ferlie *et al.*, 2015). Table 2.3 reviews empirical studies representing the KBV of KT. Figure 2.4 shows the relationship among KT, KM, OL and KBV.
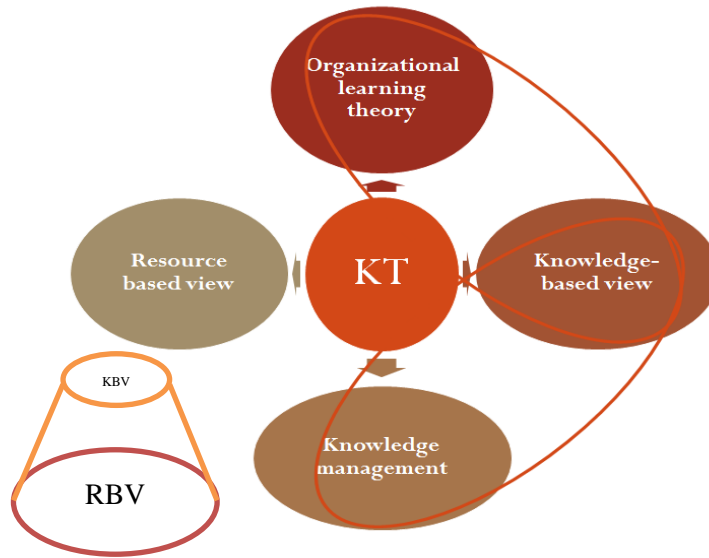
**Figure 2.4. Relationships among KT, OL, KBV and KM**

## 2.5. Knowledge transfer (KT) as the core of KM and OL

Knowledge plays a crucial role in modern organisations in both gaining strategic advantage and improving organisational performance. Attention has been paid to identifying how knowledge can be managed and how organisations can learn and adapt. The KM-literature focuses on knowledge-creation, dissemination, diffusion and application. For example, Grant, (1996) stated that "Knowledge is viewed as residing within the individual and the primary role of the organisation is knowledge application rather than knowledge creation" (p. 109). According to Argote and Ingram (2000) organisations can learn through identifying three main functions in handling organisational knowledge (retention, creation and transfer). Reviewing KT definitions and literature shows that most of the research on OL and KM practices indicates KT as the main function of both (Nonaka and Takeuchi, 1995; Bock *et al.*, 2005; Ko *et al.*, 2005) (see Figure 2.5). As learning is both directly from organisational units, and indirectly from other units (Levitt and March, 1988), these learning ways refer to KT at different levels (Argote and Ingram, 2000). Moreover, transferring and increasing knowledge are proposed to be crucial factors for high-performance organisations (Bock *et al.*, 2005).

In summary, the literature shows that the theoretical strands can be integrated through studying and focusing on KT. Moreover, although RBV, OL and KBV have multiple implications for KT, they do not agree about the concepts and dynamics of KT, the levels of analysis, and the types of KT. This is a motivation for conducting research focusing on the different facets and properties of KT and the relative emplacement and applications of KT in real-world contexts.

Since this section tries to link KT to the organisational theories, which from my own perspective answers the question of the position of KT in organisational theories, the next section reviews the literature of KT definitions.
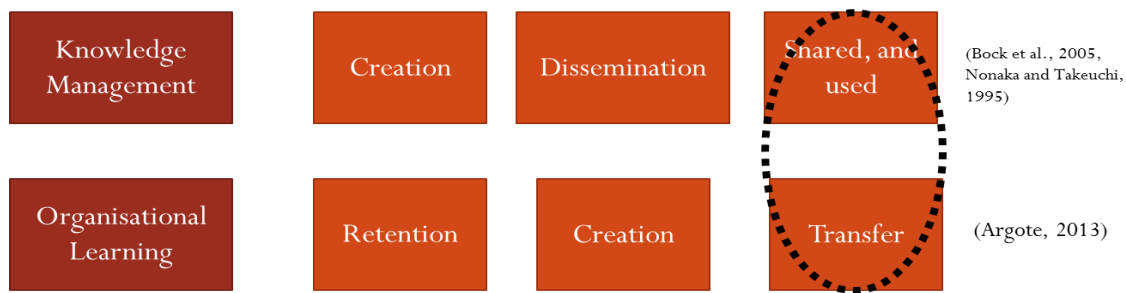
**Figure 2.5. Organisational learning and knowledge management processes.**

## 2.6. What is Knowledge Transfer?

Most OL and KM research considers KT as their main function (Nonaka and Takeuchi, 1995; Shin *et al.,* 2001; Bock *et al.,* 2005; Shin *et al.,* 2007). KT is considered the core in the domain of organisation and technology studies of KM and OL. For example, in Information System studies, the idea of actionable information/knowledge creates what is referred to as 'transferable knowledge' (Linden et.al, 2007). In OL, the KT-practice tends to improve administrative effectiveness through effective communications and interactions among people, artifacts and technologies (Nonaka and Takeuchi, 1995; Shin *et al.,* 2001; Bock *et al.,* 2005; Shin *et al.,* 2007). Historically, in order to shed light on the KT-practice as a core area, Kogut and Zander (1992) wrote: "what firms do better than markets is the sharing and transfer of the knowledge of individuals and groups within an organisation" (p. 383). The literature deals with KT as a practice that aims not only to move knowledge among individuals, but also to enhance and develop the knowledge of individuals and organisations; that is transformation. Thus, the KT-practice has been defined by Szulanski (1996) as "dyadic exchanges of organisational knowledge between a source and a recipient unit in which the identity of the recipient matters." (p.28). Davenport and Prusak, (1998), nevertheless, define it as "KT-practice is processes of knowledge transmission, knowledge absorption, and knowledge application." This approach to defining KT-practice is emphasised in many KT applications such as public administration, multinational corporations, financial institutions and franchises (Winter *et al.*, 2012).

In past years, Ko *et al.*, (2005) defined KT as "the communication of knowledge from a source so that it is learned and applied by recipient" (p. 62). IS scholars such as Bose, (2004) emphasised the use of IT as a tool to facilitate the knowledge flows from actors who possess knowledge to those who lack it and are in need to make appropriate decisions across different organisational functions. In this sense, KT is different from the communication by expecting an action to show that knowledge is transferred. However, Shin, (2004) considered a technological definition of KT by which technology is a platform that enhances KM functions including effective storage, sharing and dissemination of knowledge. A more recent definition of KT by Paulin and Suneson, (2012) is, "the interchange of knowledge between and among various units such as teams, individuals and organisations" (p. 83).

Those definitions reflect the mutual socio-technical interaction between humans, structure and technology to build and create knowledge (see Table 2.4). They indicate that KT focuses on circulating the knowledge needed to the right locations when it is needed and where it is likely to be absorbed and used. Several terms are used interchangeably in association with KT: knowledge-exchange (Lin *et al.*, 2008); knowledge sharing (Wang and Noe, 2010; Wang and Wang, 2012; Bock *et al.*, 2005); know-how best practice transfers (Kachra and White, 2008); knowledge brokering (Ward *et al.*, 2009; Reid *et al.*, 2017); and knowledge translation (Estabrooks *et al.*, 2006; Straus *et al.*, 2011). This research will use KT to cover all the aforementioned terms and concepts, in addition to knowledge-circulation and knowledge mobilization.

**Table 2.4. Definitions of knowledge transfer in the literature**

| The focus | The authors | Definition |
|---|---|---|
| **Technical systems** | Shin (2004) | KT in which technology is a platform that enhances knowledge management including effective storage, sharing, and dissemination of knowledge. |
| | Bose (2004) | KT is a function that uses technology to move the knowledge from actors who possess knowledge to those who lack it and need to make appropriate decision across different organizational functions. |
| **Social systems** | Szulanski, (1996) | *"Dyadic exchanges of organisational knowledge between a source and a recipient unit in which the identity of the recipient matters"* (p.28). |
| | Argote and Ingram (2000; 2013) | KT is a process whereby a unit is influenced by the skills and experience of another. |
| | Lockett *et al.*, (2008) | KT is *"the two way transfer of ideas, research results, expertise or skills between one party and another that enable the creation of new knowledge"* (p.664). |
| | Ko *et al.*, (2005) | *"The communication of knowledge from a source so that it is learned and applied by recipient"* (p. 62). |

This study supports the argument about the differences between knowledge transfer and communication, which is attributed to the difference between information and knowledge (e.g., Bolisani and Scarso, 2000; Hislop, 2013; Keane, and Mason, 2006; Dalkir, 2015). Information and knowledge merely differ in terms of processing mechanism, including: articulation, sharing, and application. Communications deal with means of sharing and articulating information in order to

deliver a specific meaningful message. Knowledge transfer, in turn, deals with mechanisms of interaction that result in application information technology solution at hospitals.

In healthcare setting, agents cannot be seen as passive senders and receivers, but they are more likely active through the multifunction of sense-making, such as communication, assimilation, reinterpretation, and knowledge application (Argote and Ingram, 2000; Sheng et al., 2013; Degafu, 2016) , 2016).

The KT-literature uses the socio-technical perspective to adopt a multi-faceted approach which highlights the interweaving of social and technical factors in the way people work. This also underlines the complex interactions which take place between the subjective perceptions of employees and the objective characteristics of work processes. The definitions displayed above of KT-systems carry a socio-technical orientation raised by IS scholars such as Frank *et al.*, (2015) and Pan and Scarbrough, (1998). The importance of this exploration lies in the socio-technical interaction between the healthcare community (as a social sub-system) and the health informatics (as technology sub-systems). This area is under-researched and deserves more interest from IS scholars in general and those who serve contexts where healthcare is significant (Carayon, 2012).

Generally, developing a system facilitating KT-practice is fundamentally complex, and largely results from the interactions among activities with various contents, numerous entities and diverse contexts. KT-studies are usually divided into two streams (Lin *et al.*, 2012; Lin *et al.*, 2008):

1. The traditional stream focuses on the type of knowledge which is transferrable, such as the classic distinction between implicit and explicit knowledge (Nonaka and Takeuchi, 1995; Polanyi, 1966), the distinction between declarative and procedural knowledge (Anderson, 1997; Yi and Davis, 2003; Santhanam *et al.*, 2013), and the classification of know-what, know-how and know-why (Mahapatra and Lai, 2005; Lee and Strong, 2003).
2. The more recent stream focuses on the entities/contexts among which the knowledge is transferred, including individuals, groups, departments, projects and organisations (Lin *et al.*, 2012; Lin *et al.*, 2008).

In summary, the type of knowledge is determined by the tacit-explicit dimension, while the level of analysis is based on examining the social-individual dimension. Therefore, the core of KT is the perception of the continuous movement of knowledge throughout an organisation which can be accumulated, reused and recombined to create new knowledge in order to exploit its potential benefits. For example, in the healthcare-context, the core of the KT-system is the ability of health organisations to capture, disseminate and organise knowledge in a way that allows them to improve the quality of healthcare, process efficiency, patient satisfaction and cost control (Fazey *et al.*, 2014; El Morr and Subercaze, 2010). This continuous movement shows that effective KT-practice can go beyond

transmission and movement of utilisable knowledge, and should be supported by different aspects of social practice (human, technology and structure). For each element, various associated factors can enable or hinder the KT-practice.

Consequently, to better understand the mechanisms and perspectives affecting the outcome of KT, this study aims to explore KT-practice alongside EPR-project implementation. Given that this section has considered KT definitions based on the conventional approach; the next reviews the literature of KT models.

## 2.7. Theoretical Models of Knowledge Transfer

The KM-literature shows three epistemological roots of KT models, coming from three theories: cognition, autopoiesis and connectionism (Joshi *et al.*, 2007; Venzin *et al.*, 1998). Cognitivists see knowledge as universal, objective and general, and they reduce it to the elemental essence of existence that is data. In other words, knowledge can be held as data and easily passed from one object to another. The main critique of this perspective is that the senders and receivers are passive and have no direct role in KT (Argote and Ingram, 2000). Argote and Ingram, (2000) and Argote, (2013) argued that knowledge is embedded in the process of the interactions among people, technology and structures.

The autopoietic perspective of KT perceives knowledge as history-dependent and developed in an autonomous manner and hence non-abstractable and non-shareable (Venzin *et al.*, 1998; Koskinen, 2013). However, the only process that can handle knowledge is conversion between knowledge types or re-creation of one type of knowledge via another. The main critique of this approach is that it focuses on the process dimension by conversion, and it ignores any effort at adoption. This is perceived as a contradictory vision of transformation and thus non-realistic (Jennex *et al.*, 2014).

By contrast, the connectionists perceive knowledge as multi-dimensional and socially constructed, without universal characteristics (Jennex *et al.*, 2014; Nissen and Jennex, 2005; Joshi *et al.*, 2007). Knowledge is conceived as socially constructed: it is contextual and has local differences. This view was figuratively introduced into KT-studies through the mathematical theory of communication of Schramm and Roberts, (1971) and the model of mass communication by Berlo (1960) in order to simplify the model of KT-practice (Joshi *et al.*, 2007; Szulanski, 1996).[1] This perspective admits the possibility of knowledge being transferrable, but with several difficulties (sees Figure 2.6). As knowledge is mainly contextual, the KT-practice is related to the shared understanding among actors in the same context through social interactions, ties or networks. Furthermore, socio-technical theory agrees with connectionism, adding a special concern regarding human well-being, by

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[1] David Berlo (1960) suggested the Sender-Message-Channel-Receiver (SMCR) Model of Communication based on Shannon's Model of Communication (Shannon Weaver, 1949).

providing free assumption of knowledge acquisition to those who take and become part of a system (Wood-Harper and Singh, 2011).

The connectionist and/or the socio-technical perspective are more suitable for the consideration of the KT-practice in healthcare, emphasising the critical role of the setting's richness and the complexity of interactions among heterogeneous stakeholders (Joshi *et al.*, 2007). This study support the argument about the differences between knowledge transfer and communication is related to the difference between information and knowledge. Information has processional dimension of articulation, whereas knowledge requires developments of application. The healthcare-setting reveals that actors depend on sense-making processes in the KT-practice. These processes are based on human communication in order to cooperate, interact and learn (Hirschheim and Klein, 1989; Joshi *et al.*, 2007). Thus, knowledge is co-constructed though a process of negotiation among all types of stakeholder involved, who are expected to have different views.

This study adopts the KT-practice based on KBV and communication theory. The latter emphasises the critical role of the matters of situation and the interaction among the various actors (e.g. stakeholders; sender/s and receiver/s), who actively conduct the KT-processes.
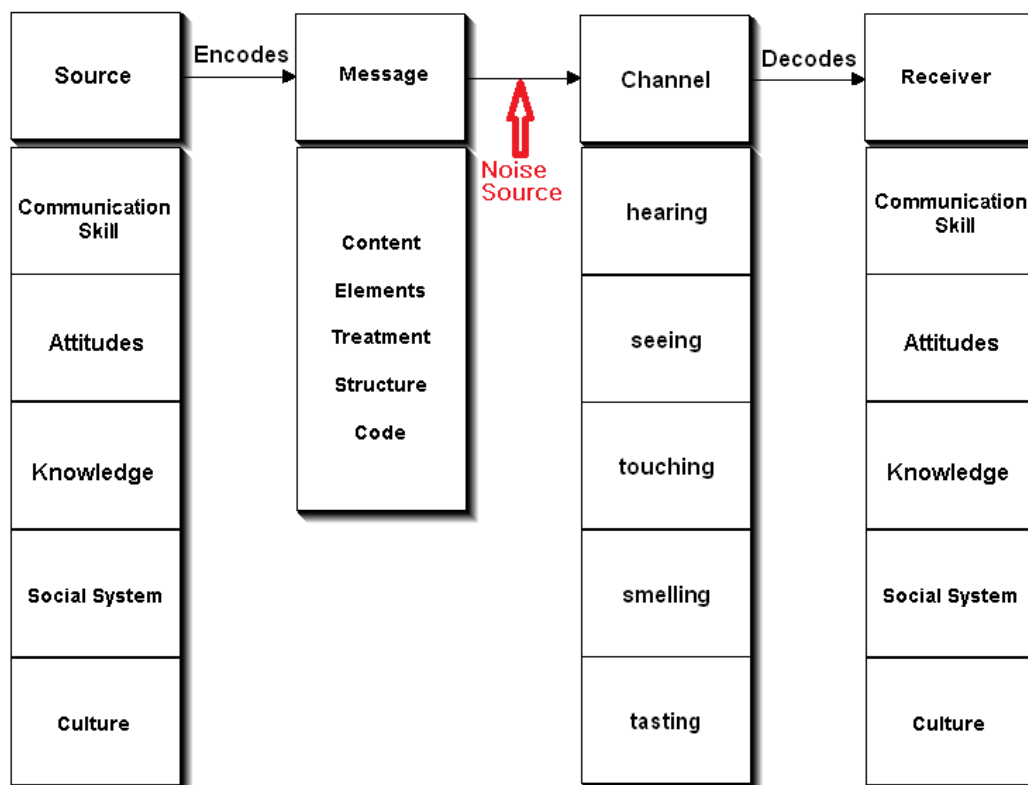


**Figure 2.6. Model of communication[2]**

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[2] Shannon and Weaver model of communication was created in 1948, when Shannon wrote a paper "A Mathematical Theory of Communication" in Bell System.

As such, KT's basic elements of communication include the message (knowledge), actors/factors, channels (means) and processes (dissemination and assimilation). Shannon and Weaver's communication theory (1948), based on cognitive epistemology, describe noise as the main barrier inhibiting transfer of a message. Similarly, Schramm and Roberts, (1971) emphasised the role of noise in human-human communication, arguing that communication is fundamentally problematic and complex. They identified noise or barriers in the relationship between the actors and the context, that might affect the value of the communication (Berlo *et al.*, 1969; Schramm and Roberts, 1971). Some studies used the communication view of KT metaphorically to describe the transmission of knowledge from sender/s to receiver/s in a given context (Szulanski, 1996; Joshi *et al.*, 2007). However, this view is limited, perceiving the actors as passive mediators with no effect on the knowledge-in-practice. In fact, knowledge and KT are seen to be effective when knowledge is absorbed and applied by the recipient. Absorption may influence the behaviour of the recipient in uncertain ways (Szulanski *et al.*, 2004). This section discussed KT models based on conventional streams. The next reviews the identifying KT aspects and factors in organisations.

## 2.8. Knowledge Transfer: Aspects and Factors

The KT-literature examines the mechanisms and factors which describe how KT occurs, focusing on the characteristics of the source, the receiver and the knowledge, besides the contextual and social environment of the interchange. For example, Gupta and Govindarajan, (2001) argue that transfer success depends on five aspects: perceived value of knowledge, the receiver's absorptive capacity, the receiving unit's motivation, the source's motivation, and the existence and richness of transmission channels. Furthermore, in a socio-technical systems context, three kinds of factor associated with KT were identified by Barson *et al.*, (2000)as technological organisational and personal. However, Degafu, (2016) and Barson *et al.*, (2000) indicated that the KT-practice required expanding the 'TOP' perspectives to include cross-categories such as the need for reward, socio-cultural aspects and materials. It was further indicated that, as well as individuals, there are technological characteristics and organisational impacts on knowledge sharing in relationships pertaining to what is termed as the 'supply chain' (Barson *et al.*, 2000). A more recent study by Lin *et al.*, (2012) reaffirmed a handful of research findings of past studies in healthcare organisations, revealing that participant-focused factors (e.g., motivation and reliability) besides other contextual factors such as politics) and knowledge characteristics (e.g., simplicity) are also vital to KT.

Most KT-studies have focused on KT elements: the characteristics of knowledge, sender/s and receiver/s, and the contextual environment of knowledge-exchange. Yet, there is insufficient research on the actual factors that enable or inhibit KT. The Appendix A.4 reviews the literature on both KT's enablers and barriers in different fields.

The literature provides evidence of various factors, especially the enablers and barriers, which can effectively influence KT. However, less attention has been given to KT-practice in healthcare notwithstanding the crucial importance and utility of which in this vital sector in society (Foss *et al.*, 2010; Nicolini *et al.*, 2008; Lin *et al.*, 2008). Chapter 3 will justify the choice of healthcare as a context for my study.

## 2.9. Conclusion

The studies adopting a 'macro' level of KT analysis have focused so far on describing the issues influencing the KT-processes. KM is widely accepted in the field of IS and IT, and the most influential premises are based on organisational theory, the process school of thought and Spiral Dynamics (e.g., Nonaka and Takeuchi 1995). However, KT as an independent topic in sociological studies of organisations is largely seen as a study of the boundaries between professions. The complexity of the healthcare sector further motivates my study to investigate complex systems, which are deeply rooted in Systems Thinking that gives a multi-dimensional orientation to this research.

KT-practice is represented as relying on transformation through new strategies, giving the impression that it will be neglected once the technology and strategy have been established. From perspective of this research, KT-practice is located at the core of health practice, regardless of the success or failure of technology. Having considered the flourishing KT-literature, the concept is investigated from different perspectives. However, it is important to find out which topics of KT have been studied and which ones yet to be examined in order to identify and hence fill the gaps in the field and furthering the current understanding of knowledge-circulation. Given the importance of KT in knowledge-rich communities such as healthcare, this is a fertile area for investigation. In the following chapter, I review the current status of research on KT in the healthcare sector, where I identify any potential gaps. Subsequently, this will enable the formulation of the research questions.

# Chapter 3: Literature Review: Part 2 Knowledge Management (KM), Knowledge Transfer (KT) and the NHS

## 3.1. Introduction

This chapter examines the conceptual and empirical foundations of Knowledge Management (KM) and Knowledge Transfer (KT) in the field of healthcare (the NHS); the literature confirms that knowledge is especially problematic in this context. The NHS has over 1.7 million employees, and is the largest employer in the UK (National Health Service, 2015). The NHS was established in 1946 by the *National Health Service Act* (implemented in 1948) as a policy response to inconsistent healthcare-systems throughout the country (Beveridge, 1942). Four main values guided the new understanding of the public health service:

- "to ensure that everybody in the country —irrespective of means, age, sex, and occupation— shall have equal opportunities to benefit from the best and most up-to-date medical and allied services available.
- to provide, for all who want it, a comprehensive service covering every branch of medical and allied activity.
- to divorce the case of health from questions of personal means or other factors irrelevant to it,
- to provide the service free of charge (apart from certain possible charges in respect of appliances).
- to encourage a new attitude to health, the easier obtaining of advice early, the promotion of good health rather than only the treatment of bad" (Scambler, (2004) p. 210).

From the early 1980s, UK policymakers began a series of reforms to *modernise* public companies including the NHS (Bovaird *et al.*, 2003), inspired by contemporary management theories (Moahi and Bwalya, 2017; Edwards and Saltman, 2017; Wastell, 2011). These theories reduce the central control (i.e., middle management) and involved decentralisation (devolvement), reflective practice and team working, in addition to KM approaches. Empirical evidence shows little influence of KM practice in the context of the NHS (Pentland *et al.*, 2014; Nicolini *et al.*, 2008). Empirical researchers assess public sector organisations as being 'unready', and the NHS environment as still being little adapted to the implement of KM practices for many reasons (including organisational and predating individual and professional influences) (Rashman and Radnor, 2005; Rashman and Hartley, 2002; Currie *et al.*, 2015; Currie and Lockett, 2011; Walker, 2014). The same reasons apply to the professional context of the NHS (Ferlie *et al.*, 2015; Ferlie *et al.*, 2013; Robertson *et al.*, 2003; Scarbrough *et al.*, 2015).

This section reviews current empirical studies regarding these professional and organisational issues, affecting the KT activity in the context of NHS.

The chapter is organised as follows. First, it discusses healthcare as an important context to investigate. Second, it reviews the modes of knowledge in the NHS. Third, the chapter examines current organisational and professional factors of KT activity in the NHS. The fourth section reviews existing KM and KT-processes in the NHS. Finally, this chapter discusses existing research gaps and determines the research questions of the current study.

## 3.2. Justification of Healthcare as a Research Context

Integration of healthcare information technology into healthcare knowledge flow and circulation is crucial. It can also contribute to favourable workflow effects. On the other hand, many studies show how most of IT projects in healthcare have reported unfavourable knowledge and practice flow effects (Bose, 2004; Lee et al., 2012; Park et al., 2012; Park et al., 2015). These issues, for example, include the wrong allocation of the PCs, and adding many tables in the record with no need in practice, and so on. Thus, these issues lead to difficulty in utilising systems and mismatching between medical practice and technology requirement, which may lead to unintended consequences arising from its very utilisation.

When a mismatch between the IT and KT practice occurs, the organisation could face increased documentation, redundancy or duplication of works, workaround and circumvention strategies, and increasing of medical errors (Park et al., 2015; Hughes, 2008). For example, Ash at el., (2004) argued that Patient Care Information System seemed to foster errors rather than reduce their likelihood (p. 105). Their study shows how technology causes two types of errors during knowledge articulation. One reason was based on the Patient Care Information Systems (PCISs)' interface design which could not reflect the nature of the healthcare processes of knowledge articulation (information entry and retrieval). The cited authors argued that clinical knowledge and information are highly context-dependent, thus highly structured information prevents clinicians from communicating in their own 'language'.

The mismatch between communication technology on one hand and clinical work and KT practice on the other hand has led to suggestions that further research should be conducted to understand the locality of knowledge circulation, and the context of implementation, by adopting the socio-technical approach (Sawyer and Tyworth, 2006; Clegg, 2008; de Lusignan & Aarts, 2008/2005; Postma, 2009; Cresswell and Sheikh, 2009; Eason, 2009; Obreja et al., 2017), and multiple perspective analysis (Churchman, 1971; Mitroff, 1983). This research required practice analysis that is multi-faceted in this sense. Thus, this research see KT practice as flow can be investigated in relation to a single information artefact or multiple information artefacts in supporting their workflows.

Further, Eason (2009) argues that overcoming the local problems of activating new technologies in hospitals requires deep understanding of the diversity of local conditions in different Trusts to find local solutions for emerging problems. The Organic Emergence approach facilitates the processual implication of the local professional community to find their own ways, within their own network at their own pace. Moreover, exploring different aspects of KT practice could provide multidimensional analyses of the local configuration of the workflow and practice. This can be in order to inform an effective design and implementation of health information systems (Abraham and Reddy, 2010). In this sense, Ash et al., (2004): and Berg et al., 2003 tried to enhance the 'mirroring' and to discuss the 'mirroring defects 'of the IT in actual practice. Since KM systematically considers how advanced information technologies can be used to leverage and create knowledge, KT practice can elucidate reshaping and crystallising these technologies.

In the light of the aforementioned points, this research aimed to explore KT practice in healthcare by reflecting on EPR project. This study was intended to provide an in-depth understanding of an emergent KT practice by studying information artefacts within socio-technical and multiple perspective analyses. In other words, I have examined the EPR as a 'mirror' being held to reflect the practices of Knowledge Transfer by studying multiple professional, technical, and managerial perspectives. This standpoint is used to elaborate on the interaction between humans, technology, and practice (Aarts and Gorman, 2007).

Healthcare lacks KM approaches to understanding the current challenges, such as care of the elderly, exponential medical innovation, increasing technological development, international organisational standardisation, and austerity (Walshe and Smith, 2016). Likewise, the scarcity of empirical studies on both KM and KT in professional contexts justifies the selection of healthcare as a context for this research. The four main dimensions of contemporary healthcare are knowledge-based, complexity, massive data and uncertainty (Ferlie *et al.*, 2015), motivate my empirical investigation. I advocate that KM and KT research can expand the theory of KT itself through furthering the understanding of the context of healthcare.

### 3.2.1. Healthcare as a Knowledge-Based Sector

The transfer of medical knowledge among and across health-professionals, settings and technologies is vital for an appropriate treatment of patients. In addition, the circulation of managerial knowledge requires additional modes of understanding of healthcare practice (Sadegh-Zadeh, 2011; Wastell, 2011). Thus, contemporary healthcare is primarily a knowledge-based multi-dimensional practice. In this regard, the capacity of healthcare organisations to find, distribute and apply knowledge can improve the quality of healthcare, practice efficiency, cost control, and patient satisfaction (El Morr and Subercaze, 2010). Extracted from the research produced by Venot *et al.*, (2014); Rosenbluth *et al.*, (2014), and Sadegh-Zadeh, (2011), knowledge-based healthcare includes:

- Risk assessment and patient safety.
- Protective care-delivery procedures at both individual and social levels.
- Investigative actions and activities of the medical staff.
- Therapeutic processes.
- Smooth involvements of the actors and professionals and patients.
- Comprehensive delivery of all these activities.

Multiple stakeholders participate in contemporary national healthcare-settings spanning patients, physicians, surgeons, epidemiologists, doctors, nurses, health students, technicians, researchers, policymakers and administrators. These stakeholders relate to each other in multiple interdisciplinary synergies, and hierarchies. Each stakeholder group is required to find its own access to information and knowledge, and each has its own responsibilities which result in both opportunities and conflict in defining professional boundaries (Fazey *et al.*, 2014; Mantzana *et al.*, 2007; King *et al.*, 2015; Nancarrow and Borthwick, 2005). Amid this nexus of different actors, KT performs an essential function in enhancing the quality of the system (Richardson and Courtney, (2004) and in reducing medical errors (McCracken and Edwards, 2016). Knowledge-circulation also helps diffuse medical knowledge throughout the health organisation, becoming central to the delivery of appropriate treatment of patients (Couturier *et al.*, 2014). Moreover, some authors claim that studying KT-practice is especially necessary in the healthcare sector (Lin *et al.*, 2012; Lin *et al.*, 2008; Lin and Silva, 2005). Knowledge not only derives from professionals, but also includes other perspectives (i.e., managers and technicians) related to the exploitation of the advantages of new technologies, and to the generation, distribution and application of new knowledge. Thus, medical knowledge available and/or obtainable from a specific health system can be diffused to develop new applications (Lin *et al*., 2008). As such, decision-making will be contingent on the accessibility of relevant knowledge from all aspects of the medical settings.

### 3.2.2. Complexity of the Healthcare-setting

A complex system is defined as having a big number of interdependent components such as agencies, processes, equipment and expertise, aggregated in non-linear ways, but analysed and displayed in a hierarchical structure. Complex systems are unpredictable, because any small deviation from the initial conditions can lead to significant transformation in the results (Lipsitz, 2012; Sweeney and Griffiths, 2002). The heterogeneity of the stakeholders and tasks within the healthcare sector adds other layers to the complexity; many independent agents interact with one another, contingently inducing changes in each another. As a result, healthcare situations are always prompt to create complex adaptive systems (Weinbaum, 2015; Lipsitz, 2012; De Savigny and Adam, 2009), while containing emergent potential properties. For example, in the NHS the contingent state of the patient requires specific careful attention from the health provider, which in turn concerns the quality of the service, the state of well-being, and the economic dimension of physical/material practice. Health-

professionals work to improve the well-being of patients against the constraints of the need to maintain careful use of tangible assets inside a hierarchical system. The complexity requires balance between the desire for dynamism and solidity, between vagueness and transparency in tactfulness, between improvised and ordered decision-making, between diversity of opinions and consensus, and between the different dimensions and characteristics of knowledge (Grol *et al.*, 2013). Researchers actively pursue different approaches and theories in order to find a way to address intractable issues arising from this professional sector, assessing the KT-practice and knowledge acquisition from different perspectives, such as managerial, technical and professional (Argote and Hora, 2017; Argote, 2013; Argote and Ingram, 2000; Newell, 2005).

### 3.2.3.  The Problem of Massive Data

Many years of stored public-sector data have become accessible, searchable and even actionable, and healthcare stakeholders now have access to massive amounts of data that are complex, diverse and timeless (Groves *et al.*, 2016). This presents challenges to healthcare policymakers, in routinely reaching medical data for quality development (de Lusignan *et al.*, 2005; Liaw *et al.*, 2013; Cabitza and Batini, 2016). The actual assimilation of knowledge in healthcare services can also be difficult; according to Davenport and Glaser, (2002), cited that medical research centres generate over 400,000 articles a year. On average, a professional would require eight hours a day over five years to keep up with a single year's published scientific papers. Thus, using and developing communication methods and technologies in such a context is crucial and challenging (Gray and de Lusignan, 1999; Carayannis, 2015; Kostkova, 2015). The situation is even more challenging because of the diversity and boundaries among the actors involved. Studying the multifaceted healthcare practice therefore requires a deep understanding of the KT-processes and knowledge-creation, transformation and application. The modes of KT-processes are also determined by the active or passive role of the transfer (Degafu, 2016). For example, in the professional hierarchy the receiver plays a passive role.

Studying KT-practice and methods can help understanding the network of acquiring and applying knowledge, and can play at least two roles: to assess managerial practice (Wastell, 2011), and to assess professional practice (Groves *et al.*, 2016). Smooth KT-practice contributes to finding relevant knowledge from the mass of data collected from day-to-day activities. For example, KT helps medical-professionals to find efficient methods to help patients through knowledge of comparable or identical patient cases (O'Sullivan and Beales, 2007; Vibe Fersum *et al.*, 2013). It also helps decision makers to access actual knowledge for accurate auditing, monitoring and research (e.g., applying Total Quality Management standards), (Leonard and McAdam, 2001; Murphy *et al.*, 2016). Establishing EPRs is only the first step in KT, supporting practitioners in generating knowledge, ensuring good-quality practice and anticipating future change. Healthcare is a complex knowledge-based system that cannot be understood by reductionism as in analysing its components from a single perspective (Rothschild *et al.*, 2005; De Savigny and Adam 2009). Complexity arises from the

interaction between/among the system elements, and between the elements and their environment (Fish and Hardy, 2015; Sweeney and Griffiths, 2002). As a result, any research methodology to study knowledge in healthcare-settings must be multifaceted, offering a multi-faceted approach. Multi-perspective analysis of the system elements (e.g., sender, receiver, context, tools) and the interaction between/among these elements is required. However, in the dearth of studies about the KT-practice in the healthcare (Lin *et al.*, 2012; Lin *et al.*, 2008; Lin and Silva, 2005; Nicolini *et al.*, 2008), neither health-professionals nor non-professionals are fully aware of the various perspectives of the KT-practice (Ferlie *et al.*, 2015; Niezen and Mathijssen, 2014).

### 3.2.4. Uncertainty

The growth of globalisation offers opportunities for the organisations to develop knowledge transnationally. IT has encouraged the management of global organisations (Alavi and Leidner, 2001; Bienstock *et al.*, 2008), which are becoming more closely connected but, at the same time, are facing greater risk (i.e., information security) and increasing uncertainty (Hall and Andriani, 2003; Hall and Andriani, 2002; Seely, 2013). At the medical level, newly emergent diseases such as different types of cancer, and viral diseases like 'Ebola' and 'Zika', require more research and effort, implying strong challenges to medical services (Walshe and Smith, 2016). Moreover, the current economic state, alongside policies of austerity, hinders the development of the therapeutic experiments that can solve many of these diseases (Reeves *et al.*, 2014; Gaughan and Michlig, 2017). Healthcare organisations also face challenges such as population growth, the speed of medical innovation, and the development of new technologies (Walshe and Smith, 2016), which increase unpredictability and uncertainty in healthcare environments (Seely, 2013). Managing uncertainty is one of the most important challenges facing healthcare managers today, and the KT-practice has a crucial role in helping them to examine and understand uncertainty. To sum up, the KT-practice plays a crucial role in the four major aspects of healthcare (knowledge-based, complexity, massive data and uncertainty).

## 3.3. Nature of Knowledge in a Healthcare-setting (NHS)

As introduced in the previous chapter, knowledge is usually categorised as tacit or explicit (Brown and Duguid, 2001; Nonaka and Peltokorpi, 2006). Tacit knowledge exists nowhere but within a cognitive environment such as professional intellect or routine, and it is not or can hardly be articulated through textual forms (Gibbons *et al.*, 2010; Erosheva *et al.*, 2014). It is subjective, informal, and somehow can be inferred from close interaction between people and the embedding context (Horan, 2007; Nonaka, 2008; Sternberg and Lubart, 1999). Explicit knowledge, nonetheless, can be described accurately in a physical format (e.g., guidelines and figures) (Smith, 2001). It can be transferred through regular reading and interaction. According to Smith (2001), tacit and explicit modes of knowledge can be summarised and evaluated through ten categories, as shown in Table 3.1.

Healthcare organisations, including the NHS, require sets of multi-dimensional knowledge to describe the many different health activities and practices. In addition to patient knowledge and the clinical component, knowledge-based practice also has a significant role to play in patient care (Lin *et al.*, 2008; Lin *et al.*, 2012).

**Table 3.1. Use of explicit and tacit knowledge in the workplace**

| Explicit knowledge ' know-what': is described in formal language, print or electronic media, often based on established work processes, use people-to-documents approach | Tacit knowledge – practical, action-oriented knowledge or 'know-how' based on practice, acquired by personal experience, seldom expressed openly, often resembles intuition |
|---|---|
| *Work process*- organized tasks, routine, orchestrated, assumes a predictable environment, linear, reuses codified knowledge, and creates knowledge objects. | *Work practice*- spontaneous, improvised, web-like, responds to a changing, unpredictable environment, channels individual expertise, creates knowledge |
| *Learn*- on the job, trial-and-error, self-directed in areas of greatest expertise, meet work goals and objectives set by organization. | *Learn*- supervisor or team leader facilitates and reinforces openness and trust to increase sharing of knowledge and business judgment |
| *Teach*- trainer designed using syllabus, uses formats selected by organization, based on goals and needs of the organization, and may be outsourced. | *Teach*- one-on-one, mentor, internships, coach, on-the-job training, apprenticeships, competency based, brainstorm, people to people |
| *Type of thinking*- logical, based on facts, use proven methods, primarily convergent thinking. | *Type of thinking*- creative, flexible, unchartered, leads to divergent thinking, develop insights |
| Share knowledge -extract knowledge from person, code, store and reuse as needed for customers, e-mail, electronic discussions, and forums. | *Share knowledge*- altruistic sharing, networking, face-to-face contact, videoconferencing, chatting, storytelling, and personalize knowledge. |
| *Motivation*- often based on need to perform to meet specific goals | *Motivation*- inspire through leadership, vision and frequent personal contact with employees |
| *Reward*- tied to business goals, competitive within workplace, compete for scarce rewards, may not be rewarded for information sharing | *Reward*- incorporate intrinsic or non-monetary motivators and rewards for sharing information directly, recognize creativity and innovation |
| Relationships- may be top-down from supervisor to subordinate or team leader to team members | *Relationships*- open, friendly, unstructured, based on open, spontaneous sharing of knowledge |
| *Technology*- related to job, based on availability and cost, invest heavily in IT to develop professional library with hierarchy of databases using existing knowledge | *Technology*- tool to select personalized information, facilitate conversations, exchange tacit knowledge, invest moderately in the framework of IT, enable people to find one another |
| *Evaluation*- based on tangible work accomplishments, not necessarily on creativity and knowledge sharing | *Evaluation*- based on demonstrated performance, ongoing, spontaneous evaluation |

*Source: adopted from Smith, (2001)*

Indeed, knowledge-based practice embraces knowledge about patients, risk assessment, new medical research, errors and incidences, auditing, training and practical applications and solutions, as shown in Table 3.2. These sets of knowledge are complex and continuously developing along with medical practice and decision-making (Jennings Mabery *et al.*, 2013). Patient histories inform medical practice based on actual daily activities, such as blood tests, scans, diagnoses and medication, (Mura, 2013). Hence, in order to monitor treatment and ensure the safety of patients, the NHS regulates medical activities through a clinical procedural framework (Executive, 1998). This involves a participatory practice using both tacit and explicit dimensions of knowledge (Goodwin *et al.,* 2005; Xyrichis 2014; Harsh and Kumar 2016).

**Table 3.2. Multidimensional Knowledge of Different Health Activities and Practices**

| Types of heath knowledge | Description |
|---|---|
| Patient knowledge: | All required information for diagnosis and treatment, which includes clinical reports, medical records, results of care, etc. |
| Risk knowledge: | Knowledge about risk of injury or illness associated with the service provided. |
| Research knowledge: | This type of knowledge is about applying research findings into practice, as delivering healthcare services for patients should be based on high quality evidence from researchers. |
| Incident knowledge: | This knowledge refers to learning from adverse incidents and making changes where appropriate. |
| Audit knowledge: | Knowledge about standards and agreed statement of best practice, which describes the aspect or quality of care to be achieved. |
| Expertise obtained from education and training: | This refers to expertise obtained from expert sources. |
| Experience knowledge: | Knowledge about actions and decisions executed in past problem situations. |
| Experience of physician patient relationship: | This is about the history of transactions between patients and different parts of the service. |

In the healthcare sector, including the NHS, KT entails different understandings and applications of knowledge. First, *clinical knowledge* is fragmented and dispersed across a vast array of healthcare occupations, requiring collaboration between healthcare-professions for successful delivery. Secondly, *technical knowledge* is related to the knowledge that professional specialists hold in regard to professional practice in the field in addition to long-term specialisation. This includes the different skills of staff and professionals in terms of the care they provide for patients. Third, *medication knowledge* is represented in the increasing abundance of medical knowledge, which makes it difficult for individuals to be always up to date. These three types of knowledge are part of the health-professional spectrum. Fourth, *administrative knowledge* usually depends strategically upon the managerial performance of the health organisation and requires a high level of both flexibility and firmness. Knowledge sources in health organisations usually exist in the form of documents, knowledge warehouses, applications, best practice and discussions (Bose, 2003), as summarised in Table 3.3.

**Table 3.3. Knowledge sources in healthcare administration**

| Documents | Knowledge Warehouses/Marts | Applications | Best Practices | Discussion |
|---|---|---|---|---|
| Patient admission; Billing & payment; Health administration; Medical research literature; Drug references | Patient record; Providers' clinical log; Medical procedures; Hospital operations | Knowledge mining & analysis –clinical, financial & administrative; Decision-support; Quality assurance | Procedure & care management; Disease diagnosis & test; Pharmacy, emergency & nursing practice; Claims processing | Cost reduction Efficiency and effectiveness Fraud & abuse prevention; Performance measurement; Coordination of care |

*Source: Bose, (2003).*

According to the KM-literature, an effective management of tacit and explicit resources should facilitate decision-making and problem solving. The heterogeneous qualities of knowledge, in addition to possible conflicts between managers and medical-professionals, indicates that if compared that of the private sector, the healthcare work environment is multifaceted and subject to different effects. Thus, KM in the NHS can be highly complex based on various interactions among various levels (personal, collective and organisational). As Nicolini *et al.*, (2008) and Meyer and Schroeder, (2009) argued, KM in the healthcare-setting can be similar to 'knitting thousands of strands of knotted wool' for the following reasons:

1) Data are often fragmented, and held across different settings.

2) Knowledge is held by a multiplicity of actors.

3) Knowledge is stored into all imaginable formats.

The Human Genome project is a good example of complex relationships and collaboration among many disciplines and functions, including more than 2,500 researchers and clinicians from international organisations (Nerlich *et al.*, 2002; Döring, 2005).

In the healthcare sector, knowledge is further fragmented by the so-called 'professions effect' (Walshe and Smith, 2016; Liljegren, 2012); the KT-process is mediated by professions and professionals, or *practices* and *practitioners*. However, the hierarchical frictions of the professions can play a double role in developing new medical/non-medical knowledge, either as enablers developing new medical knowledge, or as a barrier disseminating new medical knowledge (Ferlie *et al.*, 2005; Ferlie *et al.*, 2015; Ferlie *et al.*, 2012; Ferlie *et al.*, 2013; Currie and Lockett, 2011; Currie and Guah, 2007). For example, in the NHS according to Ferlie *et al.*, (2005), the boundaries between the professions have a strong effect on inhibiting the spread of medical innovations. Similarly, Currie and Suhomlinova, (2006) concluded that knowledge sharing was hampered by barriers both professional and institutional, with knowledge fragmented and diversified across the healthcare-system. Given the professional hierarchy (doctors over nurses, consultants over juniors) and barriers between professions in healthcare, it is often difficult to circulate knowledge from one unit to another (Dingwall, 1997; Tallis and Davis, 2013).

Moreover, the decision-making process in healthcare is often based on contextual and local conditions rather than on purely scientific evidence. Although tacit and explicit forms of knowledge are important, the tacit and local knowledge is more valuable than the explicit and centralised knowledge (Clarke *et al.*, 2007). For example, according to Clarke and Wilcockson, (2002), doctors are more likely to use their own knowledge in making a decision, rather than knowledge from a different context. Gabbay and le May, (2004), based on a two-year ethnographic study in the NHS, concluded that clinicians seldom depended on external sources of knowledge preferring internalised, collective and personal guidelines (or "mindlines" as termed by the authors). The mindlines are based

on the incremental history of practice development, occurring through interactions between leaders, doctors, patients and other direct stakeholders (Gabbay and le May, 2004; Chandler *et al.*, 2008; Wieringa and Greenhalgh, 2015). For all the above mentioned reasons, it is necessary to review the empirical studies conducted within the healthcare-context (specifically within the NHS) on the organisational and individual boundaries of the KT-practice.

professional practice among healthcare workers

## 3.4. Organisational Factors

The key factors of organisational practice are the organisational structure, culture, strategy, Human Resource Management (HRM) practices and IT, including interpersonal and team-based practices and individual backgrounds. The literature on organisational factors of healthcare is reviewed in the following sections.

### 3.4.1. Culture and Structure in the NHS

Organisational culture facilitates KT-practice throughout the NHS (Tasselli, 2015; Kümpers *et al.*, 2002; Chan *et al.*, 2016). Historically, medical practice has been the strongest organisational cultural influence (Weatherall, 2000; Pickstone and Butler, 1984; Wilson, 2011), shaping not only the NHS organisational culture, but also its regulatory structure (Klein, 2010; Gorsky, 2013). Nowadays, under the current processes of healthcare development and strategic transformation, the NHS culture has become complex and can no longer be reduced to be defined solely by medical practice. On the contrary, the current complexity results from the co-existence of multi-level heterogeneous activities along with the effects accrued by medical and non-medical stakeholders (Sweeney and Griffiths, 2002; Lipsitz, 2012). It is also influenced by the government at the macro-level. As such, the complexity of healthcare practices and processes configure and are reconfigured by the knowledge-circulation. In this context, understanding the differences between the medical and non-medical professions requires knowledge of the relational interactions between them. For example, the '*blame culture*' has become common practice in recent years, becoming increasingly difficult to ignore (Waring, 2005; Hignett *et al.*, 2016). On the one hand, the medical practice-based culture and medical services emphasise clinical independence, applying the '*blame culture*' to non-medical staff for overstepping their duties and exceeding their professional competence (Hignett *et al.*, 2016). On the other hand, policymakers see the medical staff as too demanding and less willing to share concerns and/or negotiate organisational possibilities to improve the effectiveness of healthcare (Waring, 2005).

It is, therefore, worthwhile to look back at the historical development of the NHS, to understand the role of the medical staff in shaping its organisational culture and regulatory structure. The NHS was based on a tripartite regulatory structure whose three branches are hospitals, local health service authorities, and primary care (see Figure 3.1). The first groups are consultants and hospital services

together, and the second one comprises GPs, opticians, dentists and pharmacists. The third group includes community services, such as maternity and child welfare clinics, health visitors, health education, vaccination and immunisation, and ambulance services all together with environmental services (Webster, 2002).
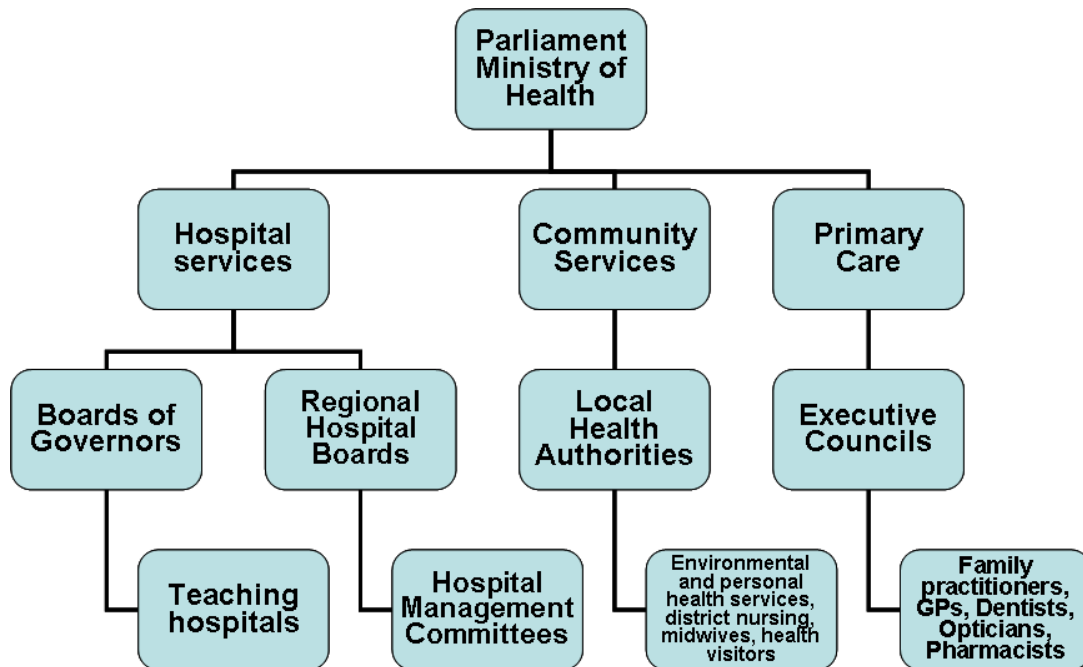


**Figure 3.1. The tripartite structure of the NHS,**

*Source: Webster, (2000, p. 23)*

This organisational regulatory structure was created as a set of 'silos', which initially failed to consider the importance of the interactions between health-professionals, which also inhibited the KT-practices across organisational and professional boundaries responding to the medical profession's needs and wants (Pickstone and Butler, 1984; Wilson, 2011; Tasselli, 2015; Hume *et al.*, 2014). This in turn had ultimately a powerful influence on healthcare policy. The monopolistic position of medical practices became the main reason for the lack of interaction within the NHS organisations (Scott, 2010; Moahi and Bwalya, 2017). In 2013, the Department of Health published an updated "infographic" (a graphic visual representation) in an attempt to simplify the complicated structure of the NHS, by illustrating how the new healthcare-system worked. Figure 3.2 indicates the statutory bodies that make up the NHS structure today (Department-of-Health, 2013). The illustration emphasises the patient-centred care policy and development processes, and highlights the coordination between national government, local government and the healthcare sector, with a focus on strategic development and improvement (e.g., Devolution, 44 STP Footprints, Digital Health).
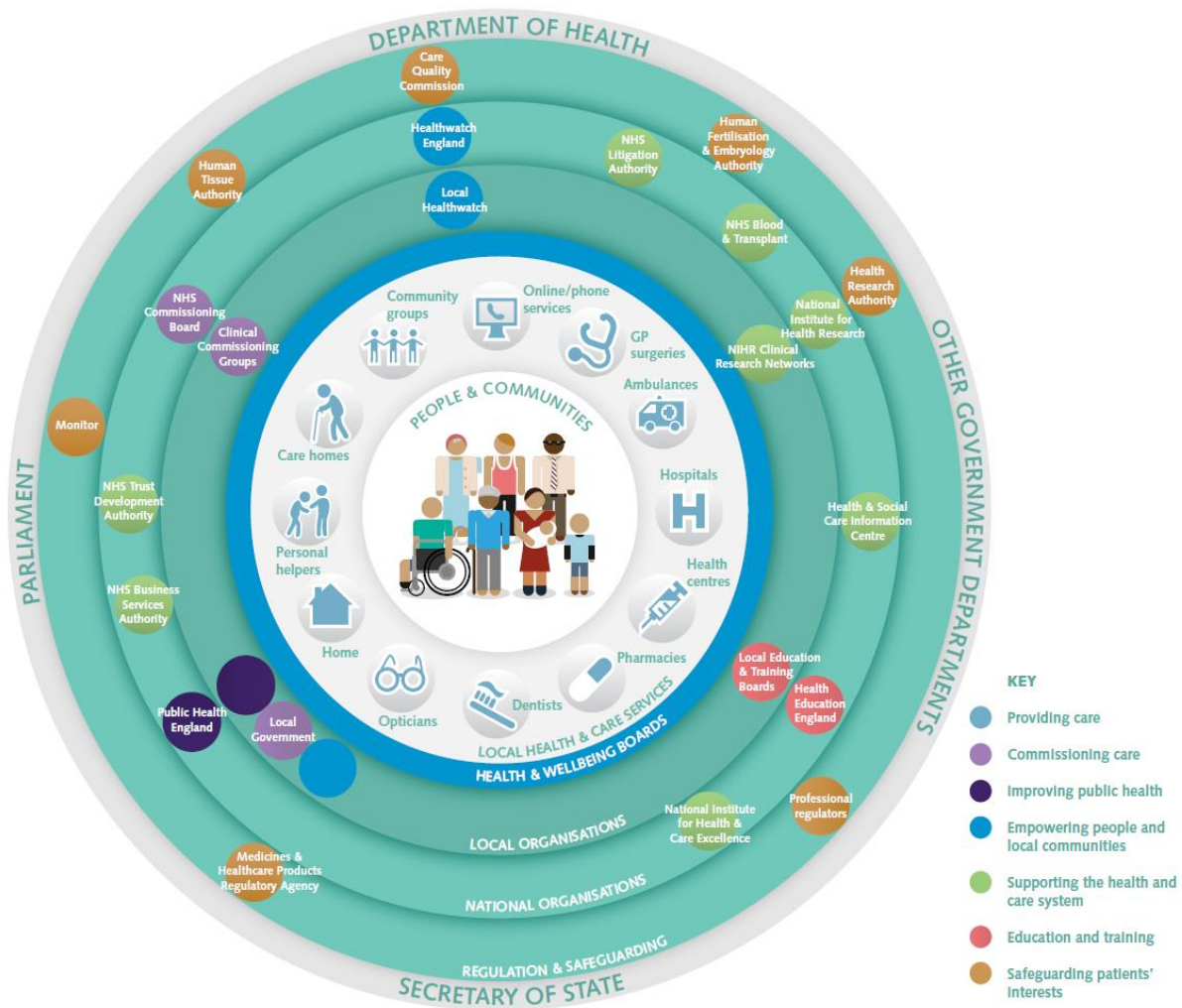
**Figure 3.2. The New NHS Focus and Structure**

*Source: Health and Care System, Department-of-Health, (2013, p22).*

The creation of the NHS was intended to replace the UK's traditional monopolistic professional position by embracing stakeholder heterogeneity from the very beginning, and allowing space to struggle against industrial competition (Hafferty and Light, 1995; Myburgh, 2014).

Medicine was often characterised as a profession filled with marginal men: drunken randy medical students, half-caste army and navy surgeons; impecunious Scots with dubious medical degrees in their kilts; and irreligious professors of anatomy who furtively purchased exhumed corpses from grave-robbers.… The line between the doctor and the shopkeeper, at least in the eyes of the lay public, was very thin indeed. Worsley (1997), p. 203, cited in (Williams, 2011).

The implementation of the NHS aimed to develop the medical profession by enabling doctors to use a variety of resources and to maintain clinical autonomy and control (King *et al.*, 2015; Currie *et al.*, 2009b). Aneurin Bevan (1948s) played a central role in introducing such a beneficial

proposition to the body of doctors. The NHS thence "stuffed their [health-professionals'] mouths with gold" as described by (Foot, 2011). In the early years of the NHS, the government was prone to let the doctors design the organisational culture and structure of this public service. The doctors started (or continued) to control most of the NHS institutions, becoming increasingly able to distance themselves from other professions, such as nursing (King and Horrocks, 2010). In the meantime, policymakers were managing issues such as finance, planning, employment and logistics, excluding doctors and medical practitioners from their tasks. Professional services were compartmentalised by specialisation, rather than by managerial boundaries, concerns and criteria. In other words, medical-professionals were considered at the apex of healthcare-professions; they were allowed to control other professions at both organisational and practical levels, monitoring the production and diffusion of organisational knowledge throughout the whole system of NHS (Bates *et al.*, 2015).

The medical profession indeed ended hegemonising most of the resources and decision-making in the NHS for almost all the second half of the twentieth century (e.g., commissioning "super" hospitals in the main cities of the country), (Klein, 2010). The Hospital Plan of 1962 collected empirical evidence that medical dominance was becoming less likely to influence policymaking (Armstrong, 1976). In fact, until early 1980s, the medical profession was influential and still in control of the NHS (King *et al.*, 2015; Currie and Lockett, 2011; Currie *et al.*, 2009b). However, the modernisation-agenda which came with reforms from the 1980s, was the main U-turn in the UK healthcare policy (Powell, 2003b; Pawson and Jacobs, 2010). Figure 3.3 illustrates how this agenda focused on four main principles and subsequent areas of activity.
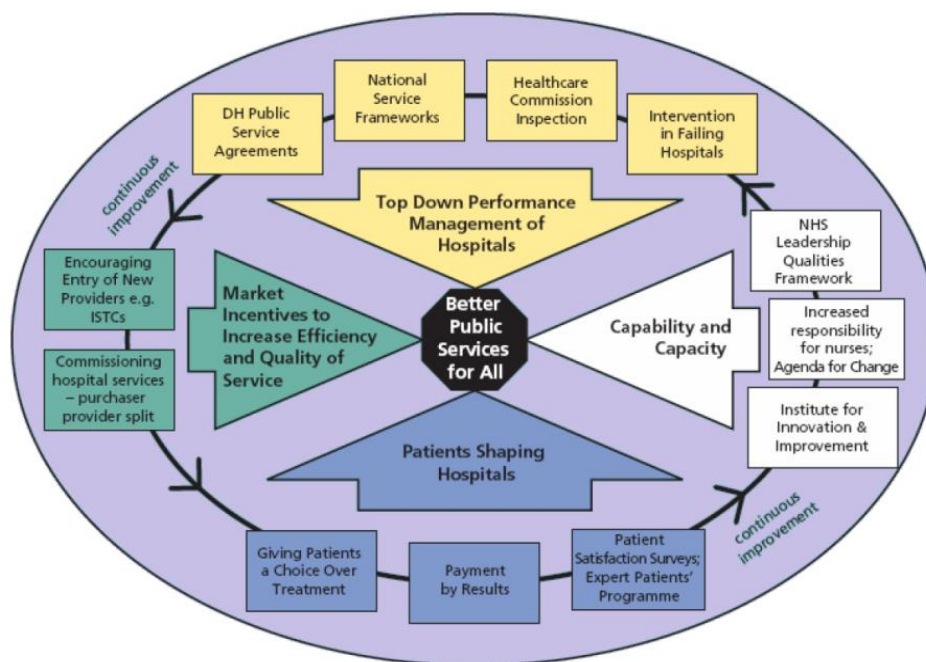


**Figure 3.3. The four principles of the modernisation-agenda for the NHS**

*Source: Cabinet-Office, (2006, p. 8)*

**61**

The government's reform agenda set out four key modernisation principles for the NHS (Department-of-Health, 2013):

1. Performance control and examination.
2. Decentralisation and freedom for front-line staff.
3. Resilient structures for staff and employment.
4. Expanding choice and diversity in public service provision.

According to Griffiths Report, policy reforms focused on a top-down flow that made the management structure of the NHS unable to deal with the day-to-day procedures (Enquiry and Griffiths, 1983). This report pointed to a paradigm shift in the NHS policymaking, and its main recommendations aimed to restructure the NHS in order to apply better accountability. As the Report put it:

> If Florence Nightingale were carrying her lamp through the corridors of the NHS today she would almost certainly be searching for the people in charge. (*Ibid*. p. 12.)

The Report' was mainly concerned with reducing management structures at all functional levels including the medical one. For example, the Griffiths Report recommended the introduction of the NHS Management Board and Managing Director, following a private-sector organisational strategy to employ consultants according to the number of hospital beds. Accordingly, the Managing Director would also be able to reduce the number and level of the staff involved in decision-making. The Griffiths Report suggested that managers could implement new organisational strategies without the supervision of the doctors, who were no longer considered to be in charge of the allocation of resources and the follow-up of policies. However, managers with the required skills and qualifications could be recruited from outside the NHS. With regard to building projects, the Griffiths Report was a result of consultation based on the business model of the food-chain supermarket Sainsbury's. The repercussions of the report were enormous in the healthcare sector, as it meant reorganising NHS resources and was followed by a stream of structural reforms aiming to change the balance of power.

In the mid-1990s, internal market theory based on competition was introduced to control the ever-growing NHS expenses (Turner *et al.*, 2002; Propper, 2012). Basically, this theory addresses two types of stakeholders (buyers and suppliers). Buyers are organisations such as GPs who refer patients to consultants. Suppliers are organisations that provide services ordered by buyers. For example, when referring patients the GPs are regarded by the internal market as knowledgeable customers, who can find services at the best value based on standard prices and their own skills. The internal market, which was designed to give more choice and autonomy to GPs in making health-related decisions, was expected to make more efficient use of resources and reduce the number of under-performing services (Propper *et al.*, 1998; Propper *et al.*, 2008). However, this policy was widely criticised. For example, the market mechanisms could not reduce the medical dominance in the NHS (Baggott, 2004;

Burke and Goddard, 1990; Hunter, 2016). The internal market policy focused on competition through extending healthcare agencies and introducing the private sector as market-based mechanisms (Powell, 2003b; Powell, 2003a). Policymakers and researchers, in response to empirical evidence, concluded that the internal market policy was not beneficial to the organisational performance of the NHS. For example, in the reform of 1997, the competition between healthcare providers was not considered healthy in terms of using NHS resources. Also, some GPs, representing buyers, were often influenced by their historical relationships with the providers (Bode *et al.*, 2014; Harrison and Wistow, 1992).

Subsequent policy changes shifted the focus to capacity and capability, by emphasising national standards which ought to be clear and transparent. For example, the 1997 Labour reforms delivered new programmes and institutions (e.g., the National Institute for Clinical Excellence (NICE) and National Service Frameworks (NSFs). The aim of these changes was to improve the knowledge capacity of the NHS through the codification of medical knowledge. Accordingly, the NHS would become accountable and articulate. The logic behind this reform was that documenting all the procedures and activities would make organisational knowledge more explicit and easy to transfer. NHS accountability developed further until it was an integral part of the change process to improve the healthcare performance (Dingwall, 1997; Tallis and Davis, 2013). The main focus of this reform was to create an environment where operational organisations could become "learning organisations" (Department-of-Health, 2013). In such a milieu, leadership would develop and flourish. The practical orientations towards the learning organisation and transformational leadership were responses to the main motivation behind this government reform (Health, 2002; Health, 2000). Ongoing regulatory modifications replaced the focus on competition with a collaborative paradigm to dissolve the boundaries between healthcare agencies (Propper, 2012; Propper *et al.*, 2008; Propper *et al.*, 2004). This orientation enhanced the fluidity of relationships between primary care and social care as well as between public and private sector organisations (Dusheiko, 2014).

Recent policy reforms have encouraged patient and NHS user involvement by giving them a "voice" in shaping the public service delivery through argumentative processes (Propper *et al.*, 2006; Buchanan *et al.*, 2005; Evans *et al.*, 2008). Additionally, after 2003, patients were given more choices in terms of accessibility and selection of healthcare services (Vahdat *et al.*, 2014). For example, patients can currently use a 24/7 NHS telephone line and NHS Choices website. Outpatient services and telephone assessment have become increasingly common in hospitals.

In summary, since the early 1980s, NHS practices have been reshaped by many factors, with the implementation of a more managerial culture, constantly moving in the direction of a market-based organisation (Klein, 2010; Powell, 2003b). The term "New Public Management" was introduced to describe the changes occurring *per se* in the new ethos of public management (Ferlie *et al.*, 2005). The history of the NHS has shown that private sector management practice can be applied

in the public sector (Antony *et al.*, 2016; Drennan *et al.*, 2014). Recently, the patient-centred care strategy has become the dominant structural direction. These reforms have affected both the cultural and structural dimensions of NHS organisational innovation.

First, the cultural dimension was strongly influenced by the modernisation reforms, which attempted to move decision-making from doctors to managers (Waring, 2005; Hignett *et al.*, 2016). This tendency was justified by a formulated rationale in financial terms. The main argument was that the new model demanded specialised managers to control financial costs, replacing the power culture of the medical-professionals (McNulty, 2002; Perri *et al.*, 2016). The popularisation of the aforementioned '*blame culture*' was another motive for the NHS reform (Waring, 2005; 2010).

Secondly, the structural dimension was subjected to reforms focusing on changing the organisational structure to respond to patient demands more effectively. These changes were needed because of the lack of incentives for healthcare suppliers to deliver the best service to patients (consumers). Therefore, the structural modifications were oriented towards the patients' needs, so-called "business customer orientation" (Ferlie *et al.,* 2005). These changes aimed to use resources effectively and to deliver a better quality service (Mueller *et al.*, 2008; Smith *et al.*, 2012; Smith *et al.*, 2008). In the first stage of the structural shift, the reforms recommended the introduction of competition among health services, despite the strong criticism based on the contradiction between the competitive strategy and the core value of the NHS. The new recommendations for reform rather focused on cooperation among healthcare providers in order to allow professionals to use resources from multiple healthcare organisations in the UK (Campling, 2014; Goddard *et al.*, 2004).

These directions were based on current organisational studies. The competition and cooperation strategies meant a new organisational structure, which made social and primary care work together under the same patient-centred umbrella. This new structure, aimed at using public resources effectively and efficiently (Currie and Lockett, 2011), and at overcoming the dominant medical practice-based culture, by implementing a managerial culture-oriented focus (Klein, 2010). Understanding the changes to the NHS structure and culture is central in analysing the roots of the KT constraints and barriers within the NHS environment. Concerning complexity, Peter Checkland, like other systems thinkers, believed that every change, development, solution or transformation would lead to new problems (Checkland, 1988; Checkland, 2000). In this regard, the reforms motivated a new culture, by which the NHS became a) more complicated, b) more concerned about business revenue, and c) more financially oriented.

Many empirical studies assessing the impact of structural reforms on the NHS, have found that the medical-professionals still have a dominant hold over healthcare staff (Wallenburg *et al.*, 2016; Klein, 2010). Moreover, the local context plays a more important role in structural innovation than the core values of the NHS (Noordegraaf, 2015). However, these reforms could not eliminate the

professional silos in the NHS (Powell, 2003b), nor facilitate the KT-practice or a better understanding of KT-processes regarding the medical profession and practices, which are still the driving forces behind structural and cultural changes in the NHS.

### 3.4.2. Leadership and Human Resource Management (HRM) Practices

The current complex reality of the NHS makes HRM practices and leadership in relation to the KT-practice highly dynamic and unpredictable (Gould *et al.*, 2007; Fitzgerald *et al.*, 2007; Ullah *et al.*, 2016; Currie and Lockett, 2011), although healthcare studies have found a strategic relationship between HRM practices, KT and the introduction of new projects. For example, when new projects are introduced the KT-practice can be positively or negatively affected by leadership and HRM practices (Saratun, 2016). The dynamics of the KT-practice also contributes to the implementation of new projects. In the healthcare-context, HRM practices and leadership style can play a significant role in facilitating KT through enhancing recruitment and retention policies, activating feedback mechanisms and performance appraisals, and introducing rewards and incentives (Currie and Lockett, 2011; Currie and Suhomlinova, 2006; Currie *et al.*, 2009b; Currie and Kerrin, 2003). In the professional context, HRM practices and leadership are considered as main external motivators through which professionals improve their communication regarding the transfer of knowledge; HRM supports KT through better employee engagement (Saratun, 2016). The absence or presence of trust plays a crucial role in mediating the relationship between the HR practices and knowledge mobilization (Pervaiz *et al.*, 2016), as summarised in following six practices: feedback mechanisms, performance appraisal, rewards and incentives, recruitment and retention policies, career development, and professional mobility and professional values and norms (see in detail in Appendix B.1).

Overall, despite recent reforms and changes, there remain significant barriers between, for example, the professions of medical doctors and nurses (Dowling *et al.*, 2013; Callaghan, 2008; Fitzgerald *et al.*, 2007). The role of HRM on the KT-practice, although central for the NHS in the introduction of new projects, has been largely overlooked in the literature. HRM practices and leadership style, nevertheless, can play a significant role in facilitating knowledge-circulation through enhancing recruitment and retention policies as well as activating feedback mechanisms and performance appraisals, rewards incentives and trust.

### 3.4.3. Interpersonal and Team-Based Factors in the NHS

In the context of the NHS, KM is facilitated by interpersonal and team-based experience (El Morr and Subercaze, 2010). More particularly, team characteristics, social networks and cultural processes, such as coordination and assistance mechanisms, are considered as important mediators of KT-processes (Rahman, 2013; Brusoni *et al.*, 2001; Marabelli and Newell, 2012; Sheng *et al.*, 2013). With regards to team characteristics, the KM-literature signals that employees have a greater tendency to share knowledge in cross-functional teams (Haidet *et al.*, 2014), although this proposition has not

been empirically supported for the NHS (Arnold and Boggs, 2015). In contrast, cross-functional teams or intra-professional relationships are often grounds for conflict (Wanzer *et al.*, 2009; Sanders and Harrison, 2008; Berlin, 2015). For example, doctors and nurses, who are seen as cross-functional teams, tend to build barriers that affect KT-processes negatively, as reported by medical sociologists (Xyrichis, 2014; Sanders and Harrison, 2008). Such findings are not supported by the KM studies cited above, possibly because these studies tend to apply an organisational perspective when examining the professional context of the NHS (Staniland, 2010; Davies *et al.*, 2016; Davies, 2003). From a different angle, many studies have found that nurses might have difficulty in having their work respected by doctors, a longstanding complaint (Budge *et al.*, 2003; Snelgrove and Hughes, 2000; Goodman and Clemow, 2010; Muller-Juge *et al.*, 2014). Thus, nurses usually have a wide range of strategies to legitimise their position while enhancing their professional work before medical specialisation. The most common strategies are 'nurses obey', role-playing games of "Yes, doctor," and "negotiated order" (see Appendix B.2).

Conceptually, the doctor-nurse game and negotiated order disclose additional dimensions of the everyday professional reality to better understand the KT-practice in the NHS-context. They reveal how social/interpersonal relationships affect the social life of the healthcare environment as much as the KT-practice does. For example, Finn and Waring, (2006), drawing on a hospital-based empirical study, found that the conflict of the negotiated order often constrains the KT-practice. Indeed, health-professionals, including —doctors and nurses in the operating theatre— usually do not share or transfer knowledge as expected by the NHS organisational goals because these goals often conflict with professional objectives (Finn and Waring, 2006).

In addition to the doctor-nurse game and negotiated order, other theories from the social sciences reveal further dimensions of the longstanding conflictive doctor-nurse relationship. For example, Sullivan *et al*., (2008) drawing on a particular vision of Marxism, claimed that any relationship can be analysed on the basis of social class exemplified by the reluctance of doctors to welcome nurses' contributions or recommendations (Vibe Fersum *et al.*, 2013; Sullivan *et al.*, 2008). In particular, the value of nurses' knowledge is usually underestimated by doctors because nurses do not share the *socio-economic* status of doctors (Sullivan *et al.*, 2008). Moreover, according to feminist studies, gender differences between nurses and doctors underlie this recurrent conflict, where the nurses' role as handmaidens was determined by the medical profession (Marshall 2013; Goldman *et al.,* 2016). Another feminist view considers the habitual perception of the relationship between doctors and nurses as a husband/wife household problem. Wives are often responsible for the household chores; whereas men are more accountable for the family affairs (Marshall, 2013). Leitão, (2015) also emphasizes the effect of the gender perspective on the interrelationship of professionals. In these approaches, the doctor-nurse interpersonal relationship has deep roots beyond the context of

the healthcare organisation. These studies not only provide information about the doctor-nurse relationship, its pros and cons, affecting the social life of the organisation, but also they shed light on the central role of interpersonal relationships in the discussion of KT in the NHS. This study discusses these issues in relation with the KT-practice into the following three points.

First, KT is seriously affected by the professional hierarchy, exemplified by the doctor-nurse interpersonal relationship. Ferlie *et al.*, (2013) found through empirical study of inter-professional networks that nurses hardly ever try to question orders from doctors, unless such orders had life-threatening consequences for the patient. According to their study, this lack of questioning was due to their own clinical responsibility and their loyalty to the medical profession. In a different study, Geist and Hardesty, (2014) claimed that doctors' orders could be disputed, if nurses were more familiar with a drug and/or if they could interact freely with their peers; otherwise, nurses were more likely to follow the instructions given by doctors (Geist and Hardesty, 2014).

Second, the KT-practice is dependent on the contextual dimension of the healthcare practice. For example, Mitchell and Flin, (2008) showed, through reviewing the literature about the non-technical skills of nurses, that the role of the nurse had become more central to clinical decision-making. The empowerment of the nurse's position is due to three main conditions. First, when the number of patient admissions becomes overwhelming, physicians depend on nurses' support to prevent chaos. Second, when there is a high workload, the medical staff creates new opportunities for nurses to help at the centre of intensive care units. In this way doctors try to distribute attention and care in the healthcare-setting, while aligning the nurses' role with their view of the medical practice. Third, when the patient is from a different country, nurses can relatively be the key support for both patients and doctors. However, nurses have focal tasks of care-delivery and treatment only when they work in specific contexts (Carmel, 2006). The rule of nurses is crucial when the patients need to move between different specialities, because the nurses will become the source of knowledge about the patients. Recently, this result was supported by Currie *et al.*, (2015) when they studied the role of the 'hybrid manager' and 'knowledge broker' across professions. The authors found that nurses were usually in a very powerful position in their teamwork relationship with doctors inside intensive care units. To sum up, specific contexts have greater potential for nurses to state their professional views and individual judgements (i.e., to provide contribution). Wherever nurses are granted authorisation, KT can work in both directions, fostering greater collaboration between doctors and nurses.

Third, the doctor-nurse interpersonal relationship can have a strong impact within KT-practice. Based on several studies, there are four main types in this regard (Price *et al.*, 2014; Price, 2009; Callaghan, 2008):

- The role of the nurse is both to support the medical doctor and to provide a happy and hygienic atmosphere. This view regards no problem in the rather subordination of nurses to doctors (Price *et al.*, 2014),
- Decision-making can be informally reversed by nurses when the nurses have knowledge and the other medical staff want to avoid any disagreement. Nevertheless, the nurses effectively remain subordinate to the doctors (Price, 2009; Callaghan, 2008),
- Doctors and nurses negotiate the decision-making process informally and overtly (Price *et al.*, 2014),
- There is another overt formal decision-making process when nurses can make medical decisions. For example, the creation of an 'advanced nurse practitioner' role can be viewed as an attempt to shift the power between doctors and nurses (Callaghan, 2008).

In all, interpersonal and team-based experiences and factors in the NHS are strongly affected by the doctor-nurse relationship (Callaghan, 2008). In this context, the KT-practice is dependent on the interrelation and/or interaction between these two professions.

### 3.4.4. Individual Professional Factors in the NHS: Boundaries to Knowledge Transfer

This section deals with the role of professionals in shaping their careers and organisational factors. The professional factors are central to the KM framework in the context of the NHS. According to Ferlie *et al.*, professions and professionals have a strong effect on KT, facilitating or inhibiting the dissemination of knowledge in healthcare organisations (Ferlie *et al.*, 2013; Ferlie *et al.*, 2005; Marsick *et al.*, 2014). Thus, the impact of professions and professionals should not to be neglected, particularly in the NHS-context (Marsick *et al.*, 2014).

According to Fitzgerald and Harvey, (2015), Knowledge dissemination can be facilitated in healthcare-settings when:

- It is being used in diagnosis.
- It is available to support previous tasks.
- It is admitted as a professional competence.
- It allows members of a profession to differentiate themselves from other occupations.
- There are clear career motivations for using it.

It would seem obvious that specific knowledge is disseminated as an embedded process in the diagnosis and treatment of patients (Olsson and Aronsson, 2015; Robinson and Dearmon, 2013). However, this is not always the case because if it is considered irrelevant, it will continue to be neglected by professional members. Thus, medical knowledge, in the context of the NHS, is more likely to be disseminated than administrative or other types of knowledge, and such type of knowledge is used routinely because it serves practitioners' interests (Ballard and Elston, 2005;

McHugh, 2016; Dingwall, 2008). Moreover, particular knowledge or skills may become shareable and used when they are academically documented; that is when they offer research-based evidence. As discussed earlier, the process of knowledge articulation at an academic level becomes an important resource for those seeking an advantage over their peers (Freidson, 1988; Giddens, 2013). In the nursing context, the creation of new roles, such as assistant practitioners and healthcare assistants, has caused this profession to be redefined in academic terms. Dingwall and Allen, (2001), for example, found that nurses often try to differentiate themselves from healthcare assistants or assistant practitioners by way of emphasising *nursing* values or by articulating specialised medical knowledge.

From a different point of view, some studies show that knowledge dissemination can be strongly affected by professional associations at the national level, which give more accreditation to disseminated knowledge (Ferlie *et al.*, 2005; Ferlie *et al.*, 2013; Ferlie *et al.*, 2015). In fact, the professional associations play a crucial role in injecting and disseminating new sets of knowledge by sponsoring the new ideas or overcoming doubts. Usually health-professionals disseminate specific knowledge when they want to differentiate themselves from other occupations. The heterogeneity of the healthcare-context motivates the medical professions to seek autonomy, or demarcation (Snelgrove and Hughes, 2000; De, 2014). For example, Operating Department Practitioners (ODPs) create intra-professional competition against the nursing profession *and also* other medical professions when they intervene in specific healthcare activities (Witz, 2013). In turn, nurses apply "atrocity stories" as a power-game mechanism in order to differentiate their occupations from those of other ODPs (Timmons and Tanner, 2004; Gillespie *et al.*, 2010).

Similarly, patient differentiation can be considered as a professional factor in KT. Collectively, since various professions operate within the NHS, these factors have an impact on the KT-practice (Powell, 2003b; Currie *et al.*, 2015). Consequently, the hierarchy created by the boundaries between professionals is likely to be found in healthcare-contexts (e.g., junior doctors, registrars and consultants) (Powell, 2003b; Currie *et al.*, 2015; Currie and Lockett, 2011). Although the dissemination of knowledge is meant to help different health actors, it is strongly affected by their professional activities and the professional bodies. Indeed, these bodies play a central role in shaping and influencing organisational practices, while KT methods may be changed by the existence of professional boundaries (King *et al.,* 2015; Currie *et al.,* 2009). Empirical evidence suggests that professions also play a significant role in organisations' KM and even in professional context (Empson, 2001; Davies *et al.*, 2016). Therefore, in the NHS, KM and KT-practice will always be dependent on the dynamic relationship between the professions and other occupations.

## 3.5. Key Aspects of Studying KT-Practice in the Professionalized Healthcare-context

A situated study in the healthcare-context can facilitate access to key characteristics of the knowledge that is produced in everyday practice. It can also offer sound evidence in understanding the KT-practice alongside inter-professional boundaries in the healthcare community. The term "boundary" can be defined as a socio-cultural aspect that causes discontinuity in communication among or between relevant actors (Akkerman and Bakker, 2011; Markauskaite and Goodyear, 2014). Several studies in the healthcare-context acknowledge that managing knowledge and transferring it across boundaries are the key to improving organisational learning and innovation (e.g., Marabelli *et al*., 2017; Akkerman and Bakker, 2011; Markauskaite and Goodyear, 2014). These studies argue, in general, that the KT-practice in professional healthcare is problematic and requires integration of the abilities and perceptions of various groups from different professions and disciplines (Charani *et al*., 2013; Arora and Sevdalis, 2010; Siedlok and Hibbert, 2014). The main problem arises because the different professions have essential differences in perspective, methodological approach and even vocabulary/terminology (Siedlok and Hibbert, 2014). Pentland *et al.*, (2011) point out that empirical research into the KT-practice and sharing in healthcare is limited and needs further investigation. Further analysis and evaluation regarding these characteristics may benefit the practical application of KT in healthcare (Pentland *et al.*, 2014; Charani *et al.*, 2013). The tables in the Appendix A.1 summarises the key reviewed studies regarding the KT-practice and healthcare.

The cited studies reveal that several organisational factors are necessary prerequisites for all the activities of the KT-practice. Here, the organisation needs to ensure the availability of sufficient resources in finance, time, human capital and technology (Siron *et al.*, 2015; Sheng *et al.*, 2013; Mitton *et al.*, 2007; Ward *et al.*, 2009; Harrington *et al.*, 2008; McWilliam *et al.*, 2008) Sheng *et al.,* 2013;Mitton *et al.,* 2007;Ward *et al.,* 2009; Harrington *et al*., 2008; McWilliam *et al*., 2008), and should offer an open, trustworthy working environment that is beneficial to the promotion of the KT-practice (Mitton *et al.,* 2007; Bowen and Martens, 2005). It is important to note that different definitions of the KT-practice share a common theme that is to communicate knowledge to relevant stakeholders through a variety of methods. Three aspects of knowledge are related to the value of the KT-practice (Pentland, 2011; 2014): relevance, accessibility plus to format and method. Successful KT-practice does not mean, however, that every member of an organisation should know everything, nor does it mean that the health-professional communities are not involved in the process. Otherwise, this would result in inefficient KT and loss of knowledge. Therefore, the healthcare organisation needs to ensure certain relational fluidity in order to engage the different stakeholders in KT. In other words, the transferring knowledge requires a suitable method of circulation in order to reach relevant stakeholders and to improve the quality of care-delivery (Siron *et al.*, 2015; Sheng *et al.*, 2013).

Accessibility of KT has two requirements: easy access to knowledge and timely delivery. Both may directly influence the results of healthcare decision-making as the dynamics of knowledge is continuously affected by methods, tools, stakeholders, events and environment. As such, the format in which knowledge is expressed or presented may directly affect its perceived value. By the same token, the methods used to deliver specialised knowledge to relevant stakeholders may influence the possibility of reconfiguring real work practices (Pentland *et al.*, 2014; Pentland *et al.*, 2011). Both flexible informal sharing and specialised formats for KT should be offered, though, to satisfy different people's preferences and demands. Some studies point out that the KT-practice may be tailored concerning the format and method to appeal to specific people's circumstances and needs (Conklin and Stolee, 2008; McKellar *et al.*, 2014).

Furthermore, Conklin and Stolee, (2008) concluded that networks play an important role in communication. The communication infrastructure should be optimised to timely and effectively allows for information accessibility. In such a context, communication and interaction tools are to be constantly arranged by the relational linkages of the healthcare social structure. Of course, the communication arrangement should provide a dynamic framework in which individuals can create, retain and KT (Argote, 2012; Nonaka, 1994; McKellar *et al*., 2014). In this regard, Harvey, (2012) discussed that health-professionals operate in the tacit KT-process via face-to-face interaction. He also emphasised the need for a case-by-case people-based approach in order to enable tacit knowledge to become originative and proactive. The main communication tools in the tacit KT-process are spoken language or verbal communication, and body language or non-verbal communication. Gibson *et al.*, (1994) stated that "The connection has been seen as either that early language contributed materiality to the emergence of human tool-using and tool-making, or that language was one of the outcomes of more advanced tool making and tool-using in early hominids" (p. 20).

## 3.6. Key Aspects of Studying Information technology and Professionalized Healthcare-context

Healthcare literature shows that several terms such as Health Information Technology, Health Information System and Electronic Patient Record, have been used interchangeably to represent computerised information systems (Faggioni et al., 2011; Kuhn & Giuse, 2001; Kuziemsky & Varpio, 2011). Many studies used the NPfIT as a standard example to cover the argument around the information technology and healthcare practice (Clegg, 2008; Greenhalgh, et al., 2008; Eason, 2009). NPfIT shows that proposing a standard approach has caused a big failure because of ignoring antecedent processes and practices for previous implementation. Thus, exploring socio-technical analysis alongside the practice was suggested to understand the contextual dimensions the healthcare practice (Clegg et al., 2010; de Lusignan & Aarts, 2008; Eason, 2010).

This research calls for a more comprehensive approach in understanding KT practice and workflow to include both the medical and non-medical practices, which are being supported by EPR implementation in a way or another. The NPfIT provides an opportunity to examine processes and practices that are part of healthcare workflow. The NPfIT costs remain, nevertheless, uncertain and the benefits can be unsatisfactory (Department of Health, 2013). Although some parts of the programme were delivered on time successfully (e.g. PACS and N3) (Eason, 2009; Robertson et al., 2010), other main systems (such as Care Record Service) faced severe difficulties (Eason, 2010). In this regard, Ken Eason (2009, 2010) had discussed many issues about EPR implementation, starting with individual users and moving on to organisational and national intersections. On the individual level, some issues emerged, such as data inputs and accessibility along with exclusion of data by health professionals and non-professionals (Eason, 2009, 2010; Robertson et al., 2010). On the organisational level, however, many structural, social and technical issues that can evolve as organisation changes were covered.

It has been argued that one-size-fits-all solutions can result in healthcare professionals having to face unintended consequences or complexities in using the technology and to adapt to new ways of practicing (Abraham et al., 2009; Eason, 2010). Furthermore, Eason's studies (2007, 2009, and 2010) show the effectiveness of socio-technical analysis to be of great aid in figuring out the reasons of the NPfIT failures, such as the one-size-cannot-fit-all matter; the solutions should be not only technical but also social, and the implementation should use evolutionary approaches rather than 'big bang' approach. Focusing on the technical and managerial views reduces volume of work required for the EPR configuration to be done in order to meet local needs (Eason, 2010); this is because introduction of a new EPR system is not a simple 'plug and play' process.

This study argues that KT practice is not just unique to the individual Trusts, but also can also be very versatile, exception-filled and variable. KT practice is configured on a day-to-day basis; hence using the tools of technology needs to be monitored for a certain period of time to ensure an integration between the practice and artefact. Also, a fully adapted system requires KT process to be reflected on the system from its operators' view (Park et al., 2015). Failure to do so could result in workarounds which can have negative effects on patient safety and in technology adoption.

## 3.7. Critiques of KM and the Consequently Research Gaps

After introducing the main themes of KM-literature and empirical evidence for KM theory and functions, the current state of the art is reviewed. The KT-practice is located at the core of the OL and KM. The KT-practice requires looking at the stakeholders and the implementation projects on the basis of a multiple-perspective analysis. The literature review of KT-studies also

reveals the lack of systematic analyses that detect key research themes, stakeholders, champions, and methodologies. This section reflects on overlooked issues in the KM-literature in order to identify and elaborate gaps in the present research.

### 3.7.1   Overlooked Issues in the KM Literature

After reviewing KM-literature in healthcare, this study recognises critical differences between organisational, professional, and technical perspectives in many issues, such as the ways of perceiving the information system (Boyce *et al.*, 2014), the professional autonomy and control (Budge *et al.*, 2003), hybrid management and organisational configuration (Correia and Denis, 2016), and the managerial knowledge and Embedding Professional Knowledge (Cranefield and Yoong, 2009). In addition, the literature reveals complex issues of social networks within the interprofessional level of KT-practice analysis (Tasselli, 2015; Xyrichis, 2014). These studies attribute many of these issues to the lack of a balanced position between the management and the professional practice in such a context. Specialists and non-specialists may find the KM-literature confusing, possibly because most academic works do not clarify as much as they seek to satisfy the underlying economic motives of organisations (Fuller, 2001); a high percentage of what is written is justified on the basis of meeting financial objectives. However, Foss *et al.,* (2010) have empirically shown that the aim of delivering effective KM strategies and the aim of improving organisational (economic) performance are not strongly connected. At present, organisational boundaries are very difficult or nearly impossible to overcome within the institutional environment. Some empirical studies have reported that a non-hierarchical organisational structure generates as many problems as solutions in the course of KT because individuals are not necessarily motivated or equipped with the resources and skills to share knowledge. Nevertheless, KM is generally approached optimistically, as if it were a panacea (Gourlay, 2006; Spender, 2015). But, the reality of healthcare is way far more complex, multi-scalar and contingent on myriad stakeholders, conditions and events.

The promises of KM are still more theoretical than practical in the healthcare-context, where most KM applications deflate along the way of well-intended initiatives or proposals. Thus, the little empirical material supporting and contrasting the KM promises can be problematic, raising concerns which can be summarised in the following two points. First, the dynamics of knowledge makes the issue of generalisability of current KM models very difficult to prove empirically. For example, the literature shows that the fundamental issues, at the core of KM theory (i.e., what is knowledge? How can we manage knowledge? What is the best approach to designing KM initiatives?), are still vague and not in agreement. Second, an idealistic view is dominant in the KM-literature, whereas a more realistic, situated approach is needed. Concurrently, more scholarly attention should be paid to the minor processes and/or practices of KM in the making. This is the case in applying KT-practice, which has many time-consuming and

challenging boundaries, such as personal motivation, structure and organisational culture (Carlile, 2004). Carlile, (2004) classifies the relationship between the characteristics of knowledge, and professional boundaries in order to understand the circulation of knowledge across disciplines. He identified three properties of knowledge generated through practice (difference [in terms of size and context], dependency [in terms of achieving specific goals], and novelty [in terms of developing new knowledge]). Hence, these characteristics of knowledge create three practical boundaries among professionals: syntactic, semantic and pragmatic (Ribeiro Soriano *et al.*, 2012).

Moreover, past and present organisational practices may conflict with each other. For example, new HRM policies can be applied to facilitate KT-practice, but they may conflict with the existing institutional cultures or structures (DiMaggio, 1982; Frank *et al.*, 2015; Hernandez, 2009). Thus, conflicts may arise from the kind of improvement required by the organisation, seen by employees as threats to their current roles or careers. Conflict may increase resistance to improving the professional environment for the sake of accelerating KT. Current research on the KT-practice mostly deals with the possibility and probability of enacting KM processes and practices in organisational science. Foss *et al.*, (2010) has argued that KM theory in healthcare organisations has not moved beyond theoretical assumptions and macro-level analyses. It has not yet invested much energy in conducting empirical studies, especially in relation to professional contexts (Foss *et al.*, 2010). As such, the KM-literature exhibits several pronounced research gaps, which will be described in the following section.

### 3.7.2   Research Gaps

This section explains the research gaps identified in the review of KM-literature regarding situated-practice research in the healthcare environment. For example, there is a lack of empirical studies exploring the dimensions and practice of KT in a professional context. In response to these gaps, the current research proposed the subsequent research questions, to be explored in the NHS. The gaps have become the essential motivation for conducting research in this field.

Firstly, the current KM-literature focuses on macro-level of analysis, which is top-down and not beyond the theoretical level of analysis. More specifically, the KM studies are usually conducted around organisational factors or processes of KM initiatives. However, the KT-practice and activities are located at the micro level, requiring multi-dimensional analysis including organisational, technical and personal factors. Healthcare lacks empirical evidence of KM applications at the micro level of practice. Therefore, the KT-process could help us to understand the KM initiatives in the complex context of healthcare. This can be justified by two grounds. First, researchers at the practical level seem to be more interested in the bottom-up organisational factors leading to the application of KM strategy and the KT-process than they are in personal, technical and organisational factors at multi-dimensional levels (both bottom-up and top-down).

Second, the main organisational theories in the KM-literature (e.g., Absorptive Capacity, Dynamic Capability, Organisational Learning, Resource-Based View, and Knowledge-Based View) regard the healthcare organisation as a single unit. In other words, multi-dimensional factors could be relevant to the theory of interest to sociologists, career theorists and psychologists as much as to organisation research theorists (Foss *et al.*, 2010), and organisation strategy theorists (Degafu 2016; Tasselli 2015).

Secondly, KM studies require multi-level analysis of practice. Individual and organisational levels of complexity should be investigated in order to provide a more comprehensive picture (Wang and Noe, 2010; McIver *et al.*, 2016). Likewise, tangible rewards are seen by some to have a negative effect on the course of the KT-practice, since they can affect individual behaviour [(Osterloh and Frey, 2000; Brandes *et al.*, 2016), while others believe that tangible rewards may have a positive effect on KS behaviour (e.g., Franco *et al.*, (2015), Harvey, (2012) and Michailova and Husted, (2003)]. Further KM study should focus on examining how tangible and intangible rewards contribute to KS behaviour within professional contexts.

Looking at the structure of healthcare organisations, Michailova and Husted, (2003) and Franco *et al.*, (2015) found that a more rigid organisational structure and more penalties for not sharing knowledge might be helpful in facilitating KT (e.g., in Russian corporations). This finding entailed a shift in KM research in terms of exploring the effects of flexible versus rigid organisational structures. In this regard, many studies highlight the importance of adopting a network-based structure to assist KT, regarding the accountability of the organisational complexities of the context (e.g., Rahman 2013; Brusoni *et al.,* 2001; Marabelli and Newell 2012; Sheng *et al.,* 2013). Therefore, HRM practices which are centred in individual participation facilitate KT-practice. Such results are generated from the integration of the preceding HRM practice and professional practices in a new arrangement of KT (Currie and Lockett, 2011; Currie *et al.*, 2009b; Currie and Suhomlinova, 2006; Currie and Kerrin, 2003). Accordingly, this study, as will be detailed in Chapter 4, suggests that multi-level analyses can be more valuable in order to understand organisational contexts in relation to KT in professional contexts.

Thirdly, the KM-literature shows a strong relationship between contemporary HRM strategies and facilitating KM processes. However, according to many studies, there is a considerable gap in the current understanding of this relationship, which needs to be filled by further empirical research (e.g., Inkpen and Tsang, (2005); Martínez-Cañas and Ruiz-Palomino, (2010)). For example, the relationship between HRM practices and the KT-practice is still under-articulated. This issue needs to be clarified in relation to the context in which KT takes place. Additionally, there are volumes of HRM practices to be studied and integrated into organisation in order to facilitate KT. For example, professional contexts seem to be fruitful in understanding

the impact of implementing new KT policies. In such contexts, it is necessary to understand the role of HRM practices (e.g., training, education, etc.) in the KT-practice.

Fourthly, KM studies tend to focus on industrial organisations, especially in the US. Further study of other contexts, such as healthcare, can provide a different epistemological intensity in the pursuit of the KT-practice. As previously mentioned, the findings of Michailova and Husted, (2003) and Foss *et al.*, (2010) encourage more contextual approaches to KT than the industry-oriented KM approaches. Their studies contests the common agreement around the main streams that configure KM studies, triggering a new inquiry into the degree of autonomy required to facilitate KT. Such a move implies a deeper understanding of the contingency of KM approaches in other-than-industrial professional contexts.

Fifthly, professional contexts can contribute enormously to advancing the body of KM research. In the healthcare environment, this is clearly due to a higher degree of tacitness than in industry-based contexts. More specifically, KM and the KT-practice have won little interest in this direction within such contexts (Foss *et al.*, 2010). This point represents the main motivator behind the present qualitative-research project. The aim of my research is, therefore, to investigate in greater depth the tacit features of multi-stakeholders' KM, which is central to healthcare. To better explore and clarify the research gaps in the KM-literature, my research will follow the practice of professionals with regard to KM at crossroads with social studies.

### 3.7.3   Current Research Gap

As the professional context is distinguished by complex and multi-faceted issues, knowledge-circulation requires an understanding of the different perspectives of fragmentation of knowledge in order to develop more accommodating answers. Wang and Noe claimed that "knowledge transfer involves both the sharing of knowledge by the knowledge source and the acquisition and application of knowledge by the recipient," Wang and Noe, (2010) (p. 117). The process of knowledge application has been identified as the core of KT, because it requires the actors to assimilate the new available knowledge in order to create and harvest value, for example by using novel technologies or new techniques to enhance performance (Cohen and Levinthal, 1990; Alavi and Leidner, 2001; Alavi *et al.*, 2005). Put differently, knowledge assimilation requires a suitable level of absorptive capacity on the recipient's side. Thus, the KT-practice, in opposition of the AC, can be better understood through mutual interactions and exchanges in a specific context than through a generic source-recipient model (Yang and He, 2014; Argote and Hora, 2017; Argote and Miron-Spektor, 2011). However, most studies on the subject pertain to the latter putting forward a mathematical theory of communication (e.g.. Shannon and Weaver, 1949, as cited in Szulanski *et al.*, (2004)). Accordingly, KT still lacks comprehensive understanding through the social and technical aspects of practice (Liyanage *et al.*, 2009). There is a tendency in the literature to explore KT through understanding the

characteristics of knowledge, such as tacitness and stickiness, linking KT and the level of codification in order to enhance the learning cycle (Inkpen and Tsang, 2005; Kogut and Zander, 1996; Kogut and Zander, 1992; Szulanski, 1996). Nonetheless, the importance of tacit quality in understanding the KT-practice in the healthcare sector cannot be overstated (Williams, 2011b; Moahi and Bwalya, 2017).

Moahi and Bwalya, (2017); Robert *et al.*, (2009) recognise that most KM-literature has focused on challenges and opportunities in the private sector. They argue that the public health sector offers more opportunities for reflection of KT through studying multiple perspectives at all levels. There is thus a significant gap in terms of KT approaches designed for the public sector (Massaro *et al.*, 2015), and even more so for the healthcare sector (Zigan *et al.*, 2010). In order to convey the reality that includes of the diversity of the healthcare actors and socio-technical aspects, a multifaceted approach is taken into account. In this regard, the present research explores how these actors and aspects interplay by way of a methodological design that renders the complexity of this professionalised-context, through conducting a multiple-perspective analysis of a qualitative case-study in a specific Trust of the NHS. The multiple-perspective approach includes the managerial perspective, the health-professional perspective and the technical perspective.

KT-practice is seen as a key to developing the status of KM and learning organisations (Easterby-Smith and Lyles, 2011; Argote, 2012; Senge, 1990), and it has been given much attention in relationship to strategic studies and leadership. In other words, leaders' interest in KT-practice has grown significantly in recent years (Smith and Smith, 2005; Mc Manus *et al.*, 2016). In practice, KT-studies cover many challenging methods and techniques, including mentoring, videotaping, storytelling, training, education, and CoP (Pentland *et al.*, 2011; Pentland *et al.*, 2014).

Face-to-face KT is one aspect associated regularly with successful practice (Brown and Duguid, 2001; Duguid, 2005a; Duguid, 2005b) because it depends on dynamic processes of the KT-practice (Tsoukas, 2009). The interactions that are structured through social interactions offer a framework in which employees can generate, disseminate, capture and assimilate knowledge (Argote, 2012; Canestrino and Magliocca, 2016). Here, KT practitioners usually emphasise the need for a dynamic, human-based approach, based on face-to-face interaction (Harvey, 2012). How this can be achieved is one of the goals pursued in my current research, briefly described below.

To sum up, I initiated my study, mindful of the need to understand how crafty knowledge is circulated within and across the healthcare-context, how KT can be analysed in this context, and how stakeholders affect the KT. Drawing on the gaps identified in the pertinent literature (Chapters 2 and 3), my study aims at contributing to the fields of KM and KT-practice by addressing a transversal interrogation, as follows: "*How do different actors perceive and conduct the knowledge transfer practice, from different managerial, technical and professional perspectives?*"

This research-inquiry was broken down into the following questions:

1. How do healthcare actors practice knowledge transfer?

    1.1.  How are the relevant methods of the KT investigated in the healthcare-context?

    1.2.  How are the KT actors identified in the research process?

    1.3.  What is the relationship among actors, methods and contexts?

2. What are the issues that affect the approaches in the KT-practice?

    2.1.  Which issues affect in particular the KT-practice in the BP-Trust healthcare-context?

    2.2.  What is the role of the EPR as a technology in facilitating the KT-practice?

## 3.8.  Conclusion

This chapter reviewed the literature to identify the research gaps and research questions related to KM and KT in the field of healthcare. The first theme was an investigation of the main features of healthcare-settings, including their complexity, knowledge base, uncertainty and massive data. The second theme explored the question of knowledge in healthcare-settings by reviewing the multi-dimensionality of the transferrable knowledge. The third theme contained many sub-themes, including organisational factors, culture and structure in the NHS, leadership and HRM, interpersonal and team-based factors, and individual professional factors in the NHS, resulting in boundaries to KT. The fourth theme explored key aspects of studying KT-practice in a health-professional context. These themes were followed by identification of the research gaps, and the formulation of the research questions for this study.

This chapter concentrated on KT as the main topic and healthcare as the context. In the next chapter, I will develop a theoretical framework in order to identify the main themes of the data collected through the fieldwork.

# Chapter 4: Theoretical Framework

## 4.1. Introduction

Since healthcare faces continuing uncertainty in how to study the emergent relationship among expertise, communication technologies and the social context, the KM-literature shows the need for a sophisticated understanding of the dynamics of KT-in-practice (Foss *et al.*, 2010; Ferlie *et al.*, 2012). This endeavour requires replacing the simplistic and reductionist perspectives upon the relationships among humans, communication and technology, with a dynamic perspective within a specific professionalised-context. These issues increasingly motivate researchers to focus on knowledge-circulation through studying the relational fabric among the contextual practice, IT (in this case EPR), organisational structures, and purposeful social actions (Orlikowski and Scott, 2008; Orlikowski, 2005). As recent research is still overlooking that the 'connectionist' view of KT-practice is inherently socio-technical, the relational interactions amongst its elements remain largely unexplored (Postma, 2009; Sawyer and Tyworth, 2006; Obreja *et al.*, 2017). Thus, this study aims to build an enriched transdisciplinary-approach to KT-practice by adopting a multiple-perspective stance to integrate the Technical (T) potentiality, the Organisational (O) possibility and People's (P) intentionality into one model termed as TOP (Singh and Wood-Harper, 2011; Wood-Harper and Wood, 2005).

KM and KT studies show that this intersection of technology, organisation and people (TOP) is key to understanding knowledge and its processual dynamics in practice (Gavrilova *et al.*, 2015; Joshi *et al.*, 2007). In other words, the aforementioned relationships amongst the elements of KT have deep intellectual roots, which have not been hitherto clearly identified nor completely approved. For example, some of these roots are present in Systems Thinking (Rubenstein-Montano *et al.*, 2001; Richardson and Courtney, 2004), multiple perspectives (Churchman, 1971; Mitroff, 1983) ethno-methodologies and socio-technical systems (Mumford, 2006), connectionism theory (Joshi *et al.*, 2007; Szulanski, 1996), soft systems methodology (Checkland 1988), Science and Technology Studies (STS) studies (Law, 2004; Latour, 2005), post-modernism practice and theory (Bourdieu, 1977), post-structuralism (Schatzki, 1996), and feminist technoscience studies (Cecez-Kecmanovic *et al.*, 2014; Åsberg and Lykke, 2010).

In the aim of developing a theoretical framework, based on mainstream KT-practice including TOP, this chapter draws on Systems Thinking, multiple perspectives, connectionism theory, socio-technical systems, actor-network theory, and practice theory.

## 4.2. Systems Thinking

Systems Thinking can be defined as a theoretical framework which attempts to incorporate different scientific disciplines and multiple perspectives in order to solve problems. This encompasses the reduction and fragmentation of a system into sub-systems in order to study how each part

functions. The term "system" is used 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, 2002), and systems thinkers take a worldview of entities organised into or by systems and sub-systems, using the term "system" to relate each and every entity within the 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 (Rothschild *et al*., 2005). Thus, any system and its sub-systems 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 (*Ibid.*). 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 *teleomatic* changes of the world through improving and recovering the connections or relationships that existed among systems and their sub-systems (Checkland, 1988). As Rubenstein-Montano *et al.,* (2001) put it, "problem-solving in this way involves a pattern finding to enhance an understanding of, and responsiveness to, the problem" (p. 6).

A healthcare-system, as a greatly complex environment, 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 (Rubenstein-Montano *et al.,* 2001). This framework helps identify the main elements required by social systems, to produce, articulate and apply new knowledge in order to achieve a desired outcome (e.g., quality of care) (De Savigny and Adam 2009). KM and KT have become an increasingly extensive area of study, requiring a Systems Thinking approach in order to identify opportunities for improvement within healthcare organisations (Kroelinger *et al*., 2015; Rothschild *et al*., 2005). When the multi-faceted approach of Systems Thinking is applied, KT can be considered as a link between and among systems and their sub-systems, including relationships with processes and goals (Yang and He, 2014). Systems Thinking views KT from both the capacity of the system for the circulation of knowledge to succeed (to achieve the goals), and the way in which knowledge is transferred (the process) (Rubenstein-Montano *et al.,* 2001). This approach should consider the restrictions within which KT typically occurs, since all systems have limits. In all, to apply Systems Thinking in KM and KT research, thinkers need to consider the integration of organisational strategy, technology, learning and culture into practice.

## 4.3. The Multiple-Perspective Theory

The multiple-perspective theory was developed by Harold Linstone in order to open the horizons for system analysis within complex real-world situations (Linstone, 1989). The theory tries to understand "know-how" types of question through recognising different worldviews of different

situations including technical, organisational and personal views. Each perspective provides different orientations by which contextual practice, and socio-technical phenomena are examined and justified in line with the practise worldwide.

The technical perspective of the practice/organisation (T) explores the differences between a designed project and actual archetypes. This perspective requires understanding the system design and structure, including data-flow and specification. This view, as in engineering, looks at the practice through cause-effect relationships that construct the organisational artifact of the relationships and their environment using input and output mechanisms (Alwi and Hayaati, 2012; Saleh and Wahid, 2015). This perspective ensures the security of the system under focus and the accuracy of the developing processes for decision-makers (Albino *et al.*, 2004). Undemanding the KT-practice in healthcare requires technical development that displays openness, and interdependence with other perspectives (Bradley *et al.*, 2012). The organisational perspective (O) the practice/organisation endeavours to explore other contextual realities which include structural and political realms (Singh and Wood-Harper 2010). This view focuses not only on the state of the internal and external forces facing the organisation, but also on organisational changes. Moreover, this view considers the dynamics of the organisational boundaries at different levels of analysis (Basden and Wood-Harper, 2006). The personal view (P) of the practice/organisation attempts to reveal human issues such as purposefulness, perception of risk, motivation and willingness (Singh and Wood-Harper, 2011; Wood-Harper and Wood, 2005). As such, this perspective of organisation tries to cover the human side of complex real-world situations, including how stakeholders understand practice and context, and why they act as they do.

Regarding the TOP approach, the multi-perspective discussion reveals that 'T' is crucial to understanding the designer's intention, whereas, the 'O' and 'P' perspectives help understand the application in practice. The multiple-perspective theory not only represents a hierarchical model for studying reality and generating facts, but also provides an intertwined relationship amongst these perspectives as a provisional model of knowledge-inquiry (Richardson and Courtney, 2004; Linden *et al.*, 2007; Churchman, 1971). In the healthcare-context, the multiple-perspective approach offers a vital learning cycle, which can be a better fit to handle the healthcare dynamism and uncertainty (Seely, 2013). Such an approach also enables the researcher to consider the views of different stakeholders being configured through the contingent and indigenous experiences of day-to-day practice (Brown, and Duguid, 2001). Thus, TOP views are based on the heterogeneous aspects of reality that do not serve a single truth, but rather seek accommodation between these aspects based — *ceteris paribus*— on one another (Basden and Wood-Harper, 2006; Singh and Wood-Harper, 2010). Regarding the heterogeneous aspects, this accommodation aims to synthesise the contingent perspectives of different actors. Each actor in the project implementation, in addition to creation and sharing of knowledge besides knowledge decision-making and application, remains highly

problematic in the healthcare-context (Ferlie *et al*., 2012). For example, many issues such as the professional boundaries between different professions, intellectual properties, and the hierarchical structure between the professions play a crucial role in practising KM in the healthcare-context. These issues confirm a high level of conflicts between stakeholders, which require further elaboration in relation to the KT-practice. In this context, the multidimensional complexity creates great challenges that require insightful management of different forces, such as business orientation, strategy, culture, context and power (King *et al*., 2015). Therefore, the multiple-perspective approach is important to overcome some of the limitations of traditional analysis in diagnosing multi-dimensional phenomena, such as KT in professionalised-contexts like healthcare (Harrop *et al.*, 2013).

## 4.4. Relational Ontology

The relationship between humans and technology has deep intellectual roots, as abovementioned in this chapter. The idea of *relational ontology* had been proposed as a different ontic angle than the 'positivist and objectivist' ontology approaches that have dominated IT and management studies since 1990s (Cecez-Kecmanovic *et al.*, 2014). Based on the positivist ontology, the socio-technical aspect of reality assumes that humans and technology are separate as self-contained units with the ability to influence each other (Feldman and Orlikowski, 2011). However, relational ontology argues that humans and non-humans (i.e., professionals and EPR) exist only through their relationship. Orlikowski and Scott, (2008) state that "the social and the material are inherently inseparable" (p. 456). Similar proposals have been articulated in the Actor-Network Theory (ANT) by other authors (Latour, 2005; Weinbaum, 2015).

Relational ontology underlies the sociomateriality and Actor-Network Theory (ANT) approaches with regards to the study complex of problems through which reality emerges (Orlikowski 2007, 2010; Orlikowski and Scott, 2008). Orlikowski and Scott (2008) said that "this conception of sociomateriality makes a distinctive move away from seeing actors and objects as primarily self-contained entities that influence each other… away from discrete entities of people and technology… to composite and shifting assemblages" (p. 455). These authors assume that 'relationality' is an ontological position which rejects the possibility of determinate boundaries between human and non-human actors (or properties). This idea had been emphasised by Slife, (2004): "Things are not first self-contained entities and then interactive. Each thing, including each person, is first and always a nexus of relations… all things, including all practices, have a shared being and a mutual constitution in this sense. They start out and forever remain in relationship" (p. 159). This ontological position opens the door for a new understanding of the relationships between humans and technology, or social and technological spheres. Accordingly, in practice, people and technologies, their properties and boundaries, are enacted and re-enacted endogenously, instead of having exogenously reciprocal interaction and impact on each other (Slife 2004).

The concept of 'performative knowledge' was developed from the theory of *agential realism*, or *agential intra-action*, introduced by Karen Barad in her book *Meeting the Universe Halfway* (Barad, 2003; Barad, 2007). This notion was based on quantum physics, the role of the observer, and the mode of uncertainty. For Barad, defined entities are reconfigured through the intra-action of material-discursive practices, in which entities enact their particular properties.[3] Thus, when intra-actions produce local determinations of humans, objects and/or technologies, this presents an agential cut — only this cut makes all entities what they are in a particular situation. In other words, people and technologies are constantly enacted and re-enacted in practice through *iterative intra-action*, although relationships between people and technologies could be fixed for specific purposes (e.g., observation or analysis) by using *agential cuts* (Cecez-Kecmanovic *et al.*, 2014; Schultze, 2017). Barad moves the focus from 'representationalism' to 'performativity', that is from *describing* reality (Know-What) to *doings*, actions and practices (from '*What* is the *nature* of culture?' to '*How* is *culture* performing?[4]').

From this perspective, practice is not reduced to the tasks/responsibilities undertaken by employees in specific roles, but is enacted through *material-discursive intra-actions* by involving an *apparatus* that simultaneously constitutes phenomena (Schultze, 2017). Also, performativity identifies complex aggregations (assemblages) of people and technologies as heterogeneous components, although they are ontologically inseparable. These components emerge through *intra-acting*, rather than interaction. Therefore, the notion of the agency can be conceived as "enactment of iterative changes to particular practices through the dynamics of intra-activity which is considered as mutual constitution of entangled agencies" (Barad 2003, p. 827). This definition emphasises the mutual establishment of the relationship between model of human intentionality (Malle and Knobe, 1997) and technology (as an autonomous component that could hold a potentiality). The performative-knowledge of professional practice emerged through the post-humanist view (Pickering, 1995; Pickering, 1993), which decentres the human *matter* through acknowledging the role of *material* in technical performance. Pickering (1995) said that "the performative… subverts the black-and-white distinctions of humanism/anti-humanism and moves into a *posthumanist* space, a space in which the human actors are still there but now inextricably entangled with the nonhuman, no longer at the center of the action and calling the shots" (p. 26). He argued that human and non-human actors have agency and that they are "mutually and emergently productive of one another" (p. 567). However, the performative idiom did not agree with the flattened ontology, in which actors are symmetrical. Instead, Pickering (1995: 1993) claimed that human actors have "intentionality," while non-human actors have "potentiality". According to Malle and Knobe, (1997), the human intentionality motives the action to be proposufull, based on the human's belief, desire, and awarness (see Figure 1.2).

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[3] According to Barad, "performativity, properly construed, is not an invitation to turn everything (including material bodies) into words; on the contrary, performativity is precisely a contestation of the excessive power granted to language to determine what is real" (p. 802).
[4] See *culture* vis-à-vis "natureculture" see Haraway, D. J. (2003).

The work of Pickering offers a good view from which to explore the emergent relationship between humans and technology, in which the actors are "constitutively enmeshed by means of a dialectic of resistance and accommodation, and are emergently transformed" (1993, p. 567). Recently, Venters *et al.*, (2014), examined the emergence of the digital infrastructure by adopting the practice of Pickering to define it as an "unstable and evolving sociomaterial configuration" (p. 931). They also argued that the performative notion could explain temporal aspects of the practice as an emergent event, and retaining the differentiation between humans and technology. This stream of research adopted relational ontology, post-humanist performativity, and a non-essentialist view of technology (Orlikowski, 1992; Orlikowski and Scott, 2008).

Agential realism was not only positioned in relational ontology, but other scholars who used the same term had shown views contrary to this ontology (e.g., substantialism). Substantialists look at ontology as relational, but having substantial realities, arguing that a key determination of the relationship between humans and technology focuses on material agency in explaining social agency. Faulkner and Runde (2012) agreed that "technological objects are shaped by the activities of humans, [and] those technological objects in turn shape human activities" (p. 64). However, they argued that social and material separation does exist. Similarly, Leonardi, (2012) considered "the materiality of technology as independent of people, persisting across space and time, while presenting specific affordances and constraints for people using technology within socio-technical systems" (p. 42). He also stated that "practice is a space in which the social and the material become constitutively entangled" (p. 35). Based on Emirbayer, (1997), Leonardi provided an alternative ontological position on which the substantialist ontology is based. According to Emirbayer, (1997) substantialist ontology "takes as its point of departure the notion that it is substances of various kinds (things, beings, essences)… [as] self-subsistent entities, which come 'preformed' and then involve themselves in dynamic relations" (pp. 282-283). Leonardi, (2011) disagreed with the view that considers the interweaving of two main issues: first, that humans and technology are inherently different, and second, that the outcomes of the human-non-human interactions are produced when humans and technology are mutually interlocking through "imbrication" or overlap. He argued that human and technological agencies are different in respect to the matter of intention and they mutually shape or mediate each other. Also, human and technological agencies become 'imbricated' through practice (Leonardi, 2011; Leonardi, 2012). Intentionality is rooted in *teleology* and *teleonomy*, but it can also be considered as a subjective position to justify planned or unplanned action (Checklan, 1988).

Mutch, (2013) had a different strand toward thinking about sociomateriality by suggesting 'critical realism'. He argued that the relational basis for sociomateriality, used by the mentioned authors (Barad, 2007; Orlikowski, 2010; Orlikowski, 2007), was a wrong turning because relational ontology is based on agential realism, which is considered as a young approach. However, the last cited authors argued that critical realism has less potential to support the dynamism and/or vitalism of

a system, and it is only capable of estimating its characterisation. Scott and Orlikowski, (2013)[5] argued that critical realism could not shift the focus from questions of communication between reality and representations, which are not suitable for matters of practical actions. This indicates that critical realism is less flexible in answering the 'Knowing-How' question, which is crucial in understanding the KT-practice. Jones (2014) recognised that adopting different ontological positions in Information System (IS) studies could lead to diversity in sociomaterial approach. Cecez-Kecmanovic *et al.*, (2014) stated that "We view this as a positive development that demonstrates the willingness of IS researchers to identify different and alternative ways of understanding the relationships between the social and the technical" (p. 810).

The aim of this study is not to solve the ontological positions of social and IT studies, but to cast light on KM and the KT-practice through technology-in-practice. Thus, this section aimed to display different approaches that could progress discussion of the framework, and also support the *onto-epistemological propositions* of my research. The onto-epistemological propositions were developed through accounting the relational and relative ontological positions, where reality is mostly socially constructed and constantly emerging through the intermingling of humans, technologies and processes in a particular context. This issue can be clarified by looking at practices based on the intentionality of the human, potentiality of the technology and possibility of the involved processes.

## 4.5. Socio-Technical Systems

Socio-technical systems emerged early in the 1950s at the Tavistock Institute of Human Relations in order to subjugate human to technological elements through emphasising the relationship between social and technical systems (Ambos and Ambos, 2009; Fitzgerald *et al.*, 1985; Horton *et al.*, 2005). The fundamental assumption of this approach was to find an optimal match between social and technical elements to design any system based on socio-technical thinking (Mumford 1987). Socio-technical systems thinking was influenced by the human relations movement (Elton Mayo, 1920-1940) and the Theory Y by Douglas McGregor (Wood-Harper and Wood, 2006; Fitzgerald *et al.*, 1985); and *also* by Trist, (1981), who assumed that socio-technical systems would improve economic performance and the quality of working-life. The approach of 'socio-technical systems' is widely used in many disciplines, including studies of organisations and information systems and technology (e.g., Avison, 2006). For example, the work of Enid Mumford (2006), greatly influenced the principles for shaping IT and information systems to improve both workplace performance and working conditions (e.g., through measuring job satisfaction). Mumford, (1987) stated that socio-technical systems are "making the best use of people and the best use of technology" (p. 10). It is widely accepted among scholars that the main contribution of socio-technical systems was achieved through addressing the

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[5] Scott and Orlikowski (2013) said that "Critical realism has taken its own wild ride through Naturalism, Marxism, Theology, and Transcendentalism, and enjoyed its own share of literary intensity, interpretive difficulty, and internal complexity (if not contradiction) along the way" (p. 4).

complex issue of intertwining technological and human aspects of organisational performance. Socio-technical perspectives were largely adopted in action-research studies, alongside information system prototyping and human activity analysis (e.g., Multiview). Multiview was introduced as a flexible framework which can be adjusted to meet contextual problems (Baskerville and Wood-Harper, 1998; Bell and Wood-Harper, 2007). Therefore, this approach attempts to integrate the systemic and reductionist views through identifying the following contingent stages: human activity exploration, information analysis, socio-technical analysis, and design and technical specification (see Figure 4.1).
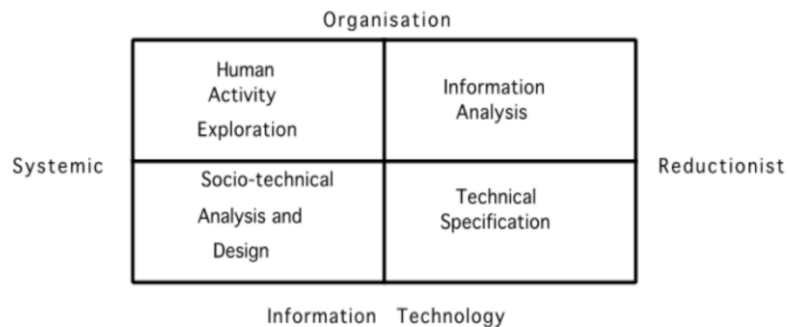


**Figure 4.1. Multiview: A comprehensive perspective including reductionist and systemic views**
*Source: (Bell and Wood-Harper, 2007)*

On the contrary, it has been argued that although socio-technical systems aim to optimise both social and technical aspects, it usually favours one aspect over the other (Orlikowski and Scott, 2008; Leonardi, 2012).

The socio-technical systems approach mostly adopts 'dualism' as an ontological position to distinguish between what is human and what is material. Dualism is a reflection of the state of reality, separated into, for example, abstract and representational (House, 2006). Most socio-technical studies prioritise the ontological assumption of what is human and what is not, such as Technology Acceptance Model (TAM). This position has been reinforced by more recent IS/IT studies, which "demonstrate the viability of a socio-technical approach in which the ontological distinction between social and technical reality is maintained" (Robey *et al.,* 2013, p. 385; see also Leonardi 2011, 2012). These studies argue that one disadvantage of the socio-technical systems approach is looking at the social parts of the system, as if they were makers or formers rather than creators or innovators. Socio-technical view fundamentally emerges from an idealistic view, which considers that there is an ultimate solution. The problem with the ultimate solution is in assuming that an objective is possible in some way. In so doing, however, the idealistic view becomes similar to the positivistic view that is criticised by supporters of socio-technical systems (Leonardi 2011; 2012).

The connectionists' perception was adopted to study the relationship between the human and technology. This perspective was driven by the mathematical theory of communication of Schramm

and Roberts, (1971) and the model of mass communication by Berlo, (1960). This perspective has been used in KT-studies metaphorically, in order to determine the main elements of knowledge communication (Joshi *et al.*, 2007; Szulanski, 1996).[6] Knowledge, from this perspective, is perceived as socially constricted (i.e., it is contextual and has local differences). This perspective admits the possibility of knowledge to be transferred, but with many difficulties such as knowledge ambiguity which is equivalent to 'noise' (Joshi *et al.*, 2007). Here, as knowledge is mainly contextual, the KT-practice relies on shared understanding among actors in the same context through social interactions, bonds or networks.

All in all, socio-technical systems can be seen as the most influential and insightful interpretation of the interaction among the technical, organisational and people aspects. The socio-technical systems paved the way for most of the studies interested in the relationship between humans and technology in different fields, including computer science, KM, network engineering and sociomaterial thinking. For example, Leonardi (2011; 2012) considers that substantivism is a continuation of socio-technical ways of thinking. However, relational ontology, the relationship between the human and technology within a structure, may represent a discontinuity with the ontology of dualism; ANT is considered as one of these discontinuities.

## 4.6. Actor-Network Theory (ANT)

ANT has an important tradition in studying issues concerning people, technology and social structures, emerging from STS (Callon 1986; Latour 2005; Law 2004, 2008; Mitev and Howcroft 2011). To understand social structure, ANT focuses on human and non-human actors, termed '*actants',* (Latour, 2005). ANT ontologically decentres the human agency and gives equal value to other non-human agencies such as natural phenomena, tools, documents, knowledge, and social structures. It emphasises the heterogeneous qualities of the actors assembling and reassembling social structure, and the actor-networks that stabilise social arrangements. Thus, the social actors and arrangements are identified as relational events rather than bodies with predefined qualities (Law 2008a). According to Callon, (1999), the network in ANT is *to configure ontologies* rather than the connected entities. In other words, Callon, (1999) said that "the actors are identified through the morphology of their relations in which they are involved" (p. 186).

ANT defines reality through the process of temporal emerging, the complex manifestation and constant reconfiguring of networks. ANT also deals with humans and non-humans without prioritising either of them. Thus, this theory adopts relational ontology, considering that actants are enacted, and that events emerge through relations and constant reconfiguration of reality. The social and material elements thereby mutually emerge and are constantly created. Indeed, actants could not exist outside

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[6] David Berlo (1960) suggested a Sender-Message-Channel-Receiver (SMCR) Model of Communication based on Shannon's Model of Communication (Shannon Weaver, 1949).

their networks, which indicates that actors cannot be independent but are continuously enacted through 'belongingness' (Law 2004). According to Spinuzzi (2008), "An actor-network is composed of many entities or actants that enter into an alliance to satisfy their diverse aims. Each actant enrolls the others, that is, finds ways to convince the others to support its own aims. The longer these networks are, the more entities that are enrolled in them, the stronger and more durable they become. An actor-network is spliced; the actants intersect" (p. 40). According to Hartt, (2013), "Networks are seen as intersections of paths, paths among human and non-human actants forming and reforming throughout time" (p. 22).

As such, the main concern of ANT is not "know-what" questions, but "know-how" ones to explain how relationships are formed, and how actors and/or events are enacted. Law, (2004) argued that the question is "How the actors and/or materials of the world get themselves done in particular locations for a moment in all their heterogeneity." He added, "how they go on shifting and relating themselves in the processes that enact realities, knowledge and all the rest" (Law, (2008), p. 632). Interestingly, ANT deals with relational ontology, post-humanism and non-essentialism (Cecez-Kecmanovic *et al.*, 2014). According to Orlikowski and Scott, (2008), ANT and sociomateriality have the same ontological position, which neither favours humans over materials nor limits agency/actors to hominids. Thus, ANT challenges the relationship between humans and technology based on their ontological positions, although it keeps their epistemology more flexible (e.g., through a material-semiotic approach, which does not necessarily imply any particular epistemology).

Succinctly, ANT and socio-technical systems have a shared predisposition to understand the intersection of technology, people and society or organisation, but they have different ontological positions to achieve the understanding of the intersection. On the one hand, ANT shares the socio-technical approach by drawing on the dynamism of systems (Systems Thinking). On the other hand, it rejects the optimal solutions to fix reality, which is defined through the process of temporal emergence, and the complex manifestation and constant reconfiguration of networks (Leonardi, 2012). In what follows, I discuss the issues covered above, but with reference to practice theory.

## 4.7. Practice Theory

Practice theory, according to Pierre Bourdieu (1977), is identified through human actions within the space that shapes the fields and structure of practice. In Bourdieu's words, as it was illustrated by Nicolini (2012), practice theory is defined by using specific terms: capital, habitus, field, doxa and agency (Bourdieu, 1977; Nicolini, 2012). Individuals, who represent agency, can enter a society that consists of multi-dimensional spaces with sub-spaces of fields. These fields are represented by many contexts such as institutions, social groups and workplaces. Individuals always have their own habitus wherever being in a field or whenever entering a new field. Habitus *per se* is an individual dimension which consists of a combination of the amount and types of capital that an

individual has. This capital might be economic (money or material), social (a network of people), or cultural (knowing the cultural codes, 'knowing-how' to behave in specific or various contexts). These types of capitals are automatically transformed into symbolic capital when the individual enters a field. Moreover, each field has its own rules or doxa that represent presuppositions that are not open to negotiation. Along these rules, the social group at the aggregated level will evaluate the individuals, and describe their legitimate positions in the field (Bourdieu, 1990). Thus, studying Bourdieuian social practice requires observing capital, habitus, field, doxa and agency (see Figure 4.2).
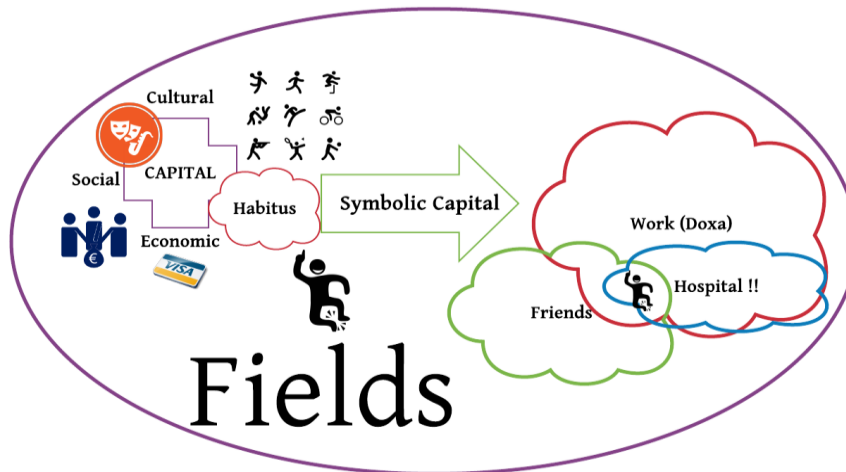


**Figure 4.2. Bourdieu's Proposition of Practice**
*Source: (Bourdieu, 1990)*

Practice theory studies have also contributed to the intersection of technology, people and organisation (Wagner *et al.*, 2011; Whittington, 2006; Szulanski, 1996; Nicolini, 2012; Gherardi, 2012; Feldman and Orlikowski, 2011). Practice theory is concerned with practice as the principal constituent of social affairs, and thus is a basic epistemic object of social theory. The theory defines practice as an ecological framework, which is regarded as the inter-meshing of the social and material that are mutually established and constantly emerging into existence (Wagner *et al.*, 2011). In addition, this theory emphasises the dynamic, complex, and ambiguous properties of practice (Gherardi, 2012). According to Nicolini, (2012), practice outlines an intelligible platform which allows insightful understanding of flexible intersection and interaction between human behaviour and material arrangements, "practice(s) constitutes conditions of life and worlds" (p. 164). Thus, practice is located at the heart of all studies that focus on the 'micro' level of analysis (e.g., information systems, social phenomena and organisation studies).

According to Schatzki (2006), practice is a social realm where human's actions affect and can be asymmetrically affected by material arrangements, artifacts and organisational routines. The effects are asymmetrical because only humans can attribute effectiveness and purposefulness. Materials shape the spaces where practice(s) would be enfolded through the provision of various technological

artifacts that have the potential to provision or constrain actions. Thus, performativity plays an important role in understanding the material arrangements entangled with practice. Many scholars have used practice theory with ANT to understand the significant roles of objects, material arrangements and artifacts in emerging social phenomena (Feldman and Orlikowski, 2011; Gherardi, 2012). It is argued that social practices are conducted through the heterogeneous qualities of the actors and the relations between these actors, without any actor being favoured over another. Thus, practice is defined by its active heterogeneous elements which represent the heterogeneous actions of knowing, being and doing (Wagner *et al.*, 2011). Gherardi (2012) defines practice as a continuous process of becoming, emphasising the dynamism of practice as ambiguous and unjustifiable. In her ecological model of practice inspired by ANT studies, he stated that "human and non-human actors, with agency distributed relationally between them, performed through networks of connections-in-action, as life-world and dwelling agency distributed relationally" (p. 77).

In fact, practice theory does not reject the conceptual dichotomy between mind and body, objective and subjective, human and non-human, knowing and doing, cognition and action, organisation and agency, *et cetera*, but it does reject the ontological separation between them (Rezkwitz, 2002). Feldman and Orlikowski, (2011), indicated that "practice theory enables scholars to theorize the dynamic constitution of dualities and thus avoid the twin fallacies of 'objectivist reification' on the one hand and 'subjectivist reduction' on the other"[7] (p. 1242).

Consequently, Gherardi, (2012) has promoted practice as epistemology in organisational studies including information systems studies. She refers to it when discussing the inseparable relation between technology and everyday practices (e.g., technology's performativity). Also, Leonardi, (2012) uses practice theory to represent the field where actors (i.e., human actors, artifacts and technology) and their agencies overlap. Practice theory does not use a bird's eye view to explore the organisation, but tries to explore the relations between the stakeholders and other materials in the field of action. Thus, exploring practice uses both zooming-in and zooming-out focuses. Zooming-in begins with an in-depth inquiry in one context, and then tries to expand it by tracing other emerging relations, whilst applying zooming-out. The main aim of this study is to explore the dynamics of practice through experiencing KT from multiple perspectives. This exploration elaborates how humans and technology in the healthcare-context, including their boundaries, qualities and identities, constantly interact, and it reveals the KT-practice consequences. In sum, the present exploration motivates insights into how the reality of a case-study can be made and re-made from multiple perspectives and beyond a specific setting, by paying attention to the rich-picture which involves critical reflection and improvisation.

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[7] 'Objectivist reification' is when people treat something 'immaterial', like happiness, fear, or evil, as a material thing.

In the light of the aforementioned points, one can conceive that practice theory may provide an important means for studying emerging socio-technical or socio-practical phenomena at the required level of analysis and from different perspectives. As such, practice theory sees practice as an epistemological orientation through emphasising relational ontology.

## 4.8. The Theoretical Framework

KT-practice in healthcare requires the integration of knowledge, including research, policy and professional information (Butterworth *et al.*, 2011). Elements of the model to study KT-practice are developed, building on the literature to apply communication and practice theories based on multiple perspectives. The Shannon model of communication between human beings and between humans and non-humans, is considered as fundamental for most followers of communication theory. Building on communication theory and practice theory, this research tries to analyse KT-practice from multiple perspectives within the healthcare-context. KT-practice serves to analyse action with a sense of doing, which helps identify challenges, understand ways of improvement, and allow individuals and organisations to know by doing. Thus, the KT-practice requires accumulating the intentional meaning that is assigned by the processes of actualisation or reification, in the modes of action (Rechberg and Syed, 2016; Van de Ven, 2007; Malle and Knobe, 1997). In brief, KT-practice shapes the experience and production of outcomes through participation, involving interactions and mutual gratifications.

In the modes-of-action, actors are defined as someone or something which produces an effect. According to the research interests of this thesis, it is necessary to differentiate between human and non-human agents. Human agents represent internal and external stakeholders by acting through organisational artifacts or technologies. Stakeholders include all the decision-makers from different professions with a dynamic identity and state (e.g., managers, technicians, health-professionals and policy-makers). Social constructionists and interpretivists give human intentionality or purposefulness a crucial role that justifies the direction of the reality-transformation (Meckler and Baillie, 2003; Checkland, 1988). Non-human agents entail a technology that involves methods and techniques used by stakeholders in order to deliver knowledge. Thus, technology has an 'agential' effect through its potentiality that may affect the outcome of practice (Pickering, 1993: 1996). For example, computers have a latent capacity to perform many tasks of communication and control by synchronising hardware and software requirements. However, this capacity cannot respond to all the desired tasks without the transformational processes, which represent the third part of practice (sphere of possibilities) through which the possible processes and outcomes of the intersection and interaction among all elements at different levels can manifest (Checkland, 1988) (see the Figure 4.3).
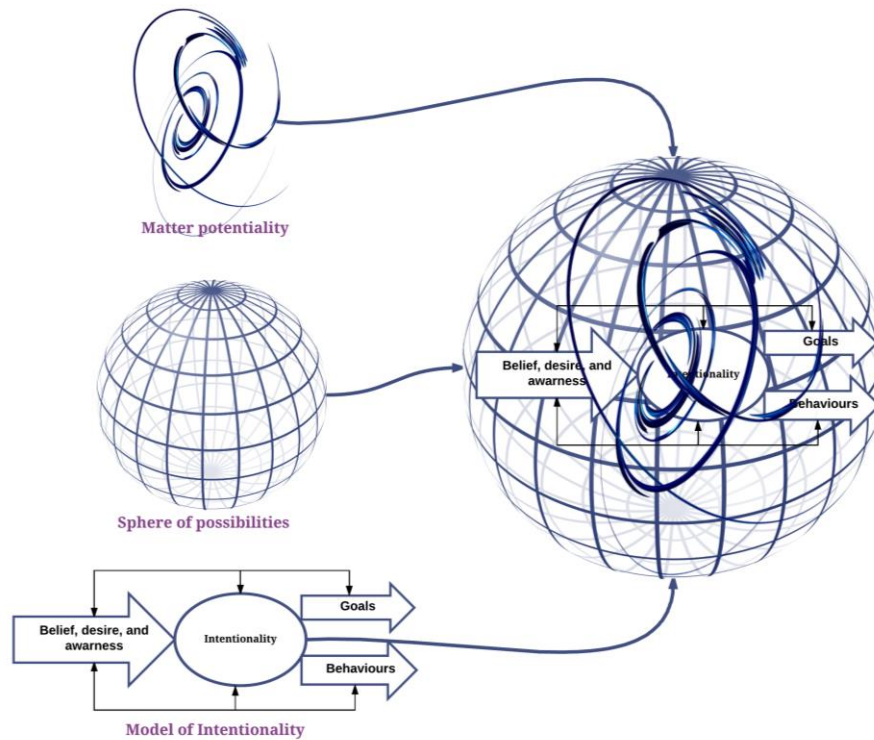
**Figure 4.3. The Representative Framework for the Modes of Action**

Therefore, KT-practice is viewed as continuous processes triggered by actors and knowledge-inquiry alongside knowledge-exchange, knowledge exploitation and application along with reflection and feedback (Lilleoere and Holme Hansen, 2011; Uzzi and Lancaster, 2003). KT in this context, therefore, is a social practice that requires interaction between actors at organisational, technical and individual levels.

Human actors are expected to perform intentionally through actions, discourse, writing, etc. KT-actors are expected to practice interdependently between source/s and receiver/s (Srivastava *et al.*, 2006). Knowledge-source is expected to provide the required information in a form that receiver/s can translate into practice. This level of abstraction is the ideal, but in practice the source of knowledge might be required to answer an inquiry based on experience through the materiality and/or artifact, and the receiver to be able to perform the required transformation and application. Also, the source/recipient are usually conceptual entities that become more dynamic in practice. KT-actors based on practice have some mandatory aspects, such as the state of the source/receiver, flow and sharing of knowledge to bridge the communication gap (Jasimuddin *et al.*, 2012). KT-practice depends not only on the ability of the source to provide the necessary knowledge, but also on the characteristics of knowledge (McEvily and Chakravarthy, 2002; Argote and Ingram, 2000). It can be governed by the intention and ability of the receiver to absorb and utilise the transferred knowledge (Steensma and Lyles, 2000; Ali *et al.*, 2011; Easterby-Smith and Lyles, 2011; Zahra and George, 2002) in a specific context. In addition, the contextual differences in cultures, structures and goals

between source/s and recipient/s may impede collaboration and consequently inhibit the KT-practice (Levina and Vaast, 2008; Torkkeli *et al.*, 2009; Salmi and Torkkeli, 2009). Thus, analysing the KT-practice requires studying 'knowing-how' associating different aspects of the circulation of knowledge interdependently. These KT-practice aspects, based on TOP, are illustrated in Figure 4.4.

Figure 4.4 show that the KT-practice depends on the intersections of the personal, technical and organisational views. The personal view represents the dynamic practice of social intentions and collaborations associated with KT (zoom-in). Technical aspects can be identified through networks and hard aspects of the systems through the structure, technologies and tools (Wood-Harper and Singh, 2011; Szulanski, 1996; Truran, 1998). The organisational view elaborates elements including organisational structure, culture and regulations that synergistically implement the sought transformations. Especially in the professional context, knowledge-based practice presents a source of power that people might be reluctant to share, in order to safeguard their credibility and legitimacy (Kankanhalli *et al.*, 2005; Pee and Kankanhalli, 2016; Kyratsis *et al.*, 2012; Attieh *et al.*, 2016). The professional context requires understanding the KT-practice from different angles, where knowledge is more personal and tacit (Duguid, 2005b; Charani *et al.*, 2013). Likewise, KT-practice has a dynamic nature that requires flexible interchange and exchange, affecting the intimacy of knowledge-actors (source/s and recipient/s) and their relationships (Tamer Cavusgil *et al.*, 2003). The dynamic and heterogeneous qualities of human and non-human actors in the healthcare-context support the performative dimension of the KT-practice, from which reality emerges and continues to change (Checkland 1988). Because of the dynamic state of the actors, as sender/s, receiver/s or searcher/s, the specific essential properties and boundaries that interact in practice cannot be determined (Mougin *et al.*, 2015). Thus, through the interaction between technology and human, knowledge-in-practice is reconfigured, by which new entities emerge and properties enacted. This implies that a task is completed when interactions between actors and technology produce local determinations of human/s and/or objects (Feldman and Orlikowski 2011).
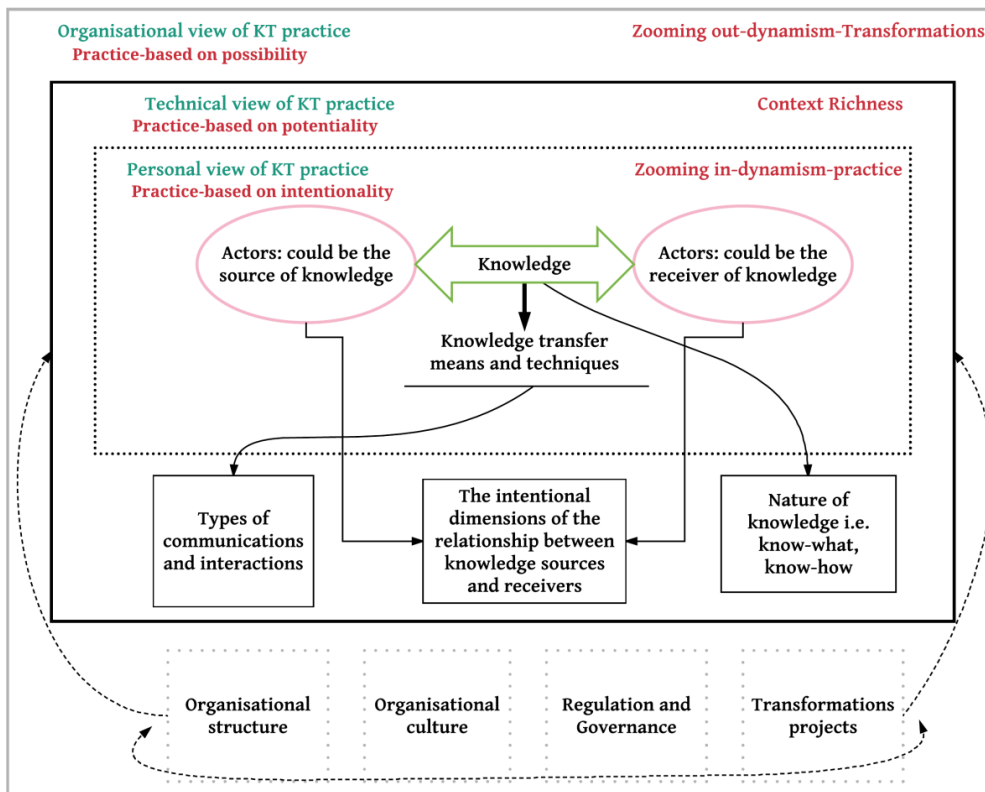
**Figure 4.4. The Theoretical Framework of Exploring Knowledge Transfer Practice**

Effective communication is crucial for establishing mutual respect, interdependence, and reliance among KT-actors (Ellis, 2000; Santoro, 2014). Just as KT can be facilitated by appropriate means, it can also be constrained by the absence of effective tools and channels (Appleyard, 1996). Therefore, identifying and examining the technological perspective is necessary (Bradley *et al.*, 2012; Albino *et al.*, 2004). Typical means or mediators may include direct communication (e.g., face-to-face), verbal or non-verbal communication, observation, etc. The face-to-face interactions entail direct communication between source/s and receiver/s, which is not usually possible (Walz *et al.*, 1993; Torre, 2015). It is widely emphasised that the role of IT is to function as a valuable means for facilitating KT and communication by reducing time and distance and, consequently, increasing the quality of and the outreach toward reliable knowledge (Aita *et al.*, 2007; Albino *et al.*, 2004; Nooshinfard and Nemati-Anarak, 2012). Thus, understanding human, political and technical aspects of practice is necessary in identifying the requirements for an effective KT-practice. These aspects contribute to the (re)configuration of the context where KT-practice is enacted. The context, therefore, can provide supportive and motivational conditions for the KT-practice (Butterworth *et al.*, 2011). As a result, identifying the contextual aspects can encourage and provide supporting settings where source/s and receiver/s agree to share knowledge. This goes side-by-side with the importance of exploring the effectiveness of different types of KT-methods in the healthcare-context (Nooshinfard and Nemati-Anarak, 2012; Albino *et al.*, 2004).

The complexity of the healthcare-settings, the KM-literature and Systems Thinking motivates my research to look at KT and knowledge-circulation in practice, with keen interest in the connection amongst IT, social and organisational aspects in such a professionalized-environment. The theoretical basis for KT-practice is manifested by questions on knowledge, practice and technology in social life (Suchman, 2007; Brown, and Duguid, 2000; Duguid, 2005a; Leonardi, 2012). Looking at practice in relation to the social and technological relationships has fostered a new stream of KT based on relational ontology (Del Lucchese, 2009; Slife, 2004; Wagner *et al.*, 2011). KT-practice in healthcare requires an integration of all types of knowledge, including research, policy and professionals (Butterworth *et al.*, 2011). This study considers KT-practice through a combination of the three main elements —human intentionality, material potentiality and processes possibility— shown in the theoretical model illustrated by Figure 4.4, and Figure 4.4.

## 4.9. Conclusion

KM and KT resonate throughout studies of practice, IS and IT, with the most influential premises based on organisational theory, the process school of thought and spiral dynamics (e.g., Nonaka and Takeuchi, (1995) and Davenport and Prusak, (1998)). KT as an independent topic is considered in sociological studies of organisations through studying the boundaries between professionals. The complexity of the healthcare sector is key motivation to examine multi-faceted systems which are deeply rooted in Systems Thinking. As such in Figure 4.4, the theoretical framework is envisaged and applied in this thesis have multi-dimensional orientations.

This theoretical framework shows how artifact and practice are affected by human and non-human (f)actors through intentionality and potentiality. The framework also considers that KT is performed *iteratively* through complex accumulations of technology, people, work, and organising dynamic emergence through interactions. The transformation process is embedded in socio-technical (i.e., discursive-material) practices of artifact and IT evolvement, implementation and use. Since my research explores KT from the practice-based view, it is more coherent in my approach to adopt relational ontology, performativity, and a non-essentialist view of technology. KT-practice relies on new strategies and technologies, giving the impression that it might be neglected once the transformation has taken place. As a matter of fact that communications are inherent to socio-technical advancement, KT is located at the core of organisational practice regardless of the technological success or failure. Basically, KT-practice endeavours to answer the 'knowing-how' question related to the processes from different points of view, where Systems Thinking is applicable.

# Chapter 5: Research Methodology

## 5.1. Introduction

The aim of this chapter is to illustrate my research philosophical approach, its epistemological and ontological foundations and the research methodology and methods I used to investigate the research questions. In this chapter I also elaborate my research position regarding the investigation conducted and the reasons behind adopting a specific amalgamative approach, rather than focusing on particularly known ongoing philosophical debates.

This research is underpinned by the relational ontology and an interpretive epistemology in the case-study approach (Easterby-Smith *et al.*, 2012; Habermas, 1970; Van de Ven, 2007). In so doing, this research reflected on a four-year period of the EPR-implementation through the KT-practice analysis. This four-year plan allowed tracing and tracking many important issues in the KT-practice and the EPR. I attempt to understand reality by exploring the matter of context and studying the interactions among/across/through individuals, teams, societies and organisations. This exploration could be better achieved through qualitative-inquiry because the latter helps exploring and understanding new contexts through the observation and interactions of participant/s in a more advantageous way than what quantitative-research methods might offer (Strauss and Corbin, 1990; Denzin and Lincoln, 1994; Dingwall *et al.*, 1998; Easterby-Smith *et al.*, 2012). For example, one objective of my study is to explore the role of organisational and professional issues and boundaries on Knowledge Transfer (KT) practice in the NHS-context. I advocate that, as this research explores the KT-practice in a rather understudied context, the qualitative-approach can be the more appropriate.

I first aim at discussing the epistemological and ontological assumptions behind the research, and second describing my research method, strategy and design. In this aim, I conducted a qualitative case-study, observation, in-depth face-to-face interviews and qualitative analysis with focus on the KT-practice and EPR stakeholders in the NHS-context. This chapter outlines my theoretical stance that informs the research approach adopted, and the rationale for such a subjective, as well as interpretive approach (see Figure 5.1).

**Research Inquiry**

*Assumptions, beliefs, and processes reagrdign the research approach*

**Traditions and Disciplines**

**Existing literature, theories and practice**

**Prior studies in the field: motives and restrictions**

**Research Topic(s) and Gap(s)**

*What, How, and Why*

**Research Questions & Objectives**

*Explore, Explain, and Describe*

*How to answer* | *Induction Deduction Abduction*

**Research Strategies**

Role of knowledge

**Philosophical Assumptions**
*to specify the reality and knowledge creation*

**Ontology**
*Perspectives of Reality:*
*What can be reseached/known*

**Epistemology**
*Perspectives of knowledge creation:*
*How can be reseached/known*

Relativism     Realism     Subjective     Objectivism

**Theoretical Perspectives**
*Context for the process for the grounding of logic and criteria*

Role of theory

Positivism    Interpretivism    Critical Realism    Postmodernism

Post-Positivism    Pragmatism    Feminism

**Research Methodology**
*Context and strategy for the process acquiring knowledge*

Experimental    Ethnography    Grounded Theory    Case Study

Survey    Phenomenology    Discourse Analysis    Action Research

**Research Methods**
*Techniques used to gather data*

Archival research

Observation     Interviews

Focus Group

Sampling     Statistica analysis

Documentation    Questionnaires    Repertory grid

Qulaitative

**Time horizon, data types, forms and resources**

Longitudinal Study    Visual Data    **Cross-sectional Study**

**Documented Data**

Textual Data

Numeric Data

**Research analysis & action**

Grounded theory data analysis    **Template analysis**

Primary Secondary    Semiotic

**Hermeneutic**

Structural analysis    Thematic analysis

**Research findigs & Discussion**

Qulaitative

**Final Research Project**

**Figure 5.1. The Hierarchal Structure of the Research Methodology**

## 5.2. Philosophical Assumption (Ontology and Epistemology)

In this research, I particularly aim to develop knowledge in healthcare as a specific field of practice. Here I elaborate on the philosophical groundwork of this study, illustrating my view of what knowledge is (ontology) and how this knowledge can be reached (epistemology) and how it can be developed (methodology). My philosophical approach addresses the question of reality with a research background and research outcomes in line with, and inspired by, the leading studies in this field of research (Saunders *et al.*, 2011; Van de Ven, 2007). I define my research philosophy with the help of a research-paradigm[8], in the sense perceiving reality is intimately entangled with the pursuit of the researcher attempting to understand knowledge-in-practice. According to Cohen *et al.*, (2013), the research-paradigm can be defined as the broad framework, characterised as a precise procedure, which involves various steps through which a researcher creates a relationship between his/her research objectives. According to the definition given by Gliner *et al.*, (2011), *"In our view, a paradigm is a way of thinking about and conducting a research. It is not strictly a methodology, but more of a philosophy that guides how the research might be conducted"* (p. 7). Drawing further attention into the development of knowledge-inquiry, Saunders *et al.*, (2009) argued that each researcher needs to be aware of the philosophical pledges which have significant impacts on the research-strategy, methods and tools. Moreover, Saunders *et al.*, (2009) considered three different components of research-paradigm or three elements of thinking in research philosophy to be ontology, epistemology, and axiology (Kuhn and Hawkins, 1963). These elements can be briefly defined as follows:

Ontology is concerned with the question of reality. This raises questions of the assumptions researchers have about the way the world operates and the commitment held to particular views (e.g., objective versus subjective). Epistemology is trying to answer a broad question on how reality can be known (realism and relativism). Thus, epistemology is concerned with what constitutes acceptable knowledge in a field of study from the researcher's perspective; in search for comprehension of the real world. Axiology is a branch of philosophy that studies judgements about value of general norms (ethics and aesthetics).

In sum, the awareness of these philosophical assumptions can enhance research quality and researcher's creativity. In fact, the main motivation of my study was to examine these philosophical assumptions, provide succinct as well as clear terms in order to avert confusion, establish clearer positions, and produce meaningful interpretations.

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[8] Research-paradigm is "the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed" (Kuhn, and Hawkins, 1963 p.454)

### 5.1.1. Ontological Position

Ontology is defined as the branch of philosophy concerned with questions of being (David and Sutton, 2011). Ontology is the starting point for philosophy, and the natural and social sciences. For example in the natural/social science usually the debate is represented as a continuum from realism to relativism (Creswell, 2013) (see Table 5.1).

Firstly, the traditional doctrine of the realism ontology implies that the world is external and tangible where the observation is the only method to acquire direct identification of the phenomena under investigation (Tewksbury, 2009). More recently, this position was modified by philosophers who differentiated between the law of nature, and the theorist knowledge by which they defined the laws. For example, Bhaskar, (2014) in his book "the possibility of naturalism" described this ontology as *transcendental realism*, claiming that "the ultimate objects of scientific inquiry exist and act quite independently of the scientists and their activity" (p. 12).

The next position in the ontological spectrum is the internal realism which considers an existing one reality and one ultimate truth, but it can never be possible to access this reality directly, but it can be accessed indirectly (Putnam, 1987). The internal realism was supported by Heisenberg's uncertainty principle (Indeterminacy Principle) when Wheeler and Zurek, (2014) 'transcribed' the uncertainty principle by stating, "The more precisely the position is determined, the less precisely the momentum is known in this instant and vice versa" (p. 64). In other words, it will never be possible to access full objective information about the state of the object because the observant is the one who determines the state of the event being observed. Therefore, based on the internal realism, there is no single scientific law that can always be true. However, recently scholars and philosopher of relativism often also claim that Heisenberg's Indeterminacy Principle, chaos theory, quantum mechanics, and complexity theory show that science is now becoming relativistic (Creswell, 2013). This issue leads to the discussion of the third position in ontology which is relativism (Checkland, 1988; Parsons, 1951; Bernstein and Vazirani, 1997).

Relativism proposes that scientific laws are not outside the observer's reach/encompassment and thus discoverable, but they are rather created and agreed by people (note the similarity with 'collective subjectivity').[9] This approach in the social science was mainly influenced by Latour and Woolgar, (2013). When they studied the research laboratories at Salk institute in (1979) and noted the diversity of views people discuss when they explain observed phenomena. Latour and Woolgar, (2013) argued that observers might hold different views (e.g., laws, patterns, facts, theories, interpretations, etc.), and need their views to be accepted by others who mainly depend on the status quo or history. Therefore, the "Truth" is a temporal dynamic idea which can be reached though the discussion and

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[9] Nominalism also is another ontological position which suggested that language and discourses are the creators of reality. This approach is mainly associated with the postmodernism approaches.

agreement between/among the main actors in a context (e.g., protagonists or subjective entities). Knorr-Cetina, (1983) and Easterby-Smith *et al.*, (2012) reflected that the acceptance of particular view is highly influenced by the politics and viable resources; this share a similarity with the debate in the NHS (e.g., the conflict between the managers and clinicians, or doctors-nurses).

**Table 5.1. The Three Different Ontological Assumptions**

| Ontology | Realism | Internal Realism | Relativism |
|----------|---------|------------------|------------|
| *Truth* | Single truth. | Truth exists, but is obscure. | There are many 'truths'. |
| *Facts* | Facts exist and can be revealed. | Facts are concrete, but cannot be accessed directly. | Facts depend on viewpoint of observer. |

*Source: Easterby-Smith et al., (2012, p. 19).*

The valuable knowledge in healthcare could be a good example of the debate about the significance of evidence-based medicine/practice (i.e., scientific evidence). Although the evidence is possibly available to all actors, there is no one piece of evidence (e.g., medicine or practice) accepted as definitive by all actors (Håland, 2012). However, both adherents and opponents of the same evidence tend to select a solution(s) based on their own justified subjective views (intentionality) which can be usually proved by their experiences/skills. Based on the dynamics of a system (e.g., practice), sometimes actors' experiences can change their views later. Thus, evidence-based management would be interesting for the description only level of accommodations as the interests of different groups may interact with the gradual acceptance of evidence (i.e., practice) (Wastell, 2011). This approach does not deny the patterns of social system(s) or structures, but it denies the ultimate observable truth (Wheeler and Zurek, 2014; Barad, 2007; Parsons, 1951; Dingwall, 2008; Kuhn, 1970).

In the sphere of social science usually the focus of interest lies in the people's behaviour rather than inert objects. Therefore, the social science could have logical or methodological problems when it utilises some methods which are purely developed for the natural sciences (Blaikie, 2007). In my study, in order to avoid such problems, and based on the structured inquiry that is the KT-practice in the healthcare sector, I aim to examine and construe the KT-practice from different perspectives, by being open to objectively handle different assumptions from both sides of the practice debate. My study also accepts that different observers may have different views and positions as Collins, (1983) articulated, "what accounts for truth can vary from one place to place and from one time to time" (p.

88). In the light of the aforementioned argument, and drawing on the inquiry of this study, I decided to adopt the relativism ontology.

To be fair, the main disadvantage about this approach is related to the main critique of positivism in the sense that occasionally the observer might look at the relativism and relationalism as if it was predetermined (Creswell, 2013). One may solve this counterargument by arguing in turn under the umbrella of speculative realism that observers are mediators who can define the observation at the level of their analysis (i.e., it is optional to stop; for example, when they become tired, they can stop) (Bryant *et al.*, 2011; Harman, 2009).

The main *principles* of the relativism and relationalism adopted in my study are that *things exist in space that is real, virtual, and actual, and things unfold in time and space in their relationship with each other*. However, discussing the speculative realism is considered for further direction and further research.

## 5.1.2. Epistemological Position

As aforementioned, epistemology is about how reality can be known as it discusses the ways of inquiring into social phenomena. Social science research, including business and management research, has been working with two main research philosophical assumptions known as; positivism (objectivism) and interpretivism (subjectivism) (Collis and Hussey, 2013). These two philosophical assumptions have opposing and conflicting assumptions and beliefs about reality in their views of the world. Social scholars formed these two contrasting views of how reality can be constructed and how social studies should be conducted. In general, the boundaries between these positions are quite vague and there is no philosophy able to address all aspects of one particular view (Easterby-Smith *et al.*, 2012). Therefore, it is not surprising to see present-time scholars who from positivism produce constructionism-related ideas.

Positivism claims that social sphere externally exists, and social entities should be inquired though objective methods (quantities and statistics) rather than subjective methods (sensation, reflection and intuition). Affected by Francis Bacon from the seventeenth century, August Comte (1850s) was the first western philosopher to apply this view on the social science. He argued that knowledge can be gained only though the observation of external reality (Comte, 1868). The positivism perceived reality as if it was predictable and could be controlled (Hesse-Biber and Leavy, 2006). In general, positivists deploy large samples, generate objectives out of quantitative data by using quantitative methods and take deductive approaches to test hypotheses and challenge theories (Collis and Hussey, 2013). According to Easterby-Smith *et al.*, (2012), the positivism approach had number of propositions which are common between most of the positivists such as causality and generalizability (see Table 5.2).

As such, positivists argue that the only authentic knowledge is scientific knowledge, and that such knowledge can only originate from positive affirmation of theories through strict scientific methods. Table 5.2 shows that positivists regard truth as objective and detached from its observers. They reckon researchers and the phenomena in the world are two independent things. In short, positivists define ontology as dualistic (i.e., Dualism) (Weber, 2004).

**Table 5.2. Philosophical propositions of positivism**

- *Independence*: the observer must be independent from what is being observed.
- *Value-freedom*: the choice of what to study, and how to study it, can be determined by objective criteria rather than by human beliefs and interests.
- *Causality*: the aim of the social sciences should be to identify causal explanations and fundamental laws that explain regularities in human social behaviour.
- *Hypothesis and deduction*: science proceeds through a process of hypothesizing fundamental laws and then deducing what kinds of observations will demonstrate the truth or falsity of these hypotheses.
- *Operationalization*: concepts need to be defined in ways that enable facts to be measured quantitatively.
- *Reductionism*: problems as a whole are better understood if they are reduced into the simplest possible elements.
- *Generalization*: in order to move from the specific to the general it is necessary to select random samples of sufficient size, from which inferences may be drawn about the wider population.
- *Cross-sectional analysis*: such regularities can most easily be identified by making comparisons of variations across samples.

*Source: Easterby-Smith et al., (2012, p. 23).*

In Systems Thinking circles, positivism inspires the 'determinism approach' or what is referred to as the 'Hard System' (Checkland, 1988). In social science, this approach was the main dominant of the social studies in the last 150 years (i.e., the distinctive paradigm based on using 'Kuhn dialogue'). According to Kuhn, (1970), science is refining and extending through *progress* what is already "well-known." However, social studies show that research findings do not neatly fit into the defined theories and/or patterns. This matter required a new way of observing (new epistemic approaches) that would consider and juxtapose the old and new study results. For example, Easterby-Smith *et al.*, (2012) argued that most of the new scientific advances would not be evolved by only logical application of the "scientific method," but they can be incremental when creative thinking goes beyond the limits of existing paradigms.

In the last fifty years, interpretivism and/or social constructionism, as new paradigms, were developed based on subjectivity in reaction to the positivism school of thought in the social science world. According to Habermas, (1970) the social constructionism was referred to as interpretive methodology. Many interpretivists root their arguments in Husserl's notion of "*life-world in a nutshell.*" This notion look at the world as an inseparably bound of experiences emerging throughout daily lives (Buytendijk, 1987; Husserl, 1970). Thus, reality has both subjective and objective features.

The subjectivity concerns with the meaning of reality and its phenomena. The objectivity reflects on the negotiation of this meaning in order to make it collective among actors through the interactions. In other words, reality is a dynamic state of duality; reality is objective in the sense that it reflects inter-subjectivity (Buytendijk, 1987). The interpretivism assumes that reality is neither exterior nor objective, but it is socially constructed and can be known through the interpretations (meanings) given by people (Creswell, 2013; Easterby-Smith *et al.*, 2012; Van de Ven, 2007). Many scholars such as Mead, (1934), Watzlawick, (1984), Berger and Luckmann, (1991), and Shotter, (1992) have focused on the ways by which people create meaning and make sense of the world through communication, interaction and sharing experiences. Indeed, they argued that reality, if it can be determined, is will be determined through human subjectivity rather than external factors or objectives.

As such, social studies would be more interested in the different social construction(s) and meaning(s) that people generate based on their experiences, rather than measuring how certain patterns take place. Social studies should focus on the ways of people thinking and feeling, collectively and individually by paying attention to the different ways of communication (i.e., formally, non-formally, or verbally, non-verbally). Therefore, the social studies (including this research) might consider that people are the actors who contribute to creating realities. Studies should also try to understand and appreciate the different views of the actors rather than searching for determined factors, causes, or laws to explain human behaviours and actions.

**Table 5.3. The Implications of Positivism versus Interpretivism**

| | Positivism | Interpretivism |
|---|---|---|
| *The observer* | must be independent | is part of what is being observed |
| *Human interests* | should be irrelevant | are the main drivers of science |
| *Explanations* | must demonstrate causality | aim to increase general understanding of the situation |
| *Research progresses through* | hypotheses and deductions | gathering rich data from which ideas are induced |
| *Concepts* | need to be defined so that they can be measured | should incorporate stakeholder perspectives |
| *Units of analysis* | should be reduced to simplest terms | may include the complexity of 'whole' situations |
| *Generalization through* | statistical probability | theoretical abstraction |
| *Sampling requires* | large numbers selected randomly | small numbers of cases chosen for specific reasons |

*Source: Easterby-Smith et al., (2012, p. 24).*

The differences between interpretivism and positivism were summarised in eight points in Table 5.3, such as the position of the researcher (observer), human interests, meanings, etc. Positivists

claim that observers are natural and isolated from the reality which is self-organised. Nevertheless, interpretivists look at the observers as active participants in generating the reality which should, in their view, be flexible and constantly changing (Easterby-Smith *et al.*, 2012). This justifies how theory is produced from research through using meaningful samples, actual participants, qualitative instruments (interviews and observation), and taking an inductive approach (meaningful interpretation of a context). Moreover, Table 5.4 visualises comparison of four research-paradigms (Positivism, Realism, Interpretivism, and Pragmatism) in management research-based on ontology, epistemology and axiology, including suitable data-collection techniques (Saunders *et al.*, 2011)

**Table 5.4. Comparison of four research paradigms**

| | Positivism | Realism | Interpretivism | Pragmatism |
|---|---|---|---|---|
| **Ontology: the researcher's view of the nature of reality or being** | External, objective and independent of social actors | Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist). | Socially constructed, subjective, may change, multiple | External, multiple, view chosen to best enable answering of research question |
| **Epistemology: the researcher's view regarding what constitutes acceptable knowledge** | Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements | Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). | Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions | Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. |
| **Axiology: the researcher's view of the role of values in research** | Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance | Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research | Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective | Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view |
| **Data collection techniques most often used** | Highly structured, large samples, measurement, quantitative, but can use qualitative | Methods chosen must fit the subject matter, quantitative or qualitative | Small samples, in-depth investigations, qualitative | Mixed or multiple method designs, quantitative and qualitative |

*Source: Saunders et al., (2009, p. 119).*

In this study, I aimed at the beginning to understand the KM-processes in the healthcare sector. Positivists perceive knowledge as an objective entity that requires formulating measures, generating

processes, and knowledge-distribution through studying transformation, social conflict and critical enactment views. Knowledge, therefore, is defined as an amount of information with objective/s that can be codified and transferred easily from one context to another (Kogut and Zander, 1992; Davenport and Prusak, 1998; Foss *et al.*, 2010; Grant, 1996).

I also gather that interpretivists would be more interested in the different aspects of how people (professionals in particular) can consider the meaning of knowledge and hence the practice of generating, distributing and applying knowledge. Managers, to this end, perhaps should consider these different aspects in the organisational strategies when they manage the available knowledge. In other words, a transformation of the KT-practice would be arranged through talking with the actors about their aspects in order to collect stories about their experiences and actual practice(s) (Brown and Duguid, 2001; 2000; Duguid, 2005a; Duguid, 2005b).

As such, including the complexity dynamics of healthcare reality seems to be more suitable for my research-inquiry (KT-practice) in the healthcare-context. Thus, this research, as a contextual and cross-sectional study, does not to test theories or hypotheses whose findings and results cannot be generalised (Creswell, 2013; Van de Ven, 2007). Therefore, the results and findings of my research can only be discussed in line with other similar environments and contexts. As Morgan, (1980) proposed, "knowledge and understanding of the world are not given to human beings by external events; humans attempt to objectify the world through means of essentially subjective processes" (p. 610). In this sense, I supported this research with a relative ontology and an interpretive epistemology as the main theoretical aspect of my work. There are other philosophical approaches that have been used in the social and management studies such as critical realism, pragmatism, postmodernism, feminism and critical inquiry (more discussion about these approaches in the Appendix C.1).

### 5.1.3. Justification of the Position of this Research

In relation to the research objectives, which centre on exploring the KT-practice, the multiple-perspective interpretive approach is adopted as the main philosophical premise. The phenomenon in interpretive research is identified and understood by studying the meanings that humans give and attribute to reality (Orlikowski and Baroudi, 1991). This approach grants the researcher a good opportunity to observe and understand the phenomenon at hand in-depth (Orlikowski and Baroudi, 1991). Thus, I examined and interpreted the perceptions of the KT-practice participants, with the aim of obtaining a thorough multi-faceted understanding of what affects the KT-practice in healthcare.

As this research is not aiming to test a theory or hypothesis, the positive approach will not be appropriate here. This research was conducted to deeply understand the complexity of the KT-practice in relation to EPR-technology deployment. Since the research positions were earlier discussed, the

next section will discuss the research-design of the case-study. This is accompanied with discussion of the main types of research-strategies and a justification of the chosen research.

## 5.3. Methodology

This part specifically illustrates the research-logic used to trigger the research-inquiry, and the research-design used to explain how this research was conducted. These questions will be answered based on the underlining philosophical assumptions, and how the research quality can be achieved.

### 5.2.1. Research Logic

A research-logic is usually defined as the point where the research question/s is/are triggered, including the series of processes that crystallise the question(s) (Blaikie, 2009). The main dominant approaches studying the research-logic in academia are deductive arguments (testing theory) and inductive arguments (building theory) (Saunders *et al.*, 2011).

In the induction approach, findings and observations induce theory generation. In other words, the process begins from specific observations and moves towards broader generalisations or theory. Figure 5.2 illustrates the inductive approach that is frequently called "bottom-up" approach (Trochim and Donnelly, 2006). While in the deductive approach the aim is to test a theory, in the inductive approach the aim is to build up a theory (Trochim and Donnelly, 2006). The inductive approach is used in my study; therefore its features are particularly discussed.

In deductive arguments, a theoretical structure and hypotheses are developed and inspected using an experiential test, and subsequently specific cases are deduced from general implications. Therefore, it has been indicated that the deductive approach starts from generalities and moves toward specifics; it is often called a "top-down" approach (Trochim and Donnelly, 2006). Figure 5.3 shows the process of deductive approach, in which deriving a hypothesis from a theory is performed first by testing the hypothesis using a strategy. The findings then emerge to reveal the verification of theory and if necessary, impose a theory modification (Bryman and Bell, 2003).

To conduct this research, the inductive approach is followed by two reasons. Firstly, the inductive approach owes more to interpretative paradigms (Collis and Hussey, 2013; Bryman and Bell, 2015); therefore, since interpretivism is my research-paradigm, it is more suitable to apply the inductive. Secondly, I endeavour to explore and investigate a suitable approach rather than testing hypotheses. Here, this research follows a modified inductive strategy (Blaikie, 2009).
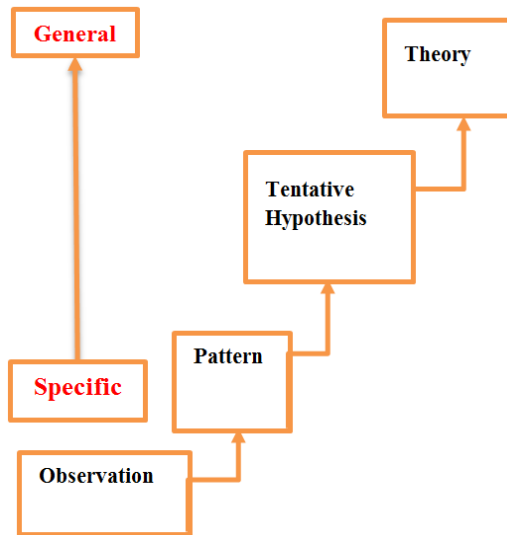
**Figure 5.2. The Process of Induction**

**Source:  Trochim and Donnelly, 2006.**
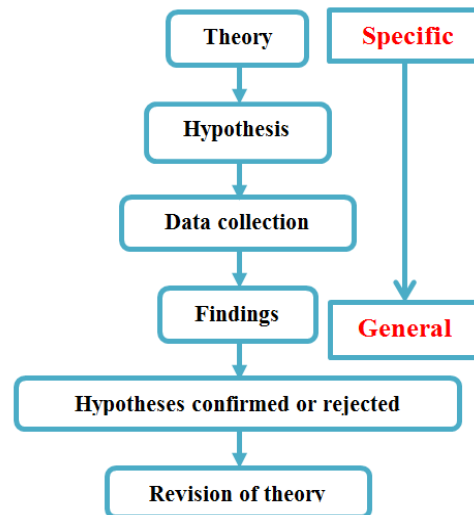


**Figure 5.3. The Process of Deduction**

**Source: Bryman and Bell, 2003, p. 11.**

## 5.2.2.  Research Design

Research-design is usually defined on the basis of the context and strategy of the data-collection in order to acquire knowledge. Research-design clarifies the way(s) in which the researcher intends to conduct their fieldwork (e.g., what will be observed and how?) (Saunders *et al.*, 2011). In social studies, the literature provides many ways to carry out research, including experimental designs, action research, surveys, case-studies, grounded theory, discourse analysis, ethnography, archival research and phenomenological theory (Bryman and Bell, 2015; Wiles *et al.*, 2011; Silverman, 2013; Flick *et al.*, 2011; Easterby-Smith *et al.*, 2012). Easterby-Smith *et al.*, (2012) argued that research-design, based on research-logic, depends on the researcher's personality and underlying philosophical assumptions. For example, when researchers rely on physical evidence in addition to detailed observation and logical deduction, they would represent the positivist side. Social studies could arguably accept the discussion of Easterby-Smith *et al.*, (2012). However, when researchers use their intuitions more than logical deduction, their work will be more on the interpretivist side. Based on this argumentation, it can be deducted that experimental designs and surveys are more suitable to the positivism approach. By contrast, action research, archival research, and ethnography are more suitable as parts of interpretivism. Also, the utilisation of case-studies has many advantages when research looks into a phenomenon in-depth (Flyvbjerg, 2006). In my research, I used logical induction in addition to detailed observation, and in-depth-interviews (as it will be discussed later).

Selecting one of the aforementioned research-strategies depends on the research question(s), the field of research and theoretical assumptions, and the researcher's attitude. According to Yin, (2013), a set of indicators can help the researcher-design their study: 1) The research questions, 2) The phenomenon under focus, 3) The time dimension, whether the research is exploring historical or current events (see Figure 5.4).

Yin, (2013) and Easterby-Smith *et al.*, (2012) argued that the case-study approach is more suitable when the research is more concerned with providing a richer picture of a context or of a phenomenon rather than testing a hypothesis.
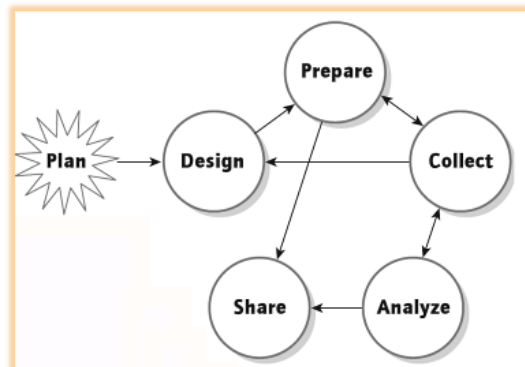


**Figure 5.4. Iterative Processes of the Case Study**
**Source; Yin, (2013, p. 2).**

My research-inquiry is more suitable to understand the questions of 'how' and 'why' in order to analyse the KT-practice model in the field of healthcare, with a focus on a contemporary phenomenon (i.e., national hospitals and the KT-practice). A case-study strategy in healthcare enables me to examine my research-inquiry more closely and specifically at a micro-contextual level.

### 5.2.3. Case Study as Research Strategy

Yin, (2013) proposed that each research-strategy has specific particular advantages and disadvantages relevant to contextual conditions. The reputation of his book *Case Study Research: Design and Methods*, one of the most cited in research-design,[10] implies that case-studies are the most common research-strategy in social science (Yin, 2013; Eisenhardt, 1989). This issue can be attributed to two main reasons: first, most of the social inquiries conduct "how" or "why," where a case-study strategy is preferred. Secondly, the social inquiries, which focus on phenomena within real-life contexts, are dynamic, where researchers has little control over events (Yin, 2013; Yin, 2015). Other scholars argued that case-studies enable researchers to use both numerical and categorical responses of social themes (Hosenfeld, 1984; Block *et al.*, 1986). While Yin, (1984) cautions researchers not to confuse case-studies with qualitative-research, he claims that "case studies can be based… entirely on quantitative evidence" (p. 25). My study investigates "how/what questions," by exploring a case-study through a multiple-perspective focus, on real-life contextual phenomena related to the KT-practice in healthcare. The case-study strategy focuses on context-based knowledge (Flyvbjerg, 2006). Moreover, the selected case-study also prevents the researcher from having any control over any new phenomena under focus (Benbasat *et al.*, 1987). Studies on KT-practice in healthcare are still scarce in general, and in the NHS in particular.

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[10] This book has been cited (146,497 times) at the time of writing this section.

As such, the case-study strategy has advantages as mentioned before, but it also has its disadvantages. First, the case-study can lack precision and rigidity (Yin, 2015). According to Boeije, (2009) researchers do not need to follow systematic steps during the research journey, but they need to reflect on the research journey in a smooth manner that allows other researchers to grasp the research findings easily. Second, the research findings which uses case-study are hard to be generalised, for example the most common question by : "How can you generalise from a single case?" (p. 21). According to Yin (2009), 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 becomes more comprehensive and sensitive to its many workaday contingencies and possibilities. Moreover, the results could have high potentials to be transferred into other comparable situations, contexts and environments. By focusing on the advantages and the disadvantages of the case-study strategy when accounting the KT-practice and the EPR in action, this research prevents any kind of generalizability by rendering the reality of the contextualized practice deeply contingent as well as broadly accessible.

### 5.2.4. Time Horizon

Research structure highlights the time horizon by which the researcher undertakes research. Here, two types of time limits can be specified: the cross-sectional and the longitudinal (Bryman and Bell, 2015). When research is concerned with the study of a specific phenomenon at a certain period of time, the cross-sectional time-scale is used in order to make particular use of strategies such as case-studies. By contrast, a longitudinal time-horizon is used when the research is examining change over time, because it is concerned with the data-collection repeatedly over an extended period of time (Flick, 2015). The longitudinal studies are likely to make a use of strategies such as action research, experiment and archival analysis (Goddard *et al.*, 2004).

My study intends to answer the research questions at a particular time: this "snapshot" is cross-sectional. The data-collection process was significantly difficult and took a considerable amount of time and energy to be completed. The data were collected form interviews and observation on practice-based reflections around a four-year EPR-project implementation, through over a 8-month period, from January to August 2015.

## 5.3. Sampling and recruitment

Greenhalgh and Taylor (1997) emphasised that: "to gain an in-depth understanding of the experience of particular individuals or groups; we should therefore deliberately seek out individuals or groups who fit the bill" (p. 741). Based on the Greenhalgh and Taylor's argument, the purposive sampling tactic was deliberately employed in this thesis work to specify the eligibility of the initial research participants, who were chosen on the basis of participants' membership, experience or knowledge, following (Holloway & Wheeler, 2010). Afterwords, snowball sampling was used to

introduce further participants. Through the snowballing process, the initial group of interviewees assisted the researcher to find other interested participants.

Since the objective of this study is to explore multiple perspectives of the KT practice in relation to the EPR project, participants were selected by means of purposive and snowball sampling techniques. These techniques were aligned with a heterogeneous sampling and a variation strategy. The heterogeneous sampling technique was also employed to get as much variation as possible in choosing the samples where the participants differed from each other on a major aspect; this was done to be concordant with the work documented by Holloway & Wheeler (2010). The heterogeneous sampling was employed to gain an understanding of both clinical and non-clinical processes of KT practice, in relation to the EPR, which were performed collaboratively among heterogeneous members. The purpose of these techniques was to identify the interviewees based on their involvement in the EPR project (e.g., health professionals: doctors, nurses, medical and non-medical managers and technicians). Table 5.7 depicts the interviewees' category.

## 5.4. Methods and Procedures of Data Collection

Research methods are defined as the techniques used to gather the data in a particular situated-practice. These techniques should be consistent with research-inquiry, philosophical assumptions, and research-strategy. Techniques are used to gather and analyse data in order to answer the research questions at hand and to achieve the research objective(s). Research methods clarify the way(s) the researcher may use techniques to conduct fieldwork (e.g., how the data will be collected?) (Saunders *et al.*, 2011). In the social studies, the literature provides many ways to carry out the data-collection and analysis such as questionnaires, sampling, statistics analysis, observations, interviews, focus group, content analysis, grounded theory, thematic analysis, and template-analysis (Bryman and Bell, 2015; Wiles *et al.*, 2011; Silverman, 2013; Flick *et al.*, 2011; Easterby-Smith *et al.*, 2012). On the one hand, methodologically, interviews, focus groups, and observation as qualitative data-collecting methods are analytically associated with thematic analysis, grounded theory and template-analysis. On the other hand, questionnaires and samplings are considerably quantitative methods and they are associated with statistical analysis.

In order to compare between the quantitative and qualitative techniques of data-collection, surveys, questionnaires and experiments are considered the main tools for data-collection in the quantitative social science (see

Table 5.5, and the Appendix C.2 for more details). The crucial differences between qualitative and quantitative approaches, and the choice between them, are strongly influenced by the researcher's ontological and epistemological assumptions (Hesse-Biber and Leavy, 2006; Checkland and Holwell, 1998).

**Table 5.5. Differences between the Quantitative and Qualitative Methods**

| Quantitative researchers | Qualitative researchers |
| --- | --- |
| Quantitative researchers mainly look for a cause and effect relationship or try to prove a causal relationship. | Qualitative researchers mainly look for meanings in the social context. |
| Quantitative researchers favour the formal writing style when writing up their conclusions. | Qualitative researchers favour writing informally and they prefer to write very rich and detailed descriptions about the phenomenon being studied |
| Quantitative researchers also randomly choose large samples and employ a deductive process whereas | Qualitative researchers carefully select a relatively small sample and employ an inductive process in their research. |

*Source: King and Horrocks, (2010), Creswell, (2013), and Boeije, (2009).*

## 5.5. Rationale of Qualitative Methods as a Research Approach

According to Ospina, (2004), the qualitative-strategy would be adopted when limited research is available for a particular issue or when it has not been studied before. In this case, there is a scarcity of research on KT-in-practice in the literature relevant to the NHS healthcare-context.

Moreover, Yin, (2013) argued that qualitative-research strategy is better to be adopted when studying and examining a complex phenomenon. The case in question (NHS healthcare) has been proven to be complex enough to fall under that category. In addition, Ospina, (2004) suggested that when researchers try to understand the phenomenon from different perspectives from the people's, or stakeholders' —what this research aims— the qualitative-research is the most appropriate approach. Also, the qualitative-strategy is also more valid approach to be adopted when researchers attempt to draw a comprehension of how people perceive a particular phenomenon (Tewksbury, 2009). In particular, Britten, (2010) suggests that qualitative-methods provide integral information on facilitators and barriers to understand system-implementation and communication mechanisms.

According to Creswell, (2013), one of the main characteristics of qualitative-research is the multi-faceted view of social phenomena, whereas, the qualitative-research endeavour to assemble a conventional view of the phenomena under research. The qualitative scholars, then, look at a social phenomenon from multiple perspectives to sketch the larger picture. In this research, the qualitative-strategy is more convenient to be adopted in order to understand the KT-practice in healthcare.

To sum up, the KT-system in the NHS-healthcare is quite complex in terms of assembling specialists, departments, locations and stakeholders. Using quantitative-strategy is not feasible as it

relies on finding causal relationships in the data, which is not the focus of this research.[11] Also, a quantitative-strategy does not help answer questions with specific focus on meanings and culture (Collingridge and Gantt, 2008; Ospina, 2004). Therefore, these issues are exploring from different perspectives. I qualitatively investigate and analyse a complex phenomenon that it is related to multiple perspectives of knowledge-circulation in action. Indeed, the main research objective is to get in-depth different views about understanding the complexity of the KT-practice in the NHS healthcare-context, and thus a qualitative strategy is carefully chosen.

## 5.6. Fieldwork: Methods and Procedures of Data Collection

### 5.6.1. Semi-Structured Interview

Many authors considered interviews as the main technique to collect primary-data in qualitative studies (Myers and Newman, 2007; Easterby-Smith *et al.*, 2012). This technique has three main kinds, namely: unstructured, semi-structured and structured interview(s) (Tellis, 1997; Easterby-Smith *et al.*, 2012). Unstructured interviews have no specific arranged questions, which give less power for interviewees/interviewers to control the process. This type allows questions to emerge freely around a certain topic. The semi-structured interview usually has a soft structure, which can be re-configured during the interview. It also allows the interviewer to ask different questions to different interviewees. All participants in the structured interviews are asked the same questions. Also, each of these questions should be read word by word by the interviewers to ensure 'neutrality' (Denzin and Lincoln, 2011). Choosing between these two methods in the qualitative-studies mainly depends on research-inquiry and researchers' assumption/s.

In my study, I have, then, used a semi-structured interview as the main technique/tool to collect the data in my work. The semi-structured interviews include questions about the main issues around the KT-practice and knowledge-implementation among of multiple perspectives. Questions in the interview-protocol are developed based on a detailed literature review, and a pilot-study which focuses on different practices at a hospital (see the Appendix C.3: Interview Protocol). Drawing on inductive studies, the analysis is iterative as the data is revisited constantly (Eisenhardt, 1989). Having presenting the advantages of the semi-structured interview, there are still a few limitations to be considered. For example, time limits might affect gaining a comprehensive view and an adequate multi-faceted understanding of the phenomenon at hand. Moreover, the time limits might not be enough to establish the trust needed to allow interviewees to share their personal experiences. Another limitation is related to permission and access to organisations/hospitals in order to meet the participants.

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[11] To do justice with the reality of knowledge-in-healthcare, this research is prevented from becoming "a prisoner of P-value," of what is considered up-front right or wrong.

Semi-structured interview technique is deployed in this study to achieve a much better understanding of the ways in which knowledge is transferred and to elicit the lessons learnt from agents such as individuals and groups within the BP Trust. This research considers that information with objective(s) is actually Knowledge. Thus, the EPR can be regarded as a project of knowledge management, transfer and learning. Moreover, in this work I have explored knowledge transfer practice on the basis of multiple perspectives of different actors (sender, receiver, relationships, knowledge, technologies, methods, and context).

Since the conceptual framework (p. 91) illustrates the complex relationships between multiple views of the organisation (i.e., Managerial, technical and professional) and KT practice, the Interview Protocol (Appendix C.3) covers two dimensional questions:

The first dimension aims to demystify the technical and managerial issues in relation to the EPR project implementation. This dimension was broken down into:

- Questions about General Hospital Information (most of which were addressed only to the management board), and Technological Issues (most of which were asked to the managers and/or technicians) aim to understand the richness of the context and to simplify the hospital settings.

- Questions about Organisational Issues (most of which were asked to the managers and/or technicians and/or medical staff), and environmental Issues (most of which were addressed only to the management board) aim to provide a deep understanding of the context.

The second dimension aims to illustrate the ways of practicing and transferring medical and non-medical knowledge in the Trust at hand. Questions were about practicing Knowledge Transfer by tackling the type of communication and interaction among professionals, the nature of knowledge in the healthcare context, and the intentional dimension of the KT practice (most of which were asked to health-professionals and clinical managers) (See Appendix C.3). Thus, the value of interview protocol lies in its ability to provide rich insights and directions for future inquiries. At each semi-structured interview, the interviewer provided a briefing to help the respondents understand the phenomenon of interest and the matter at hand and also to avoid any terminological confusion.

### 5.6.2. Participant Observation

This research explores the development of KT-practice as a society at the professional level in the healthcare sector. Frequently, there is new software as well as hardware-technologies applied in this sphere (e.g., communication-technologies and/or apparatuses). These developments, which may be complicated or require spending a long time to fathom, are facing huge challenges in practice. This issue also creates pressures on how developers and providers of healthcare-technology should behave.

Accordingly, qualitative-studies need to find more about the narratives of electronic or non-electronic technologies and alternative sources of communication at the practice level.

As an observant-participant, I conducted situated-observation through this inquiry: how did professionals use the EPR at the A&E department? I followed the circulation of knowledge for ten working days. This observation took place between May-June 2015. My role was to see the EPR at work onsite (Lyon, 2013). Such a chance enabled me to observe the professionals (doctors and nurses), and patients in their everyday-life setting after implementing the EPR (i.e., the transformation system) (Myers, 2013). Written notes were taken to document the participants' activities and controversial issues in the participants' daily interactions. The aim was to get first-hand knowledge of processes. At this stage, the researcher was only an observer with limited interaction with the staff, and with no interaction with the patients or their data because the focus of the research in addition to patients' confidentiality. The observant-participation exploration aimed to capture a level of insightful practice, and to evaluate how the EPR would facilitate effective and efficient care-delivery services. The observation records were discussed later with the participants with the aim to improve the reliability of the information and to avoid any misunderstanding. The analytical result was added in Chapter 6.

### 5.6.3. Archival and Case Documentation

The qualitative scholars recommend conducting archival analysis (e.g., project business case) for complicated industries where both private and public sectors are involved (Majima and Moore, 2009; Berg *et al.*, 2004). The archives usually reflect the institutional narratives, including objectives and strategies. As a researcher, I asked for access to the business-case of the project in addition to other archives which were related to the EPR-project case. The manager agreed to give permission to look at the documents that reflect the institutional narratives, but without mentioning the factual figures. This request was appreciated by the BP-Trust and agreed with the researcher.

## 5.7. Fieldwork: Research Scope and Selection of Respondents

The focus-group of this thesis was the staff in the EPR-system, thus the range of selection of respondents for interviews was limited to the staff in the NHS-hospitals, which made the case for this research. Through the interviews, the main purpose was to get in-depth information regarding how the KT-practice is conducted in the daily-work between different departments in the community under research. In addition, I aimed to link these issues with the existing problems during the KT-practice. In order to get reasonable and reliable empirical data, the most important two characteristics of the selected respondents were diversity in functional roles and diversity in levels of experience. The range of respondents should cover different functional roles from different departments and also span senior and junior workers in each department.

The healthcare situation reveals that diversity and integration are always essential between different participants, departments, and communities during the new implementation. Due to this diversity, the scope of this research covered the following types of stakeholders:

- EPR owners (Information Technology - IT specialists) were interviewed to explore the characteristics of tools used in KT at the NHS-Hospitals. This type of stakeholders can strongly influence the network-performance by their ability to control the flow of knowledge.
- Administration staff and decision-makers were interviewed to explore the characteristics of the context of KT-practice at the BP-Trust.
- EPR-users (general physicians, surgeons, specialists and consultants), and assistant medical staff (nurses, technicians) were interviewed to explore the characteristics of sender/receiver, and the relationship amongst them as issues of KT at the NHS-hospitals.

This research tries to investigate one thorough case-study (BP-Trust). Also, most of participants in this study were involved in the pilot-project run by the Council of Health Services concerning the exchange of medical knowledge and health information.

During this research, data were generated as a result of observations and interviews with key stakeholders (system developers and system users) at the NHS-hospitals. The semi-structured interview protocol was designed to conduct semi-structure interviews to collect data, as this would allow interviewees to discuss and help the researcher acquire information about issues of knowledge-in-practice from a socio-technical perspective. These issues were studied by using the socio-technical assumption to analyse knowledge, sender/s, receiver/s (actors), context, and tools. Moreover, the in-depth semi-structured interviews with the aforementioned stakeholders were conducted to get a deep and multi-faceted view of issues affecting the KT-practice at the BP-Trust.

In this study, three phases of distinct methodologies were conducted in order to get a multi-faceted picture of, and deep understanding issues on, the KT-practice. These phases are:

- Phase 1 (Pilot-study): A well-defined structured methodology for using a pilot-study to investigate the field is necessary in complex situations such as healthcare. In this phase three developers and four EPR-users were interviewed. These participants were called the first group at a hospital at the BP-Trust. The pilot-study detected problems of the interview-protocol (e.g., wording of questions, and meeting time). It helped clarify the logical style of the tools (interview and observation). It also tested the ability of the interviewer to manage the research techniques and to know whether further training was needed (see more in Appendix C.3).
- Phase 2: The interviews were analysed and developed throughout continuous interactions between the interviewer and the first group of participants. This analysis was designed to help

the researcher better understand the particular situation of NHS-healthcare and generate the interview-protocol.

- Phase 3: As the objective of this research was to obtain a deep understanding about the KT of NHS-healthcare situation, the expected number of interviews was 25-30, with participants from different backgrounds (finally 30 interviewees, see Table 5.7). The aim of the interviews was to reach the epistemic saturation about this research topic.

## 5.8. Fieldwork: Research Methods of Data Analysis

### 5.8.1. Rich Pictures

The rationale of the Rich Picture (RP) is that the complexity of human affairs arises from the complexity of the varying interacting relationships (Bell and Morse, 2013). The NHS includes macro-, meso-, and micro-level stakeholders that interact across different relevant systems. Two types of rich-pictures have been developed: inclusive pictural RP (Avison and Wood-Harper, 2003; Wood-Harper and Wood, 2005), and hand-drawing RP (Bell and Morse, 2013). The Rich Pictures in this research resulted from my observation and were followed-up by the template-analysis of the interviews.

### 5.8.2. CATWOE Analysis

Sensing and modelling each picture has been developed using CATWOE-analysis. According to Checkland, (1988), CATWOE consists of six components (Customer, Actors, Transformation Process, World view, Ownership, and Environment), by which researchers could construct the root-definitions of proposed EPR. In so doing, challenges of CATWOE-analysis have been reviewed to avoid re-inventing the wheel (Basden and Wood‑Harper, 2006). CATWOE served to define an enriched explanation of worldviews in relation to the research problem. Thus, in the present case-study, CATWOE is used through a two-level clarification: the NHS level and the BP-Trust level (see Chapter 6: Table 6.1 and Table 6.6). Likewise, three 'Rich pictures' have been introduced in the next chapter, with the aim to reflect the technical, managerial, and professional perspectives (TMP).

### 5.8.3. Template-Analysis

Cassell and Symon, (2004) argued that the way used to analyse qualitative-data is responsible for extracting the meaning which is offered by the same data. For example, in-depth interviews offer good potentials that require generating many levels of themes and codes (Miles and Huberman, 1994). This technique is referred to as thematic analysis that is mainly used to identify main topics of the textual data that helps answer research questions (Miller and Crabtree, 1992). Thematic analysis is used by grounded theory analysis, template-analysis and matrix analysis (King and Horrocks, 2010). Template-analysis is defined as an approach to analyse that qualitative-data through identifying and classifying different themes, or a 'codebook'. According to King and Horrocks, (2010), template-analysis is useful to conduct an inductive qualitative-research when researchers start from the flexible priori themes by which researchers take a middle position between the Grounded Theory (GT) and

Matrix analysis. GT requires the researcher to extract the open codes from the gathered data, because GT encourages the researcher to start from collected data passively. However, Matrix analysis requires rigid priori themes by which all the collected data should be fixed in.

According to King and Horrocks, (2010), the priori themes would be created based on the literature review, research-inquiry, objectives and interviews in order to create the initial template(s). In this research, I created the initial templates through the coding processes which require reading the data and clarifying them under similar topics or broad themes. Subsequently, these themes were modified through the same processes. Each broad were modified and supported by sub-themes through more detailed manual coding. These processes help format more specific groups within each theme by building the hierarchical codes. This hierarchical coding shows different level of relationship between the themes and the transcribed data. For example, broad themes and sub-themes provide a general direction of the transcribed interviews, whereas the sub-themes on the lower level of coding help filtering the interviews among different cases and issues. These process of data analysis followed the guidelines of Braun and Clarke (2006), and involved six phases of analysis (see Table 5.6).

**Stage 1: Familiarisation**

Familiarisation includes the process of immersing researchers with raw data by listening to recordings, transcribing, reading the transcripts and reviewing the field-notes (Braun & Clarke, 2006). At this stage, I spent a considerable number of hours (i.e., one hour for each ten minutes of recorded material), immersing myself in the thinking, brainstorming and preliminary mind-mapping on how to process the collected raw data. This stage included listening to and transcribing all of the recorded interviews and reviewing all the field-notes. The documentary sources of the case study were also subjected to the familiarisation process where all documents were read, commented and reflected on. During this stage, many emerging notions and issues were recognised such as the different between the human intentionality and the material potentiality. These notions were relevant to the understanding of A&E work, which was further incorporated during the analysis stage afterwards. As a result, most of these ideas were reflected later in the findings.

**Stage 2: Generating Initial codes**

The coding process started when I started to be more familiarised with the data. At this stage, data were examined line-by-line in order to identify initial codes and classify into categories. This stage involved an iterative process by which initial codes and data segments were compared and further analysed to allow for the development of new codes and categories and the refinement of the existing ones. Thus, codes were marked at the margins of the text before they were copied to another word document to allow easy groupings of similar codes. It was an iterative process where the developed codes were checked and re-checked in a self-reflective practice that ensured objectivity,

resulting in a reconsideration of previous choices: giving a segment multiple codes or fully removing a segment to a different code. I found many connections between codes and thus. the codes that had similar content were double-checked by looking at the sections included in each code. The double checking of connections and categories provides insightful understanding in line with the recommendations provided by Polit and Beck (2013). Examples of codes included patient admission processes and patient arrivals, staff doing the registration process, and staff doing observation and using EPR to do documentation. These codes were then created by using NVivo notes and manual marking for the next step, i.e. searching for themes. Table 3.3 lists some of the sample codes and its related vignettes.

**Stage 3: Searching for Themes**

According to King and Horrocks (2010), the initial themes would be created based on the literature review, research-inquiry, objectives and interviews in order to create the initial template(s). In this research, I created the initial templates through the coding processes which required reading the data and clarifying them under similar topics or broad themes. The coding process was using three levels of categorisation: open coding, axial coding and selective coding (see Figure 5.5). Open coding was creating the code based on a specific node: a sentence or a paragraph. Axial coding was applied through re-reading and re categorising the open codes. Then, the selective coding was processed through re-reading the axial codes and selecting themes through collected categories.

Subsequently, the themes were modified through the same aforementioned processes. Each theme was modified and supported by sub-themes through more detailed manual coding. These processes helped format more specific groups within each theme by building hierarchical codes. This hierarchical coding showed different levels of relationships between the themes and the transcribed data. For example, broad themes and sub-themes provided a general direction of the transcribed interviews; whereas the sub-themes on the lower level of coding helped in the refining of the interviews among different cases and issues. Moreover, the thematic framework was constructed by creating and categorising codes. This stage identifies the themes reviewed in relation to the coded segments and the entire dataset.

The final thematic framework consisted of two main themes with sub-themes. The first theme discussed the characteristics and functionalities of the EPR project at hand, in supporting the collaborative nature of A&E work as well as in terms of handling the issues faced with existing information architecture and project implementation. The second theme discussed the KT practice in terms of components of services, staff, medical and non-medical processes. This included discussion on the roles and responsibilities of the multidisciplinary members of teams as well as the execution of medical and non-medical processes. Overall, the construction of the thematic framework of this study

was continuously developed and polished as the analysis proceeded; this receives support from the work produced by Ritchie & Spencer (1994).

**Stage 4: Reviewing Themes**

NVivo was mainly used during the Theme reviewing process, which was preceded by exporting word files of the interview transcripts and observation field-notes to NVivo. One of the steps of processing was moving the textual data from their original written documents to NVivo nodes. These nodes were created to represent the categories and codes developed in Step 3. While pieces of data from the interview transcripts and observational notes were being reviewed, nodes or sub-codes were continuously updated and refined. Note that the refinement of categories is the norm in qualitative analysis (Flanagan et al., 2011). NVivo was a good tool in supporting the process. This tool made it feasible to refine the initial coding framework and to go through several iterations, but it was the current researcher who came up with the coding framework and made sense of the data processing.

**Stage 5: Defining and Naming Themes**

At this stage, concepts and associations between themes were determined in order to provide an interpretation of the findings, after Pope et al. (2000). During this process, I interpreted the data as a whole. This included defining the concepts, finding associations, providing explanations and developing strategies to support the interpretation with corresponding literatures. This process also included developing the knowledge flow diagrams. Afterwards, the interpretation from the case study is summarised and discussed in the results and discussion chapters. This also includes a discussion on the similarities and differences of the case study findings.

**Stage 6: Producing the Report**

This step was conducted to finalise the analysis. This step included a selection of vivid and compelling examples from the transcribed data. Producing the report was used to link the research questions to the findings of the case study.

The transcription and coding processes were addressed by following these phases. In so doing, the researcher familiarised himself with the collected data and ended up with producing the final report. This was followed by the creation of initial codes from the textual data. Then the final themes were created through searching, reviewing, defining, and naming in the report.

**Table 5.6. Thematic Analysis, Guidelines for Analysing Transcribed Data**

| Phase | Description of the process |
|---|---|
| **Familiarizing yourself with your data** | • Transcribing data,<br>• Reading and re-reading the data,<br>• Noting down initial ideas. |
| **Generating initial codes** | • Coding interesting features of the data in a systematic fashion across the entire data set,<br>• Collating data relevant to each code. |
| **Searching for themes** | • Collating codes into potential themes,<br>• Gathering all data relevant to each potential theme. |
| **Reviewing themes** | • Checking if the themes work in relation to the coded extracts (Level 1) and<br>• The entire data set (Level 2), generating a thematic 'map' of the analysis. |
| **Defining and naming themes** | • Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells,<br>• Generating clear definitions and names for each theme. |
| **Producing the report** | • The final opportunity for analysis.<br>• Selection of vivid, compelling extract examples,<br>• Final analysis of selected extracts,<br>• Relating back of the analysis to the research question and literature,<br>• Producing a scholarly report of the analysis. |

*Source: (Braun and Clarke, 2006).*

For producing these codes, a variety of tools/applications, including Computer Assisted Qualitative Data Analysis Software (CAQDAS) can be used. NVivo as one of these applications was used for initial stages of coding based on practical and personal preference. This useful software allows the researcher to index segments of the text to particular themes, carry out complex search, conduct retrieval operations quickly, and link research notes to coding. However, it is hardly surprising that software only aids organisation of the material and is not in itself an interpretive or analysis device (King and Horrocks, 2010). Yet, computerisation allowed the researcher to work with large amounts of text and complex coding-schemes efficiently, but it could not facilitate depth and sophistication of analysis. To analyse the findings and better understand the research implications, all issues were mapped into the revised KT-practice (see theoretical frameworks in Figure 4.4 and Figure 4.4 in Chapter 4).

Thus, why Template-Analysis? Template-analysis helps examine the different perspectives (TOP) of providers, regulators, software vendors, intermediaries, and end users involved in the KT-practice in the EPR case-study. While I was developing the templates, some themes were revealed of

great importance to participants, but laid outside my research scope. For further research, examples of these issues are how the KT and mobile devices empower women's needs in the healthcare industry.

### 5.8.4. Hermeneutics and Semiotics Assumptions

This research had applied semiotics, and hermeneutics assumptions of interpretation, because practice-analysis requires the link between discourse and application. Semiotics is branch of linguistics that tries to interpret the meaning of communication based on a system of signs (i.e., systems of meaning-making). Semiotics is the approach that deals with semiosis activities including the production of meaning though the indication, designation, analogy, symbolism, metaphor, and signification. Therefore, semiotics, as type of interpretative methods, tries to extract the meaning based on the context rather than objective isolation. These reasons among others make semiotics more convenient for the contextual analysis of the data collected by observation and *also* more consistent with the research philosophical assumptions. Figure 5.5 illustrates the systemic research-methods of data-collection, processing, and analysis.
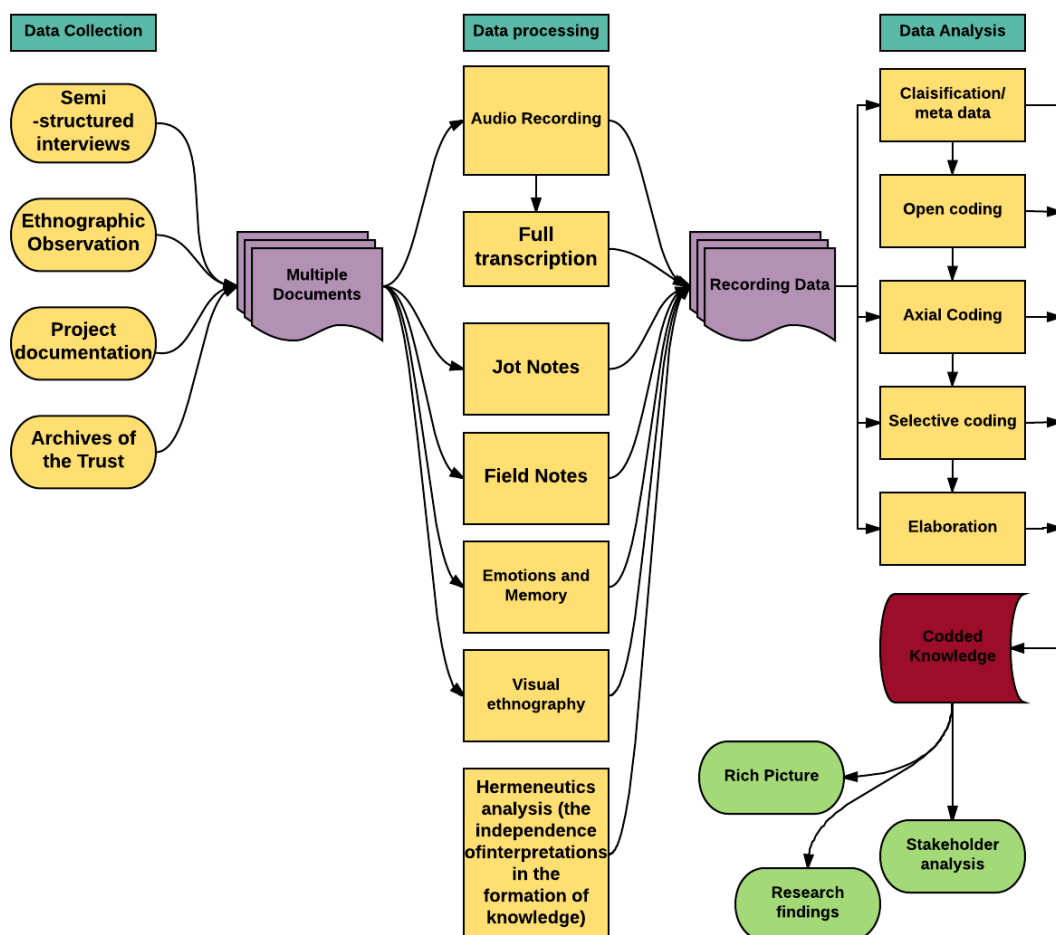


**Figure 5.5. Data Collection and Analysis Processes**
*Source: Strauss (1987) and Flick (2008).*

121

### 5.8.5. Research Validity and Reliability

Yin, (2013) explained that 'construct validity' is the way to establish correct operational measures for the subject under investigation and Yin proposed several approaches for the researcher to increase construct-validity when carrying out case studies. There is an ambiguity regarding the validity in qualitative-research (Benz *et al.*, 2008; Onwuegbuzie and Leech, 2005). Lincoln *et al.*, (2011) argued that because reliability is a necessary condition for validity, proving validity in qualitative-research is enough to establish reliability. First, in order to deduce research-validity, researchers need to determine the exact scope of the phenomenon under investigation. Also, they need to accurately specify the sources that will be generated in order to provide evidence for the researched phenomenon. Second, studies need to use multiple sources to collect the data through via different methods in order to increase convergent lines of research question(s) (Yin, 2013). Multiple methods to collect the data through many sources are used to insure the survey is done by examining a phenomenon from different angles, what is termed as 'triangulation'.

According to Yin (2013), there are four types of triangulation.

- The first is through observation, e.g., observing different people in different time at the same location.
- The second is data triangulation, by using qualitative and quantitative data together to answer the same question.
- The third is methodological triangulation, which is to look at a phenomenon using subjective and objective approaches.
- The fourth is theory triangulation, a synthesis between two main theories such as functional theory and symbolic interaction in order to validate the phenomena under investigation.

Finally, the above-constructed validity-criteria can enhance academic research by applying an analytic tactic of *pattern-matching* (e.g., thematic analysis, grounded theory, or template-analysis) (Yin, 2013).

In this research, I triangulated the research findings through three approaches. First, the research's theoretical framework was constructed based on two main theories (Systems Thinking and Szulanski's metaphor related to the sender, receiver framework). Second, evidences are obtained through three main resources of data (observation, interviews and documentation) in order to collect evidence for the research's line of inquiry. Thus, semi-structured interview collection technique was used along with documentation review and interviews with seniors (participants) from a range of different positions to gather the required data. Finally, the research findings were compared with the findings of other studies. Moreover, this research used the template-analysis, which included the

thematic-analysis method as analytic tactic of pattern-matching in order to extract the knowledge from the qualitative data and to construct validity in research.

The final approach for enhancing the validity of the research results is to have the draft case-study report reviewed by key informants. This is why I planned to review my analysis and findings with key informants in the NHS healthcare-context.

In summary, to enhance the validity and reliability within this research, the following steps were taken into account:

1- Checking and reviewing the interview questions with practitioners and academics specialised in healthcare and KT.
2- Doing a pilot-study with practitioners in the healthcare sectors and with academics specialised in healthcare and KT.
3- Interviewing more than one person from each position in the hospital.
4- Checking the findings with healthcare experts, and making comparisons with other literature's findings.
5- Presenting the findings in a conference.

### 5.8.6. Describing the In-depth Interviews

The 30 interviews were conducted face to face with 6 technicians, 5 project managers, 5 clinical managers, 2 IT managers and 12 health-professionals (7 doctors and 5 nurses) (see Table 5.7). The interviews were one hour and half on average, but some interviews took more than three hours. For example, the interviews with the manager of the Informatics Department took *circa* 3.5 hours conducted over three meetings. The interviews were usually semi-structured interviews where the participants were encouraged to discuss their opinions and experiences of the KT-practice in relation to the EPR-project. Most interviews were conducted at the interviewees' offices, except in some cases when they were conducted in a common room at the hospital. The main idea was to ensure that interviewees were comfortable and confident in the interview-setting.

The case-study was considered a research-method and the BP-Trust was chosen as an empirical sample. In addition to participant-observation, in-office meeting enabled the researcher to construct a detailed picture of the interviewees' interactions and the rationale of their actions. It is worthy to mention that the case-study strategy was not decided at the beginning of the fieldwork. However, when the pilot-study was conducted, and after reading numerous documents about IT strategies and projects, the case-study seemed to be very suitable with the estimation that the data being collected would be deep and broad enough.

The interviewees were promised to be anonymised, and they were promised that their transcripts will be used only to conduct this academic research. This strategy was very appreciated by most of the interviewees who agreed to be recorded. Thus, all the interviews were recorded and later transcribed word by word. The transcribing processes involved listening to the recordings repeatedly. Also, pointing and synchronising the time with the scripts was important, whenever a point was not very clear. In addition, notes during each interview were taken. Since the deep meaning was required, some interviewees were asked to use the notebook to illustrate their ideas, as shown in Figure 5.6.

**Table 5.7. Interviewees Involved in BP-Trust Case.**

| General Category Of The Sample | Participants | Number | Named in the data analysis chapter |
|---|---|---|---|
| Managers | Project implementation team members | (5) | ➢ Head of the Informatics Department<br>➢ Clinical Director<br>➢ Development Manager<br>➢ Clinical Change Manager<br>➢ Technological Director |
| | Clinical managers | (5) | ➢ Nurse Medical Manager<br>➢ The lab manager1<br>➢ The lab manager2<br>➢ The lab manager3<br>➢ Medical Manager of the A&E |
| | IT managers | (2) | ➢ IT Project Manager<br>➢ E-prescribing Project Manager |
| IT staff | Technicians | (6) | ➢ Technician1<br>➢ Technician2<br>➢ Technician3<br>➢ Technician4<br>➢ Technician5<br>➢ Technician6 |
| Health professionals | Clinicians | (7) | ➢ Consultant1<br>➢ Consultant2<br>➢ Consultant3<br>➢ Consultant4 |
| | | | ➢ Doctor1<br>➢ Doctor2<br>➢ Doctor3 |
| | Nurses | (5) | ➢ Nurse1<br>➢ Nurse2<br>➢ Nurse3<br>➢ Nurse4<br>➢ Nurse5 |
| Sum $\sum$ | | (30) interview(ee)s | |
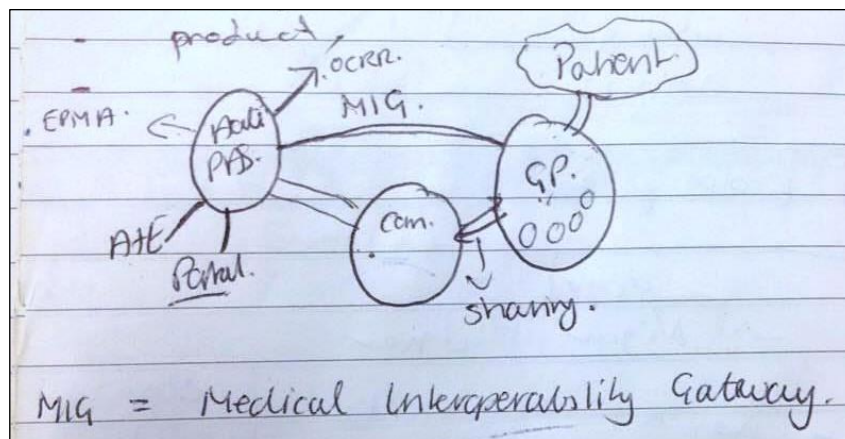


**Figure 5.6. A Note drawn by one of the project managers**

When the transcription was done, the meanings became much clearer, and most of the themes emerged, as well. In fact, the transcribing stage was vital where theory started to be articulated, and where many category patterns started to become evident. The interviews' transcription was conducted

by the researcher, who gained time to become more familiar with the deep and broad meaning of the transcripts. This process was very time-consuming, as each hour of actual recorded interviews required a ten-hour careful continuous transcription-work. Although the transcription processes were very time-consuming, it improved the level of familiarity and the skills of dealing with qualitative-data more carefully and thoroughly. Subjectively, it can be argued that handling qualitative-data may require higher level of patience and sensitivity to enrich the accrued meaning. This issue is also supported by many qualitative theoreticians (e.g., King and Horrocks, (2010), and Easterby-Smith *et al.*, (2012)). All the interviewees were asked to give their contact details to be used if the researcher would have any further queries after the revision of the interviews.

### 5.8.7. Using Computer Packages (Use of NVivo)

At the early stage of data-analysis, the researcher decided to use NVivo as a computer-application which can be used to manage and analyse data. NVivo is defined as a Qualitative Data Analysis (QDA) application of the family of Computer Assisted Qualitative Data AnalysiS (CAQDAS). I used NVivo to store all the case-study data, including transcribed interviews, and other documents supporting the analysis. NVivo was used to analyse unstructured/non-numerical data. In addition, many articles that had direct relationship with the research were stored in NVivo. The University of Manchester provided doctoral researchers NVivo free-access, which encourages me to attend two training-workshops at Leeds University and at the Alliance Manchester Business School.

In practice, I adopted an open-coding approach in order to build a model out of the collected data. All the transcribed interviews were coded by using the NVivo. Table 5.8 illustrates a screenshot of most of the generated nodes in addition to references and sources for each one. Since the interviews had been classified by way of coding, many attempts were conducted to analyse the codes (*nodes*) using NVivo. However, I found that NVivo was greatly limiting the word-count and word-trees underpinning the analysis. The practice showed that NVivo did not allow doing the analysis using the selected method. Therefore, NVivo was abandoned and I opted for a manual analysis. I printed out all the coded data from NVivo and used these as the basis for my analysis.

Mentioned that, the new strategy was not very productive in practice and this encouraged me to 'alter' my research methodology. Therefore, after a tedious spell of lengthy troubleshooting, I decided to abandon using NVivo as a tool to aid the data-analysis. Table 5.8 is only an example of what had been done as part of the practice with the software.

**Table 5.8. Screenshot of generated Nodes by using the NVivo**

| Look for | | | Search In | | Nodes | Find Now | Clear | Advanced Find | |
|---|---|---|---|---|---|---|---|---|---|

**Nodes**

| Name | References | Sources |
|---|---|---|
| AS IS and TO BE, being to becoming | 5 | 18 |
| Case study | 2 | 6 |
| CyberLab Order Communications product | 3 | 14 |
| EPR | 0 | 0 |
| Ethnography | 7 | 29 |
| Habitualised behaviours | 7 | 27 |
| Interdependencie | 3 | 7 |
| Knowledge Portal | 1 | 1 |
| Knowledge Transfer | 2 | 3 |
|     Cha of relationship between sender and receiver | 3 | 7 |
|     characteristic of technology | 7 | 21 |
|     characteristic of the context | 4 | 8 |
|     Characteristics of knowledge | 3 | 15 |

## 5.9. Fieldwork and Reflection on the Research Methodology

Since conducting a research is a learning journey, the learning perspectives of a case-study approach helped the researcher get involved in the data-driven practice and decision-making. The data collection in any case-study is only part of the entire narrative. Therefore, researchers can make use of their case-studies as an opportunity to use relevant data to take decisions. Case-studies help appreciate complex real-world situations (Yin, 2013; Jensen and Aanestad, 2007a). In the case-study, the present research reflected on a four-year period of the EPR-implementation through KT-practice analysis. This four-year plan allowed tracing and tracking many important issues in the KT-practice and the EPR. For example, when the data are collected separately from the real-world, everything may look linear. Here, looking at an EPR-business case may reveal many conditions as fixed and by which the desirable outcomes should be achieved. However, the real-world complexity of the NHS and/or hospitals does not work in a linear way. At the NHS-management level, the real-world situations can be more complex based on a vast array of issues including internal, external, environmental, political, non-political, patient professional and non-professional dimensions, and so on and so forth. Thus, case-studies represent opportunities to acquire deeper-and-broader understanding to deliver new as well as novel answers derived from the real-world situations of the NHS. Moreover, case-studies are typically open-ended problems, which mean that there are no right or wrong answers, but there is only coherent and plausible interpretation of the situation and context.

The main mission is about the process of real-world data-analysis. This should deliver a rich-picture that helps in the understanding and hence the illustration of a specific case or a phenomenon in profound fashion that integrates the individual and organisational learning and KT into the process. Finally, since data was collected also through interviews, the case-study approach helps in the discussion of and dialogue on the interviews' transcriptions. In research, case-studies can be conducted to combine an ethnographic observation, and generated conversation between researcher/s and participants. Case studies, therefore, make such an integral part of the research-strategy by which

research-data can be collected and analysed (Yin, 2013; Jensen and Aanestad, 2007a; Eisenhardt, 1989; Myers and Avison, 2002).

For data-analysis, the case-study approach has comprehensive principles which include multidimensional resources of the data such as documents, observation and inter-subjective dialogue (interviews). According to Yin (2013), a case-study should have four steps towards data-analysis (creating of a data repository, creating codes, generating a variety of reports, and generates the final propositions). This case-study research starts with the situation-analysis. Accordingly, it describes the case-study as a story in order to illustrate a focal multidimensional situation. For example, this procedure was used in stakeholder-analysis by taking note of the key actors and their concerns and perspectives. Examining the structural analysis of the NHS (i.e., first part of the stakeholder-analysis), shows a typical narrative in order to simplify the complexity of the NHS situation as the System Thinking requires. Subsequently, the stakeholder-analysis shows the basics of the key actors internally and externally, in relation to the practice, the classification of which is based on their tenacity and extensiveness. Moreover, based on the real-world practice, the analysis of the intensive and internal stakeholders' practice and perspectives relevant to the EPR-project may develop gradually. At this stage, the analysis should show different perspectives in order to clarify the weaknesses, opportunities and situation sources' of the KT-practice and EPR-project. In this sense, Yin (2013) essentially displayed that the multiple-perspective analysis can be conducted based on the narrative as well as the data given in a case-study. The multiple-perspective analysis included managerial perspectives at different levels, technicians' perspective, and professional perspectives (doctors and nurses). However, the intrinsic and extrinsic basics of the patient perspective are concluded through personal experience, observation and indications through other stakeholders. This issue was justified in my study by proposing that EPR could move outside the A&E department, as it was challenged by the effect of the organisational practice, long time before seeing major effect by patients and/or on patients. Since the situation-analysis is conducted, the analysis goes deeper-and-broader through the case-study narrative and data, trying to identify and distil the key problems of the area of concern.

The case-study showed the difference between understanding the core of a problem and the symptoms of the problem in the practice (see Chapters 6 and 7). For example, analysing the perceptions of the health-professionals showed that their views had a potential narrative central to comprehend the *matters-of-concern*. From the managerial perspective, professionals were consulted and involved in the decision-making to implement the EPR. However, from the professional perspective, the decision, which had been taken externally, was imposed onto the professionals who had little opportunity to choose between two somewhat not good enough projects for them. However, this issue was agreed by the management members, but they considered it rather mandatory, because

they had to choose one project anyway in order to meet the NHS IT-strategy. Also, the management members had an agreement with the Alert Company (the EPR representative), in order to adjust the EPR-project based on the professional KT-practice. As such, the multiple-perspective analysis did help the case-study manifest the area of concern, rather than losing focus when dealing with levels of symptoms of interpretation (Linstone, 1989; Avison *et al.*, 1998). I advocate in my research that such an analysis is required because of the NHS complexity, where one or unilateral view may fall far short of providing the required elaborate realistic understanding on the crux of the problems at hand (Sweeney and Griffiths, 2002).

As demonstrated by Yin (2013), this type of analysis should be the key aspect of the case-study analysis in order to not only acquire a deeper understanding of the NHS situation and the KT-practice, but also reach better clarity in distinguishing between the symptoms and problems. This analysis can be helpful to identify and analyse both available data and missing information that may limit the richness/depth of the analysis (Creswell, 2007).

This analytical approach is estimated to be helpful in the identification of the limitations of the case-study and thus deemed useful to suggest any required further research (Yin, 2013; Zigan *et al.*, 2010; Easterby-Smith *et al.*, 2012). The case-study and multiple-perspective analysis should lead to better understating and defining the area of concern regarding the KT-practice and the EPR. The narrative and *telling-the-story* approach was based, in my study, on the "whys" approach by which the intentionality of a subject (human actors, and/or potentiality non-human actors) was illustrated and linked to emerging events (i.e., *event possibility*).

I based my case-study approach on the symptoms and problems in the medical field (Britten, 2010). To better clarify, the differences between the symptoms and problems need to be discussed. For example, in the healthcare situation when a patient has fever, the degree of the temperature is a symptom, and when doctors dig deeper into the patient's case, they may discover ailment/s that led to the fever. If the doctors do not go deeper, dealing with fever would be then only considered as a second priority of understanding the fever-event. The same thing was applied, in my work, to the BP-Trust and the EPR as well. Here the question in the case of the KT-practice and EPR was on how the researcher would use the "whys" approach.

Starting from the obvious contextual results, the EPR was not accepted as a project at the BP-Trust. This raised a few questions of the "whys" type. The level of "whys" could not be predetermined as in the grounded theory (King and Horrocks, 2010). This was one of the reasons why I did not literally apply the grounded-theory approach. However, the template-analysis was more flexible at this term (King and Horrocks, 2010). As way of illustration, "three whys" are discussed here. First, EPR was terminated because it failed to meet the project plan. Second, the research went deeper-and-

broader when asking participants, who showed high-level resistance about why the project plan was not realistic in their opinion and whether that was related to the internal management of the hospital (referred to as the Trust-Project Implementation-Team). Further speculation was raised on whether the issue was related to the supplier (i.e., Alert Company), or more to the circumstances of the users and their practices, or even owing to a political, cultural, and /or environmental matters.

At this level most likely the views were different, and then the first "why" came, when high level of conflict between different perspectives arose. This was followed by the realisation that different groups might have had different plans and views of reality by which they defined their practices, communication and responsibilities. Therefore, the verbal plan or blueprint plan was changed accordingly, in line with recent research (King and Horrocks, 2010).

For example, on the one hand, the internal management team attempted to make sure that the business case, based on the rational usage of the available resources (e.g., cost-and-benefits), was reflected by the project. On the other hand, the professionals were promised easier and more intuitive work tasks, but they realised afterwards that the EPR made the work more complex for them than before. Furthermore, they complained that EPR-implementation started at the A&E department and that was a bad choice for them.

Moreover, the professional with managerial responsibilities justified choosing the A&E as an initial department for intentional processes of implementation. Health-professionals claimed that they knew that the A&E was the most complex area in the hospital, but if the EPR could have been deployed successfully in it, the A&E could have been then moved easily to a different department and *vice versa*. Through the discussion with the management board, the EPR-supplier argued that the implementation plan changed, because they were trying to adjust the EPR-platform based on the BP-Trust KT-practice, to reflect the real professional-practice in the project. This issue, in addition to 'disconnectivity' among different departments through the EPR, hindered the application of the implementation plan.

Thus, the participants at the A&E, and other departments, became demotivated to join the project and they started to go back to the traditional way of Patient-Record transfer. This indicated that the EPR was not embedded successfully, due to change or resistance. However, the resistance is actually occurred because of a multidimensional factor that created a conflict which in turn ramified along with the matters of power, social intentionality and technological potentiality (McCracken and Edwards, 2016; Håland, 2012). In other words, the EPR was noted sufficient enough to represent a level of synthesis between the conflicted views, and/or it could not hold an acceptable potentiality to motivate different actors to keep acting through it.

The case-study analysis based on the narrative and storytelling approach (i.e., the "whys" approach) helps to understand the complexity of healthcare which is a multidimensional situation *per se* and irreducible to specific terms and factors. Such an approach also may facilitate and bring about much deeper analysis. This analytical approach helps pick and illustrate an accepted level of richness of the area of concern. It also provides a level of flexibility to encompass many new emerging issues. The data-analysis in Chapter 6 is shaped to provide further details. These emerging issues have been considered as backbones of this thesis, especially in the discussion and conclusion chapters (Chapters 7 and 8). The practice-analysis of the case-study was important *to separate the wheat from the chaff* toward a better understudying based on real-world data relevant to real-world situations. This issue keeps the relationship between the research philosophical assumptions and methods consistent and should provide the ability to overcome organisational constraint. Therefore, the Rich Picture and discussion would be more meaningful regarding the situation analysis conducted for the BP-Trust. For example, the lack of the NHS-resources will show how the Systems Thinking can provide clearer ways to create and maintain the balance between the micro- and macro-levels of analysis, where the suggested solutions should fit the levels of NHS orientation and the Trusts. However, the unified description or interpretation (reductionism) of the phenomena has no potential to analyse the problem. Systems Thinking suggests that a synthetic multidisciplinary interpretation is regarded as more logical orientation (De Savigny and Adam, 2009; Rubenstein-Montano *et al.*, 2001).

For example, the researcher's subjectivity would prioritise the rational analysis over other dimensions of the practice and empirical application. Therefore, the multiple-perspective analysis suggests intersubjective and *intra-action* of the events, practice and behaviour, as different ways of thinking about complexity, rather than reducing reality to the theory-and-practice relationship.

Moreover, the case-study and data-analysis approach motivated my study to manage the case discussion, conclusion and further research through suggesting additional questions:

- How does the analysis and discussion deal with the research problem and matters-of-concern?
- How to handle and analyse the current literature?
- What is already covered by the literature?
- What are the gaps that limit our knowledge in this research arena?
- How does this study contribute to the field of healthcare?
- Last, but certainly not least, what are the limitations and recommendations of this research?

The case-study as a research-strategy tries to spotlight the link between identifying real-world problems and providing ways on how to collect, analyse, interpret and reflect on the data associated with those very problems.

## 5.10. Conclusion

In this chapter, the research hierarchical structure inspired by the Systems Thinking, was introduced (see Figure 5.1). Each level of the research-structure, i.e., research-paradigms, theoretical perspectives, methodological assumptions, and research-methods, including data-collection and analysis, provided a more detailed description of the research process, and an effective account of progression through which the exploration was designed and executed. Social constructionism, supported by relative and dynamic ontology, and an inductive research-strategy, framed the basis of thinking in this research. To accomplish a socially qualitative exploration of the KT-practice, this study has taken the form of an in-depth case-study. Adopting a dominant qualitative-approach one an NHS Trust with re-scannable experience in implementing EPR, was selected. In collecting evidences, I deployed standard case-study techniques, i.e., observation, documentary analysis and interview. Finally, critical semiotic and hermeneutic analytical methods were used to analyse the data derived from documentary sources and, lately, template-analysis was applied to analyse the interview data.

# Chapter 6: Data and Fieldwork Analyses

## 6.1. Introduction

This research reflected on a four-year period of EPR-implementation as a transformational-project through a KT-practice analysis. This four-year plan allowed tracing and tracking many important issues along the KT-practice and the EPR. This chapter comprises four sections as follows. The first section introduces the analytical approach. The second piece outlines the research scope and the primary stakeholders. The third part discusses the research focus on the EPR. Finally, the forth section presents empirical data drawn from a multi-perspective analysis (TMP: technical, managerial and professional) in relation to the EPR-implementation.

## 6.2. Data Analysis Approach

A compelling analysis of public health projects requires understanding the multiple dimensions of the context from different perspectives (e.g., stakeholders and groups analysis, communities and healthcare organisations), in which the interviewees live, interrelate and work. Drawing on Systems Thinking to explore a complex setting, the emerging reality out of the interactions between humans and technology, when involved in KT-practice in healthcare, entails new potential solutions to dispel problematic communications and interactions. According to Grimble and Chan, (1995), Stakeholder Analysis (SA) involves "an approach and procedure for gaining an understanding of a system by means of identifying the key actors or stakeholders in the system, and assessing their respective interests in the system" (pp. 2-3). A stakeholder is an individual who affects, and/or is affected by, the policies, decisions and actions of a system. Individuals, communities, social groups or institutions of any size may be accounted as stakeholders (Grimble and Chan, 1995). Conflict between stakeholders can arise from the interrelation and interaction between these groups, as well as from potential competing interests. SA seeks to understand the issue at hand from a multiple-perspective approach, taking these competing interests into account. SA is appropriate when little is known about the stakeholders and actors at different levels of the healthcare-practice, and when investigating complex processes of change (e.g., the EPR adoption) in their everyday-life setting, and the complex dynamics of the KT-practice in such a professionalised-context.

SA has many levels, which take into account the internal, external and general extended environments. SA offers valuable information about stakeholders. In particular, it provides a deeper understanding of their different perspectives and their tendencies regarding communication and any opposition against transformation. SA also facilitates the understanding of the wider impact of transformation on political and social forces, the clarification of conflicting viewpoints oriented towards a particular proposed transformation, as well as the potential power struggles within a healthcare organisation. Likewise, it releases information that is valuable when reviewing a

transformational strategy, and when identifying potential strategies for understanding and negotiating with disparate stakeholders.

The socio-technical analysis of practice is expected to extract the understanding of stakeholders presenting different perspectives within a specific context. Emphasising the viability of socio-technical analysis in understanding different stakeholders, Avison and Fitzgerald, (2003) argue that the socio-technical approach "takes account of the fact that as an information systems project develops, it takes on different perspectives or views: organisational, technical, human-orientated, and so on" (p. 497). In other words, socio-technical analysis, as described in the multiple-perspective approach, is required to identify the social and the technical requirements (programming skills, system structure, database design and financial capabilities). The relational dynamics and socio-technical analysis of the SA, in relation to the EPR-project, were discussed with five active members of the BP-Trust's Board Management (i.e., clinical or practitioners and management team).

In addition to the SA, this research applied part of the Soft System Methodology (SSM), developed by Peter Checkland in the 1990s. SSM aims to explore different perspectives that are relevant to a situation, by asking questions related to the 'real world' (Checkland and Poulter, 2006). High and Nemes, (2009) argue that SSM can make stakeholder analysis more powerful and flexible, thereby making it sustainable. In addition to SSM, this study applied also partially Rich Picture and CATWOE, along with SA, in order to conduct a more comprehensive, deeper-and-broader analysis of the Patient Records and the KT-practice at the BP Trust.

## 6.3. Context and Stakeholders

### 6.3.1. General Stakeholders in the NHS

The UK public health sector entails a hierarchical organisational structure, which is known as the National Health Service (NHS). The NHS includes the public health services in England, Wales, and Northern Ireland and Scotland. This research focuses on a situated-exploration of the organisational structure of the public-health service. The scope of the case-study conducted in this investigation was NHS-England. The NHS-England structure was (re)formed many times, in order to reduce the extent to which politicians can intervene in the day-to-day running of the NHS. The rationale of using both the SA and the Rich Picture tool is that the complexity of human affairs arises from varying multi-component relational-interactions. Systems Thinking serves as a research approach to conduct multiple-perspective analyses of a given system. In order to understand the KM System as a system/technology, and the KT as a practice, this thesis applies two levels of analysis: the NHS as a general system, and the EPR as a specific unit of analysis. Moreover, each level of analysis was developed using the CATWOE analytical-approach. Regarding this approach, Checkland (1981, pp. 224-225) proposed six components to conduct empirical analysis (Customer, Actors, Transformation Process, World View, Ownership, and Environment), through which the researcher

becomes able to construct root-definitions for the UK's NHS. Table 6.1 presents the CATWOE analysis of the NHS as a general healthcare-system. CATWOE was used to draw an enriched explanation of worldviews in relation to the research problem. Therefore, in the case-study of this research, CATWOE is addressed as a two-level clarification approach: the NHS level (Table 6.1), and the BP-Trust level (Table 6.6).

**Table 6.1: CATWOE Analysis of the NHS**

| C.A.T.W.O.E. | | |
|---|---|---|
| **C** | **Customers**: Who receives the benefits of the system? | *The patients* |
| **A** | **Actors**: Who implements the system? | *All the healthcare centres in all levels: primary care, secondary care and tertiary care (e.g. GPs, Trusts, Foundation Trusts, and other social care centres)* |
| **T** | **Transformation process**: Why do they implement the system? | *It is a delivering care by assisting and supporting the patients during the temporal or permanent conditions of illness in order to produce conditions of wellbeing.* |
| **W** | **Weltanschauung**: The worldview or value system espoused | *How to keep the public healthy* *Healthcare centres should coordinate to deliver care when and where is needed regardless the economic conditions and background patient* |
| **O** | **Owner**: Who controls the system? | *Department of Health* |
| **E** | **Environmental constraints**: What affects the system? | *Governmental roles and regulation (e.g. governance, Acts), financial constraints, resource availability* |

The last major reform of the English NHS was in 2010 by the Conservative and Liberal Democrat coalition government, under the Health and Social Care Act 2012. The white paper *Equity and Excellence: Liberating the NHS* stated that the coalition government's ambition was to create the largest social enterprise sector in the world by "increasing the freedoms of foundation trusts and giving NHS staff the opportunity to have a greater say in the future of their organisations, including as employee-led social enterprises" (Department of Health, 2010, p. 5). The coalition government sought to localise the NHS system. For example, the Health and Social Care Act 2012 gave commissioning rights for secondary healthcare to the Clinical Commissioning Groups (CCGs). Knowledge-based management and Stakeholder-analysis can be appropriate processes to understand this reformation (Visram *et al.*, 2014; Wastell, 2011; Mantzana *et al.*, 2007).

Prior to analysing the stakeholders of the English NHS, these were classified into three levels: macro- or regulator level, meso- or inter-organisational and operational level, and micro- or health delivery level (see Figure 6.1). Since 1968, the Department of Health (DH) became a ministerial department in the United Kingdom's government, which has the primary jurisdiction in England. The law was also amended to give the Secretary of State for health less power in relation to the day-to-day running of the NHS (Martin, 2009). Hence, the DH usually tries to interpret what the Secretary of State claims in order to form the policies for health and social care.

### 6.3.2. Macro-Level

At the macro-level, the DH and the Secretary of State for Health are considered the main developers of policies for England NHS. The Secretary of State for Health has a particular focus on financial control and oversight of all NHS delivery and performance, and is hierarchically located between the Prime Minister and the DH. Thus, the Secretary of State is not only accountable to the government, but also it is accountable to the parliament which selects the health committee. The DH is responsible for government policy on health and adult social care matters, and to do so, it develops guidelines and policies in order to meet patient expectations by improving the quality of care. The DH has fifteen Executive non-departmental public bodies, which are called 'arm's-length bodies', and it has six chief professional officers, who are leaders in their professions and provide the DH with expert knowledge about health and social care disciplines (see the Appendix D.1). The DH has also established the National Information Board (NIB) to set up the strategic direction regarding the priorities and commissioning for information technology across the healthcare-system.

The English NHS has two independent regulators: the Care Quality Commission (CQC) and the National Institute for Health and Care Excellence (NICE). Care Quality Commission assesses the standards of care in all health- and social-care providers in England. NICE is an organisation in charge of reviewing the feasibility of medicines. NICE also recommends the English NHS about the use of these medicines. These organisational bodies provide national health regulations and standards, such as national guidance, governance information, policies, and procedures in order to direct, monitor, evaluate and improve health and social care. In other words, NICE and CQC set the standards for the operators based on the policies of the regulators.

### 6.3.3. Meso-Level

The NHS-England has many managerial roles, distributed at the macro- as well as at the meso-level. For instance, in 2014 NHS-England released a five-year forward plan to be deployed at the macro-level. After two years, NHS-England came up with the idea of fifty footprints, which put the NHS-England at the meso-level. In other words, NHS-England commissioned different services at the meso-level. Likewise, there are many other types of organisations at the meso-level. These organisations aim to either commission and or to deliver healthcare for the population. These are classified into three types of care: primary care (General Practitioners), secondary care (acute hospitals) and tertiary care (hospitals specialising in cancer or other chronic diseases). The CCGs also have an objective to commission most of healthcare services by compensating and/or redistributing a crucial part of the NHS budget (two thirds of the total NHS budget), to the healthcare providers which facilitate health services at the micro-level. In England there are around 200 CCGs, which comprise GPs and representatives from hospital doctors, the public and nurses (Wood and Heath, 2013). Their role is to commission, in other words, to choose and to buy health services. CCGs commission

services from a range of organisations, which are registered with healthcare regulators and monitors, such as hospitals, community health services, and other sectors (private and voluntary sectors).

CCGs have two organisations that act as supporters/advisers: the Commissioning Support Unit, and the Clinical Senates.[12] The Commissioning Support Units mainly provide technical support to the CCGs, such as data-analysis, contract negotiation and contract management. Conversely, the Clinical Senates are mainly professionals from hospitals, who aim to bring a whole range of medical professions to give comprehensive advice to the CCGs on particular groups of patients with special conditions (e.g., patients with heart disease or cancer). The CCGs are not bound to act upon the advice(s) provided by the Commissioning Support Unit or the Clinical Senates (Naylor *et al.*, 2013).

NHS-England also operates at the meso-level of the commissioning operation, which conducts specialist commissioning for the minority patients, with special conditions both regionally and nationally, and it also commissions GP services. NHS-England also has responsibility for improving the quality of primary care. It is headquartered in Leeds and has four regional offices and twenty five local teams that represent NHS-England locally. Finally, the Health and Wellbeing Board, which is led by the social council, also operates at the meso-level, and was established by the local government as a key stakeholder agency consisting of health- and social-care, in addition to the local councillors, with the aim of improving care by taking a joined-up approach to health, social care and other public services (Humphries and Curry, 2011).

## 6.4. Micro-level and Complexity of the NHS Structure

The (re)forming, change and development of the NHS structure have massive instruments of transformation (e.g., through the legislation, the government, scientific research, and social movements). The policies of the formulation are classified into mainly four categories, namely: nodality,[13] authority,[14] treasure,[15] and organisation[16] (Hill and Varone, 2016). Changing the structure of the NHS through the Parliament is a very problematic piece of legislation. For example, the Health and Social Care Act 2012 brought about a very complex structure for the English NHS (Timmins, 2012). On the other hand, the National Program for IT (NPfIT) was delivered through the power of 'authority' (i.e., the labour government). Public health seeks to care the health of the citizens through enacting and supporting healthy conditions, habits and lifestyles. Recently, both the organisational structure and the feasibility, through which public health would be achieved, were strongly affected by the NHS reformation in 2010. This reformation was based on the idea of localism and local democracy, moving the public health and the NHS budget to the local government and NHS-England.

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[12] Most of the CCGs do not have clinical senates any more after 2012 plan.
[13] The use of information.
[14] The legal power used.
[15] The use of money.
[16] The use of formal arrangements.

This would lead to a devolved system in which the NHS-England holds minimal power in its central position. For example, there are around 200 CCGs belonging to NHS-England to commission health services locally (Tidy and Henderson, 2016).

The implementation of policies is a matter of decision-making. Multiple debates are held in the Parliament, the DH of NHS-England and within the office of the Secretary of State, for instance. When these parties agree, a new law is approved, known as an Act. The approval of a law may be assumed as the end of a reformation process, but what implies is in fact just the beginning. At this point, the relevant stakeholders start to consider how to implement the Act, and decisions are made regarding which organisations and stakeholders should be involved in the implementation of that Act. Some pharmaceutical and medical organisations may need to get involved. For example, a stakeholder may agree with the law in general, but not specifically with the content relating to patient accessibility. For these reasons, the implementation of a new law may take many years and there are multiple opportunities for the law to become distorted by stakeholders at each level (macro, meso and micro).

Studies of national policy and implementation account the processes, by which implementation occurs (Hill and Varone, 2016). The national organisations represent a complex system that states what should be done, but these organisations do not focus on the practicalities of implementation. Their words arguably lead to a monolithic structure. They appear to give both the state and the market the right to decide, and the state and the market will appear to be monolithic entities, but in reality they were not (Gorsky, 2013; Gorsky, 2008). However, this direction ignores the complexity of implementation. The paradox and the ambiguity of this situation create a vital context for discussion, but it also leads to a lengthy discussion and analysis, which may hinder the implementation process.

Reviewing the NHS-structure leads to the conclusion that the NHS-structure is extremely complex, and it involves multiple stakeholders. Moreover, this structure is in a constant state of change, meaning that the influence and the role of its various stakeholders are in continuous flux. In the case of the EPR, according to the Business Case of the BP-Trust, the project attempts to respond to the vision of the Security of State for Health, which has set the mission for the NHS to become paperless by 2018. The goal of this implementation should save money, improve professional practice, and help meet the needs of experienced patients.
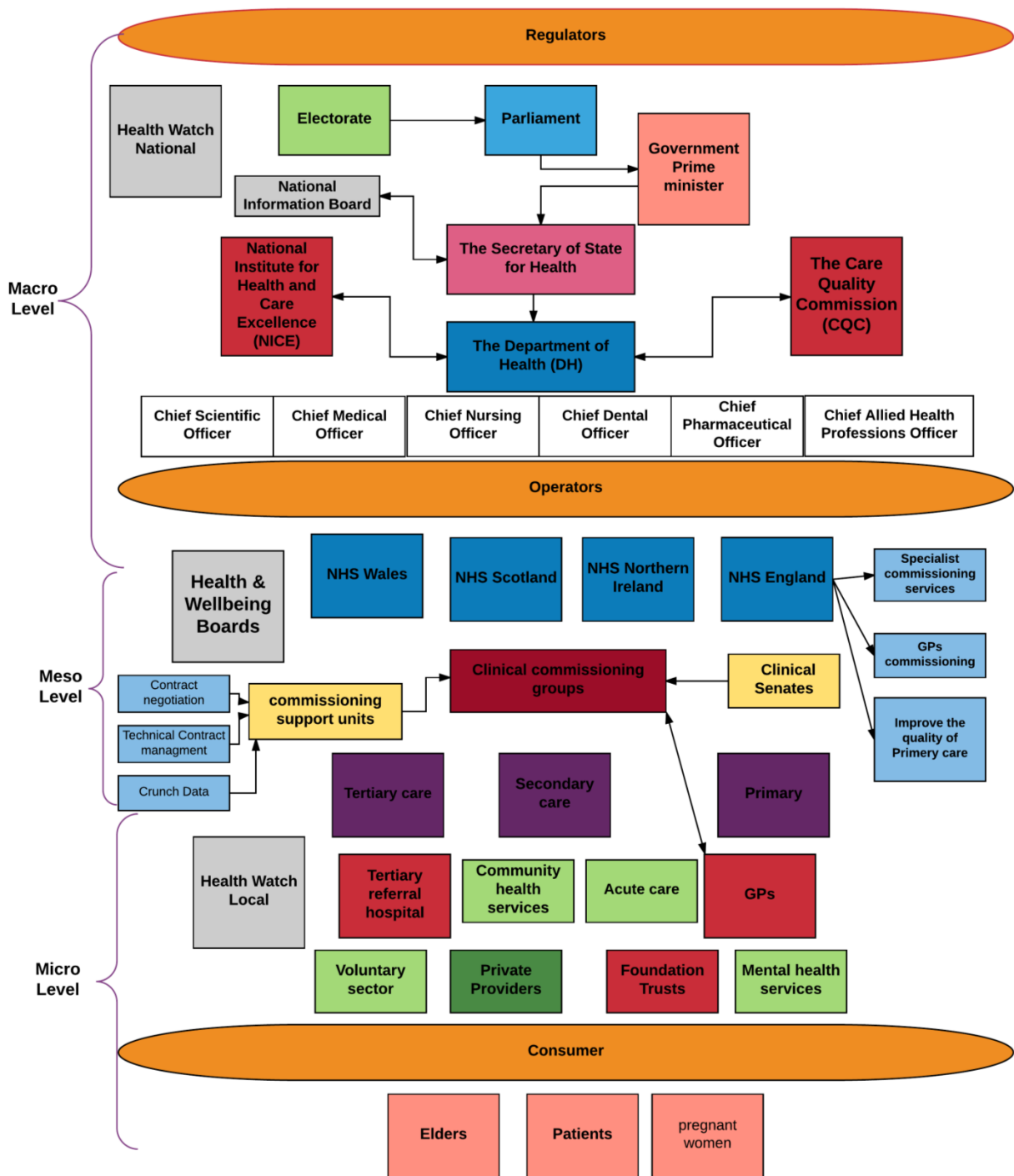
**Figure 6.1. Illustration of the NHS Structure in NHS England**

## 6.5. EPR Fieldwork Analysis (Micro-level)

The previous section discussed the stakeholders involved in the NHS, such as regulators, operators, and care providers. The following section analyses the power and influence of these stakeholders on the EPR-project(s).

### 6.5.1. What is EPR?

The EPR is a project that mainly aims to capture, share and use information and knowledge electronically. Stakeholders were identified in some examples, detailed in the following sections, where quick gains could be made on the digitisation agenda when products and services were available and usable with immediate effect. The list provided is not intended to be an exhaustive one.

### 6.5.2. What Could the EPR Be Utilized For? (Martials Potentiality)

*Information Strategy in the NHS*

At the macro-level, and after the major failure of NPfIT, in October 2014 NHS-England produced the NHS Five Year Forward View (NHS-FYFV). NHS-FYFV discusses why transformation was/is needed, what change might look like, and how to achieve it. NHS-FYFV states that the NHS has many challenges that still need to be considered, such as:

- Changes in patients' health needs and expectations.
- Changes in treatments, care-delivery and the role of technology.
- The need to deliver care that is genuinely integrated with and around what patients require.
- Changes in funding and the continued decline in funding.

In order to overcome these challenges, the report sets out a number of key themes that need to be addressed (prevention, patient and communication, new model of care, leadership and workforce, efficiency and productivity, information and technology, and health innovation).

Shortly after the release of the NHS-FYFV in November 2014, the National Information Board (NIB) issued its framework for action: *Personalised Health and Care 2020: Using Data and Technology to Transform Outcomes for Patients and Citizens*. This document aimed to provide further details, as to how data and technology would support the delivery of the NHS-FYFV.

The report reiterates the view of the NHS-FYFV, stating that the use of data and technology has the potential to improve health, transform quality of care/services, reduce cost, give patients and citizens more control, empower carers, reduce administrative burden for care professionals, and support the development of new medicines and treatments.

*The Power of Information*, the NHS information strategy, advocates joining care and access up to patient-information for health-professionals, patients and carers in care-settings. In January 2013, the Health Secretary at the time, Jeremy Hunt, stated that he envisaged the NHS to be paperless by 2018. NHS-England's *Safer Hospitals, Safer Wards*, published in July 2013, set out the vision for a fully Integrated Care Digital Record (ICDR) across all care-settings by 2018; "an information rich care system built on innovative and integrated solutions" (p. 184).

*The NHS Belongs to the People: Call to Action*, published in July 2013, further defined a vision for the delivery of integrated care, centred on the patient rather than being allied with episodes of care. It proposed that the £30-billion funding gap could be closed by applying innovation, transformation and technology to change the NHS-service delivery-model from acute- and episodic-based care to integrated-care closer to patients' homes. The £260-million Safer Hospitals/Safer Wards fund was provided to support and encourage NHS-England's guidance on EPRs for the IT adoption in the NHS.

## Issues Arising from the National Strategic Context

This investment aimed to support these objectives by delivering digital-record keeping by 2018 and through providing systems and infrastructure that would directly support the delivery of high-quality care at every stage of the patient journey, regardless of location (e.g., healthcare-systems and apps, open and transparent data). In addition, it aimed to improve the communication and informatics skills for all stakeholders. EPRs are an important component of the NHS' focus on digital-record keeping. The following section discusses this concept further and its potential functionality.

## The Trust's Digital Strategy

The Trust's Digital Strategy describes how technology will drive transformation in the way the Trust delivers services to patients and carers. The strategy also considers the future by providing scenarios of how the delivery of the strategy would improve the outcomes and experience for stakeholders, providing easily accessible information whenever and wherever is needed. Underpinning this strategy involves a considerable number of the service improvements, new developments and efficiency gains (proposed by the Trust and divisional business plans), which rely on a modern and robust IT-infrastructure and good quality besides relevant information provision.

The founding principle is that "real-time patient information will always be at hand for all stakeholders to provide the best seamless care"[17] (p. 4). The Trust's vision is for a comprehensive patient-centric clinical-record for every patient viewable from acute, community and primary care, as well as from social care-environments. This comprehensive EPR combines both: (1) the administrative; and (2) the clinical information about a patient, where the user-stakeholders (e.g., doctor/s, nurse/s, therapist/s, clerk/s, secretary/secretaries, and manager/s) can access all the information about a patient in a format that is intuitive and direct.

EPR-systems are recognised as being significant enablers for healthcare organisations to fully establish themselves as a credible leading provider of integrated healthcare in the 21st Century. The health secretary, Jeremy Hunt, announced in the modernisation-agenda of the NHS that all hospitals needed to meet the target of being (arguably) paperless in 2018 (Mooney, 2016; Iacobucci, 2015; TechUK, 2013). All hospitals in United Kingdom were expected to implement EPR based on the 2018

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[17] Business-Case report, PB Trust.

digital vision, and many of them have already complied (TechUK, 2013; Mooney, 2016). The national agenda demands digital-record to be implemented and applied in all NHS-Trusts by 2018. The one to seven HiMSS rating scale for IT-deployment in healthcare-organisations has shown that by achieving level six or seven an organisation gains significant qualitative and quantitative benefits (see Appendix D.2: HIMSS Europe EMR Adoption Model).

In general, the strategy demonstrates the Trust's intention to work with partners to provide joined up care for patients. This approach, further emphasised by the Trust's participation in the Health and Social Care Strategic Review, which is likely to result in a major site reconfiguration, requires the adoption of IT technologies to support greater collaboration. It will also capitalise on work conducted by other acute Trusts who have introduced similar technologies.

### *Tracking Information and Knowledge Electronically*

When the professionals add information about the patient, EPR could store it electronically in a way that can be easily accessed and interpreted. Thus, EPR requires capturing and storing information and operates on it in real-time. Based on the NHS-regulations, information needs to be organised and coded based on specific standards that enable the professionals to process and analyse the information. For example, EPR could be useful in terms of supply and management decision support, commissioning, and for auditing and examination. Examples of the current situation are detailed in the following subsections.

### EPR for Capturing Information Automatically

The diversity of electronic devices in the clinical workplace is very useful to capture many types of medical information based on real-time practice (e.g., tablets, mobile devices, PCs, digital dictation, tele-monitoring devices, voice recognition, etc.). Thus, the EPR has high potential for automatic collection of real-time data only through the integrating of all IT sub-systems.

### EPR for Managing Clinics and Patients

EPR allows instant access to patient-records through the historical records of all clinical activities. It allows recording and managing professional notes, and other procedures such as scheduling and referrals. EPR as a management-system also can handle patient cases; update healthcare plans and supports messaging and recording feedback. The EPR-potentials for managing the clinics and patients are summarised in Table 6.2.

### *Sharing Information and Knowledge Electronically*

To increase the outcome of healthcare practice, health-professionals and patients should be open to communicate and interact with each other. This shows an importance and the need of an IT-system to exist and facilitate this communication. EPR aims to facilitate knowledge and information diffusion electronically. Moreover, the lack of interoperability causes missing part of the full picture

about the patient such as information about the medication, different tests and scans. This could cause tests or drugs repetition which leads to unsuitable care-decisions may be taken and care stays extended. Table 6.3 points out some examples of the main functions of the EPR-projects in the NHS.

**Table 6.2. EPR functions for clinics and patients**

| EPR for managing clinics and patients | Description |
|---|---|
| EPR for Capturing information automatically | The diversity of electronic devices in the clinical workplace is very useful to capture many type of medical information based on real-time practice (e.g. tablets, mobile devices, PCs, digital dictation, tele-monitoring devices, voice recognition etc.). Thus, the EPR has high potentiality to automatically gather actual data only through integrating these systems. |
| EPR for managing clinins and patients | EPR allows access to patient records through the history. It allows recording and managing professional notes, and other procedures such as scheduling and referrals. EPR as a management system also can manage patient cases; update healthcare plans and supports messaging and recording feedback. |
| EPR as E-prescribing and medication management | More than 50% of the trusts in the UK have E-prescribing solutions at workplace, but the rate of medication errors is still the second most common events of medical errors (TechUK 2013). These types of errors cause preventable harm, and they cause patient delays, drug waste and preventable extra examinations. EPR can provide factual information through integrating drug ordering, stock control, accurate dispensing and labelling, and supporting the administration of medication to patients. |
| Picture Capturing, and storing | Picture archive and communication system (PACS) is massively used throughout the NHS. For instance, Vendor Neutral Archives solutions also become available to support the graphic data capturing reporting and retrieval processes. |

*Source: TechUK, (2013).*

**Table 6.3. The EPR main functions**

| The EPR sharing functions | Description |
|---|---|
| Network infrastructure | The NHS is fully connected with wired and wireless infrastructure to enable secure and rapid sharing of information. |
| Referral systems | Currently the NHS uses the national Choose and Book referral system. This service provision substantially changed from December 2013. From an industry perspective, it would arguably be expected that the market would demand a richer user experience for booking appointments, based on expectations from the consumer market (e.g. travel booking). Functionally, patients and their GPs expect an online booking service for all of their interactions with providers. |
| Portal technology | Aggregation, access and sharing of existing information. Existing portal technology can help a care community make better use of its existing investments in IT to meet information sharing challenges. For healthcare providers, portal technology provides one approach for integrating existing systems and can be extended to deliver online services and access to patients and carers. |
| Integration/interoperability | There are a wide range of solutions to address this challenge, from mass data migration, moving information between solutions and fully sharing information between solutions. |
| Collaboration tools for professionals | A collaboration platform for health and care professionals joins up care by providing secure document storage and sharing, instant messaging, social collaboration, groupware such as tasks, calendars and contacts. Collaboration tools are integrated communications platforms, able to make patient-focused information sharing as easy as possible, between professionals and for the patient and all carers with the appropriate permissions. |
| Standards: | Whilst not a solution itself, there has been good progress in defining and agreeing standards, particularly open standards around interoperability. |
| Information governance, security and quality | A large variety of products and services are available to support governance and security needs, such as secure sign on capability, role-based access, filters and firewalls, audit trails, data cleansing and data validation. |

*Source: TechUK, (2013).*

*Electronical Form of Information and Knowledge*

One of the main EPR-functions is to make the forms of information and knowledge collected in the way of care-delivery easy to be used by staff /practitioners. The electronic-layout of information can be easily accessed to know more about patients that can drive business decisions and reporting, support service redesign, and commissioning intelligence. Examples of current methods for using information and knowledge electronically are listed in Table 6.4.

**Table 6.4. Examples for Transferring Knowledge Electronically**

| The EPR application functions | Description |
|---|---|
| Diagnostic services order communications and reporting: | Multiple reports have found that between 20% and 30% of diagnostic tests performed are unnecessary or duplicate events. Solutions are available for end-to-end support within and between health providers |
| Dashboards and electronic whiteboards | Provide clinical staff with at-a-glance digital visibility of patients and bed status in real-time. Information displayed on whiteboards can include the patient's name, age, room, bed, consultant's name, admission date, and expected discharge date. They can also display organisation performance information such as workforce management and resource planning |
| Analytics and modelling: | Business intelligence tools take information feeds from multiple sources, providing a holistic view of the data population. This enables commissioners and providers to make efficient and effective decisions. Additionally, business analysis and measurement tools examine key demand trends and key performance indicators in depth, using data from across the organisation including referrals, waiting lists (out and inpatient), clinical and diagnostic activity |
| Knowledge services | Solutions are available that provide knowledge and insight into consumers of healthcare information, whether to the public or the professional. This is one the biggest areas of need and growth in the future, particularly to empower the citizen in their involvement in their health and care |
| Scheduling systems | Existing scheduling solutions work within and between providers, allowing organisations to manage hospital and patient activities, appointments, monitor patient journeys, alerts and allows providers to examine their performance for better future planning |

*Source: TechUK, (2013).*

The EPR is required to facilitate accessibility to clinical documentation, including patient administration and pharmacology information. See Table 6.4 for information on the source systems of the clinical portal, what they provide access to and the usage of these systems. EPR was also required to have many functions. The required EPR-functions are illustrated in Table 6.5.

**Table 6.5. Systems of Clinical Portal, Accessibility and Usage**

| Access to | System | Example |
|---|---|---|
| **Clinical documentation** | Doculive | The previous epicrisis of the Patient |
| **Patient Administration** | PAS | Who is currently in-patient/out-patient |
| **Clinical Chemistry** | NetLap | Creating, HB, electrolyte. |
| **Pharmacology** | NetLap (Miclis) | CyA-concentration |
| **Immunology** | NetLap | Rheumantological marks |
| **Microbiology** | Miclis | Cultivation and resistance. |
| **Pathology** | Sympathy | Biospsy, cytology. |
| **Radiology** | RISWeb | Ul abdomen (results). |

*Source: the EPR business case of the BP-Trust (2011).*

In addition to the factors considered above, to fully understand why EPR was introduced, it is pertinent the matter at hand to consider the system/s used prior to EPR and how these were perceived by NHS-employees.

The management processes of the EPR-project shown in the "business case" allow illustrating the hierarchical relations between the managerial perspective and their concepts, as well as these processes use the domain of expert-knowledge. Therefore, based on the detailed map (see the Appendix D.3), the project potentiality is illustrated in Figure 6.2. The visual structures presented at this step 'Laddering' illustrate the idea of how potentiality can bridge the gap between the disorders of unstructured data presented in the implementation agenda, and can be a clear means of showing an implementation map.
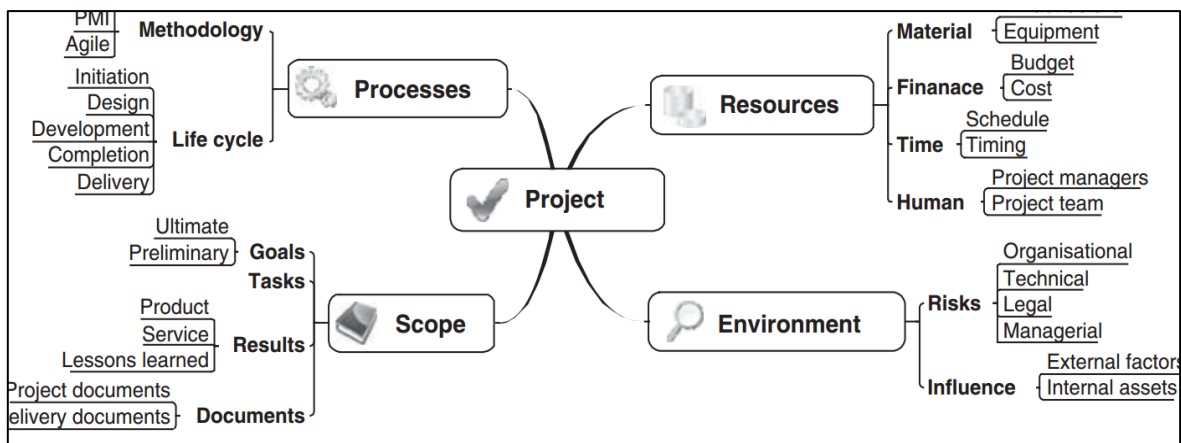


**Figure 6.2 Management Processes of the Project Potentiality**

*Source: BP-Trust Business case (2011)*

### 6.5.3. Why is EPR Introduced? Description of the Situation before the Project

Successful implementation of EPR requires considering the multiple dimensions of the setting in which the interviewees live and functions. The relationship between the KT-practice and EPR-project shows that the emerging reality out of the interaction between humans and technology entails potential solutions to dispel problematic situations. These issues emerge from the dynamics of healthcare-practice which depends on the complex relationship between contextual factors, personal factors, health behaviours and outcomes (see Figure 6.3).
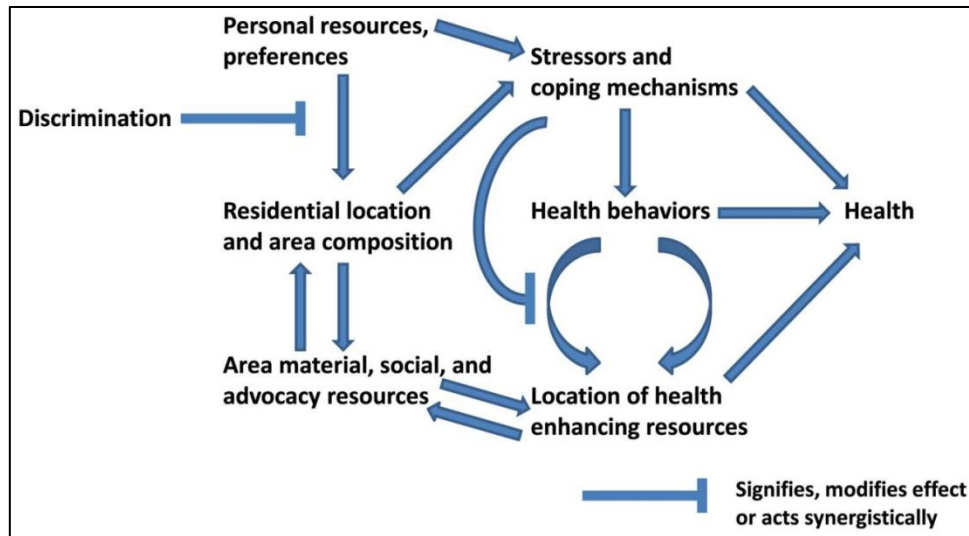


**Figure 6.3. The dynamics of healthcare practice.**
*Source: (Kroelinger et al., 2015).*

It is important to understand this in relation to the healthcare-system, in order to understand knowledge, the function of KM and how these are being implemented. Furthermore, the difference between technology implementation-processes and using of technology-in-practice could provide valuable information regarding the development of healthcare-delivery.

The deployment of EPR in A&E as part of the BP Teaching Hospitals NHS Foundation Trust, took place in 2010-2015 by internal and external implementation teams. There were a number of issues prior to this implementation. These are discussed below. From a technical perspective, hospital systems were disparate and had a lack of interoperability with the each other. Also, systems were mainly paper-based, with all the inefficiencies associated with such an approach. Interviewees from the Informatics Department provided insights into the following issues:

**Issue of standalone systems:** *"Within the rest of the Trust, we have gotten standalone systems. We have ordered comms [Order Communications] system that records the Trust orders. Which one is from clinicians? Who are supplying pathology data? Et cetera. We were doing e-prescribing from CSC, for clinical use. There are departmental clinical places that we have out. There are maternity departments that have their own system which is E3. The theatres have their own clinical system, which is OMIS (Operations Management & Information Systems), which is handover from the national program, although we still match it with the paper-based."* (Project Manager)

**Issues of data availability:** *"The paper-patient-record is a major barrier to share or transfer the knowledge. Everything was on paper. We did scan the A&E attendance, but predominately the paper can only be in one place, which can only be accessed by one person. However, if you got an electronic record, you would get on a demand access by multiple users to the latest clinical information. EPR helps with clinical coding that we have gotten actually maximising income to the Trust. The idea of the EPR is to get everything in one place electronically."* (Head of the Informatics Department in the BP Trust)

**Finical issues:** *"Every A&E department will get payment by results. Unless you can code properly, you could be losing a lot of money. We were losing almost 700,000 pounds a year through poor coding."* (Clinical Director)

Stock management was identified as particularly important from a management's perspective, but the hospital could not manage stock effectively due to the paper based system. EPR also seems to be a good solution to be more accurate about the different tariff of the patients. In addition, the management believed that the 18-week waiting list could be shortened to 6 weeks by reducing the time spent exchanging paper-records:

*"When we were paper-based, it was very hard to differentiate between these tariffs, but when we got that information easily written, and with 'Alert', we started reporting back to it. All of that information was valuable and we started getting a lot of money."* (Head of the Informatics Department in BP Trust)

*"Before the EPR, and at that stage, the main struggle was with the accessibility of the patient record, because the healthcare here is not one hospital. Sometimes there were some clashes of information, or missing information, because of the less accessibility and integrity of the patient record from different healthcare centres in the region."* (Clinical Change Manager)

*"I think they are aimed to drop down the waiting list for 18 weeks to something around six weeks. This is a primary benefit that we will deliver with this particular project."* (Development Manager)

*"Paper is not accessible [to] all people. And from the other hand, when some people cannot access to it, they will consider that information is missing. For example, if the patient with diabetes comes to the A&E, and then to access to their case notes, you have to ring to the secretary, but when all that is electronic will make it easier."* (Consultant4)

From a clinical perspective, the system could not provide the required information and knowledge when it was needed, and there were issues with the quality of the data[18]:

> *"Prior to using this, we used to keep logging on the PAS laboratory system to see if the results were ready. And they were always not ready, and we were losing productive time, because we always are waiting for checking if the results are available."* (Clinical Director)

> *"If you would come with Pneumonia, you need a chest x-ray, blood test. You need fluid blood kind; you need CPR, et cetera. These procedures used to be manual, which means a lot of wasting time and may be the patient will stay for days in the hospital."* (Consultant 2)

Lastly, from the nurses' perspective, the paper-based system was slow but very productive since the staff were familiar with it. Figure 6.4 shows a rich-picture constructed from the responses, which practitioners shared to describe the situation before the EPR-system deployment.

### Table 6.6. CATWOE Analysis of Electronic Patient Records at the BP-Trust

| C.A.T.W.O.E. | | |
|---|---|---|
| C | **Customers**: Who receives the benefits of the system? | *The Trust management board, and Practitioners* |
| A | **Actors**: Who implements the system? | *Supplier implementation team, Clinical change management board, and Informatics board* |
| T | **Transformation process**: Why do they implement the system? | *EPR systems are recognised as being significant enablers for healthcare organisations to fully establish themselves as a credible leading provider of integrated health care in the 21st Century.* |
| W | **Weltanschauung**: The world view or value system espoused | *The EPR aims to:* <br> *Make the Trust as a paperless place and to integrate all the information systems of all departments inside the Trust and outside it.* <br> *Modernise healthcare system in the NHS in line with the national health service framework.* <br> *Work towards more efficient and cost effective healthcare through, paperless and better integration* |
| O | **Owner**: Who controls the system? | *Bb Teaching Hospitals NHS Foundation Trust* |
| E | **Environmental constraints**: What affects the system? | *The NHS 2018 view of modernisation, A patient's journey and pathway through a multi-agency environment, where currently, information exists in silos and is not joined-up e.g., financial constraints.* |

In sum, the BP-Trust used to experience many problems due to the old health record-system which was mainly paper-based. Organisational performance was generally poor and the pressure on the Trust increased substantially. The Trust was experiencing negative consequences as a result of

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[18] CRP: cardiopulmonary resuscitation.

losing patient information, including lack of accessibility and lack of stock management. There seems to be a strong justification for the EPR-implementation, and the following section discusses the multiple perspectives of EPR-in-practice (managerial, practitioner and IT perspectives). It also discusses two primary considerations for each group: the main interest of each group in EPR, and their experiences of the EPR-reality. The information presented in this subsection is summarised through a CATWOE analysis, incorporating multiple perspectives. Table 6.6 shows the CATWOE-analysis, upon which the researcher constructed root-definitions of the EPR in the NHS.
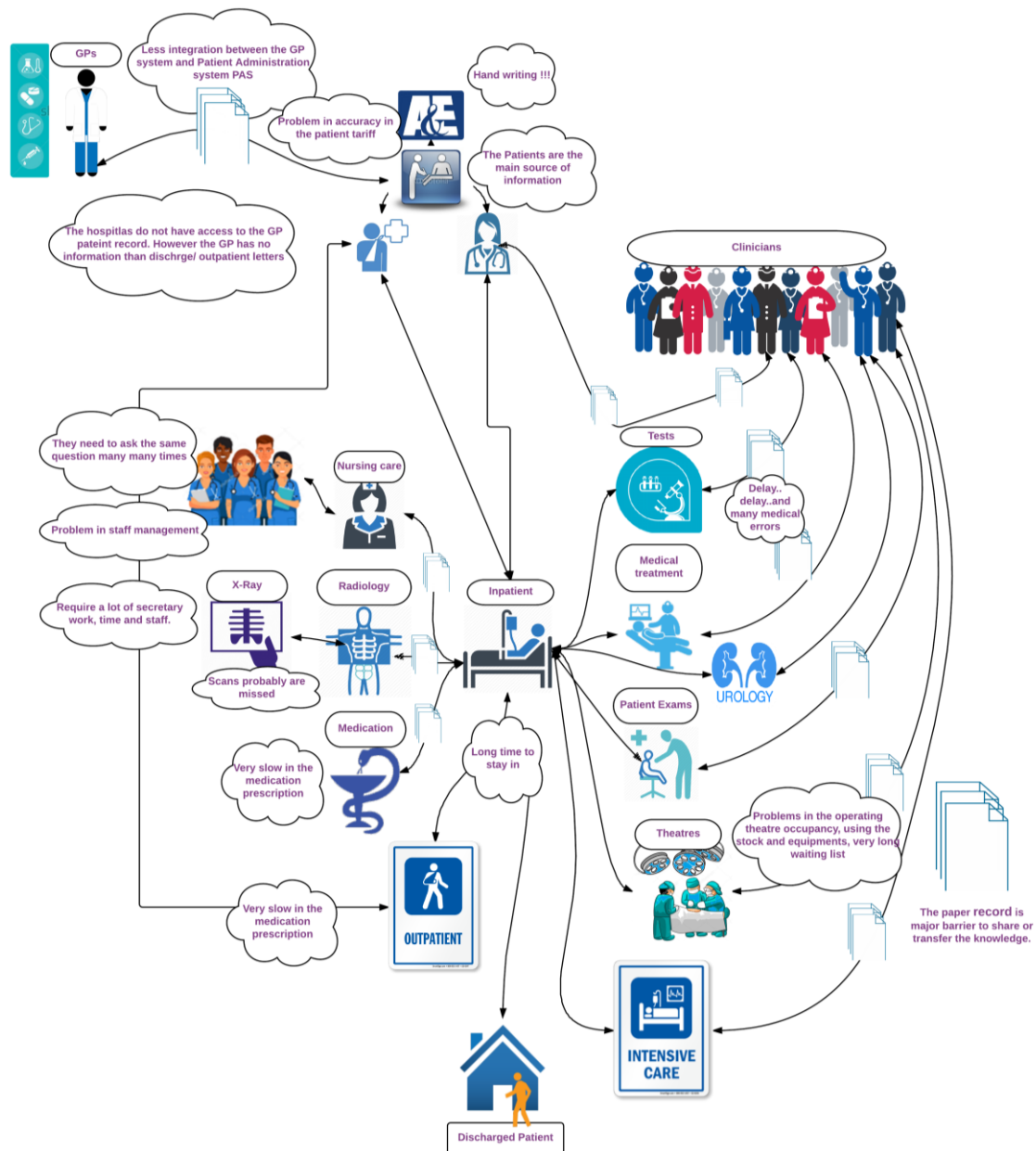


**Figure 6.4. Rich Picture of the Paper System from the Practitioners' Perspective**

### 6.5.4. Identification of EPR Stakeholders (Who)

From a broad perspective of the NHS, there are multiple stakeholders at various levels involved in EPR. At the regulatory level, the Secretary of Health is considered the main regulator of the EPR through the modernisation strategy. At the national operational level, the Health and Social Care

Information Centre (HSCIC), alongside the National Information Governance Board for Health and Social Care (NIGB), are considered the main bodies with authority to support and monitor all strategic projects relating to the IT of healthcare-organisations, through the coordination with the local Informatics Departments. HSCIC and NIGB have also minor roles in regulation, as they are considered key advisors to the Secretary of State for Health and local Informatics Departments in relation to information governance. Therefore, Informatics Departments are considered to be the operators of most of IT and IS projects locally.

The NHS did identify itself the main stakeholders in EPR in a report presenting its benefits (NHS, 1993). The report identified three different 'worlds' that will be affected by EPR use. 'Worlds' (categories) of actors were identified as: (a) patients (patients, next of kin); (b) clinicians (clinicians, non-clinicians, responsible clinicians, health care facilities and clinical students); and (c) third parties (controllers, technologists, administrators and legal professionals).

The focus of this research is at the operational level: the hospitals, where, the main stakeholders were identified as the EPR-implementation team and associated users. In other words, EPR-stakeholders can be identified as human actors or organisational actors with sub-categories such as inter/intra-organisational actors: "(a) Acceptors and/or Users, (b) Suppliers, (c) Supporters/ Monitoring and (d) Controllers/Governance (e) Sponsor" (Mantzana *et al.*, (2007): P.118). Most NHS-transformations, including EPR, seek to represent all stakeholders through a project-team which has a sub-category of actors (IT and clinical teams).

In the case of BP-Trust, stakeholders were identified based on the analysis of interviews. The two primary roles of the IT team were the 'Supplier' (an external company) and the 'Supporter' (internal, from the hospital's Informatics Department). The implementation-team also has many directors and representatives such as financial director, governance director, and user advisors. This team is critical because its members are in charge of analysing the needs of the hospital and the effectiveness of the project from multiple perspectives. The Sponsor is NHS-England and the CCGs, which are supported by Commissioning Support Units (CSUs). CQC, NHS-England, Monitor NHS, and Trust Development Authority are the main bodies which play important roles in the monitoring and evaluation of all care-services, including the EPR-project. These bodies work together to provide patients with safe, effective and high-quality care, and to encourage health-organisations to improve their performance. The Informatics Department with the implementation-project team are also in positions of authority and control. Acceptors and Users are mainly the professional staff of the hospital and some external staff (e.g. General Practitioners). Approaching patients as users was considered afterwards in my study. This information is presented in more detail in Table 6.7.

The users of the EPR were studied at the departmental level of Accident and Emergency, Maternity, Oncology, Radiology, Operating Theatres, Pathology, Pharmacy, and Cardiology (see

Figure 6.5). These users include at the individual level carers, clinicians, equipment maintenance personnel, IT-workers, laboratory workers, medical-record personnel, medical students, nurses, patients, physicians, physicist, specialists, technicians, and therapists.

**Table 6.7. EPR Stakeholder Identification at the BP-Trust**

| Stakeholders | Human | Organizational |
|---|---|---|
| **Regulator** | | Secretary of Health National Information Governance Board for Health and Social Care (NIGB) Care Quality Commission (CQC) |
| **Users** | Healthcare professionals • Clinicians • Non-clinicians • Clinical students Patients NHS managers and planners Other public bodies | Medical departments (e.g. Accident and Emergency, Maternity) GPs Police |
| **Suppliers** | External implementation team | ALERT Life Sciences Computing |
| **Supporter/Monitoring** | Implementation project team Researchers | Health and Social Care Information Centre - NHS Digital (HSCIC) National Information Governance Board for Health and Social Care (NIGB) |
| **Controller/ Governance** | Managers of the Trust and Managers of the Implementation project team | Informatics Department Health authorities Health and Social Care Information Centre - NHS Digital (HSCIC) |
| **Sponsor** | | Taxpayers |
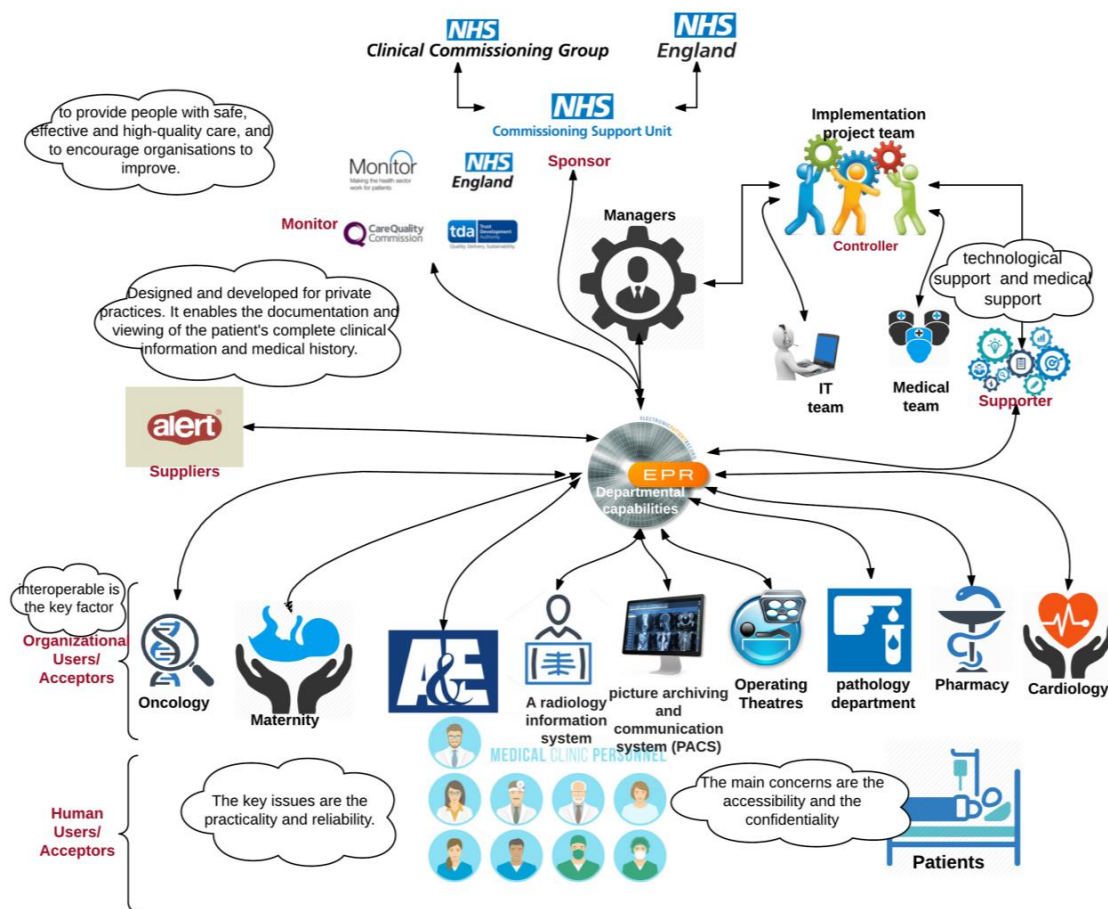


**Figure 6.5. Pictorial Representation of EPR Stakeholders**

In sum, identification of EPR-stakeholders suggests two analytical dimensions. The first dimension discusses the decision-making and planning of implementation bodies (which includes regulators, implementers, supporters, controllers and suppliers), and the second discusses groups of beneficiaries of such systems. All of these stakeholders work together to stimulate the potential and beneficiaries of EPR, which are summarised in the following points (Campion-Awwad *et al.*, 2014);

1. To grant health-professionals access to fast, reliable, accurate information to support their work.
2. To grant patients remote access to their own test results.
3. To empower NHS-managers and planners, so that they gain access to high-quality information that helps them target and utilise resources.
4. To encourage and support the public to assess the performance of local hospitals and other healthcare-service providers

The common characteristic of the stakeholders identified in this study is heterogeneity. That is, the stakeholders had different requirements based on their skills, working environment and functions. It is crucial that the diverse perspectives of the users are considered in relation to EPR. Many users from different departments and professions were interviewed and observed to reflect the fact that the diverse user requirements may have a substantial impact on all aspects of the EPR-development.

The interviews and observations aimed to understand the potential support for EPR from three different perspectives: managerial perspective, professional perspective and technical perspective. Therefore in my data-collection, I aimed to understand users' activities in their daily work-environment. Answers were sought for the following questions:

1. What are the differences between the professional, technical and managerial perspectives?
2. To what extent is the KT-practice reflected by the EPR-system? What are the gaps?
3. What are the recommendations to help bridge the gap/s?

This section described EPR and discussed the reason/s why it was introduced and the main stakeholders involved in its introduction. The following section explores the EPR-implementation.

## 6.6. Implementing Electronic Patient Records (EPR)

In this part of analysis, the study tries to illustrate the gap between KT practice and EPR project from multiple perpectives.

### 6.6.1. Geniral Challenges Associated with Implementing EPR

The perspectives of multiple stakeholders, at the hospital level, were analysed to explain why the stakeholders reacted and interacted with the project in the way they did. Major challenges were identified in two particular areas: social issues, and socio-technical issues. Some professional expectations were met in practice, such as the accessibility and security. Furthermore, the standard

procedures were functioning correctly, which in turn eased some of the professional practices (e.g., giving alerts when the results were ready).

Regarding these issues the EPR- Project Manager said:

> *"The main aim of our implementation is to change all paper document(s) to be electronic. Also, it will be used to make the time and material more accountable. We want to use the operating theatre more efficiently."* (Project Manager)

However, the professionals generally criticised the system for the tasks were time-consuming and for creating parallel works that were not originally included in their responsibilities. In the medicine-prescription case, the doctors had to spend more time in typing tasks that were accomplished by the secretaries on the basis of clinicians' dictations. Doing non-valuable procedures caused time-expenditure in contrast with the profession's objectives.

The EPR, in addition to imposing administrative procedures to the professional practice, caused knowledge anxiety or *'Infobesity'* by providing too much information to hand, which affected negatively the clinical-decisions and professional-autonomy (Bawden and Robinson, 2009; Duftschmid *et al.*, 2013). Social issues relate to the personal and professional characteristics of the actors. These issues demonstrate the important role played by interpersonal relationships and group-culture in relation to KT-practice. Furthermore, they demonstrate how this practice affects the way an individual or group may handle technology. These issues usually led to a huge resistance to EPR.

In addition, socio-technical analysis provided further reasons for resisting EPR. End-users were highly reluctant to form any socio-technical relationship with the EPR-project. The disconnection (gap) between knowledge- and technology-in-practice, and the lack of interoperability, arguably played a major role in this struggle and may have created extra-workload. Moreover, this study noticed that previous socio-technical relationships should have been taken into consideration when seeking to understand the reaction and impact of introducing EPR into a new setting.

### 6.6.2. Technical Perspective

The primary interest of those involved with IT at the BP-Trust was the integration of all IT-systems together to enhance efficacy, efficiency and effectiveness of the organisational performance (interoperability). To gain an in-depth understanding of their perspectives, interviews were conducted with the Informatics Manager, EPR-project Manager, six Technicians (IT-Developers) and those working in IT-change support at various divisions but all with a focus on EPR (e.g., e-prescribing system and laboratory system).

There are almost 20 IT-systems at the hospital (see Figure 6.6). IT-interviewees described four of these systems in particular:

1. The Patient Administration System (PAS), which is the core system, used when patients enter the hospital and when they are discharged.
2. Department-specific applications, such as CyberLab. An order-communication system which provides blood-test orders from inside and outside the hospital back to the lab for example.
3. A laboratory system (LAS) for coding and labelling the samples to link them with the patient reference number.
4. A radiology system (RAS) used for medical imaging and cardiology.

The Department of Informatics collaborates with other departments across the BP-Trust (e.g., Nursing, Pharmacy, Radiology, Laboratory Medicine, and Transfusion Medicine) as well as multiple institutes that use 'Alert'. Alert is the primary IT-system used to support patient-care, clerical and administrative activities at the Trust. Alert is used directly by physicians, nurses, and administrative staff in performing a variety of information tasks related to patient-care. Table 6.8 presents the primary actors involved in using Alert and the tasks that they complete. Figure 6.6 demonstrates that all systems are interconnected, representing the various business requirements of the relevant Departments and Institutes. This figure illustrates the technicians' perspective, and it shows how the PAS, which was used as the main data-storage for the EPR, needs to be integrated with other sub-systems (i.e., all the systems in pink color) by adding masks (i.e., adapter), such as the HSF Integration Engine, and Integrated Clinical Environment (ICE) (i.e., all the makes in blue color).

**Table 6.8. Information Tasks Related to Patient Care**

| Actors | Tasks |
|---|---|
| Nurses and receptionists | Managing admissions, transfers and discharges |
| Nurses and receptionists | Managing patient registration |
| Nurses and secretaries | Maintaining patient demographic data |
| Nurses | Maintaining patient protocol information |
| Managers of the wards | Providing bed management |
| Doctors and nurses | Writing all medical orders |
| Nurses and secretaries | Attributing medical activities (orders, appointments and documents) to a specific research protocol |
| Doctors | Retrieving laboratory results |
| Doctors | Retrieving radiology results |
| Doctors | Documenting patient care plans |
| Doctors | Documenting vital signs |
| Pharmacists | Documenting medication prescription and administration |
| Doctors and nurses | Documenting progress notes |
| Doctors | Reviewing outside documentation |

*Source: BP-Trust Documents.*
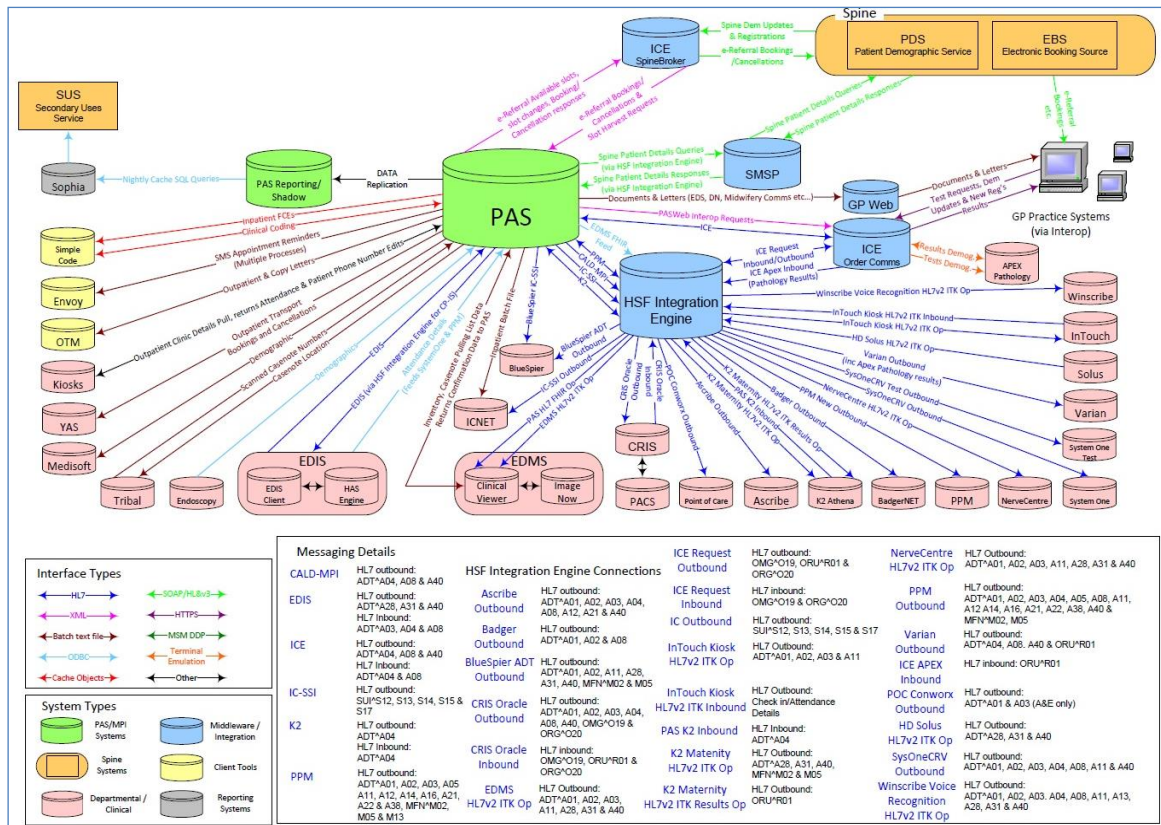
**Figure 6.6: IT Infrastructure and Interfaces in BP Hospital**

*Source: BP-Trust Documents, ITs Map.*

EPR is a very large IT-project and the fact that it works interdependently makes interoperability a critical consideration. That is, the ability of a system to work with other systems without extra effort from the users. A couple of the interviewed technicians (the fifth and the sixth) of the Trust described this problem in relation to EPR, respectively, as follows:

> *"The role of the Informatics department is to ensure that the communication between the departmental systems and the EPR system is correct. In that correct way, messages are going to right places, with right results to the right patients. That is my experience on that side."* (Technician5)

> *"The problem is that they are not all linked. The whole point of the EPR system was to have one system that does everything. That's why a lot of Trusts in the countryside used to do EPR. Previously, I was thinking that it will not work because every department is very specific. Also, I don't think there is a company that can do everything that we need to do; that is the nature of the NHS at the moment."* (Technician6)

For example, the blue cylinders displayed above in Figure 6.6, which are middleware integration, represent IT efforts to integrate EPR with the various departmental systems and databases. EPR, in my study, could not be integrated into the order communications[19] and ICE,

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[19] In the Trust, they call it: ICE/Order Comms procedures.

which was the IT-system in the lab. ICE receives orders from pathologists for blood-tests and then ICE sends back the results to the pathologists. However, Alert can only make the result available to its database, and not the departmental systems. This issue required many months of development by the IT-developers without a satisfactory solution. The Technological Director of the implementation-team commented that:

> *"I would prefer to buy a system that was fully ready rather than having a pilot, and develop and put work in. There is a lack of functionality, a lack of development in the EPR solution."* (Technological Director)

When interviewees from the Informatics Department were asked about administrative knowledge which could be supported by the EPR, it emerged that Alert was only able to show the location of patients and their stage of care. If weekly, monthly, or annual reports were needed, for example, the Department would have to develop another platform (called the knowledge portal):

> *"We are trying to bring a clinical portal that can bring data from various systems, to look like one system, which is not actually one system."* (Technological Director)

The myriad of challenges related to Alert, from an IT-perspective, are summarised in the following subsections.

### Technological Obsolescence

The current EPR is increasingly archaic to users accustomed to Microsoft Windows and web-based software.

> *"In fact, the NHS seems to be a bit behind when you are deploying a new technology. If you are using lowest back hardware, lowest back service, it means that you [NHS] are quite behind. Just recently in 2015, NHS had moved from windows XP, to widows7, and what we have now is windows 10. I think this is one of the major hindrances in the NHS."* (IT Change Support)

There is also a risk that the current PAS will be retired in the near future. This risk increases each year as the number of system-users reduces. Then the supplier must focus on developing and supporting their latest EPR systems. Some platforms (e.g., The Clinical Portal technology platform) were outdated ones[20], and they do not provide enough flexibility to meet the changing needs of the organisation. Such platforms are not compatible with modern integration-standards, thereby inhibits data-sharing between systems, preventing a common 'feel' across the Trust-systems. As a bespoke system, the main risks are the ongoing function and development of PAS-Web to meet clinical demands as well as keeping the base safe. This issue was covered and elaborated on by a considerable number of technicians to read for example as follows:

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[20] They were developed in-house

*"The main problem of the EPR is that it was not built around the professional activities. It has strongly intervened in the professional practice. This paradox reduces the potentiality of the EPR to meet the depreciation of the practitioners. EPR is top-down, but it needs bottom-up development. Bottom-up development needs a different strategy of implementation, at least to work side by side with the practitioners."* (Technician6)

*"User engagement is very important. You cannot develop something and go to the user and saying what you want me to do."* (Technician4)

*"I think it is very difficult for suppliers to any way get a bottom-up approach, because that would require starting from very detailed levels. It is very hard to say,* '**but… I do not know'**, *because nobody has done it. We are only developing some e-pieces to replace the paper by computer."* (Technician5) (The bold words are used, because the participant stressed these terms)

### *User Interface*

The current EPR does not provide bi-directional interfacing. Most of the information entered in disparate systems cannot feedback to PAS. As the one of the technicians (Technician 1) mentioned:

*"You need to be sure that the EPR solution is fitting straightforward for the purpose of the NHS, and then you need to assure that the system is giving what you need, and being compatible with other systems (e.g., laboratory system, radiology system, electronic prescribing medication, et cetera."* (Technician1)

### *Expectation Management*

Expectation management was relatively positive in relation to EPR. For example, in the past, when a staff-member had been carrying out a pathology test at the A&E, they had to keep looking at the system to know when the results were available. With the EPR, they received an alert when the results were available. This example highlights that there are benefits from the EPR, although still it may be challenging to meet expectations when the EPR is perceived as having a greater theoretical functionality than what it performs in reality.

### *Interoperability*

EPR holds patient-information in a way that is system-centric rather than patient-centric. This results in the need to open multiple systems with multiple logins.

*"I keep asking my boss, do we really need the EPR? If the whole point of the EPR is just the electronic documentation, the electronic recording of information, the electronic ordering of test... We have gotten all these systems out there any way, and it is just the matter of linking them in one place. And that's where I am developing a clinical portal, because I saw that there is a gap here between these entire variance of individual departments, and having all the information in one place. My point is: we have all the electronic systems and we can put all of them together buying the clinical portal. I think then we do not need EPR. The EPR should be more than an electronic platform of hospital documentation."* (Technician3)

The lack of the competition between the Its-health providers has led to fewer choices in the market. For example, the Procurement Manager noted that only two EPR-systems were short-listed to meet the basic requirements within an affordable budget. From the technical perspective, there are many issues related to building an EPR to be as KMS in healthcare. These issues are mainly related to two main factors: functionality and interoperability (see Figure 6.7). Most of the interviewed technicians argued that functionality is mainly related to the ability of the system to engage the end-users and encourage them to participate. In the case of Alert, the lack of functionality was emphasising the lack of development in the EPR-system. This has led to the Trust's decision to stop EPR-Alert from going forward and to move to a new EPR, which is called EIMS-solution from a different provider. Regarding interoperability, the limitations of the system in its ability to interface with other systems without increasing the workload of the users was highlighted.



**Figure 6.7. Proposed Integration of the Main Functions of EPR**

This section discussed the IT-perspective, and the next section presents the medical stakeholders' perspective. The main interest of these actors was to identify a tool which can capture and transfer accurate information or knowledge in order to make the correct medical decision. These stakeholders mostly have a medical background, but they have diverse needs based on their positions within the hospital. This group comprises consultants, junior doctors, nurses, divisional managers and healthcare assistants. This diversity can lead to conflicting views. The current research aims to develop a comprehensive view of EPR. To simplify this analysis, medical practitioners were classified into three main groups: medical managers, physicians and nurses.

### 6.6.3. The Practitioners' and Medical Managers' Perspectives

In my study, divisional or medical managers were primarily concerned with how patients should be managed. They were, therefore, interested in EPR as it could have important functionalities such as a tracking system, a stock-management system, and a coding system. They were also interested in the ability to interface with other divisional systems, such as pathology and radiology, in order to collect a comprehensive picture of a patient's case.

PAS-web can create an intuitive care-plan for a patient based on the system-database. PAS web is an automatic system that allows a satisfactory level of care to be provided (equivalent to a consultant). The Medical Manager of the A&E described this functionality:

> *"If the patient came to the A&E and they have pneumonia, I would like EPR to say to me, 'You have not done the antibiotics. You must do it before the patient can leave the department'. Also, I want to use the EPR to drive access to care. And that is really an exciting sort of thing that EPR has advantages over any other system. Also, the PAS web should be able to give alerts, if there is any drug interaction: if the patient came with asthma, the system will give you warnings or alerts to do some procedures."* (Medical Manager of the A&E)

In addition to PAS, there are tracking, stock and coding systems. The tracking-system is a system that provides information about a patient's location and allocation at every moment. The stock-system is a system which provides accurate information about the medical stock account and supply. Lastly, the coding-system[21] gives accurate information about the cost of the admission, diagnosis and treatment associated with a patient's case to be submitted to the CCG. In fact, the coding-system is crucial and was the only income-generator that the hospital had.

The Trust had several systems prior to EPR. For example, MAXIMS was used to track patients and their test results, and this had a completely paper-based coding-system. This system led to a number of difficulties, because its tracking was inaccurate and constant checking was required to ascertain whether a test result was ready. Conversely, the Alert-system presents different coloured icons to clearly illustrate to the user when various stages of a blood-test or x-ray are completed, for example. This is more intuitive for the users and is more efficient for the hospital-system. As the Clinical Change Manager stated:

> *"Alert tracking system had a clock on to give you the length of the time, because one of things in the UK system is a four-hour target. This is regarded to the patient in the A&E department."* (Clinical Change Manager)

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[21]

 *"Coding is when the patient comes to the department or the hospital, coding would tell you that you have to record any coding what the patient had been admitted with? What treatment you provided? What investigations they have had? And then an algorithm calculates how much money the department will get paid".* (Medical Manager).

The challenges associated with EPR relate to its functionality. Although there was an increase in income compared to the previous coding-system (£700,000 per annum), some expectations remained unmet and there was a persistent lack of integration between systems which negatively affected the coding accuracy. The Medical Manager of the A&E commented:

> "We said that the biggest mistake on Alert was not having one page option."

Despite the tracking-system was working well, test results were still late to appear. This is primarily due to the poor connectivity between the laboratory-system (CyberLab), radiology-system and Alert tracking-system. These challenges were highlighted in interviews with the Medical Manager of the A&E and Clinical Change Manager:

> "The EPR system is not integrated with the other departmental systems. So, we need to print all the patient record and transfer it manually when the patient is admitted to a different department [other than A&E]." (Medical Manager of the A&E)

> "The CyberLab did not talk to Alert, which means that we have to run two systems spontaneously. We had another issue with the X-ray system that we were trying to get an icon to the X-ray in the Alert. We did. But we had to log on twice, whenever we need to do any request for the X-ray. And then they changed the X-ray to another system, which was called Zero, which does not talk to Alert at all." (Clinical Change Manager)

Moreover, the information-system in the Operating Theatres (ORMIS) could not be integrated with Alert. The Medical Manager of the A&E elaborated on this issue:

> "Then they [the EPR] moved to theatres, which was a huge problem, because the theatres have an operating system that is called ORMIS, which could not talk to the Alert system. The idea was that anything that will happen with our system will have to be copied into the Alert system. We thought to do snapshots for all the historical records on the ORMIS, and transfer these snapshots to the Alert, but in reality this thing could not happen. Here people start to be a bit resistant to Alert, because of the data migration or data transfer." (Medical Manager of the A&E)

In all, PAS-web was relatively unsuccessful for two reasons. First, the clinicians did not trust it to be fully reliable. Second, it required substantial change in organisational culture and practice:

> "I would say there are two reasons for resistance. Some people can resist to use it, when it is too busy, and certainly in the A&E department. And maybe because it was a mature transformation and people were not very adaptable. I think we have to get used to having the changes as frequent bases. But I think it is difficult to do." (Medical Manager)

*"People do not like dealing with a new way to deal with the same practice."*
(Clinical Change Manager)

The main problem with EPR was related to system-potentiality, as the Clinical Change Manager said:

> *"EPR should have a huge database of information, and should be able to pick and extract the information you want that does the work for you. Coding is good to get the right money, but you can use the same system for coding to generate a letter to the GPs. There are so many things that can be tied up by EPR. EPR without a doubt is the way forward, but the difficulty with the EPR is that everywhere had a slightly different requirement for the EPR to do and to be unique for every individual environment. The complexity is tweaking a system whereby it keeps everybody happy, instead of saying, 'do not upset the system; it is for somewhere else'."* (Clinical Change Manager)

### 6.6.4. The Practitioners and Nurses' Perspectives

An important task for the nurses, arguably representing tacit or procedural knowledge, is to take care of patients in addition to completing recording requirements (e.g., medications, somatic assessment, scanning orders, laboratory orders, and clinical measurements). The main example of their declarative knowledge is that they send the appropriate patient-record with the correct information (e.g., patient name, identification number, and physician's signature) to the intended receiver at the correct time. Nurses are responsible for ensuring that the trajectory of care patients receive is on track and up-to-date. Thus, their expectation of the EPR is to facilitate data entry, monitoring and learning. However, they did not accept EPR in the way that they were expected to.

The nurses' practice is arguably to be more acquiescent to receiving and accepting orders, but I observed that that was not the case all the time. This may be explained by three factors. First, nurses have a more structured chain of practice compared to other practitioners. Second, physicians and administrators rely on nurses in matters related to documentation. Inevitably, this results in a requirement for the nurses to use EPR. Third, nurses spend a more time with patients than physicians do, and therefore their view of a particular ward may be based on a sense of ownership that makes them more committed to the smooth running of the ward/hospital. Moreover, nurses reflected that EPR requires the physicians to enter much of the information themselves, which means many tasks would fall under the physicians' responsibility. Thus, introducing EPR had a positive and empowering impact on nurses as it allowed them to dedicate more time to their primary concerns (nursing patients).

In reality, the EPR was implemented at the A&E department initially, where the nurses were the first to use it in this intensive environment. The Nurse Medical Manager accounted the main functionalities of the EPR along with their early experiences:

*"To look at the running of a patient case in the department, and then you can click on the patient record, and then you can enter the patient information; find out what the patient is up to, then look at the blood result, x-rays, look at medical and nurses' notes on it... The staff in the ward does not need to get all the information as was provided by the Alert.* **They need something different***...There are a lot of problems with* **multiple clicks***. To find the gap, we did a simulation. We went back to the company and asked for changes to be made... It was difficult to ask everybody to do everything on computer, where they had not done this before. We asked the staff to use the computer within the patient cubicle, and they did not feel comfortable doing so. Moreover, there are many functions we never used."* (Nurse Medical Manager) (The bold words are used, because the participant stressed these terms)

The data highlights that the patient-nurse disconnects at the A&E cubicle, whilst the nurse enters patient-information into the EPR (see Figure 6.8). This issue was also highlighted by many nurses when they were asked about the usefulness of the EPR:

*"I think sometimes the logistics are not there. For instance, in the emergency room, there are four beds and four computers, but the patient's head is in front of you, looking at you. On the other hand, the computer is behind you, hung on the wall on your back. It means that when you write the record, your back will be facing the patient. Another issue is that the doctors will use the computers to see the test result, x-ray, et cetera, and then the nurses will not be able to use the computer. Then they will put everything on the paper, because the accessibility to the information is only by means of the computer. Thus, in most cases, we are then still using the paper."* (Nurse Medical Manager)
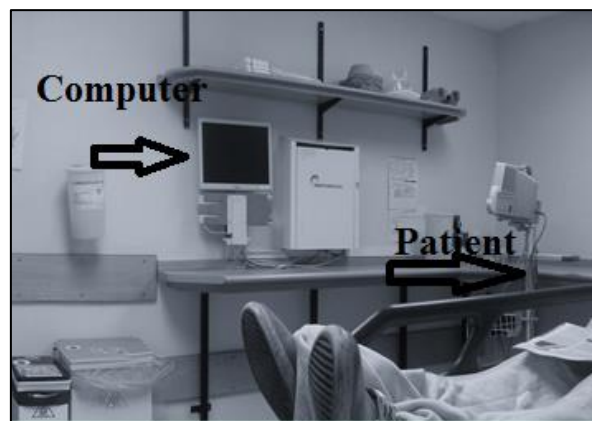


**Figure 6.8. Photograph from A&E Demonstrating the Location of the *Computer* and the *Patient***

In the interviews, nurses said that they would prefer to use a light and cheap portable technology to take notes with the patient, to avoid the issues of disconnection noted above, and to avoid duplication of records (paper and electronic records). One of the nurses at A&E said:

> *"We need our own computer, such as a tablet, but it should be without thick protector, with a keyboard that doesn't cover half of the screen."* (Nurse1)

Moreover, the system between the acute admissions and wards was not integrated, resulting in nurses printing out all patient-documents. Two nurses (1 and 2) commented respectively on this issue:

> *"[EPR] is a nightmare. We never can anticipate what will be the best way, but we ended by printing out these large documents for each patient. These documents could indeed go to anywhere. Otherwise, without using the paper, no one else [outside the A&E] would be able to see what happened with the patient. This issue was one of the big problems."* (Nurse1)

> *"We expected EPR to save our time, but we realized how time-consuming it became using EPR rather than writing down [the record] by hand."* (Nurse2)

The Nurse Medical Manager described a case when the EPR could not be accessed by the doctors in one of the wards which led to printing documents, adding handwritten notes and then hiring new employees to scan these notes into the system:

> *"For instance, you have a patient in the A&E and they need a doctor, who could not access to the Alert. So, in this case he has to print the notes, and then the doctor will write his notes on the paper, which will start to create more and more paper, when the system is electronic. Then we had to employ new people to scan these entire paper documents into the computer system, whereas the EPR implementation conversely required applying redundancy to most of the secretary staff."* (Nurse Medical Manager)

The PAS-web was unintuitive and difficult to use, and most of the nurses found it difficult to remember the process of adding new patients to the system, for example:

> *"When you get a patient in front of you, and you are in a rush, it will become more difficult if you are under pressure, and suddenly [you need to decide] which button is. You [anybody] don't know!"* (Nurse5)

The nurses' perspective and observed practice demonstrated a disconnection between the system and reality: physical-separation, KT-separation and procedural-separation were all experienced. Physical-separation was based on the relationship between the location of investigation of the case and the location of the system, which may have affected the accuracy of the knowledge transferred. KT-separation occurred when there was time and distance between the knowledge-creation and the knowledge-dissemination. Finally, procedural-separation was interpreted based on the practitioners' discourses. The main purpose of the A&E nurses, for example, was to interact with

patient to collect as much information as possible to inform timely treatment decisions. However, the system required more of the nurses' time, which was problematic in terms of time availability and allocation in a sensitive as well as complex environment such as the A&E. This led to staff resistance.

In reality, the anticipated positive factors (e.g., facilitation and empowerment) were not straight forward because the new system amplified nurses' workload. It was found that nurses had to familiarise themselves with EPR, as well as using previous paper-based systems and carrying out their duties relating to direct patient-related interaction and care. Nurses were also affected by the changes to the physicians' practices, which is discussed in the following section.

### 6.6.5. The Practitioners' and Doctors' Perspectives

*Health-Professional's Perspective*

The KT-practice of physicians, based on their role and responsibilities, is different to that of the nurses. Physicians have total control over the treatment of a patient, and as a result they also have control over how nurses conduct their daily activities. They are, therefore, in a position of power in terms of expressing their acceptance or resistance of a new technology. In terms of the KT-practice, their declarative knowledge is the main source of explicit knowledge in the EPR. This knowledge is based on the physicians' abilities to provide appropriate information and make judgements, which are mostly subjective. Knowledge of when to apply a specific medical procedure used to be built though learning and reflection, and although the 'evidence-based medicine' approach is mostly accepted, physicians still have differing approaches, which is known as procedural or technical knowledge. During my study, this issue was raised by many physicians, as a consultant put it:

> "*I think most of the doctors, even from the same level, are technically different. For example, if you send the same patient to different consultants, mostly they will not do the same tests and exams, and sometimes they would technically do a different surgery.*" (Consultant 2)

Users of information-systems often had to use more than one login-process to access information about a single patient. Moreover, the number of clicks to reach a certain point was a big concern that was consistently raised.by users. The E-prescribing Project Manager explained this issue:

> "*If you are prescribing in the A&E by using Alert, you have to first put note of the patient, then you have to get the right screen, then you have to get the prescribing screen, then you have to choose the drugs, this, and this, and a lot of things. It is very long winded, because what they need to do is just to write the medicines... At the A&E, we can do the patient record while the doctor is talking with the patient, but with the Alert it has never happened because, for many reasons, doctors don't like using the computer in front of the patient. This is also due to their preference for one to one contact. So, if you want to access to the computer, you have to turn your back to the patient, which can cause disconnection between the cases and their diagnoses.*" (E-prescribing Project Manager)

The main concern of this group was the way in which technology and practice can be integrated. However, this group demonstrated a high-level of resistance. Two dimensions of this resistance were identified (practical resistance and professional resistance). Practically, physicians were resistance due to the lack of functionality of the technology. In general, physicians were struggling to have access and to utilise the system at the times and in the locations when they needed it. For example, in A&E doctors could not complete patients' records by using the Alert, while they were talking with the patients. Doctors did not like using the computer in front of the patient as they prefer to have one to one contact. Using Alert means doctors need to turn their backs while talking (see Figure 6.8). Doctors required a more flexible technology to utilize in the absence of patients, and for a better doctor-patient communication when patients are present.

A significant amount of additional work is required for the technology to meet the doctors' requirements.

Using the previous paper-based system allowed doctors to capture the relevant information when they were with the patient, whereas the new system did not allow this to be achieved up to the same extent and was therefore less efficient. Moreover, the new system seemed to be substantially different from the NHS style and usual approach; as most professionals reflected in these interviews. For example, the Clinical Change Manager noted that:

> *"When they came with the product, they were intending to deliver something that was going to be the final package. What we said to them was: 'what you designed is very, very clever, and very, very useful, but this comes with too much stuff, which we don't need, and too much different from what we do'."* (Clinical Change Manager)

The disconnection[22] between the professional practices and technology, as highlighted by most of the practitioners interviewed, would lead to substantial wasting of resources. For example, inefficiencies related to time, poor coding and medical errors. It is argued that the main reason for this disconnectivity was because of the lack of involvement of clinicians. When the practitioners, especially the doctors, were asked to justify this disconnectivity their answers focused on two issues:

1. The lack of qualitative features of the design.
2. Implementation-decisions were usually imposed from outside the organisation.

For example, whilst the practitioners agreed that Alert has many useful features, they doubted its usability. Alert was designed based on the tasks the practitioners completed, but it overlooked how they completed these tasks. The Development Manager explains his initial conversation with Alert company:

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[22] This research proposes the term 'disconnectivity' to describe the disintegration between the design and real-time practice.

*"I said you have a lot of stuff in here that we will not use, so we asked the company to make our [BP Trust] flavour"*. (Development Manager)

Whilst the design of Alert seemed logical, given the activities carried out in the hospital, the design and usability seemed to have been overlooked. As the one of the lab managers (Lab Manager2) stated:

*"What aspects of the EPR you should do? It is usability, which means having clinicians on board, and somebody senior who can change the EPR for the clinicians. This is one of the main aspects that should be taken into consideration. One of the problems that we get this time is not having clinicians involved."* (Lab Manager2)

Politically, the implementation decisions gave the impression that the management board was imposing change. Most of the practitioners interviewed agreed that a system like EPR to be useful, but they felt uncertain about whether it was a good decision. The practitioners criticised the timing and procedures surrounding the implementation, which was completely top-down. As the pathology Lab Manager1 said:

*"The outsourced companies want to satisfy managerial level, and the people supervising the operational areas, rather than actual operators. And I don't believe they, at this level, understand how complex the organisation is."* (The Lab Manager1)

This issue was very prominent in the case of PAS-web. For example, a consultant was justifying neglecting the usage of the PAS-web based on a personal dimension of the professional practice. The consultant argued that EPR sought to be a dominant feature in medical decisions, which could be *"abridging the freedom of practice"*. He explained:

*"Most of the time for some cases, you will see that there is no right or wrong procedures, but there are many ways to do the same things, and there are many things to do or not in the same case. Sometimes, there are mandatory steps, but those are very argumentative, and they cannot be identified in advance."* (Consultant 4)

At the professional level, physicians usually have a hierarchical structure with three levels (junior, middle and senior). They are not equally considered as sources of knowledge between themselves. Intellectual capital is constantly acquired and developed through career development, but the professionals may exponentially increase their knowledge. However, the physicians seem to fear losing the intellectual capital that they had accumulated prior to the introduction of EPR. This fear was not equally perceived by all physicians as this was dependant on their positions and divisions.

This fear was noticed for some interviewees who noted that physicians and consultants in specific positions or divisions tended to provide less information in EPRs. This complex situation was highlighted by a consultant and a lab manager, respectively, as follows:

> *"We know to do something, and to deal with some cases, more than we can tell about it."* (Consultant1).

> *"Talking about people having tendency to share their knowledge, unless we can get an intuitive system or product, we still don't know whether they don't want to share or they don't have any chance or time to do so. Indeed, I don't think the EPR was intuitive."* (The Lab Manager3)

Part of this fear seemed to relate to losing the benefits of the administrative work that the nurses carry out, perhaps emanating from the view that doctors' time might have been perceived to be more valuable than the time of nurses. As the Clinical Change Manager commented:

> *"They want the documentation work to be done for them, not by them."* (Clinical Change Manager)

This captured the physicians' attitudes both before and after the EPR-implementation, and reflected that EPR was perceived in some cases to be a threat to their status by increasing their administrative workload.

Two factors should be considered to better understand this issue. First, physicians used to rely on nurses to enter most of the patients' administrative information, requiring the physician to provide a signature only. Second, EPR requires all the orders in the patient-record to be attached directly. This small change had technical conditioning consequences with a direct effect on how EPR was perceived, and led to it being perceived as a hindrance to their daily duties.

A number of consultants pointed out that one of the disadvantages of using EPR was that physicians entered most of the information in one field, which created a lot of confusions for the recipient of the information. The main problem occurred when physicians had very little time available to enter the information required into the complex hospital system. This may also have increased the likelihood of medical errors. For example, in order to label blood test tubes in the laboratory, the specialists had to take blood-samples in one location, handwrite a unique identifier number manually onto the sample, and then add labels to the samples in a second location. This issue was supported by one of the Lab Managers saying (the Lab Manager3) saying:

> *"There is massive risk of medical error. Because of this we have almost 2 errors a week"*. (Lab Manager3)

The above-mentioned errors were crucial ones in the barcode reader which should make the system more self-driving or intuitive. Thus, the real cause of error could be attributed to the gap between the ability of staff to transfer the required knowledge and the workload required by the EPR. These problems were summarised by another lab manager:

> *"Anybody who wants to buy an EPR product needs to talk to the user, to the people in the A&E, in the theatres, in X-ray, in Pathology. Anybody would need to contact the people who know the business, in order to get their opinions. The developer would need to know what and how the end-users works and then reflect their practice in the project."* (The Lab Manager2)

The interviewed physicians noted that during four years of implementation they were still using paper-based records in parallel with EPR, which added to their workload and made their tasks more difficult, as well as resulting in a high degree of confusion and uncertainty surrounding the EPR-implementation. As a result, many physicians refuse to use the EPR-based version on the argument that it could cause serious errors neither was safe nor easy to use.

As discussed previously, declarative and procedural knowledge seem to be the main interests of this group of stakeholders (i.e., health-professionals). This group indicated that knowledge and technology (or KMS) require understanding of the human interactions at the practice-level. That implies the motivations and actions, certain functionalities of the technology and end-user involvement and management of users' expectations (see Figure 6.9, and Figure 6.4).

This group of stakeholders perceived the KT-practice as a successful communication between their practice and the transformational EPR-project. They identified the EPR as an IT that can facilitate their work to be done with less effort. They came to the conclusion that technology should keep their work as it used to be, but it could make it faster and easier. These professionals usually have huge experience in doing something which requires very close observation and managing things that require more general or multi-faceted view of doing things. The main conflict between practice and technology was attributed to professionals for a variety of reasons:

1- Education and training: some participants/practitioners argued that training was a prerequisite and thus an issue to be able to use the EPR. For example, two doctors argued that technology required specific skills to be shown by the users to be able to get the maximum of it. They made the link between the required capacity of using the technology and the accuracy of the communication among them. They reflected on this matter by respectively saying:

> *"If I want to talk about the person who can use the technology much better, who would transfer the knowledge much better, in comparison with other who is learning about 'Medicining', for example, I think all of these issues could be accrued by training."* (Doctor3)

*"We have an information department, an informatics centre, information strategy, rather than information being part of all other clinical strategies. I have rather seen informatics as someone else's business, which is a different department with some really geek people there, talking a language which I don't understand."* (Doctor1)
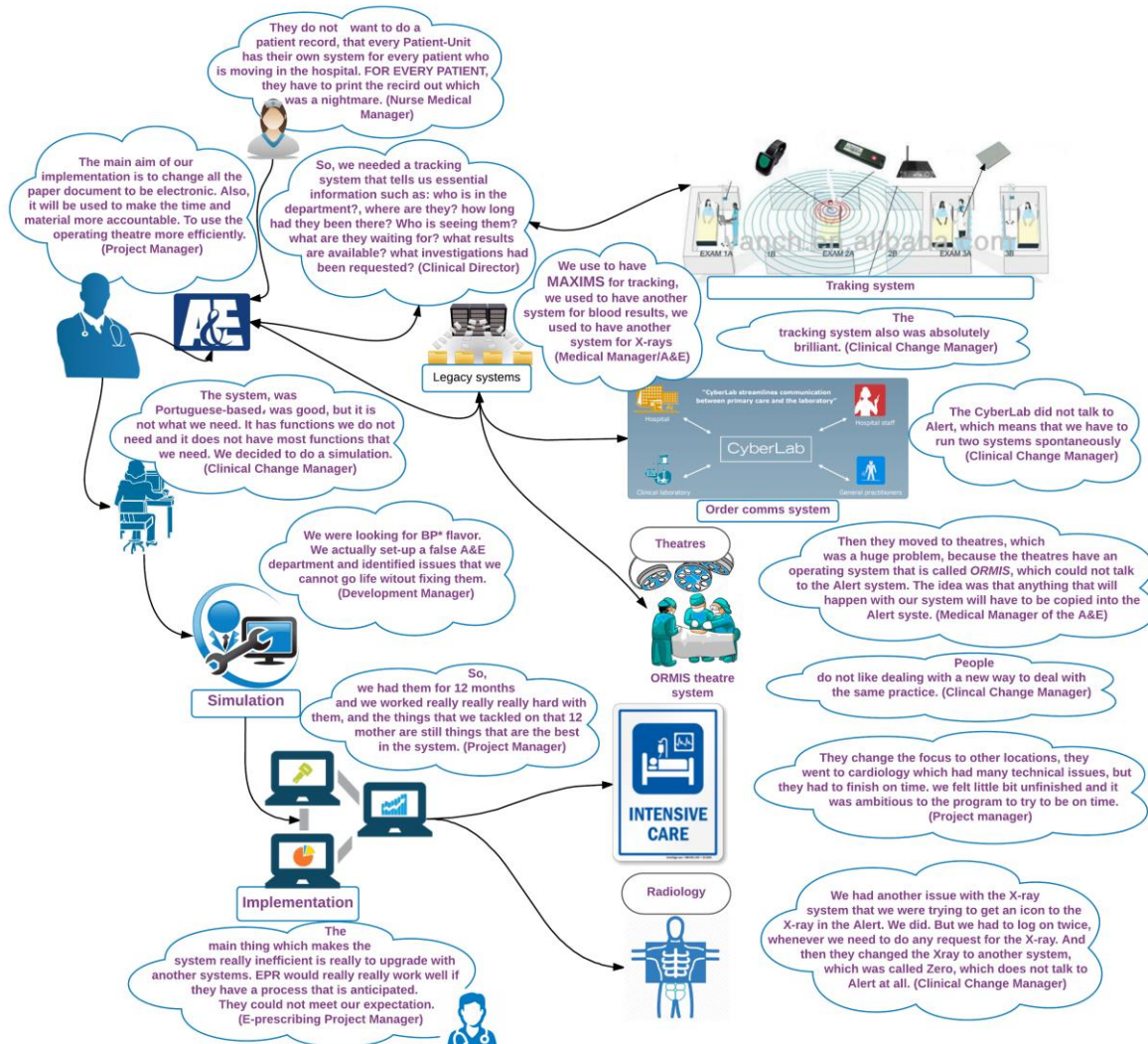


**Figure 6.9. Practitioners' Perspective of EPR Implementation**

Other participants shed light on the lack of familiarity with the technology had roots in the education system where non-negligible number of nurses did not learn or develop computing during their pedagogical life. As one of the nurses put it:

*"We have a generation who hates the computer, based on their education, and we need many years to make this generation retire and leave the Trust. We are expecting more IT knowledge from the staff than before. When I came here the blood result was the only thing we were using the computer for. We have almost 30 per cent of the staff who hates the computer."* (Nurse2)

**2-** Technology intuition and the ease of use: many practitioners argued that ease of use was an important issue to attract one to involve the technology in their work. As one nurse stated:

> *"Based on my experience with the EPR, the technology should be simple to make people easily to use it. We have a generation who hates the computer, and we need technology that reduces this feeling, not that increases it. We need technology, and if we don't have technology, we wouldn't have any historical record. We would have to get all old patients' notes on paper, which is a nightmare […]. Knowledge and the technology need to be simple."* (Nurse4)

Specifically, the practitioners attributed the gap between their practice and EPR to the lack of clinical practice-analysis and to the lack of experience in the efficacious implementation of technology. The Nurse Medical Manager said:

> *"I think we did not get what was promised by the provider. For example, we asked them to do something certain, and they made it, but it was taking six clicks to do it. We didn't do it before in the NHS to go for a full electronic record, and we didn't know the question to do it. Actually, we didn't know what we didn't know. We didn't specify how to do it in one click. So, now you have to click on one bottom, and other, and another to do it […]. There are a lot of functionalities that we never used before. Now with the EPR, we had a map for the A&E department to know where the patients are. We know where they are, and I don't think this is crucial […]. I think we were slightly blind, because we didn't really know about what we need... we had an idea about what we wanted, but we had no idea about how to do implementing […].We didn't realize how time-consuming using the EPR became in terms of practice in comparison with writing the record down by hand […].We didn't appreciate how specialists from outside the A&E are going to use the system."* (Nurse Medical Manager)

The lack of the functionality and disconnectivity between the clinical practices in some cases led to medical errors as the following example which was given by a doctor:

> *"For example, you have a patient in the A&E, and they need an orthopaedic doctor, who has no access to the Alert. So, we have to print the notes, and then the doctor will write his notes on the paper, which will start to create more and more paper in spite of being the system electronic. I think, as the Electrocardiogram (ECG) told us, that we will be able to transmit the results to the system but that isn't working always. Then we had to employ new people to scan all these papers and documents into the computer system. We had been prescribing on the Alert, but we stopped it. Because, when the patient will be seen by the specialist, they will get prescription, which is written by hand, and then we would get double prescription, which leads to medical error. Also people didn't like it."* (Doctor2)

**3-** The overlapping between the paper and electronic systems: Nurses and other professionals were upset because of the disconnectivity between their way of transferring the medical record and the way the EPR worked. This issue was discussed in detail with the Nurse Medical Manager:

*"The system was available to some places for the medical units, but it was not available to all of them the access to the patient record. The staff at first doesn't want to use the EPR, because every patient unit has their own system for every patient who is moving in the hospital. For every patient they have to print the case note out, which was a nightmare. We never anticipate that this issue will be this way, but we ended by printing out these large documents for each patient."*
(Nurse Medical Manager)

Regarding '*Infobesity*', as abovementioned, professionals confirmed that although the EPR made many sources of knowledge available, in some cases it made them less confident to take specific decisions. In addition, it was observed and mentioned that professionals started to apply tactic information avoidance by filling the forms with less information and by ignoring most of the information retrieval. As one doctor shared:

*"Now, when I am asking to get a patient record, I am having almost **30 pages** to retrieve, do you think I have time to do so with **every single patient**?"* (Doctor3)
(The bold words are used, because the participant stressed these terms)

Also, the data showed that the power of position could affect the level of the developed technology. It was noticed that specific facilitating technology was not equality distributed among the relevant professionals (e.g., some professionals had computer devices with touched-screens). When the researcher asked a participant about this issue, one doctor conceived it as an issue of inequity. This issue made a case of a problem mentioned once albeit important. The doctor said:

*"At some part of the hospital, some clinicians got a touch screen that they like it, because it was more a kind of user friendly and intuitive. However, most of the other doctors got a normal system [hardware and software], which was like Windows. The clinicians may have felt that this issue wasn't fair."* (Doctor1)

### Medical Managers' Perspective

The main interest of the manager as a stakeholder is to increase the control of materials and level of effective communication between human and non-human actors in order to achieve the best outcome (as cited in the Quality Improvement Strategy the Trust's Digital Strategy, 2011).

The main concern for this stakeholder is to achieve the strategic goals of the Trust. In order for the Trust to achieve its strategic goals, particularly transforming care and improving patient experience, the way services are provided must be transformed. Part of this transformation is to be able to provide seamless care both within the Trust and between the Trust and its partners in the local health-economy. Such integrated care can only be realised, if it is supported by seamless and integrated information. To achieve this, the Trust should have an EPR-system so that every member of staff has access to the information they need, when they need it, and wherever they are working, without having to look for a piece of paper, wait for a vacant computer or ask the patient. This group of stakeholders had member from the management-board of the Trust who was the head of the Informatics Department, and the

implementation-team and management which included IT-manager, clinical-change manager, and clinical-governance leader. They worked alongside the patient-safety regulator and procurement team.

### *The Board Management Team's View*

This group of stakeholders regarded the EPR as a project that could enhance the organisational performance (e.g., cost-saving, data-saving, and speed of data-communication and exchange throughout the Trust). In addition, these stakeholders needed to follow the DH-strategy. Interviewees from this group explained the situation of the EPR-project in relation to the KT-practice, before the question "What is the impact of the EPR-adoption on the practice?" A development manager noted that almost all implementation-team members agreed with that a different group had different requirements, based on the practice of this group at the Trust:

> *"As a clinician, I have a way to work. I first identify the stakeholders, which are the people who are benefiting and are involved, especially in the EPR project, where the diversity of stakeholders is very huge. If I want to design a process, I would say: Ok, whose is going to benefit from this? Who can I convince? To sit around the table and help me with it, and to whom I can pass the responsibility for and the administration work. So, if you want to design something for a new emergency care, I would say this is what it should happen. Then the other doctor will say: I think we should be doing that as well. After this discussion, then we gave orders to somebody in the clinical change, and afterwards, to the executive board, and later to the clinical policy to do the final proof, and then we would start to implement it. What I meant was that the needs and requirements should be identified by the people in charge, to make sure that the needs and requirements are reflected later in the new projects or systems."* (Development Manager)

Stakeholder-analysis was an effective method for change management in order to understand these stakeholders' needs and their power. The EPR-Project Manager discussed this issue in details:

> *"In the A&E there are many classes: seniors, middle consultants, young and front-line doctors, and nurses. There are senior clinicians, who are close to retirement, but they may be in very powerful position. You can say that the senior clinicians are very powerful in every department and they hold a kind of resistance for implementing anything in that department. Because they have gotten certain reputation, they are always most of the time very good in what they do, and they are respected by everyone. There are other clinicians in the middle range, so these will be in the Trust for, so to say, five years or above. Those [juniors] aren't known, but they aren't difficult, and you can engage them easily, but they are guided by seniors. They have had a lot of banding with them, because they already were with them for five years. Then you got clinicians, who are very, very new, who are junior consultant and junior doctors. They were fantastic for this project, they were up for changes, they wanted something new, and they wanted everything electronic. They were quite enthusiastic and upfront. But the problem was something dealing with logistics. The front-line doctors liked the EPR, but they only followed what the consultants wanted. They have to follow what consultants are saying."* (Project Manager)

His opinion demonstrates the relationship between employees, who worked at the hospital for many years, and resistance. Thus, the Practice and Power theory can be used to interpret this phenomenon in terms of the staff with a longer tenure, representing the 'old' habits of the organisation in terms of documentation and sharing knowledge. It also shows that the consequences of established habits can be more than experienced employees maintaining power. This also suggests that newer employees may be positive towards accepting a change as it represents devolution of power.

### The Clinical Managers' View

This group of stakeholders perceived the KT-practice as a successful communication between the practice of doing something and the best practice of doing the task. Clinical managers usually have considerable experience in doing something that requires very close observation. They are also good at managing tasks that require more general/multi-faceted view. Stakeholder Analysis demonstrated how different employees had different capacities for change and technology. The Clinical Change Manager discusses this issue by saying:

> *"Nurses are much better in using the EPR because, in spite of that all medical professionals are documenting, nurses are very good on this. For the doctors, and because of the rotation changes, it took them a few days to get familiar with the EPR."* (Clinical Change Manager)

Two of the lab managers respectively attributed the main reason for the conflict to the organisational structure that was hierarchal and it only supported one way of communication:

> *"Our care organisations need to talk to people who are going to be using any piece or product. If you want to buy an EPR product needs to talk to the end-users, to the people in the A&E, in the theatres, in X-ray, in the Pathology, and need to understand the people who know that matters to get their opinions."* (The Lab manager3)

> *"I don't think that previously our managers went down to the operational level. They went to the manager level, rather than to the actual operators, and the people supervising the operational areas. I think our previous leaders generalized the solutions, and it is more complex. And I don't believe they **understood** how complex the organization is."* (The Lab manager1) (The bold word is used, because the participant stressed this term).

The Clinical Change Manager justified his comments by explaining that nurses were more familiar with documentation than doctors. Furthermore, there are external stakeholders (such as GPs, the CCG, Police), who need to access information such as patients' medical procedure histories. The Clinical Change Manager explains:

*"Our system should be based on multidisciplinary communication. From the GP perspective and commissioning [Care Commissioning Group, CCGs] is much faster, detailed and easier to follow up. For the commissioners, it is easy to understand the payment, that they aren't getting over-charge to the hospital or under-payment for the work."* (Clinical Change Manager)

When lab-manager 1 was asked about his view to describe the problem practically and to suggest a practical solution, another lab manager said:

*"I don't want to be involved, for I am not an end user per se, but 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 [NHS], 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 [...]. There is a lot of operational professional, like myself, and a lot of people in the Pathology and Radiology, who are still imposed to accept the new implementations."* (The Lab manager2)

Intensive-change has also occurred as a result of internal employees leaving the organisation, as the Clinical Change Manager mentioned that:

*"People retiring...who are very, very senior people who were not very happy"*.

The Clinical Director elaborated:

*"One of the biggest obstacles is in August, when all the doctors change. The rest of the year they slightly change. Every August the medical grads and junior doctors will change. So, some people will stay for six months, four months or twelve months. August always is a dilemma that my department is always junior-dependent. I have in my department always two consultants, two medical grads, and up to ten juniors. So, whoever I have, a new staff will ask me directly how to use the EPR."* (Clinical Director)

This issue and others made the majority of the clinicians in many occasions express themselves saying that it was impossible to have a communication-system that could make healthcare a paperless-place. For example, the Clinical Change Manager emphasised this view by saying: "In the future we can have system that is less paper, but it will not be paperless." This view was justified based on the relevant professionals' analysis of their practice. The same Clinical Change Manager also stated, in a different occasion, the following:

*"I am saying that paperless is very difficult or it is impossible. The idea of replacing the paper record by the electronic record is based on the work analysis called 'AS IS it is will be', and I think it should be a more realistic transformation 'how it should be it will be'."* (Clinical Change Manager)

However, from his point of view the contract termination was not only because of the delay of implantation, but also because the EPR Company had different types of customers. He added:

"*Because, they [Alert provider] had new people [other customer] who they are interested in, in the UK.*" (Clinical Change Manager)

An important lesson mentioned by IT manager and Nurses' manager that the Alert was the first project of the company in the UK, and thus being akin to a 'trial mode' Alert was considered a notable weakness since it had not been yet implemented nationwide:

"*We needed one which is used in the UK, and had track record of use.*" (Technological Director).

The manager of the E-prescribing project argued that:

"*It is blamed a lot on the adaptation of the software, which was widely used in Portugal, Spain, and also across the USA and South America. It is widely used but there are very different healthcare cultures to the one that we have in the NHS. Because of that, it was so much the adaptation to do, to make the system fit to use in the NHS.*" (E-prescribing Project Manager)

I observed that this group agreed that the implementation of 'Alert' failed when the consultants as the most powerful actors decided that EPR ought to be abandoned. This issue was implied by most of the implementation-project team.

The managers interviewed identified that the main implication of the EPR was that KMS could support KT. This relates directly to the strategic objectives of the Trust's management-board. Accordingly, seven main themes as potential benefits of the EPR are cited below (see detailed themes and sub-themes in the Appendix D.4):

1. Hold patient-records electronically.
2. Underpin and enable improvements to clinical care and patient safety.
3. Sophisticated enterprise-wide scheduling.
4. Tracking and communication-systems.
5. Patient access to, and eventual control of, their own health records.
6. Provision of systems that actively support best-practice and efficiency.
7. External stakeholders, partnership working outside the Trust.

In sum, the profession entails intentionality that makes the professionals react accordingly. The KT-practice and EPR-project analyses were conducted through numerous interviews with clinicians, representatives from/of professional organisations, clinical managers, and administrators. This allowed the researcher to understand that the digital-technology agenda should be set right back to

central dimension of the clinical and KT-practice. In terms of the clinical practice, it is incalculable to understand what EPR can do and the difference it can make (e.g., the EPR-potentiality). It requires building technology based on the clinical practice, and to embrace informatics and digital-technology. This requires looking at how different perspectives can influence what happens locally in an organisation in order to achieve best clinical-practices through vitally effective communication amongst professionals, patients and health providers. For example, it is crucially important to introduce the technology that can help collect and articulate accurate data which will in turn enable the Trust to enhance their managerial processes (e.g., accurate patient-tariff could enhance the commissioning). However, based on the aforementioned arguments, this issue cannot be dominant over the professional and clinical practice.

## 6.7. The Nature of Knowledge at the BP-Trust

The nature of knowledge was inductively identified, in this work, based on the observation and interviewing different participants in order to grasp multiple perspectives. The data clearly show that knowledge-categories are basically affected by the group practice, e.g., when a consultant was asked to identify the types of knowledge which were circulated at the Trust, he emphasised the individual and collective levels besides multiplicity of knowledge as also he underlined the interdependent relationship amongst these types of knowledge by saying:

> *"We can say that we mainly have: Social knowledge, professional knowledge, administrative knowledge, and technical knowledge [...]. I would say every individual in the Trust could be seen as a unique knowledge, including: managers, doctors, nurses, social workers, et cetera. If we want to investigate what knowledge is, I think can grasp it through our techniques, skills and experience. In other words, the many types of knowledge in the Trust are interdependent. For instance, the stroke physician, who is an expert, will rely on the CT technicians, who are able to do the CT [computed tomography (CT) scan], who will rely on the radiology. Also, they will rely on a physiotherapist to do rehabilitation and re-mobilization. They will rely on the OT to make sure that the patient can do the main activity, which is needed. Everybody has a knowledge, which could be considered as a piece of the bigger knowledge of the Trust. I think everybody brings something to the table, and it is a very huge model when you are trying to think about it holistically."* (Consutant2)

The Clinical Change Manager emphasised that knowledge at the hospital was much related to the clinical and medical practice. He stated:

> *"Q: How many types of knowledge can you find in the hospital?*
> *A: You can have knowledge about the patient health conditions, biochemical, meteorological or any other investigations. We have also clinical knowledge, knowledge from the scan or investigation, knowledge to take the decision, if the patient needs more testing, other opinion, or do an operation."* (Clinical Change Manager)

Technicians had the perspective that the nature of knowledge at the hospital is mainly related to the professional-practice. They justified their perspective by emphasising the healthcare where doctors efficiently dealt with illness to make people in better conditions. They comprehended the technology as an essential facilitator providing accurate and integrated information. For example, one technician commented on the role of informatics by saying:

> *"[Informatics] has mutable roles. We have got the IT side, where we have gotten a blog on it, services, PCs, whatever. Then we have gotten data quality, which looks after data within the system to make sure that we get right data about the patient demography. We have informatics for more reporting whatever needs to be reported, and for stating an application development. Then we have gotten communication to deal with different services, including the EPR and different projects."* (Technician2)

In sum, based on daily practice, knowledge at the Trust has many knowledge categories (social, professional, administrative, and technical), and many dimensions (space and time, people and technology), which are required to be integrated via recursive interdependent relationships between the social parts and technological parts. The professionals and their professions have effects on the multiplicity of the knowledge. Knowledge in healthcare mostly has two main dimensions (declarative and procedural), which are (re)shaped by socio-technical dimensions. Moreover, practice and practitioners indicate that knowledge cannot be objective, but it has impassive property that stimulates actions to fill the gap of inquiry.

Since this part of the analysis focused on knowledge, the following part will focus mainly on the actors, in order to identify their personal and interpersonal perspective/s on the KT-practice in relation to the EPR-project.

## 6.8. Nature of the Health-Professionals and KT-practice

The aim of this section is to understand the interaction between KT-practice and EPR based on the actual practice of health-professionals. Tracing the EPR-stakeholders was very helpful to identify common issues from different perspectives, and how these issues were affected by the practice of the groups or communities. Also, the types of knowledge illustrate important dimensions and aspects of (re)shaping the EPR, which is directly related to the KT-practice. This part of the analysis also revealed some struggle of the actors in relation to the KT-practice and documentation. Before the EPR-project, the main struggle of the actors was with the accessibility of patient-records, as a result of many technical managerial practical and personal reasons including the geographical extension of the Trust which naturally has many subsidiaries. The limited integration and accessibility of the EPR created many cases and possibilities of the information clash, or missing information from different healthcare centres in the region. This section presents findings from interviews with different groups on KT-practice already used in the context of the EPR-project.

### 6.8.1. The Capacities of KT Actors

For the knowledge-articulation and knowledge-retrieval, the participants emphasised the importance of electronic-communication that could enhance the overall accuracy and KT-practice. This issue was clearly discussed by the Consultant 4:

> *"Q: How could the EPR play a role to enhance the KT practice?*
> *A: I think it is a fingertip. I have EPR, which is working for the A&E, and I know when I have to respond to the complaint, or investigate a patient episode that I can log on the system, and the information will be located at a site's position. I will be able to see who has done it. I will be able to read it, because all are typed. This is a huge advantage. All will be a timestamp, and all will be accurate. Whereas, going to the notes, it will be another story. Just I spent, before to see you, almost ages. For instance, if I will do a case notes, it will take me forever. Because you cannot read the handwriting, no date or time, and without knowing who they are! For instance, some would write Johns! Is he a doctor, is he a radiologist, who is he? On the EPR, you will read it, and everybody can access, and they will be directly there. And nobody will waste time that is unique."*
> (Consultant4)

This issue was also highlighted by another consultant when they gave an example of disseminative capacity of the sender to apply the knowledge in the practice:

> *"When you are writing your discharge summary, and in order to allow the GP to follow up, your summary should tell the GP the clear picture of what happened medically; what led to the investigation you did, what led to the medicine you gave, what was the management plan for the future. The GPs need to know all the background. Otherwise, the GP will keep asking for more clarifications, which is happening. It is very important for the receiver to understand your processes. If you are not able to communicate what you have done, then it is very difficult for the people in the other end to realize or to plan accordingly."* (Consultant3)

The profession was seen as main factor that can (re)configure the professional capacity. This issue was agreed by the majority of participants. Here, a consultant clarified this with an example:

> *"The difference between the GPs and the consultants is big, because GPs usually deal with more chronic conditions, whereas the consultants are more specialised in a certain area."* (Consultant2)

In general, the participants emphasised the role of the technology in facilitating the KT-practice. However, the participants reckoned that the key role was played by the social and professional parts of the practice. For example, the clinical director explicitly elaborated upon this role of humans:

> *"Knowledge is very clearly depending on who is using the knowledge, why do they use the knowledge, and how do they use the knowledge? Who are documenting (what)? And whom they are documenting for?"* (Clinical director)

Another key participant made a link between the capacity of the sender to articulate knowledge and the KT-practice. In his opinion the role of the human capacity is essential, and the role of the technology is substantial.

> *"For the doctors, it is very important to be very good at the articulation of knowledge. If you put rubbish in, you will get rubbish out. […] Talking about an example, Mr. John came to the A&E and he had a specific illness. His stomach was bleeding. You would need to refer him to a specific consultant. The skills and the training of the doctor, who is seeing the patient, are very important to deliver the best care. How does that person articulate the knowledge? How is he disseminating the knowledge? Et cetera."* (Clinical Change Manager)

Most of the participants made the emphasis on the sender in order to transfer knowledge successfully. For example, some consultants argued that, if one did an appropriate management, an appropriate investigation, and an appropriate plan for the discharge, but they gave out very limited information, then the receiver would not understand what is being discussed or at stake. Several senior participants confirmed that this was a big recurrent-issue:

> *"So, it is very important that the receiver gets the full information, not just half of the information."* (Consultant4)

When the clinical change manager was asked about this issue, he agreed but he commented that the availability of knowledge was limited at that point of time, but the future would be better:

> *"These kinds of issues are going to get better in the future, because I am expecting in fifty years' time of one hundred years' time, everywhere there will be an electronic patient record, and then you will have all the data at all levels all the time. But at the moment, the receiver has to rely on what is sent to them, and has to rely on the receiver's knowledge to analyze what had been sent."* (Clinical Change Manager)

As for the receiver, the consultants from their point of view also evaluated the role of the receiver in the knowledge-assimilation as essential to lead to a successful action and the completion of the KT-process. Two consultants respectively verified:

> *"So, the receiver should have the capacities to analyze the information that had been sent by the center, and also they should have the ability to do their assessment, and make the judgment whether the information, which was sent, is applicable to the patient, or whether they have to have a different plan, which I expect the receiver, as a specialist, can do that."* (Consultant3)

> *"I always think people like a jug of water. You can put so much information in, but eventually, the more you are pouring, the more you are going to displace something."* (Consultant1)

The data-analysis revealed that there were contrast and dissimilarity between the attitude of the doctors and nurses about their willingness to share knowledge. For example, the nurses believed that

the nursing profession was not very competitive, or too vulnerable to be taken over by others. As the Nurse Medical Manager pointed out:

> *"We [nurses] aren't afraid of losing our job security or intellectual property. Nurses believe that their job is very hard to be taken over by other people; including robots or technology. The other problems are related to the awareness of understanding the knowledge sharing. […] People just write rubbish, but when they have more time, they would do it better."* (Nurse Medical Manager)

A similar answer was repeated by another nurse participant:

> *"As nurses, we don't have any fear of losing our job or intellectual property, or reducing any job security. However, we don't have time to do more work. We need more staff, and especially nurses."* (Nurse3)

However, the Clinical Change Manager had different view reflecting on the willingness of clinicians to share knowledge:

> *"I would say that eighty per cent of the clinicians are not up for change. EPR was a huge challenge. There were a lot of consultants who were very against it according to their culture. They felt that this was going to be a threat."* (Clinical Change Manager)

To clarify the meaning of the professional as a main actor, most of the participants attributed this meaning to the ability of the professional to do the *right* action or take the *right* decision. This issue was highlighted clearly by a consultant:

> *"Our work is not to retain a lot of information, but to retain our action. We need to know when and where we can find the information. I struggle to retain a lot of information, but I do remember where I can find information that I need… In information terms, I always think that you can't put so much information in, because the more you add, the more you will displace something* [Infobesity]. *In action terms, I think people always can do more and better."* (Consultant1)

This argument shows the important of the practice as the main dimension in the professional action. However, this practice is not isolated from using the tools and technology, because surgical practice is partly based on the skills of the surgeon, i.e., how they use and control their surgical tools.

### 6.8.2. The Relationship between Actors

In terms of the importance of the relationship among health-professionals, the KM-literature gives an important evaluation regarding the format of knowledge. For example, in terms of the declarative knowledge, which can be shared among professionals by the EPR or any other formal report, the relationship was not a key issue. However, the observation and participants had different opinion. It was apparent that when the knowledge was more informal, most of the he participants would prefer to meet and discuss with the most trustful staff with whom they had a good relationship. Therefore, in terms of the informal knowledge, the quality of the message which came from the sender could affect the credibility of this source. As some consultants assumed that the issue of

sending poor information to answer an inquiry was mostly related to poor relationship between the source/recipient. A doctor commented on this issue as follows:

> *"I think the relationship is important for the KT practice, and it is affected though the practice. In other words, suppose you are constantly sending very poor information. Then you will lose your credibility."* (Doctor2)

Moreover, in terms of formal knowledge, this issue is more complicated because it is not only related to the relationship between the sender/receiver, but also it is related to the situation and the context of the inquiry. To make this issue clearer, one consultant elucidated with an example of a specific case. When a doctor in the intensive care, or in a recovery ward, needed to get a report from the A&E or from a different department, he would rather get a summary of what was already done in a single page in addition to the long detailed report (30-40 pages). Despite this summary was completely optional, which eventually made this issue very personal, it still appeared to be affected mostly by the relationship between sender and receiver:

> *"I think it is very important as a clinician to be very professional, rather than becoming personal. However, if you are a close friend with a person, you can ask them to summarize the cases without any concern, whereas if they aren't, then the relation will be very official, and limited [...]. On the other hand, in some cases, if you are too close to a friend, you may feel embarrassed to ask them to do extra work [...]. So, close personal relationship, yes, it can sometimes impact poorly the KT practice, but sometimes it also encourages the pathways as, for example if you know someone and you want him/her to do something very urgent, then you can ring them and they will come, and will sort it out very quickly, because of the relationship."* (Consultant4)

The Clinical Change Manager also highlighted the issue about the professional practice and behaviour to evaluate the impact of the relationship between senders and receivers on their actions:

> *"What I see as a clinician, we are prioritizing the cases according who is referring them to us (very, very importantly), but also we are prioritizing them based on the urgency from the patient viewpoint. So [the relationship] sometimes depends on the 'source credibility' [...]. It depends on who is sending and who is receiving. Suppose that you are constantly sending very poor information. Then you will lose your credibility. So, the electronic way to send the data is good in a way that it prints out almost the whole consultations in the A&E or in any department."* (Clinical Change Manager)

In terms of dealing with the language issue, the NHS is a multi-ethnic organisation and thus its patients are from many different ethnicities and tongues. Therefore, hospitals, GPs, among others, use interpretation services to understand the patient's case. However, the EPR had no function to provide the report in different languages but English, even for patients. This gap seemed to be huge when the transformation of integral projects to communicate with all the stakeholders, such as the EPR, was taking place. As a consultant explained:

*"The common language is important for the communication and knowledge to be shared, because NHS is a multiethnic organization, where people from different countries are working together and patients are from different ethnicities as well. So, when you are seeing a patient from a different culture and language, you need an interpreter. This does effect the communication and transfer of knowledge, but we do rely on the interpretation services. However, if we need to be consistent, sometimes we need to get a patient report based on different languages. As far as I know, this issue is not considered in any medical information and communication project."* (Consultant2)

At the BP-Trust, the professionals agreed that the communication between staff was poor and they assumed, however, that EPR could have the potential to improve the interaction and communication amongst staff. An important example was mentioned by the Nurse Medical Manager:

*"Nothing worse, I am going to see the doctor or nurse, and they ask the same question that somebody else asked half an hour ago, and you think, why didn't they talk to each other? So, if this is the case, the communication is very, very poor."* (Nurse Medical Manager)

## 6.9. Conclusion

This chapter presented the data-analysis conducted in relation to the implementation of EPR at the BP-Trust. At the macro-level, the analysis identified many challenges faced in implementing the Trust's 'digital vision'. For example, the difficulties encountered in trying to achieve a single view of a patient from multiple current systems were identified. These difficulties arguably led to a number of the project failures as experienced by the interviewees. The diversity of the stakeholders was also a challenge, exacerbated by the EPR-implementation, being primarily focused on administration rather than clinical needs. The result was that some applications and processes were unnecessarily complex, having evolved in a piecemeal way. The practice-analysis demonstrated the lack of interoperability, which highlights that the information about a *patient* often does not follow *them*, as *they* move through care-settings. As discussed previously, information-systems users at the Trust often had to use more than one login process to access information about a patient, and sometimes they remained unable to access all the required information. The number of clicks to reach a certain point was also a significant challenge that received complaints from the users. Re-engineered care-pathways therefore cannot be sustainably implemented without full modernisation of information-management. The current provision for clinical-decision support in clinical-systems is also not yet effective, including access to knowledge bases in the context of the clinical process and decision-support rules (enforced for order communications). Lastly, the analysis demonstrated that management and clinicians do not have a real-time view of activity and performance across the Trust.

An important lesson mentioned by the IT manager and Nurses' manager that the Alert was the first project of the company in the NHS, which was seen as a main weakness. It is important to make it clear why there is a genuine need for variation across the MHS-services which depend on data and

information. It is of paramount importance for the professional and non-professional to enable and to be able to share best-practice, where the transfer of information and technology is a key to make this materialise. The data revealed that technology should enhance the communication which is crucial in a world where patients have to take centre stage, and they need to be able to make choices about their clinical care where they can get their clinical care from. This chapter illustrated how the participants perceived the potentials of the technology in their practice (EPR and KT-practice).

There are many types and levels of stakeholder involved in EPR. For simplicity, these can be reduced to internal and external stakeholders. The external stakeholders include GPs, social-care centres, the subsidiaries of the Trust, the Police and community-services. The internal stakeholders are divided into divisions and communities, such as doctors, nurses, laboratory scientists, managers, and IT-professionals. In other words, the internal stakeholders are managers, health-professionals, and technicians. This diversity of stakeholders reflects the complexity of the healthcare-sector, which is considered as a multidisciplinary context.

Multiple-perspective-analysis was useful for a number of reasons. It demonstrated how most of the resistance to EPR was based on users' expectation of this system and their experience during implementation, and that when EPR is fully electronic its stakeholders will change. Transformation-projects should therefore be associated with the dynamism of the stakeholders. Stakeholder-dynamics are usually neglected in stakeholder-analysis, where the reform or transformation-project will affect the power and interest. For example, junior doctors may be very interested in projects, such as EPR, that reduce the power of senior doctors by increasing the information availability. However, nurses appeared to be less interested in EPR, as they believed it would add more tasks to their workload. Furthermore, this chapter discussed multiple perspectives of KT-practice, including identifying the knowledge-in-practice, KT-methods, technology-in-practice, in addition to human actors. In conclusion, this research advocates that organisational complexity, heterogeneity, and multiplicity in the healthcare-system justify the level of conflict of interest demonstrated by the data analysed herein.

# Chapter 7: Exploration of the KT-practice in the Healthcare

## 7.1. Introduction

KT-practice in healthcare requires studying the relationships among humans, technology, and processes, which involve micro- and macro-level professional activities. It also delves into the relationships that enact transformation in the dynamic reality of healthcare. Transformational EPR-projects entail new modes of understanding dynamic systems.

Studying KT-practice has a potential to understand the context and the complexities that may enable accommodating a particular change and/or development of the healthcare schemes. This study examines the KT-practice and KT-processes through many dimensions, namely the nature of knowledge, stakeholder and actor-analysis, and socio-technical analysis. This research explores personal and contextual KT-practice methods to conduct a deeper-and-broader exploration of the KM in healthcare. This study centres on the following inquiries: How does knowledge circulate in the relational field of healthcare? How is the KT-practice analysis carried out in the healthcare industry today? How do stakeholders influence the KT-practice workings?

Based on the gaps identified in the literature (Chapters 2 and 3), this study aims to contribute to the fields of KM and KT-practice by addressing this transversal interrogation: "*How do different actors perceive and conduct the knowledge transfer practice, from different managerial, technical and professional perspectives?*"

In order to clarify the complexity of the KT-practice on the healthcare-context, this chapter addresses its multidimensional aspects in three different areas of discussion. The first part discusses the main findings in relation to the literature, informing about the question of knowledge, the involved actors, the social entities, and the technology at play, through the socio-technical analysis of the KT-practice. The second part illustrates the interactive dynamics of the KT-practice and medical activities. The final one addresses organisational, individual and professional issues regarding KT-practice.

## 7.2. The Socio-technical Analysis of the KT-Practice

Literature on the KT-practice in healthcare argues that hierarchical structure and evidence-based medicine are the central unit of analysis, regarding the factors that affect the knowledge co-production (Pentland *et al.*, 2011; Britten, 2010; Kitson, 2009; Gabbay and le May, 2004; Green, 2008; Ay *et al.*, 2014). Thus, organisational change is a key issue in terms of understanding complexity and developing solutions. However, the literature shows that most of the frameworks impose a rigid and linear structure that fails to provide a sufficient depth and span about the context, and also fall short in recognising the complexities that affecting change in healthcare (Pentland *et al.*, 2011; Kitson, 2009; Pentland *et al.*, 2014). This contextual study was conducted through an interpretive analytical-approach, according to what is usually required in the healthcare-context (Kaplan, 1995; Boyce *et al.*,

2014). Unlike the Cultural Historical Activity Theory (CHAT) and medical cognitive science, Systems Thinking and theory of practice deal with the actual KT-practice at work rather than theoretical concepts (Patel *et al.*, 1995; Engeström, 1995; Åkerström, 2002; Greenhalgh *et al.*, 2009). The aim of the analysis and discussion is to present contextual knowledge in healthcare for the development of IT/EPR-health side-by-side with knowledge-circulation, concerning management and health-professionals, instead of implementing EPR which was perceived as growth of the surveillance artifact (Ammenwerth and Rigby, 2016; Kaplan, 1995; Andersson *et al.*, 2003). This artifact is rooted in the socio-technical perspective of clinical-work experience in the healthcare-setting. This analysis aims to explore the health-professional activities in the practice-oriented healthcare-situation. In addition, this was built based on an inductive approach and primary data in relation to pre-existing studies in the field (Novak *et al.*, 2013; Berg *et al.*, 1998; Greenhalgh *et al.*, 2009; Chen *et al.*, 2017; Mougin *et al.*, 2015; Ferlie *et al.*, 2015). Thus, the socio-technical analysis of the KT-practice requires drawing multi-perspectival views of the practice encompassing *knowledge*, *humans*, *technology*, *processes* and *communities*. Thus, the first question of discussion starts with the 'nattur of knowledge'.

### 7.2.1.  The Nature of Knowledge

The data-analysis confirms that the nature of knowledge in healthcare-settings is complex, dynamic and contextual. This issue received extensive discussion in the organisational studies, including KM and OL literature. Traditionally, the nature of knowledge entails the differences between information, data, and knowledge and/or wisdom (Davenport and Prusak, 1998; Spender, 1996; Chen *et al.*, 2017). A number of studies indicate that data and information integrate perspectives, but knowledge would not have such an integrative perspective (Nonaka and Peltokorpi, 2006). Note that the term 'data' refers to accidental essential observations, while the term 'information' refers to analysed data with extracted meaning or with meaningful pattern(s). However, knowledge, unlike information, is about individual and collective beliefs, obligation, perspectives, purpose, and action (Nonaka, 1994; Nonaka and Von Krogh, 2009).

Many scholars classified knowledge from philosophical assumptions. For example, economic-based research, Kogut and Zander, (1992) discuss that knowledge has an objective dimension (e.g., 'knowing-what', or "*episteme*" scientific facts) and a practical dimension (e.g., 'knowing-how,' or "*techne*" as more craft, skills and experience). Nonaka, (1994) and Davenport and Prusak, (1998), drawing on Polanyi, (1966), claim that a good deal of the literature discusses the knowledge qualities as a dichotomy between the tacit and the explicit (Krylova *et al.*, 2016). Accordingly, tacit knowledge involves the ability of the knower to perform or to practice 'knowing-how' (Conner and Prahalad, 1996; Kogut and Zander, 1996; Brown and Duguid, 2001; Duguid, 2005a), and explicit knowledge comprises the ability of the formula to hold an objective meaning or declarative evidence 'knowing-what' (Hansen, 1999; Hansen, 2013). These views argue that

knowledge can have personal, procedural domains, or it can have general and declarative domains (i.e., objective and subjective dimensions of knowledge).

Nonaka, (1994), in his well-known model of knowledge-creation, proposes that knowledge dimensions are complementary and correspondent. Knowledge can be transformed from one character to another. The data-analysis of this thesis shows that professionals perceive sending information about the patient through the technology as declarative knowledge, which is central to the KT-practice. However, the professional domains signal that practical knowledge needs to be performed and experienced through the interaction between the professionals and the case. The professionals argue that declarative knowledge is incomplete knowledge that needs to be refined though practice (Rechberg and Syed, 2016). Thus, if this thesis-study admits that declarative knowledge is a form of knowledge, then the understanding of declarative knowledge as convertible into procedural knowledge becomes an issue, since it can adjust the practice and *vis-à-vis*.

Moreover, this view may align with the interpretative philosophies arguing that the qualities of knowledge are multi-faceted and dynamics, and these qualities make the categorisation strictly impossible (Brown and Duguid, 2001; Tsoukas, 1996; Tsoukas, 2009). For example, Brown and Duguid, (2000: 2001) argue that knowing by doing is based on the inductive and practical technique of knowledge. In other words, they propose that doing and knowing are inseparable, entangled, and intertwined. Similarly put, knowledge is held by the professionals, who have the capability and/or willingness to act. Consequently, Tsoukas, (1996) argues that it does not matter if organisations or individuals produce explicit or declarative knowledge, for humans always need to engage judgements and implications.

Exploring KT-pracrtice entails the differentiation between the intentionalities of professions and professionals, or the purposefulness of professionals and professions. These intentionalities can justify how two doctors holding the same information about the same issue/patient's case can take different medical decisions. This issue requires re-framing the effort in KM to include the professional dimension of the practice. At this level of analysis, knowledge would be reflected by the interpretive meaning that drives the action. Meanings have personal aspects, but they cannot be reduced to the meaning-giving activity(s) of individual subjects. Knowledge and sense-making need to be justified by the actual dimension of the profession, and to be accepted by the practice-field. In other words, knowledge and meanings are not based on a ultimate objective view, but rather on collective agreement, and viewed as social-constructs. The Polanyi's view supports this aspect, which claims that all knowledge is rooted in the tacit dimension (Polanyi, 1966).

Based on the data-analysis —interviews and observation— this thesis confirms that a different perspective may require different types of knowledge. For example, health-professionals mainly focus on the knowledge source through 'knowing-how' to do their practice, whereas health

managers mainly focus on the fact or "knowing-what." In addition, this study notices that technicians are mainly concerned with what technology should do and how it can be integrated. Thus, this result confirms that knowledge can become subject of controversy, especially regarding the attributes of context(s), and actors' background, where people try to specify the form of social and collective knowledge. Although some studies stress the dynamic, tacit, situational and subjective dimensions of knowledge (Tsoukas, 1993; Brown and Duguid, 2000), other studies deal with knowledge as objective entity/entities that can be regulated (Smith *et al.*, 2012). This controversial view was drawn by methodological individualist view of the organisation (e.g., economics). Moreover, knowledge is widely defined as fluid, that it cannot be easily captured or classified (Brown and Duguid, 2001). Since the context clarifies the nature-of-knowledge, the question of 'what is the source of knowledge?' is stimulated.

### 7.2.2. The Source of Knowledge

This study finds that the KT-practice socio-technical processes, in the health-professional context, are affected by the different perspectives of the professionals, or the participants who have been interviewed and observed at work during the fieldwork; that is the situated 'knowledge-nature'. These processes expose how knowledge comes into being, or how it is triggered by a particular event; that is, the situated 'knowledge-inquiry'. Still, the literature does not provide much clarification about the types of knowledge, and the primary sources of knowledge in the healthcare-context. Furthermore, these issues (knowledge-qualities/sources) are still controversial in the KM-literature and organisational studies. For example, the cognitive-perspective in the study of knowledge considers knowledge as a subject that is attached to the knower who holds it (i.e., the individual) (Cohen and Levinthal, 1990; Davenport and Prusak, 1998). This refers to a kind of knowledge that can be collected by the aggregation and the codification of shared knowledge. This view was criticised by the constructionist view, where the corporate event is not reducible to individuals (Rechberg and Syed, 2016). As such, the cognitive-perspective is considered as a manifestation of a reductionist orientation.

From another angle, many scholars, including Spender, (1996; 2015) differentiate and separate individual knowledge from collective knowledge, based on the proposition of Aristotle, that the "whole is greater than the sum of its parts (i.e. Gestaltes)" (Tsoukas, 1996; Nonaka and Takeuchi, 1995; Brown and Duguid, 2001; 2000; Tsoukas, 2009). Those scholars defend that collective construction is the source of knowledge. They advocate that knowledge societies create and acquire knowledge collectively through social communication and interaction. Thus, the collective knowledge can be embedded into, or can be expressed by, culture-identities, routines, and artifacts (Nonaka and Peltokorpi, 2006). Accordingly, individuals and organisations would act or react based on improvisational and adaptive human activities.

Some scholars have attempted to combine the subjective/objective dimensions of knowledge, proposing that both dimensions could exist at many levels simultaneously (e.g., individual, group, and organisational levels) (Nonaka and Takeuchi, 1995; Nonaka, 1994; Nonaka and Von Krogh, 2009). Therefore, knowledge could be created through processes at many levels, which will internalise, externalise and circulate new modes of knowledge. Accordingly, knowledge-creation starts with individuals, who process tacit knowledge through the environmental interaction.

Churchman, (1971) and his followers in the information system literature, such as Linden *et al.*, (2007); Richardson and Courtney, (2004) attribute the knowledge source to the *inquiry* or an emerged event that stimulates the circulation of knowledge. This indicates that the knowledge-inquiry is an event that emerges through the process of searching and providing facts, decisions-and-actions. In other words, the *reality* of practice emerges through the processes which *reality* appeals to. Thus, the knowledge-inquiry always signifies a process in development. The knowledge-inquiry' answer tells the knowledge-seeker that knowledge can be accepted as true until further inquiry modifies it. At this end, knowledge is not considered as an inalterable entity, or something that should be accepted by seekers in a conclusive way. Churchman's view is interestingly similar to the views of the interviewed health-professionals of the A&E (See Chapter 6 for details) in the sense that knowledge is the product of a deep level of analysis and comprehension, but at the same time it may seem as an idealistic view of ontology, where the best practice remains latent. On the one hand, the idealistic view admits the users' involvement, but this view does not consider or care for human contributions. On the other hand, this view badly affects the attention of the professionals at a specific moment and event (Parrish and Courtney, 2015). The inquiry unravels gaps, but the discovery of gaps stimulates the process that produces new knowledge to answer questions, to incite action and/or to solve a problem[23]. Churchman, (1971) discussed the origin of knowledge at many levels, which are, for example, the inquiry about theories of epistemology, theories of evidence and the philosophy of science. He stated that knowledge "can be considered as either a collection of *information* [declarative], as an *activity* [procedural], or as a *potential* [latent]" (p. 9). So, knowledge has vitality, and this vitality is inherent to the real-life world that is in constant movement.[24]

Fundamentally, Churchman, (1971) claims that "knowledge is an ability of some person to do [or to know] something correctly (p. 10), and that, "Knowledge is a potential for a certain type of action, by which we mean that action would occur if certain tests are run" (p. 11). This view is central to the *intentionality*-and-*potentiality* of the entities that are in the sphere of *possibility* and have ultimate goals and want to pursue these gaols (see figure 7.1). Singer discussed that knowledge mainly has an 'impassivity' characteristic, or, that inquiry is 'restless' (Linden *et al.*, 2007). Thus, the inquiry always signifies a process in development. The new-knowledge can be accepted as true until

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[23] The problems could be contextually solved entirely or partially.
[24] "movement" or "movements" is based on the level or angle of analysis

further inquiry modifies it.[25] At this end, knowledge is not considered as an inalterable entity, or something that should be accepted by seekers in a conclusive way. The health-professionals of the A&E see that knowledge-inquiry is the product of meta-cognitively rich comprehension understanding, but it is subject for human contributions and effects (see Chapter 6).

These discussion leads to question of 'knowing-how' to acquire knowledge from experience'. Gilbert Ryle, in his book, *The Concept of Mind*, made a distinction between 'knowing-that' or "what," and 'knowing-how' (Ryle, 2009). Accordingly, knowledge-seekers have two types of inquiry to pursue their ends. Thus, 'knowing-what' is related to the facts characterised in declarative sentences, having a subject, a verb and an object. It is the sentence that refers to the state of affairs, which is a linguistic knowledge. The object of the knowledge is a meaning of the sentence, and the meaning is a semantic content, which is called a proposition, and a standard term. In other words 'knowing-that' is a propositional knowledge by which the subject can believe about or consciously be aware of natural or social phenomena. For example, 'knowing-that' is the knowledge that it is used for the presentation, which is the kind of knowledge one can get from reading a book. In the healthcare-context, this type of knowledge receives the main attention through KM and KT studies that use evidence-based approaches (Pentland *et al.*, 2011). This study finds that professionals would like to access such knowledge, but they are mainly concerned with issues regarding professional autonomy. For example, in the case-study, health-professionals argue that the contextual dimension of knowledge cannot be articulated in a database. Thus, this kind of knowledge should not dominate the KT-practice. Instead, it can be used to confirm the right direction of the practice (i.e., professional practice should be conducted through knowing-by-doing). 'Knowing-how,' as a prescriptive of knowing-by-doing, is always followed by an infinitive verb, which expresses events (e.g., to run, or to swim). In other words, it tries to answer 'how to do something' by prescribing the '*techne'*. According to Ryle (2009), every philosopher has almost neglected this type of knowledge. This may justify why most philosophers of science, scholars and designers are attentive to find modes of discovering facts that surround the observer, but with no interest in discussing how they are doing what they are doing.

In this study, as central concept in the healthcare organisation, knowledge is regarded as multi-dimensional. This view refers to the way of interpretation and of presentation. Through analysing different perspectives, the dynamics of the practice emerges from events and inquiries that can be contextually patterned. Knowledge can be tacit, explicit, subjective, or objective, or a combination of them, as long as it is related to the emerging events. Thus, the knowledge source to be triggered is mainly based on events, inquiry/inquiries and involved processes.

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[25] When I use "It" to refer to the enquiry, I exclude the usage of "it" as a "dummy subject".

Drawing on the framework of the modes-of-practice including human and non-human actors and sphere of possibilities, the following sections discuss nature of the actors and activities in the healthcare-settings (see Figure 7.1).
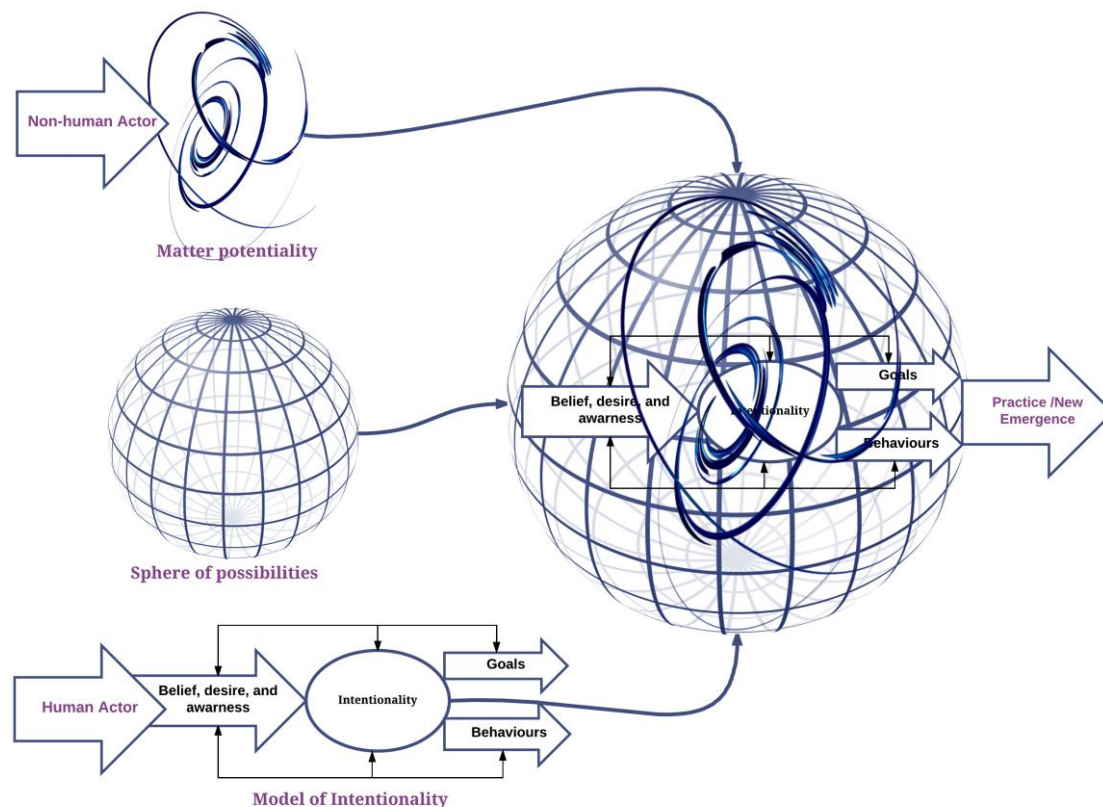


**Figure 7.1. Exploring: Intentionality, Potentiality and Possibilities of the KT-practice**

### 7.2.3. KT practice and the Nature of Actor(s)

*Dynamism of the Healthcare Actors:*

In order to enhance the current understanding about stakeholders, the dynamic approach needs to be considered along with identifying the actors in a context (internally and externally). It needs to perceive the states and positions of actors as subjects to constant change, and to acknowledge the practice-analysis to observe the actual and contextual occurring change. The heterogeneity of the actors involved in the KT-practice in the healthcare-setting became all the more relevant when investigating the EPR-implementation process. In this light, this study is intended to contribute to the current understandings of the complexity and the dynamics of the KT-practice from different angles, including the stakeholder-analysis. It investigates the role and the involvement of the stakeholders in the EPR-project at the BP-Trust. Although the IT adoption occasionally struggles, in terms of efficacy, at the public sector, the implementation of technologies has a limited understanding of the dynamic states of stakeholders (Mantzana *et al.*, 2007). This study confirms that the dynamic states of the

stakeholders can impact the different stages of KT-practice and technology implementation, through the transformational EPR-project. Therefore, this research aims to account for the rich-picture of the many perspectives and processes of the KT-practice and the technological transformation.

The data-analysis reveals that the Stakeholder Analysis, allied with the Soft System Methodology (SSM), can be used to identify the healthcare-actors involved in the healthcare-transformation processes. The findings from studying KT-practice, associated with the change-processes, inform about the stakeholder's states. The extended structure of the NHS reveals a differentiation between the *intensive* and the *extensive* stakeholders (Deleuze, 1994). *Intensive* and *extensive* qualities are driven mainly from French philosopher Gilles Deleuze's book *Difference and Repetition*, translated by Patton, 1994.[26] This variation can be used to distinguish individuals of groups, or organisations from other institutional actors. Also, to identify their roles, privileges and capacities, in order trigger or to hold back the transformation process. In general, stakeholders in healthcare are defined by Mantzana *et al.*, (2007) as "any individual(s) or group of human or non-human that accepts, provides, supports or controls healthcare services" (p. 98). The literature on the stakeholder analysis, based on the healthcare-system, empirically provides evidence for the importance of applying a dynamic approach when investigating key actors (Mantzana *et al.*, 2007; High and Nemes, 2009). In this regard, the dynamic stakeholder-analysis method becomes an alternative development of static approach (Postema *et al.*, 2012; Kamal *et al.*, 2011; Omar and Osmani, 2015; Mantzana *et al.*, 2007; Cripps and Standing, 2011).

Drawing on the literature, the data-analysis reveals the locality and the contextualisation of knowledge and practice in healthcare as central to identify the *intensive* and *extensive* changes in the main actors or stakeholders. These different changes are implied by Systems Thinking and thermodynamics, and their relation to energy and work of the system (McNaught and McNaught, 1997; Patton, 1994). The *intensive* attributes of the unit cannot be reduced or divided without transforming their holder-state completely, while *extensive* attributes can be subject to separation (e.g., the units of analysis, such as human and non-human, need to be relatively connected or disconnected). Form the practice perspective, actors can be defined as individual(s) or group/s of organisations that can trigger and/or deliver actions in the healthcare services. The data analyses of the KT-practice clarified the *intensive* and *extensive* attributes of the stakeholders, by which the transformation processes were perceived and applied. Interviewed practitioners, such as doctors and nurses, had the power to hold back the implementation-processes. The data show that transformation projects in the

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[26] Intensity governs the basic processes through which differences interact and shape the world, so intensive quality (e.g., attribute) is one whose magnitude is independent of the size of the system, and does not change with quantity. Extensity refers to the actualised dimensions of a phenomenon, thus extensive quality (e.g., attribute under this notion) is one whose magnitude is additive to the subsystems.

NHS —EPR-project implementation—, regard most of the decision-makers as *extensive* actors who act and impose external and general strategies on local practice.

The empirical data revealed that decision-making processes, for the EPR-implementation at the BP-Trust, are conducted in response to the central government and its modernisation-agenda. In the stakeholder-analysis, this study supports the dynamics of the stakeholders at more than one level (*intensive* and *extensive* levels). The dynamism of the practical operations was not perceived before introducing the project. The *extensive* level means that the KT-practice has no geographical or disciplinary limits. For example, the police-officers need to synthesize the patient report with the professional practices (e.g., GPs and consultants). The *intensive* level means that the same actor can take many roles through the communication and the interaction of the knowledge-seeker or the knowledge-interpreter. All these analyses are profoundly affected by the knowledge source/inquiry.

The rich-picture of the healthcare-system confirms two main issues: the complexity and dynamism of the system. Far from the determinism and reductionism approaches, this picture requires a multiple-perspective analysis. The multiple-perspective data-analysis reveals that every single view has its own discourse and justification that may eventually affect the practice of the beholder. However, the central authorities seem to hold a focused view regarding transformation, which proceed as an isolated orientation from the sender and awaited application by the receiver. Conducting KT-practice analysis, side-by-side with the EPR-project implementation, illustrated that the healthcare-system tends to adopt a static view of transformation. Practically, the formal authority (e.g., top-down processual decisions) justifies the strategic orientation on the basis of a prejudice-planned view that was triggered externally, by which adaptation should happen internally.

However, the local, contextual, multidimensional knowledge in healthcare requires a dynamic perspective of the stakeholder-analysis that considers the end-users as (assertive) actors (Mantzana *et al.*, 2007; Tasselli, 2015; Ford *et al.*, 2010; Jensen and Aanestad, 2007b). Learning from the EPR-project implementation and stakeholder-analysis, the intensive actors may hold back organisational change. Actors may comprehend that central power is degrading the environment, by isolating the decision from the applicant, to serve the economic needs based on the rational justification. My research findings revealed that the actors in healthcare can be heterogeneous, and their states can be continually dynamic where the change is emerging (e.g., reality as emerging and becoming). However, the central and General Authorities may be more consistent with the homogeneous nature of actors and static analysis by which change can be considered as an occasional event. Therefore, these differences reveal an important assumption about the resistance and acceptance of the EPR-project. The intensive actors —the human part of the practice— are discussed in the next section in more detail drawing on the KM-literature. This focus orients the EPR-project as a (non-human) technological part of the KT-practice.

## *Humans actors and KT-practice*

In KM-literature, 'knowers' have received little scholarly attention. The reason of this gap could be due to two reasons. First, KM is still an emergent field. Second, the business orientation of organisational studies is usually more focus on the general and organisational levels of KM-processes (Nonaka and Peltokorpi, 2006; Hansen, 2013; Foss *et al.*, 2010; Jennex *et al.*, 2014; Fox, 2011; Rechberg and Syed, 2016). Although the KT-practice can be improved through focusing on the role of the individuals involved, most studies do not account the individual component as a starting point when analysing the KT-practice (Rechberg and Syed, 2016). Additionally, KM-literature does not draw enough attention into the dynamic interaction between the micro- and macro- levels of analysis.

One seminal work worth to mention was conducted by Conner and Prahalad, (1996), who inspired by the work of Herbert Simon (1955), studied the humans based on their 'bounded rationality'. Bounded rationality claims that all humans have self-interest, and that they are prompt to seek for opportunistic behaviour. However, this behaviour is limited by the bounded rationality of humans (Nonaka and Peltokorpi, 2006). Thus, bounded rationality implies cognitive limitations, which are the main reason why humans do not have equal knowledge. As a result, this inequality is the main motivation to commit knowledge-exchange. This view denies any volunteering work in society that achieves no desirable return(s). Yet, humans behave and interact truthfully because individuals are expected to be motivated to interact rationally in order to complete their missions (Kano and Verbeke, 2015). By applying rational assumptions, one general theory may be conducted, and the focus will be always based on knowledge-exchange rather than on knowledge-creation. Put differently, if one finds a solution for a problem, his/her group might not try to figure out other ways to solve the problem. This issue is obvious in healthcare, for junior doctors and nurses eventually become burdened by having to follow medical-guidelines (Green, 2008; Gabbay and le May, 2004).

However, Kogut and Zander, (1996) discussed the humans as depending on the knowledge-based organisational view. They proposed that humans are social beings, and that they have preferences for specific shared identities and moral communities. Thus, persons are characterised based on two types of wills, namely willing to achieve self-interest and willing to belong to something (*Idem*). The authors also argued that focusing only on the opportunistic view of individuals (seeking with guile) cannot justify the subjective emotions[27] and or the abstract values[28] of humans. Therefore, the shared sense of community and organisational identity entails a responsibility to articulate authority-distribution, coordination, and learning. Since the learning-process is articulated by identity, the KT-practice would be enabled by its symbolic role as well.

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[27] For example, association with friendship, empathy, loyalty, etc.

[28] For example, as notions of good, beauty and truth.

KM and OL literature, based on practice-theory and interpretive sociology, defines humans as actors who behave based on their intentionality and purposefulness (Tsoukas, 1996; Brown and Duguid, 2000; Brown and Duguid, 2001; Schatzki, 2006; Schatzki, 1996; Tsoukas, 2009). Tsoukas, (1996) argued that intentionality and socialisation play a central role in motivating humans to engage in a particular practice (e.g., face-to-face interaction with intention to conduct the KT-practice). Socialisation represents the capability of actors to follow unspoken roles grounded on an unarticulated background (*Ibid*.). Tsoukas, (1996), drawing on the Bourdieuian concept *habitus* (Bourdieu, 1990), emphasised the role of humans as central to creativity. He described humans as "active co-producers of their surrounding reality" (p. 13). Therefore, humans do not act as problem-solving machines, but they act based on their contextual values, moral community and social relationships. In order to learn something new, they might also need to unlearn specific old practices (e.g., procedural knowledge). In this regard, my research recognises that health-professions are not built based on the bounded rationality, but established based on volunteering and charity efforts (Tallis and Davis, 2013).

The multiple-perspective data-analysis found that just one view cannot be always right — neither subjectively nor objectively. When one view belongs to only one decision-maker, health authorities, regulators, and their peers in other organisations (i.e., other managers, whether at other hospitals or at the police office) can be considered as *extensive* stakeholders. Consequently, the divisions' managers, other health-professionals and non-professionals inside the hospital construct their practice *intensively*. Focusing on KT-practice reveals that each group of actors has power based on their Social Capital, Political Capital and Cultural Capital statuses (Greenhalgh *et al.*, 2009) (this issue will be discussed in the section 7.2.4).

Moreover, the multiple-perspective data-analysis indicated that knowers and their characteristics are crucial participants in the organisational practice and for the healthcare-context. The analysis confirmed that management in healthcare was attributed to somewhat discourse based on opportunistic behaviour, in which the economic view prevails. For example, the EPR-project is mainly built upon a business-case that can justify the whole project by cost-saving. On the other hand, the health-professionals do not agree with this orientation, and eventually decide to dismiss the EPR away from their practice, even when they have evidence that the EPR can benefit some income by doing accurate tariff records (Duftschmid *et al.*, 2013).

At first, most of the health-professionals were not against the EPR, but when they could not see the additional value with regards to the patients, they, therefore, turned to be against it. They argue that the origin of healthcare would be based on altruistic, merciful and empathic dimensions. Mostly, the health-professionals work with less concern about the opportunistic behaviour. They believed that their work was based on problem-solving in order to improve the population's health and well-being, which are based on communal morals (McCracken and Edwards, 2016; Jensen and Aanestad, 2007b).

They did not deny that their opportunistic behaviour had an objective touchstone. They actually considered that their work will endure, while keeping their privileges in the current healthcare situation. However, these professionals argued that the main mistake of modernity is related to an intensive focus on the economical dimension of the transformational EPR-project (Håland, 2012; Jensen and Aanestad, 2007b).

In brief, this study perceives that humans in the healthcare sector are actors and co-producers, a view that can be conceptualised or characterised based on their contextual values and/or moral community. Thus, management in such context needs to consider the main characteristics of health-professionals, which are autonomous, sensible, and voluntary. The managerial practice is influenced by methodological individualism, by which employees follow opportunistic behaviour and act as cognitive machines. The participants who drew on a managerial background conceptualised firms as homogeneous entities where people would do the best for themselves (Wastell, 2011; 2010). Thus, people's behaviours can be enhanced through analysing and predicting their parameters using quantitative methods (Sherer *et al.*, 2016; Cripps and Standing, 2011).

This view was also perceived by the professionals who believed that most of the IT or transformation projects attempted to achieve this, but without any concern about the humanistic dimension of the professionalised-work (Jensen and Aanestad, 2007b; Greenhalgh *et al.*, 2009). My work confirms the importance of human autonomy, which somehow justifies the autonomy of the KT-practice in the professionalised-context. It is apparent that professionals tend to act as actors who co-create their reality based on their morals as well as shared identities as consultants, doctors, or nurses. Since this section discussed the human motivation and tendency to mobilize knowledge as an intentional part of KT-practice, the next section will focus on the potential part of it.

### The Non-Human Actors and KT practice (EPR potentiality)

The autonomy of the KT-practice in the professionalised-context opens the door for professionals to use suitable methods or techniques to share knowledge. Thus, methods may have potentials which can be confirmed through practice. In order to understand the methods and techniques of the KT-practice, the EPR-project has been studied as an apparatus which potentially provides benefits for knowledge-exchange and application. The positive approach studying the technology and methods focused on humans' behaviours as users and actors in relation to accepting new technologies. For example, Chismar and Wiley-Patton, (2003) studied physicians' tendency to use Internet-based healthcare applications, by which physicians could retrieve medical evidences. Based on a qualitative approach (i.e., Technology Acceptance Model 'TAM'), the authors deduct the usability of technology to be more important than its simplification. In another study, conducted by Schaper and Pervan, (2007) in the healthcare-context, the findings supported the issue of usability of the technology. In addition, they highlighted the importance of the expectation management by which

the healthcare actors believed that technology was a magical solution. The limitations of the TAM model are related to a view that reduces the ontology to the individual level, which is the opposite to the complexity of the organisational technologies. In addition, TAM deals with users as passive entities that need to be satisfied to give their best (Jensen and Aanestad, 2007a).

The TAM literature has primarily focused on the static view of the end-users' aspects (i.e., perceived usefulness and perceived ease of use) without examining the situations where the users should be involved (Sherer *et al.*, 2016). The literature argues that TAM is a satisfactory orientation, which is also helpful to build expectations about the behaviour, connected to the individual tendency of the adopter, rather than being an equivalent orientation between the professionals and professions' orientations, which is substantial in the healthcare-context. This thesis claims that when technology can meet the actors' intentionalities at different levels, there will be more potential of belongingness in their practice (Leonardi, 2011). However, this study argues that the TAM model was built based on a rational perspective that perceives the user as a passive entity rather than by following a processual orientation. As such, in order to focus on the autonomous actors who have dynamic tendency and capability, the KT tools and methods should be considered as a dynamic apparatus.

This issue is mostly covered by Information System implementation studies, including (STS, SSM, Socio-technology, and Sociomateriality). Project-implementation studies seek to clarify how actors interact with technology and why they do it in the way they do. Orlikowski and Gash, (1994) brought a pioneer research that identified the technological frames. They examined the shared assumptions of technology by different groups. They claimed that studying technology should "include not only knowledge about the particular technology but also local understanding of specific uses in a given setting" (p. 178). Based on this concept, many studies on IT implementation show that technology could receive different interpretation according to the variety of perceivers (Lin and Silva, 2005; Schaper and Pervan, 2007). Similar conclusion was offered by Multiview-based studies, which consider technology as a social process, as the perspectives of the actors that affect the way of perceiving technology (Wood-Harper and Wood, 2005; Kawalek and Wood-Harper, 2002).

Moreover, based on Weick, (1995) study, many scholars try to examine how the day-to-day practices enact social interpretation and the structure of IT (Jensen and Aanestad, 2007a; Havn, 2006; Bansler and Havn, 2004; Jensen and Aanestad, 2006; Aanestad and Jensen, 2011; Jensen *et al.*, 2009). Similarly, it has been argued that social and behavioural orientations have a good potential to study the problematic implementation of practice. For example, one problem is related to the resistance to changes in the routines and work practices (Jensen and Aanestad, 2007a; Gill, 1996), while another one is related to the power of the structure (Puri *et al.*, 2004; Kanstrup *et al.*, 2017; Winschiers-Theophilus *et al.*, 2010; Vines *et al.*, 2013).

Regarding the socio-technical and sociomaterial dimensions of KT-practice, the IT implementation studies show that the relationships between the end-user involvement, change resistance, and social disorder are lack when change affects the power structures in the organisation (Vines *et al.*, 2013). In the EPR-case, the data-analysis showed that the relationship between the health-professionals and the EPR incessantly would grow at the beginning of the implementation. Regarding the EPR-potentiality, it is confirmed by the interviews that professionals first had a positive reflection, they welcomed the new technology. The EPR was based on touch screens, and other potentials, with good reputation in different countries, "but not in the UK!" as many participants confirmed. The professionals, including the nurses, considered the EPR as a tool that would be able to assess their documentation and facilitate the KT-practice, at least for the declarative type of knowledge. Moreover, the professionals expected that it would facilitate the protocols of medicine prescription through the E-prescription. Indeed, the idea of reviewing all the required information from one location was very attractive to the health-professionals at first.

During the following two years after implementation, the professionals, however, felt that their power and responsibilities were challenged. Doctors and nurses also perceived the need of extra time to do the same work. The health-professionals and mainly nurses blamed the decision-makers who did not involve the users in the decision process enough. After four years, the Trust decided to cease the old contract of EPR and move to another company. Although the professionals decided to stop EPR implementation, they agreed with keeping using it. In other words, the same human actor seemed to hold an attitude of being acceptant and reluctant simultaneously. They argued that EPR was time-consuming during the processes articulation, but it gives good results about the patient tariff accuracy.

Moreover, the conflict was clear between the professional perspective and the managerial perspective at many issues concerning the explanation when the implementation was not as desired. For example, discussing the change resistance, following the observation of my study, it can be inferred, from the health-professional point of view, that EPR could not move beyond the A&E department. Health-professionals were very keen on having required information for one location, such as the EPR. Their argument was based on that fact that most of the works in the A&E were based on change, dynamic and urgent events, where the professionals are dealing with unpredictable cases all the time. However, managers stated that change resistance might be different between the doctors or nurses are dealing with patients and when they are dealing with new technology.

Practice-analysis and observation show that users' attitudes were articulated by the EPR abstracted functionality, as were their views constructed through the actual interaction with the EPR in the day-to-day practice. The health-professionals assert that the gap between expectation and reality is summarised in using EPR to facilitate their documentations and medical decisions. However, they declared that EPR imposes its standards and protocols on their practice, restricting their time and way

of control. Management studies attribute the conflicts between technology and practice to change resistance (Attieh *et al.*, 2016; Orlikowski, 2007; Wastell, 2011). The contradictions between practice and technology implies that the EPR is related to the IT's "openness" as was elaborated by Orlikowski, (1992; 2007).

According to Jensen and Aanestad, (2007a) and based on the Orlikowski, (1992), the EPR "openness" grants flexibility. Technological flexibility allows many interpretations and use patterns to construe the technology locally at the organisational settings and workplace. It also equips the professionals (users) with capacities to use the system not just in the way it was designed for, but rather in the way that it can be interpreted and developed by based on professionals' respective interests. This is because at first it was difficult to anticipate the right usage of the EPR by the users. For example, the data-analysis showed that doctors were filling in just one 'cell' of the vacant spaces, instead of sending prescriptions into many 'cells'. On the one hand, the professionals argued that filling all the wards and following the structure of the EPR were not relevant for their day-by-day practice. On the other hand, the EPR also negatively affected work procedures in the hospital; occasionally there were positive effects. For instance, EPR was time-consuming, but it gives good results about the patient tariff accuracy.

From the management point of view, EPR reduces the secretary work and labour, which can help the hospital reduce expenditure. The accurate tariff of the patient-cases is also positive as the Trust earns more money from commissioners. In addition, the professionals, as seekers, admitted that patient-records became more aesthetic and readable through the EPR. They also valued that the EPR could give an alert from the lab when the test results were ready. One important issue, which was highlighted by one of the interviewed medical managers, is that the EPR helped the policy-makers look at a bigger picture of the hospital than before. For example, keeping the patient in the hospital during the weekend is more expensive than paying extra money for the doctors to work during the days off. This argument has a root of agreement with the issue of "affordances" introduced by Hutchby, (2001) and Jensen and Aanestad, (2006), when they discuss how the technology had potentiality to shape the sociality though accounting for any constant conflict over the KT-practice (Szulanski *et al.*, 2016).

This argument clarifies that the EPR's technical, material potentiality can be evaluated and respected over the practical interactions in order to shape reality. The professionals including the medical manager(s) accepted the changes in the work practices and the KT-practice, believing that the EPR was going to help them perform the core of their work in less time and no effort, and that it would be more efficient and accurate. This issue was sometimes observed through the KT-practice, by which the EPR increased the governance and control over the required practice(s). However, the health-professionals argued that the EPR requires practices with dynamic routines, at least not as

before. These changes could not meet the intentional expectation of the practitioners. Put differently, the EPR was perceived as an extensive entity that required parallel and isolated works far from the actual practice can possibly afford. Jensen and Aanestad, (2006) and Doolin, (2004) address this issue by arguing that professionals in healthcare prefer peer to peer control, rather than extensive and external control which can justify the control features of the EPR.

For example, the Patient Administration System Web (PAS Web), as part of the EPR and the decision support system, mainly serves to speed up the medical decision-making, by automating the following steps of diagnoses. However, the EPR interviewed participants realised that the PAS Web is too big of a name for the very little results that offers. The health-professionals noticed that the PAS Web might make feeding the project with the required information difficult in both the short and the long terms. However, the positive side of the EPR showed that part of the patient-record, after the first year of implementation, became electronic, which meant "less paper" in the A&E Department. However, by the end of the implementation process, all the patient-records had to be printed out, in order to be transferred to the right wards with the patients, which meant more papers in the whole system. In other words, allowing the A&E Department shift to save paper by EPR-implementation. Conversely, printing the long patient-record(s) consumed much more paper than without EPR. In the same way, the EPR saved time by allowing many "pre-defined standardised package" procedures. It consequently reduced labour, such as the required typing by secretaries and thus created extra work for other staff in terms of typing and printing. The management staff also confirmed this gradual increasing of the workload and decreasing of labour.

As the interviewees shared, the EPR was rather controversial, and not always equally perceived by the same group, or by different groups, as merely advantage or disadvantage for the Trust. Eventually, the EPR-functionality was interpreted through the gaps and connections between the professions' aims, practice, and individuals' cooperative subjectivity. The interpretative approach of my study illustrates the ambivalence within the same health-professional group. Professionals were very engaged with day-to-day practice, with immediate EPR-usability, and kept demanding to track the patient pathway in the work situation and actual moment, rather than concerning about future rewards from the EPR. Essentially, the immediate EPR-usability is regarded by Jensen and Aanestad, (2007a), whose findings emphasised on the belongingness and flexibility that are rooted in the construction and interpretation of technology.

This study demonstrates that the KT-practice is associated with the potentiality of the method and the technology as a dynamic application, rather than as an inadequate strategy of implementation that requires constant analytical and practical engagement. For example, this study confirms that the practitioners' views of the technology are shaped and reshaped through the processes of implementation. Their views are also accommodated, not only by the application in itself, but also

through disconnecting the views from the practical conditions (the actual practice). These processes of shaping and reshaping the technology can be seen as an extractive process of matter potentiality (Gherardi, 2012; Frank *et al.*, 2015; Leonardi, 2012; Carayon, 2012; Orlikowski, 2007). In effect, the routines related to the EPR system may have to be within the time scale re-modified after the initial exposure to the effects of the project's implementation. Therefore, introducing a new technology in healthcare cannot just be one-view oriented, but rather it requires continuous care, attention and commitment to adapt and revise the routines and arrangements around it. Furthermore, the EPR-implementation needs to accommodate the varying conflicts and interpretations through the whole process of transformation.

### 7.2.4. KT practice and the Nature of the Social Entities

In healthcare-setting, disconnectivity is a main theme of cultural dimensions, which is based on multidisciplinary practices, or can be justified by, the "Fortress Mentality" (Ham and Alderwick, 2015). This mentality is rooted in the professional culture (Alderwick *et al.*, 2016). This is a characteristic of culture that can prevent open culture. However, it may focus more on a '*blame culture*' at hand than on motivating a social group to look for a scapegoat. The data-analysis may support that top management in the Trust cannot persuade the health-professionals to become motivated, more or enough, by joining the project. In this case, management needs to control the negotiation through, rather than applying vertical control and any rigid style of decision-making. For example, this strategy was successful in the engagement of health-professionals to become owners of the EPR-project in the early stage of implementation, as the clinical change manager illustrated (see Chapter 6). Therefore, when the authority and the responsibility are delegated to the medical-professionals, working as small interdependent units in healthcare, the KT-practice would become more consistent with living relational dynamics of the context. In this sense, the autonomy of the professionals would be less affected by the change.

The KM-literature draws little attention to the actors involved in the KT-practice. The KM-literature mostly focuses on groups and organisations, as the main bases for exploring collective knowledge. For example, many scholars, based on different perspectives, define the organisation as a multi-community establishment that mainly works to create or generate knowledge (Grant, 1996; Kogut and Zander, 1996; Kogut and Zander, 1992; Dougherty, 1992; Hearld *et al.*, 2016; Montgomery *et al.*, 2015). In my work, I cast light on the relationship between the accountability by social entities and by the KT-practice in relation to two main theories, which are Knowledge-Based view (Grant, 1996) Cohen and Levinthal, 1990), Dynamic Capability (Teece *et al.*, 1997), and Resource-Based view (Coase, 1937; Conner and Prahalad, 1996).

Drawing on knowledge-based view in the hospital reveals that all the knowledge related to the patient and illness may draw the hospital boundaries and departments or divisions boundaries. Thus,

the knowledge-based view suggests that knowledge can be generated more efficiently inside the organisational boundaries rather than at the marketplace. Since it is not possible for an organisation to produce all the required knowledge, the absorptive capacity theory recognises that organisations need to enhance their ability to process external knowledge (Cohen and Levinthal, 1990). Eventually, the absorptive capacity underlies KT across organisations, without emphasising the importance of the practice level, i.e., the 'level of doing' (Vera *et al.*, 2011; Lichtenthaler and Lichtenthaler, 2009).

In the hospital, knowledge is complex and has multiple dimensions, which cannot be reduced by organisational boundaries. However, the present data-analysis showed that hospitals had, if they existed, dynamic and complex boundaries (e.g., profession boundaries, departmental boundaries, group boundaries). These boundaries are drawn based on the view of the participants and the discourse of their professions. For example, the EPR was perceived by the management boards and Informatics Department as a project which could not be produced internally. Their justifications were not homogeneous. They mainly believe that the EPR needs special external companies. They considered that companies can provide professional people in the databases to extract, analyse and distribute the data of the hospital, provide the hardware and software requirements, as well. Health-professionals did not really perceive the EPR as knowledge. This was because they would consider such a technology should support them to acquire and catch the most important information/ knowledge (e.g., standardised protocols, computerised patient-records, and accessibility). Their argument is mainly focused on the created barrelled work and on growing the surveillance society.

In short, the knowledge-based view conceptualised the organisation as mechanisms that can create and utilise knowledge economically. However, the multi-perspective analysis showed that the knowledge-based view and the absorptive capacity have many limitations to explain the KT-practice, in a professionalised and complex environment such as healthcare. For example, the KT-practice and the circulation of knowledge require multidimensional and multilevel analysis, unlike the absorptive capacity and Knowledge-based view. In addition, the circulation of knowledge in the hospital showed that reality across the hospital, and specifically at the A&E Department, can be processual and dynamic where events emerge continuously. However, the managerial perspective seemed to have a static ontology that keeps the process as a 'black box' without any consideration of the processual conceptualisation (Eisenhardt and Santos, 2002). It is noteworthy here that this perspective perceives knowledge as an equilibrium-state of reality, but in practice knowledge can only be perceived or observed through engaging the dynamic reality and the eventual becoming-events.

The KT-practice/process analysis emphasises the *belongingness* of knowledge (or technology) in relation to the EPR-implementation in healthcare, which cannot be articulated outside the organisation. Therefore, the absorptive capacity is an uncompleted theory where the focus is mainly on the receiver side, as one passive entity, which needs to be adjusted in order to accept the external

knowledge (Lichtenthaler and Lichtenthaler, 2009). In this regard, my study shows that knowledge resources and/or recipients are not only theoretical concepts, but also active forces in the framework of knowledge-inquiry. This research follows the view of an organisation as an evolutionary process; a view which was developed by Teece *et al.*, (1997), in order to replace the static understanding of organisations, and to reach an integrative perception across social entities (Lichtenthaler and Lichtenthaler, 2009). In this line of thought, the competitive advantage of organisations is allocated in the processes that coordinate and combine asset specifications and paths. Teece *et al.*, (1997) developed the concept of dynamic capabilities to illustrate the ability of organisations to communicate and learn over time. These scholars show that dynamic capabilities help specify the processual dynamics of the organisation in order to adapt, change, and solve problems. However, the cited study only considered the organisational level, where the dynamic interaction between the individuals and communities was still uncovered (Nonaka and Peltokorpi, 2006; Easterby-Smith and Lyles, 2011).

Unlike the knowledge-based theory, in the OL and the KM-literature, many organisational theorists aim to open the 'black box' of the processual dimensions of KM and the KT-practice (Nonaka, 1994; Brown and Duguid, 2001; 2000; Nahapiet and Ghoshal, 1998; Fitzgerald and Harvey, 2015; Fitzgerald *et al.*, 2007). The cited studies share a common factor; they attempt to tap into the 'Knowing-how' and go through the details in order to illustrate how knowledge can be generated, disseminated, assimilated and applied or legitimated within communities. Instead of Max Weber's hierarchical bureaucracies, and according to Brown and Duguid, (2001), organisations consist of informal communities, rather than formal groups that create and retain knowledge collectively. Accordingly, knowledge can be accessed through the collective acceptance and participation. This means that knowledge-processing depends on the relational rather than the rational view and this will be based on volunteering connectivity. Based on this view, this study detects an important gap between the implementation processes of the EPR and the KT-practice in hospitals. Put differently, the gap between the EPR-project and the KT-practice comes from the tendency of the administrative discourse to rationalise the professionalised work on the basis of acceptance and participation. Here Wasko and Faraj, (2005) and Nahapiet and Ghoshal, (1998) discussed the effect of the social relationships on knowledge generation and application. Drawing on network theory, these scholars focused on how the Social Capital could facilitate and develop the situated-practice, skills and/or the Intellectual Capital [29] (or Cultural Capital) through communication and knowledge-exchange (Montgomery *et al.*, 2015). In order to illustrate these efforts, a discussion will follow below around these concepts with some details.

Cultural Capital includes non-economic resources that enable social mobility, such as skills and personal and symbolic knowledge, which it can be exchanged through economic processes (DiMaggio,

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[29] This is meant here as the intangible value of a business (including the people's intellectual capital).

1982; C. Ickis *et al.*, 2014). Cultural Capital presents three states (embodied state e.g. medical skills and personal knowledge; objectified, state e.g., medical patents, brands, scientific and technological inventions; and institutionalised state, e.g., medical certificates. Social Capital is what provides access to resources embedded in social relationships. It enables people to mobilise these embedded resources to facilitate action. Social Capital includes economic resources that an actor may gain from taking part in a network including group membership (Coleman, 1988; C. Ickis *et al.*, 2014). There are also other kinds of Capital including economic and symbolic capitals, respectively.

In healthcare, these Capitals are usually perceived as a resource that allows someone to get something done (e.g., software, person with influence, etc.) (Coleman, 1988). For example, when patients are sick, they may not know what the matter is concerning their health. They need to go to the doctor to know what the problem is. However, in turn, doctors may face an epidemic that requires communications to enrich the case in more details (knowledge gap/s). Therefore, through both communication and the interaction amongst stakeholders, problems start to be shaped, or eventually may be solved, as well e.g. through medication. The better understanding, or even the actual solution, is decided by the large part of actions and interactions through the resources in the active networks where actors are involved in the process.

As these Capitals can mobilise the resources, they also work through the structure of the network (i.e., topology), as social networks comprise people and their relationships. This implies a specific size for the specific relational dynamic. The size of the network usually depends on the actors' preferences as well as on their ability to build one. The size and the type of connections (acquaintances), and people of the network affect the quality, the diversity and the amount of resources that actors can potentially access. According to Shannon's *information-entropy* law, there are only six or fewer degrees of separation worldwide (Shannon, 1949). For example, based on the *information-entropy* any person in the world would need a maximum of six orders of connectivity to link with any other person, that is, six levels of networks, from the first person to the last one, passing through varying networks of second, third, fourth and fifth-order connections.

Moreover, these Capitals are also related to the relationship among actors in the network. The nature of relationship defines to what extent the potential access to resources is embedded in some social network that actors can actually realise (Wasko and Faraj, 2005; Nahapiet and Ghoshal, 1998). There is a spectrum of qualities in the network (e.g., friendship, respect, trust, anger, neutral, etc.). These qualities define norms, obligations, expectations, and or feelings of closeness. While the maximum amount of connections to meet a new person is six, as mentioned above, this does not mean that the relationship in the network lends actors connection to each other. The power of Social Capital drives the development and the adoption of viral consumer technology solution in the modern world. It emerged in the early days of computers, when work was restricted to note-taking. Social computing

**203**

provides a leverage of Social Capital in open computing, up to the rest of actors. In brief, Social Capital and Cultural Capital emphasise that social networks and culture have value. However, Social Capital has to do more about the network analysis and Cultural Capital than about the actors' capacity to enable social mobility.

In this research, the EPR-design methods are related to the healthcare-context, this specific context and the trust that these methods inspire and or enact. This study actually deals with the pre-expectations about the EPR-technique. In other words, the autonomy is very high in the health-professional context, which allows for a space for health-professionals to claim pros and cons and even to reject issues about the EPR-project in implementation. This is also related to the Social Capital because most of the ITs have parallel processes of redundancy. Doctors and nurses did not reject at first the printing operations in favour of writing, even when note-taking seemed easer. Printing actually became more accurate and much clearer for the profession intentionality. What is meant to provide as a profession is to treat patients, but this does not mean to face all the unnecessary issues required by the use of the computer. This became obvious when the EPR showed a lack of functionality from the most basic tasks. For example, the medical-professionals could not expect that the EPR had no spell-checker. This issue also affected the daily workings in order to meet the profession's intentionality.

Drawing on the Social Capital and Cultural Capital, the data-analysis of the KT-practice in relation to EPR confirmed that it was not only the technology by itself, but also the shared language and narratives in the qualified network(s), which allowed the health-professionals to provide a means (apparatus) for evaluating and/or developing new knowledge out of the KT-process. Von Krogh, (1998) claims that care is a key enabler of knowledge-creation and KT-practice. Similarly, in my study I argue that the actors' status, as being knowledge-seekers, is one of the key conditions that enable KT-practice, which helps identify behavioural dimensions that emphasise the dynamics of knowledge-seeking.

In order to synthesise the formal and informal structures of organisation, it has been argued that hybrid hierarchical forms may be a suitable structures to transfer tacit knowledge (Davenport and Prusak, 1998; Grant, 1996; Nonaka, 1994; Nonaka and Peltokorpi, 2006; Sanchez and Mahoney, 1996). For example, Sanchez and Mahoney, (1996) proposed a relationship between the hard system, that is techno-material, and the soft system, that is socio-technical, within an organisation is based on the *Isomorphism* or the symmetry of structures. Furthermore, Flyvbjerg, (2004) proposed the *Phronetic Methodology* for social research (an endeavour to synthesise the practice and the control, the subjective and the objectives approaches altogether). Thus, *Phronetic Methodology* is concerned with the discussion between the contractual values, power and self-interests. Flyvbjerg, (2004) argues that an objective intentionality is the main priority to understand the practice in any field by asking:

"Where are we going?" "What are the benefits?" "Is this development desirable?" (p. 283). The *Phronetic Methodology* attempts to clarify details of "*Who* is doing *what* to *whom.*"

Therefore, the organisational structure may be equally mixed between the declarative knowledge and the procedural knowledge in order to circulate knowledge in a multidimensional context. In the same way, Nonaka, (1994); Nonaka and Peltokorpi, (2006) suggest a dual form of the organisational structure (the hierarchical structure where the knowledge is socialised and internalised); and project-type structure, where the knowledge is externalised and combined. Nonaka (1994) argued that 'hypertext structures' are based on the interconnectivity, which is a fundamental practice between the formal and informal arrangements of knowledge-creation and transfer. In this research, I argue that professionalised environment is based on an *asymmetric ontology*, 'asymmetry in knowing', where knowledge has different interpretations, and professionals have different capacities or skills to do the same procedures. Thus, this study agrees with the view of governance when it is based on the community-like aspects that include cultural and social engagement, rather than hierarchical authority and control (Sveiby and Simons, 2002; Prescott, 2012). In addition, the role of top management is aimed to build the vision rather than the mission, and to support shared activities through the common culture (Hedlund, 1994; Pee and Kankanhalli, 2016; Pee *et al.*, 2010).

Cultural Capital draws on the literature when arguing that knowledge can be transferred through *vital networks* and interactions, which could be based on trust, loyalty and belongingness to the organisational intentionality (Duguid, 2005b; Duguid, 2005a; Von Krogh, 1998; Fitzgerald and Harvey, 2015). Moreover, the effects of the workplace environment, as a context able to enact the practice, cannot be ignored. It needs to be structured and conceptualised in order to facilitate the KT-practice. For example, the data-analysis indicated that the A&E had its own speciality in managing through space to minimise errors when patients' records are generated. This issue can be reflected on the *ba*, the 'shared context in motion for emerging relationships', as an important concept to study the hospital context (Nonaka and Konno, 1998) (p. 40). In other words, *ba* refers to all types of spaces which are needed to integrate all the needed knowledge into practice (i.e., declarative and procedural knowledge).

In brief, this study reveals that social entities are processual organisms where and by which the KT-practice can be enacted. Therefore, the KT-practice depends on social entities, as a higher order of individuals' interactions and communication processes. Additionally, it depends on knowledge inquiries into former events. The KT-practice can be conducted through the coordination of declarative knowledge and the cooperation of procedural knowledge. For example, when the medical-professionals are taking a medical decision with the aim to treat a patient, they will do this on the basis of the elicited knowledge, which is provided by the record and by the actual diagnosis of the patient case. Thus, studying the KT-practice in healthcare, as a professionalised-context, reveals that

knowledge can be transferred through the arrangements between the Communities of Practice (CoPs) and the processual entities. However, the knowledge-based view, since it has positivist foundations, cannot explain the process in such context. Healthcare reveals that the dynamic theory of the KT-practice has potentiality to understand the different perspectives of human and professions, conflict and synthesis (Rajic and Young, 2013). The social entities in healthcare show that the KT-practice also requires ecological orientation rather than an economical one (Pentland *et al.*, 2014; Kümpers *et al.*, 2002; De Savigny and Adam, 2009). The ecological view, similar to Systems Thinking, can support the process view of the work by which the knowledge and the resources participate in a continuous cycle of creation. Here, the role of the top leaders (e.g., the management board of the Trust) consists of supporting the emerging processes with idealistic requirements (i.e. professions' intentionality), and the individual tendencies of using the time and power (i.e. capabilities and willingness or professionals' intentionality). It shows that the managers' concerns are driven by financial backing, but it is recommended to be more focused on care-delivery. Therefore, the management of the social entities in healthcare requires a different orientation of leadership. For instance, thinking about ecology means that the platforms and the cultures need to belong to the practice, in order to provide an environment where knowledge can freely emerge, be nurtured and be cared for. In such an environment, the knowers (actors) can be considered as catalysts of the knowledge to be created and also as connectors of knowledge actualisation.

### 7.2.5. KT-Practice and Professional Boundaries

This study reveals, through the stakeholders' analysis, that health implementation groups tend to have different perspectives on similar issues. In addition, most health-professionals (i.e., doctors and nurses) have differences in their knowledge backgrounds, in spite of the shared context of the environment embedding them in practice. On the one hand, the implementation process was intended by policymakers and decision-makers, who mainly concentrate on the economical dimension of the practice (i.e., efficiency and effectiveness). This process was driven through the IT group(s) that had knowledge in computing and electrical engineering, but they had very limited knowledge about the social network and the day-to-day medical practice. On the other hand, health-professionals had knowledge in medical practice in addition to their social ties which may have created differences that could be sensibly related to the objectives of their professions. This somehow configured and was configured by their professional occupations. However, the professional differences signal potential conflicts and disagreements as each professional group is entailed to be intentionally responsible for the own practice.

Due to the differences in perspectives, each group tended to prioritise their tasks over the tasks of others and other groups. Each group thought that the other groups want only to be successful on the basis of their professional objectives. Moreover, each group had an impression that the tasks at play were more complex than those of the other group/s. This view of complexity was not fully understood

by the groups out of the complexity inherent in their own profession. For example, the 'business case' of the EPR-implementation showed that the EPR can improve the accuracy and the accessibility of the provision of knowledge or information, but it did not discuss that extra work would be added to the health-professional practice. However, the health-professionals regarded that the additional tasks might have affected their original tasks negatively by adding extra work to their already existed workloads. In this case, they had to neglect many new tasks, even when it would have affected the new project. Doctors tended to write as less as they can or tended to pass the extra work to nurses. These issues negatively affected the collaboration between the two professional groups.

The EPR-implementation involved three major stages: Evaluation through 'business case', recruitment and implementation. The implementation stage was applied on the basis of a phased-departmental approach, by which implementation started in the A&E department. This thesis study shows that there were many types of knowledge and boundaries which were entailed to be developed and changed through the project life cycle (Scarbrough *et al.*, 2015). Using the KT-practice to analyse the implementation stage revealed that many types of boundaries were required to be managed.

At the beginning of the EPR-implementation, the boundaries, drawing on the gap between the project and practice, were strong. The uniqueness of the project involved different interests among the health-professionals and managers, and between the individual professionals and their practice. For example, the health-professionals noticed that the EPR had many unimportant functions, while it lacked many important functions. They attributed these differences between the design and the practice to the developers and the customers (e.g., Portuguese versus English). In the following stage, the adaptation stage, IT groups (internal and external) and health-professional groups decided to work together in order to bridge the gap between design and practice. Because each group had seen the situation from their different perspectives, some practical and semantic boundaries emerged at this stage. These groups looked into the EPR on the basis of their own practice. For example, while health-professionals tried to translate their original practice into the project, the technicians were concerned by the issues of integration among different systems. Practical boundaries were attributed to the hierarchical relationship between doctors and nurses, where professionals came to the conclusion that the EPR could make the hierarchy weaker. Semantic boundaries were justified by addressing the differences between the IT practice and the medical practice, on the one hand, and by relating to the NHS organisation, on the other hand (Carlile 2004; Fitzgerald *et al.*, 2007). Thus, these perspectives caused many problems and discontinuities in the cooperation among the involved groups.

Moreover, many professional boundaries were defined according to the pre-existing practices that health-professionals engaged in and thus by which they were affected through the new project. For example, the health-professionals regarded the pre-existing medical practice in the A&E to be not compatible with the new settings of the project. They, therefore, had to adjust many settings to make

their practice compatible with the new project. In most cases, they found that these adjustments had more disadvantages than advantages (e.g., dealing with the EPR required ignoring the patient) because they still used the paper-based system as a parallel one to the EPR. Thus, most of the professionals saw that there was no need to change their practice to participate in the new project.

In this study, I found that the KT-practice, through the EPR-project, was not supported by the key health-professional actors within the nurses' practice and the consultants' practice. Thus, this research resonates with the literature of medical sociology, when arguing that professions mediate the knowledge-exchange (Ferlie *et al.*, 2005; Greenhalgh *et al.*, 2009; Rajic and Young, 2013; Ferlie *et al.*, 2015). In particular, this study shows that the EPR-project was difficult to be implemented within the nursing profession, drawing on the limited evidence of strong support, particularly, at the professional level of the nurses. In addition, the findings revealed that the health-practitioners were given extra mundane tasks that sometimes distracted them from their main professional duties. As a result, my research suggests that the EPR-project was less likely effective than it was expected, in regards to supporting professional practice. Likewise, the findings demonstrated that the view of the policy-maker, regarding the EPR as something that would facilitate the KT-practice, could be correct. However, when the practice was reflected in the project, it became obvious that it did not consider enough the professional boundaries. Hence, this study uncovered that the professional boundaries may inhibit the technological implementation, if these technologies are not based on the practice-analysis. One of the main reasons for this issue in the investigated project was related to the lack of involvement by the health-professionals. As such, the KT-practice initiatives in healthcare require more understanding of the practice and of the professions.

The patient differentiation played a significant role in the KT-practice. In particular, the EPR required using the health-practitioners to provide full services to the patient at a low-risk level, with a high level of monitoring and control. The EPR somehow demanded the health-professionals to distance themselves from their professions to some extent. This made the organisation use two-tier structures that in turn made the KT-practice difficult to effectuate across the involved professions. Therefore, this thesis study showed that when professions engage in patient differentiation policies, this practice can undermine the efforts from the health occupants (Ferlie *et al.*, 2015; Ferlie *et al.*, 2013; Ferlie *et al.*, 2005). Here, the EPR-project had the potentiality to clarify the boundaries between different healthcare-professions by creating a new organisational structure around the patient differentiation. In studying the stakeholder analysis and professional boundaries, one of the research recommendations was to change the organisational mechanism, so that the health-professional practice and the practitioners involved would be taken more into account within the existing organisational structure of the NHS organisations.

In general, the findings suggest that there were many motivations for the KM research to be conducted in relation to the professional boundaries, due to the co-presence of the organisational and the professional context. In agreement with prior studies, the present research reveals that studying a complex project in relation to knowledge-circulation increases specialisation in not only in science but also in practice, and opens opportunities for sharing knowledge and learning (Scarbrough *et al.*, 2015; Akkerman and Bakker, 2011; Ferlie *et al.*, 2015). The findings also indicate that studying implementation projects needs to have significant modifications to successfully transfer clinical knowledge within the professional practice. Otherwise, the KT-practice initiative would not be supported by the key actors of the different professions. Such lack of consideration for transformational EPR-project conditions in the professionalised-context would become detrimental to practitioners who would eventually end up with more work and limited returns in such an investment.

## 7.3. The Nature of the KT-practice and Medical Activities (possibilities)

This research considers multiple perspectives (i.e. the managerial perspective, technical perspective and professional perspective) to understand the KT-practice in the complex context (e.g., healthcare). The multiple-perspective theory is based on a social constructionist epistemology in the present research. The social constructionist position emphasises the social context within which ideas are generated and exchanged between individuals and groups, ultimately contributing to knowledge which is "intrinsically the common property of a group or else nothing at all" (Kuhn, (1970), p. 210). The organisational perspective (managerial) offers a deeper insight on how the regulators of healthcare justify their personal interest in an organisational frame and speak as representatives of the society. In so doing, system analysts should intervene in the KT-practice to relieve problem situations and improve human conditions by creating better multi-faceted systems. The data-analysis highlighted the way in which power within-system subjugated those stakeholders. The technical perspective was determined about the integration issues, but it ignored the social and political changes accompanied with EPR-development. However, it covered some economic/financial issues associated with business modelling and value creation. Complementing the view, the management and professional perspectives revealed the characteristics of EPR along the information and activity levels (Håland, 2012; Greenhalgh *et al.*, 2009). The professional perspective also addressed spatial characteristics of EPR-information.

That stated, the multiple-perspective approach revealed a trilogy between the EPR (as a technology), the managerial, and the professionals' society. Based on the practice theory, managerial technological and professional perspectives could explain how EPR-system would lead to new social forms at the professional society. The multiple-perspective theory helped us see the impact of an inclusive system development process where the dynamic social structure of the professionals may shape and be reshaped by the available technology (Attieh *et al.*, 2016). This research shows the

inanimate networks in the EPR as a channel for information "flows" that are shaped by the socio-economic professional dimension.

The present analysis of the health-professionals' practice identifies three main activities that include many work procedures (see Figure 7.2). The professional activities are: (1) Divisional management activities, which deal with managing the clinics and wards. This activity focuses on the perfect use of space and time in the different divisions; (2) auditing activity and care-delivery, which involves documentation and development of the care practice delivered at the divisions; and (3) technical supplement activity, which includes patient support and assistance.
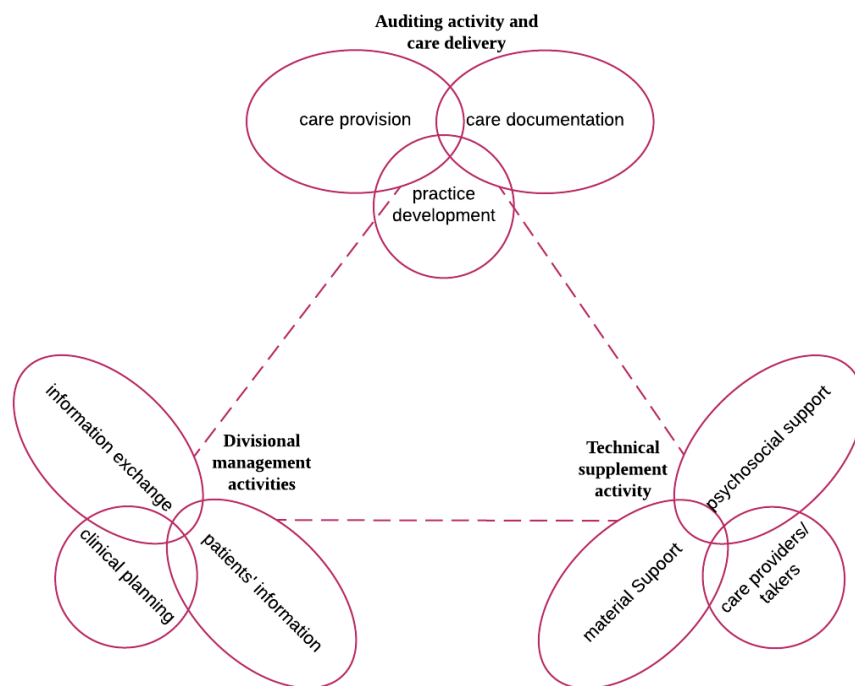


**Figure 7.2. The structure of practice in the healthcare-setting**

*Source: Flottorp et al., (2013).*

### 7.3.1. Divisional Management Activities

The divisional management activities deal with the information exchange and the integration between different care-units. For instance, when patients arrive at the hospital, they can be referred to different types of functional units, GPs, or even to other hospitals. For this reason, the divisional management activities are important in order to plan for patient admission before arriving. In the A&E, more than one functional division or professional usually involves the care of the patient, such as psychiatrists, nurses, anaesthesia specialists, orthopaedists, etc. Thus, it is crucial for the medical-professionals to know the professionals pertinent to the management of the patients' care. The lack of knowledge and information exchange, and the integration among the divisions and units force the staff to waste a considerable amount of time in tracing information. This type of activity carries on even after the patients' discharge.

The second concern of these activities is information about the patients, including radiology scans and different tests. This kind of information is very important for the divisional management because it shows the most recent procedures and the required recovery-time. In the A&E, for example, all this information will be required before the patient admission. This information or activity would save money by saving the time of staying of the patient at the hospital, and by saving the redundant procedures (e.g., scans, tests, etc.). In addition, it would enhance post-care delivery.

The third concern of these activities is information about planning the clinic and the words. According to this information, the clinicians can know the location of the patient, and the readiness of the clinics or wards to receive new patients. This information is necessary for managing the patients' appointments. Furthermore, this type of information deals with the stock, patients and staff management at the wards. In the case of the EPR, most of these activities were conducted by the secretaries or by the nurses before the EPR-implementation. However, introducing the EPR increased the number of these activities, and changed the way of dealing with them. For example, most of these activities were conducted by hand-writing, but the EPR required the health-professionals to improve their skills in using keyboards and typing. In addition to increasing the volume of the work, introducing the EPR required cutting the labour size (e.g., the number of secretaries was cut more than 50 per cent). Therefore, the doctors started making the nurses do most of the extra activities.

### 7.3.2. Health-Professional Practice

Care-delivery and auditing activity include many procedures which allow the nurses and doctors to perform care activity in a better way. These procedures include care provision by which different healthcare-professions work together with the aim to produce the outcome of the care-profession. Auditing activity also included practice development by which each division could study the work-flow of the clinics as well as enhance the efforts of developing the care-delivery. The practice development outcomes were assumed to adjust the work routine of the divisions. Practice development was involved in the EPR-project by which the care-providers would have access to the required information by using the day-to-day care documentation.

The day-to-day care documentation was also part of the auditing activity. This activity was aimed to develop the care efforts. According to the NHS regulations, health-professionals have to record all treatments. The documentation would enable different care-providers to make sure how the illness was treated. The documentation practice has many legal and ethical dimensions. It is also used as a source of protection for both sides of care (patients and health-professionals). For example, when the patient wants to claim about any mistake, misconduct, negligence, the documents about all treatments should be accessible. Therefore, all the medical treatments and observations that are performed by the care-providers are expected to be documented. Additionally, the medical-

professionals usually document their endeavours of developing medical treatments and work routines at the workplace along with how different professionals use them in practice.

In the KT-practice, the documentation procedures are used as a medium between the professionals and non-professionals including patients. Accordingly, the information will be stored for long time. Less time will be used on oral briefing. In addition, the documentation is often used by the professionals for teaching purposes, for the new professionals, on topics, such as work routines, and to share existing experiences. There is an agreement among health-professionals to unify the terminologies in order to share documentation between the hospitals.

### 7.3.3. Technical Supplement Activity

The technical supplement activity focuses on the procedures that are not directly connected to the medical practice but are important for the patients' well-being. These procedures include material and/or non-material assessments (e.g., pharmaceutics, equipment or psychosocial support). This type of activity is practiced in all divisions, such as logistics management, by which assessment is provided on a daily basis. This activity could estimate how many resources are required over time. For example, when careful attention has not been paid to the management of pharmacology, errors might easily be made or medicines could easily be wasted. Before the EPR-project, the hospital did not have a system to show how often some medicines and stock (e.g., bandages, diapers and injections) were used. In addition, the material assessment is expected to deal with handling waste products, as well as cleaning materials. The psychosocial and non-materials are related to patients, when feeling comfortable, and to health-professionals, when feeling open to patients. The information flow within this assessment requires personal communication and interaction in comparison with the material supports. I noticed that the EPR was expected to provide a database of all the potential support in addition to contact numbers. These activities do not involve the hospital documentation or medical events. However, all the clinical activities were dependent on these procedures with a focus on care-delivery.

The aforementioned activities illustrate the process orientation of the medical practice in the healthcare organisation, and the relationships between the functional units. The present analysis was developed on the basis of the KT-practice and Systems Thinking, in order to understand the practice and the activities in each of the professional perspectives involved. The motivation of this investigation was driven by the need of studying the KT-practice from different perspectives, with the aim to provide deeper understanding of knowledge-circulation in such a complex context. This investigation shows the potential demands of the information and activities involving three groups of stakeholders (i.e., managers, health-professionals, and IT developers/informatics practitioners). In addition, it enhances the potential considerations of cultural issues.

Drawing on Systems Thinking, the complexity of healthcare requires shared understanding of the processes of information and practice from different perspectives (Senge, 1990; Rothschild *et al.*, 2005; De Savigny and Adam, 2009). In the healthcare situation, understanding the KT-practice requires knowing where the knowledge is produced and how it can be obtained and used. This exploration would support different disciplines, including healthcare managers who want to obtain information and knowledge about specific actions and resource use. For the health-informatics practitioners, this part identifies the type of work and routines that need to be supported by any information system such as the EPR. This part illustrates the heterogeneous qualities of healthcare activities and networks. It also provides an overview of how medical-professional practices relate to each other. For example, this part shows how clinical management activities are directly related to the documentation and supply activities. This implies that patients' well-being can be improved by integrating the KT-practice. It also implies that managers and informatics practitioners need to understand that health system development should include psychological assessment that mediates health-professionals and patients. Furthermore, the divisional and clinical co-ordination can be enhanced through information and knowledge sharing and managing. Work co-ordination is required to detect the cost accrued in different health activities by which it can be used to identify and follow resources and factual cost. This analysis aims to show where the system analysts can find important information and knowledge within the care activity. Subsequently, this analysis describes how the professional and the clinical activities are interrelated within healthcare KT-practice. Thus, the KT-practice and Systems Thinking can be used to identify the activities at the micro-level that shows how knowledge can be generated and applied in practice.

## 7.4. KT Practice and Organisational Issues

The previous part was a discussion on the research questions of the KT-practice and its elements, including nature of knowledge, actors and social entities, in the NHS-context (see the elements in the Figure 4.4, and Figure 2.3). Following the EPR-project, and in order to grow the discussion of the KT-practice deeper-and-broader this part aims to discuss how organisational issues affect the KT-practice. The first section summaries empirical findings associated with discussing the organisational support and methods of knowledge circulation. The second section discusses the associated issues at different levels of analysis and the KT-practice (i.e., organisational, group-based and individual levels), and the last part discusses the factors associated to technology and the KT-practice.

The key issues and factors affecting the KT-practice are summarised in Figure 7.3 (supportive and motivational factors, where barriers are created in the absence of drivers).

**Knowledge**

Characteristics of Knowledge

The origin of knowledge

Knowledge ambiguity

Tacitness

Emerging knowledge

Dynamic knowledge

Knowledge Availabilty

**People**

characteristics of group and relations

Individual Characteristics

Disseminative capacity

Absorptive capacity

Communication capacity

Relaibility of the knowledge actors

Social Relationships

**Knowledge transfer practice**

Learning Environment

Trust

IT Belongingness and Alienation: to match between the staff's requirment and IT

ICT skills

Disseminative capacity

Absorptive capacity

Maintenance support

Recognition and Reward

Leadership supoort

HRM

Interoperability between IT systems

Organisational Culture

Information Technology

Organisational Context

Time and resource management

Communication Methods

**Technology**

**Environment**

**Figure 7.3. Key issues affect the Knowledge Transfer practice**

## 7.4.1. Discussing KT methods and Organisational Support

This study explores knowledge circulation with the use of methods and tools, such as formal and informal modes of the KT-practice. The literature informs that formal learning and communication can facilitate the KT-practice in a clear way, when the individuals would like to be more knowledgeable about a specific knowledge or set of skills.

In regards to developing new skills to use the EPR, the majority of the interviewed practitioners did not find the *formal* training useful. For them, the training offered content which resulted in too general and with little or no relevant benefits to their medical-practice. It was insufficient and pointed to something that was far from their everyday context of practice. Moreover, when the health-practitioners, especially the nurses, needed more knowledge about a specific clinical case for example, they usually used personal (re)sources, such as partners or close colleagues. Hence, my study is intended to be consistent with the stream of studies conducted in the healthcare-context, with a focus on situations when nurses and junior doctors receive less formal support (Dingwall, 2008; Dingwall and Allen, 2001). Likewise, it supports the view that training can be an effective KT-method, if it can take place in the actual practice (Szulanski *et al.*, 2016). However, the training outside the practice inhibited the KT-practice, because it only focused on the practice of sending, which was perceived as reading instructions. In particular, the KT-process could not be completed to enable the practitioners gain knowledge. To share their knowledge with others became problematic because the lack of time and accessibility to their colleagues. Therefore, in that sense, this study is in agreement with previous studies on the matter of 'knowledge stickiness' (Szulanski and Jensen, 2006; Szulanski *et al.*, 2004; Szulanski, 2000; Szulanski, 1996). As this study was conducted in the NHS-

context, the impact of the specific public-sector context became relevant on the operations of the KT-practice. For example, the KT-practice tended to be adopted by different rules and norms in comparison with the private sector. Similar to the many studies in this filed, this research confirms that the complexity of the NHS makes the professional boundaries more effective. (Rashman and Radnor, 2005; Fish and Hardy, 2015; Lipsitz, 2012; Gillian Ragsdell *et al.*, 2016; Bode *et al.*, 2014; Ferlie *et al.*, 2012; Nicolini *et al.*, 2008).

In this study, the reality of the practice and knowledge accounted in the healthcare-context make most of the KT-practice conducted via internet connection and face-to-face and direct communication, at all levels, including the individual level and the interpersonal mode of interaction. Current KM-studies have a tendency to study personal and group learning as the main levels of analysis of organisational learning (Teece *et al.*, 1997; Easterby-Smith and Lyles, 2011). This issue sheds light into the role of the declarative and procedural types of knowledge (i.e., explicit and tacit) in the healthcare-settings. In this study, the procedural knowledge is regarded as a representation of 'doing', being aware that declarative knowledge is mainly concerned with formal reports and written materials. Such distinction becomes useful to understand the KT-practice and its appurtenances. However, this issue has a crucial role in the context as much as it can contribute to the practice; and the *how-to's* of such a contribution. In other words, the practitioners seem to be interested in knowledge when they can use it in practice, or when they can generate it and share it through the practice regardless of its category. Therefore, this study argues that the discussion about the tacit and the explicit knowledge may be perhaps less important in comparison with methods and processes of knowledge configuration or *how knowledge becomes eventually usable*. In the healthcare-context, in particular, the central needs are for 'knowing-how' knowledge is "enculturated" and "acculturated" by studying its methods of personal and interpersonal dimensions. The enculturated knowledge is rooted in the healthcare situation and organisational routines, where experimental learning draws most of its attention, as it was discussed by Sheffield, (2008) and Currie and White, (2012). However, contextually, this experimental learning is strongly affected by the 'power' or privileges of the health-professionals and the organisational structure. Therefore, external knowledge would be isolated and inhibited; making its transformation depends on the individual and the organisational structure. In such context, nurses, for instance, cannot share their knowledge with others. Thus, the organisation cannot use external knowledge appropriately within the existing mechanisms. However, this issue seems to be relevant for future KM studies for further investigation.

The KM-literature shows three epistemological roots of the KT-practice. These roots stem mainly from three theories (cognitive theory, connectionism theory, and autopoiesis theory) (Joshi *et al.*, 2007; Venzin *et al.*, 1998; Canestrino and Magliocca, 2016). In short, the cognitivists see knowledge as universal, objective and general, and they reduce knowledge to the main element of existence of 'data'. The connectionists perceive knowledge as multidimensional and socially

constructed, and as something that does not have universal characteristics (Jennex *et al.*, 2014; Nissen and Jennex, 2005). The autopoietic perspective into the KT-practice perceives knowledge as history-dependent and as something that can be developed in an autonomous manner (Venzin *et al.*, 1998), non-abstractable and not shareable. Knowledge is perceived as socially-constructed, through interpretation process (i.e., it is contextual and it has local differences). This perspective admits the possibility of knowledge to be transferrable, but with many difficulties based on the tacitness and personal dimension of the practice. Since the understanding of knowledge is mainly contextual, the KT-practice relates to the *shared understanding* among actors in the same context through social interactions, ties, and/or networks. Moreover, socio-technical theory aligns with connectionism, and adds a special concern with regards to human well-being by providing free assumption to get knowledge to those who are part of the system (Wood-Harper and Singh, 2011).

Drawing on the data-analysis, this thesis takes in an amalgamative perspective that is partly connectionist and partly socio-technical in an endeavour to provide more suitable insights and recommendation to consider in the KT-practice in healthcare. The data-analysis revealed that the actors depended on sense-making processes in order to conduct the KT-practice. These processes were mainly based on human connections in order to cooperate, interact and learn (Hirschheim and Klein, 1989). Thus, knowledge is co-constructed through a process of negotiation among all kinds of the stakeholders involved, who have different views to add another layer of complexity to a multifaceted context. The data exposed that the major part of the negotiations related with the accessibility to knowledge, which answers to the knowledge-inquiry and improves professional practice. Similarly, the socio-technical aspect has potentials for meeting the contextual challenges.

In general, in emphasising the multidimensionality of knowledge, but in healthcare this issue becomes difficult across organisational and individual limitations. The organisational limitations include lack of feedback and poor human resource practices. In addition, there are difficulties to enhance the interactions interprofessionally or between professionals and non-professionals. The preserved practice is considered to be an important theme of the professional behaviours, which foster the professional boundaries in some cases. However, in my current study, I detected that individuals could justify the importance of the KT-practice, but they lately would show concern about the tools and the resources to obtain a sensible justification about their actions. Therefore, there is always a potential gap between the tools/initiatives and the actors' expectations.

### 7.4.2. Issues at Different Levels KT-Practice Analysis and EPR Project
*KT-Practice and Organisational Factors*

One of the primary motivations of this study is to explore the impact of organisational, group-based and personal factors onto KT. The findings of this work show that the organisational factors usually inhibit knowledge from being shared, even when individuals have a tendency to share. For

example, the data-analysis of this study showed that, although having the EPR been introduced, the knowing about the patient by the nurses usually was delivered in an informal way rather than following formal organisational means. It can be argued that modernisation plans are oriented towards network-based organisational structures. Here, the KM-literature suggests that structural developments are crucial to facilitate the KT-practice in organisations, especially by applying the modernisation strategy that attempts to assemble the organisational structure (Liyanage *et al.*, 2009). The literature argues that network-based structures facilitate the KT-practice, where actors have more autonomy to collaborate (if compared with their collaborative capacity in bureaucratic settings or those settings organised on the basis of functionality, such as divisions and departments) (Brown and Duguid, 2001; Duguid, 2005a; Duguid, 2005b; Attieh *et al.*, 2016; Marsick *et al.*, 2014).

In this study, I illustrate that the organisational structure does not positively affect the KT-practice. In most cases, the health-practitioners work autonomously as a general approach to develop their practice in the EPR-project. Even when the patient-record is in place, the KT-practice still depends on the previous relationships between practitioners, rather than in the cross-functionality of the patient-record processing. In other words, changing the EPR is not attractive enough to extend the network of the KT-practice. Therefore, the existence of groups and their interaction was what mainly contributed to the EPR-project. Thus, this study sees that the modernisation-agenda of the NHS is firmly affected by the policymakers' tendency to move the organisational structure towards external stakeholders as a way to facilitate the KT-practice (Iyengar *et al.*, 2015). In this regard, my fieldwork revealed that the modernisation-agenda usually reforms the organisational structure in isolation from local-practice. For example, one critique was early highlighted by Currie *et al.*, (2008) when they argued that structural transformation in the NHS would not necessarily increase the interaction between professionals in the NHS. Practically, such a transformation could not encourage more professionals to interact more among themselves and the technology. Because of this issue, there are critiques about the policy reforms based on structural transformation. Regarding these issues, this research argues that organisational changes, when they come externally, will have a marginal impact on the organisational restrictions of the NHS. However, the restrictions affecting only the structural modifications upon the KT-practice are questionable. In other words, this research sees that organisational reforms in the NHS, when they are based on hierarchical restructuring, may be unresponsive to existing problems, such as the KT problems of this study. This is when blurred boundaries between professionals are not identified.

The KM-literature shows that culture has a vital effect on the KT-practice (Hedlund, 1994; Pee and Kankanhalli, 2016; Pee *et al.*, 2010). This issue links the structural transformation and the cultural transformation in a way that structural changes will change organisational culture (Pee *et al.*, 2010).

Moving from a traditional structure of dealing with the patient report towards the EPR-project did not change the relationship amongst professionals (e.g., doctors and nurses). Instead it showed that professional culture resisted structural developments imposed by the EPR-project because it was clear that nurses will be still subordinate to doctors and consultants. These results regard the centrality of sociological discourses (i.e., symbolic interactionism) of medical studies, which admit the medical dominance on healthcare-systems (Liljegren, 2016; Liljegren, 2012; Åkerström, 2002; Dingwall, 1997; Pickstone and Butler, 1984; Allen, 2001). In other words, the new strategy and the structural changes of the EPR-project had less impact on the health-professional culture, where these changes could not relieve the professional boundaries between professions. The main issue that limited this assumption was that the EPR-project had a limited lifetime, and thus it would show how change would occur. However, the EPR-implementation process showed an acceptable level of potential changes from the structural perspective.

There was not much tangible outcome from using the EPR in practice, at least from the practitioners' perspective. As it was mentioned in the data-analysis, the EPR helped increase the organisational outcome when the BP-Trust started to get an accurate "tariff." However, the practitioners did not see these issues as a huge benefit. Moreover, most of the practitioners did not regret when the contract was terminated with the firm in charge of implementing the EPR-project. Correspondingly, this research found that a professional structure, especially in the nursing career, acted as a deterrent as the nurses did not show any interest in developing their career practice further. Technology required them to use it carefully. This issue is in contradiction with most of the previous studies that emphasised that the use of network technology would develop the professional career and the KT-practice (Holbeche, 1995). Using the EPR and being familiar with it does not seem to be an opportunistic event for the health-practitioners when developing their career. In contrast, most of the nurses witnessed their career becoming more disrupted, if not unstable. In reality, the team-boundary spanning was regarded as a non-realistic view of the practice in order to facilitate the KT-practice (Marrone, 2010). Thus, I noted that the KT-practice should be considered and understood carefully in relation to providing direct and tangible benefit from the career's point of view.

The KM-literature emphasises the role of human resource activities in facilitating the KT-practice such as rewards and incentives, training, feedback mechanisms, recruitment and retention and workforce planning (Pervaiz *et al.*, 2016; Currie *et al.*, 2015). Feedback mechanisms seem to play an important role when clarifying the systematic accountability processes, and the lines of authority that could facilitate the KT-practice. Studying the EPR-implementation reveals that these mechanisms were not clear. And this made the implementing mechanism problematic. The HR activities in this research were studied in relation to the EPR-implementation, which proves that the feedback mechanisms are central in facilitating the KT-practice, for evaluating implementation processes at work as well as for improving the interpersonal relationship (Blau, 1999; Granrose and Portwood,

1987; Meijers *et al.*, 2013). This study shows that absence of line managers' support inhibited the KT-practice between the implementation team and practitioners in order to achieve the EPR stabilisation.

In the professional practice, the feedback mechanism has a significant impact on the KT-practice, as it was previously discussed in the section focused on the professional boundaries. It is worthy to mention that the difference between KT and knowledge transmission is mainly based on the feedback. In other words, when the feedback is more open and free in the two ways of interaction, knowledge then has more possibilities to be transferred. However, when feedback is limited, knowledge is more likely to be only transmitted than to be transferred. For example, in some cases, when the nurses try to forward a medical decision by their own, the doctors usually do not respect their initiative (e.g., the most common example was Martin Bromiley and his wife story, 2005).[30] Knowledge transmission depends on the passivity of the receivers, which reduces their willingness or motivation to apply knowledge (Yang and He, 2014). Therefore, this study supports the previous literature to see feedback as a critical factor, not only to facilitate the KT-practice, but also to identify it as an actual practice. In other words, without the feedback mechanism, the whole KT-practice would be questionable.

The KM-literature argues that tangible incentives would enhance the KT-practice in an organisation (Nelson, 2011; Nelson and Folbre, 2006). In my study, using the EPR was seen as an indicator of increasing the KT-practice, and even when financial benefits were associated with moving into the EPR-project. None of the participants admitted that they were motivated by the financial incentives to share more knowledge. The main motivation of using such technology was clearly driven by the need to save time and effort at their workplace. This vision could improve the level of the service to patients. The majority of the interviewed health-professionals agreed that the work in healthcare was based on a better standard of care-delivery to the patients than on personal wealth. This issue, therefore, could be the reason why the health-professionals were less sympathetic with the IT failure based on financial costs. They perceived the EPR as an alien mode of management, or rather intrusive instruction imposed upon their practice. They also regarded this kind of participation as more rhetoric than realistic. For example, the nurses seemed to be dissatisfied with the project which added new activities to their practice; besides not getting any additional recognition out any expansion of their workload. Therefore, health-professionals saw the patient care was the most important reason to enhance the communication and for moving into the EPR-project.

The KM-literature shows that new technologies can affect the retention policies. These policies would decrease the recruitment and increase employees redundancy (Hislop, 2013). In my study, the practitioners mentioned that the new technology would change the practice and the volume

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[30] How mistakes can save lives: one man's mission to revolutionise the NHS: < http://www.newstatesman.com/2014/05/how-mistakes-can-save-lives >

of the workforce. Thus, workforce could be affected by EPR which requires different set of skills to get professional practice done through EPR. However, the management view was closer to the idea that the new technology would facilitate the practitioners' work. These reasons represent the justification of professional boundaries against the new practice (Currie *et al.*, 2009b; Iyengar *et al.*, 2015). Thus, the findings show evidence in line with previous studies on the retention and recruitment policies within the boundaries of professions and organisations (King *et al.*, 2015). In particular, these issues show the importance of understanding the multi-views of the practice as valuable assets for the organisation willing to facilitate the KT-practice. In all, HR could support the KT-practice, but they need to be more consistent with the professional practice.

### *KT-Practice and Group-based and Individual Issues*

It is argued in the literature that group-based factors have influences on the KT-practice (Canestrino and Magliocca, 2016; Frank *et al.*, 2015; Visram *et al.*, 2014; Sheng *et al.*, 2013; Paulin and Suneson, 2012). Interpersonal factors, such as group characteristics, practices, coordination, group member's diversity, social ties, social networks, and group culture were considered to improve the KT-practice in organisations. In my study, the coordination between nurses and doctors, nurses and the GPs, and or practitioners and technicians, was organised through cross-functional teams. The coordination supported knowledge-inquiry, the existing relationship and other interpersonal factors. Thus, my study contributes to the existing literature by highlighting issues that relate to the workload across professional boundaries (Bonache and Zárraga-Oberty, 2008; Zarraga and Bonache, 2005; Currie and White, 2012). According to Currie and White, (2012), the teams that share the same contexts are more likely to share knowledge, rather than those having no sharing-promoting contexts. In addition, this research argues that knowledge inquiries could enforce a level of the KT-practice, even when there is no shared context. The last point makes this study more consistent with Currie and White, (2012) and Currie *et al.*, (2008), which highlights the problems of coordination between professionals on the basis of the professional boundaries. In other words, the KT-practice would face difficulties where little similarities among group members are observed. The knowledge gap would motivate those members, however, to overcome difficulties. In short, actors' similarity is important, but the interactions between different actors to share knowledge would require clearer objectives.

At the individual level, the literature provides examples that individual factors, such as willingness and capacity, perception of benefit and cost, trust of the other, could contribute to the KT-practice (Rechberg and Syed, 2016; Gillespie *et al.*, 2010). In my study, I verified those individual factors by studying the individual attitude to share their knowledge across professional boundaries and through their interaction through the EPR. My findings also add a central subjective dimension to the facilitation of the KT-practice. This research shows that practitioners are more likely to engage self-knowledge seeking, as a response to the lack of knowledge and system support. For example, in some cases, dealing with the EPR problems was motivated by individual attitudes, which somehow

guaranteed a certain effective level of patient service, rather than organisational support. Thus, nurses, and most health-practitioners at the beginning of the project, were very motivated because they wanted to improve patients' services. Their collective view was of EPR as a benefit rather than a cost. Furthermore, nurses agreed to abandon the project when they felt that this objective was not reachable. Individually, the health-practitioners had different attitudes to share their knowledge through the EPR, on the basis of mandatory knowledge to conduct the professional practice, and in certain occasions, also on the basis of their subjectivity. This study found that some health-practitioners considered their practice as something that needed to be preserved in the healthcare-context. Therefore, the EPR in some cases could have become a hole that made their knowledge leak. Some practitioners said that they did not mind sharing their procedural knowledge with others, but they believed that such knowledge needed to be supervised, for declarative knowledge could not achieve such purpose. Thus, this study is different from the KM-literature, in the sense that the latter mainly focuses on the organisational processes (more on the macro-level of analysis than on the micro) (Rechberg and Syed, 2016). In this study, the KT-practice has many dimensions including the dynamic processes, the actors and knowledge in circulation. It shows that individual and interpersonal factors can play a crucial role in facilitating the KT-practice. Thus, this study highlights the need to focus on the individual level of analysis in future research of the KT-practice, rather than so much on the macro-level (Easterby-Smith and Lyles, 2011; Easterby‐Smith *et al.*, 2008; Foss *et al.*, 2010). In brief, my thesis study demonstrates that the KT-practice depends on the individual willingness and capacity of using a suitable network to share knowledge.

### 7.4.3. Technological Issues and KT Practice

ITs in the KM-literatures are regarded to be crucial facilitators of the KT-practice in the organisation (Alavi *et al.*, 2005; Alavi and Leidner, 2001; Hislop, 2013; Albino *et al.*, 2004; Rechberg and Syed, 2016). In this study, the KT-practice was examined through the interaction with the EPR-project. The rational benefits of the shared patient-records electronically were to enable patients' health information across different healthcare organisations, providing the richest information at the lowest cost. Thus, the EPRs have potentials to enhance the organisational performance and the continuity of care through (inter)national integration. The institutional perspective represents a rational orientation about the cost and the procedures efficiency of the EPR-project (the imposing of the IT-strategy receives support by this argument). However, the KT-practice at the micro-level confirms the emerging issue that the EPR would cause declarative knowledge overload. According to Bawden and Robinson, (2009), this type of overloading can happen when "information received becomes a hindrance rather than help, even though the information is potentially useful" (p. 183). The conflicts between the implementation groups can be summarised as when the technicians were trying to do the right implementation and allocation on the basis of time and space. However, the clinical group attempted to implement the EPR efficiently, reflecting their practice of knowledge sharing.

At the beginning of the EPR-implementation, the health-professionals were motivated to accept the premises of the EPR as a way to improve the quality of care-delivery, and to serve the best interests of patients. In other words, the health-professionals positively responded to the EPR premises reflecting the professions' objectives. At that time, they only felt worried about timing and deadlines. Afterwards, the health-professionals felt being challenged to perform administrative tasks in addition to their professional chores.

The participatory group mainly perceived the EPR as an administrative system that was alienating their tasks, distancing their usual occupations from their crafty work and daily professional objectives. They used to do their daily work by hand, and then after the EPR-implementation, and they had to spend more work-time using commands, with no convincing return. Thus, the health-professionals started realising many conflicts to occur between their professions' intentionality and the technology potentiality. The 'felt-imposed' administrative procedures of the EPR caused knowledge anxiety among the professionals. This '*Infobesity*' derived from the use of the EPR provided too much information, which eventually negatively affected the clinical decisions and professional autonomy at the organisation (Bawden and Robinson 2009; Duftschmid *et al.*, 2013). These social issues were related to the personal and professional characteristics of the actors. The social issues are central in this research because they demonstrate the important role played by interpersonal relationships and group culture in relation to the KT-practice. Furthermore, the social issues induced by the use of the EPR showed how knowledge-circulation could affect the different ways individuals or a group handle communication technology. Actually, these issues led to a huge resistance from the actors involved in the case of the EPR-project.

In addition, socio-technical analysis demonstrated further reasons for resisting EPR as end users had been highly reluctant to form any socio-technical relationship with it. The disconnection (gap) between the practice and technology-in-practice, and lack of interoperability, arguably played a major role in this struggle and could be the primal reason why the extra workload was added. Also, this study recommends that precedent socio-technical relationships should be taken into consideration when seeking to understand the impact of and reaction to introducing EPR into the BP-Trust.

Moreover, the conflict between the institutional and professional discourses can be attributed to the heterogeneous[31] qualities of the stakeholders and of the health-professional practice, and also to each stakeholder's objectives and interpretations. For example, the professions' intentionality typified by the role of the health-professional was that doctors and nurses performed tasks to treat the patient intensively, so they should not have needed to perform pure administrative tasks. In the case of the EPR, most of the health-professionals felt that extra administrative tasks were challenging their tasks

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[31] The heterogeneity is an innate and original quality of system, and it is the quality or state of being diverse in character or content (Oxford Dictionary).

along the process of implementation. They also argued that making EPR administratively oriented was logic, since the EPR was originally designed to satisfy the decision-makers' view. These conflicts showed that heterogeneous practice and multiple interpretations could live side-by-side in healthcare organisations, as contradictory forces. Therefore, the institutional perspective, regarding the system efficiency, authorised the implementations' plans at a national level, but the matter is that professional practices enacted the EPR at organisational and group levels.

At the practice level, the EPR-project can be interpreted on the basis of subjective and intentional processes of healthcare-professions and professionals. This is with regards to the EPR acceptance by health-professionals at the beginning the EPR-implementation, where the general discourse interpreted the EPR on the basis of the professions' aims. However, the EPR-in-practice challenged the health-professional state and identity, making the health-professionals request, and (re)interpret the EPR differently and distinctly. The data-analysis illustrated that the health-professionals did not accept to add secretary and administrative tasks to their work (e.g., typing and printing tasks). Data also showed how the health-professionals' cognition affected their interpretation of the technology, which in turn changed through practice and actions. Additionally, irrespective of the drawbacks, discussed above, the data showed that the EPR enabled the health-professionals to make more sense about their practice (e.g., the case of keeping the patient over the weekends because the hospital did not pay the doctors during the weekend) (Rodríguez and Pozzebon, 2011).

This study revealed that technology could play a crucial role in the KT-practice. However, in reality, technology might not be always efficaciously up to the expectation of providing a complete delivery. Following the previous discussion, the EPR was perceived as a tool of control rather than being a tool of support. This issue was concluded by most of the practitioners, signalling that the gap between the flow of knowledge and the orders of technology is enormous (Lin *et al.*, 2008; Lin *et al.*, 2012). Eventually, the findings of this thesis research corroborate the view that doctors' clinical decision had more power than the IT tools in terms of helping the decision-making in the clinical practice. This result is consistent with previous research (Currie *et al.*, 2008; Iyengar *et al.*, 2015). In effect, the IT can bring potential contribution to the practice, but only when it fits in/with the complexity of the professionalised-context.

Regarding the career prospects, the KM-literature argues that the KT-technology could improve the career prospects, especially when the technology integrates into knowledge acquisition at the workplace (Meijers *et al.*, 2013). However, the findings of my work show that the technology could not play a major role in improving career prospects; the relationship between the technology and career prospects was preserved by the health-participants. The EPR did not seem to be an alternative source of knowledge aiming to reduce the professional boundaries. For example, nurses eventually kept using their old resources of getting knowledge, rather than moving into the new practice. As a

result, this study adds empirical evidence to the issue that the professional boundaries prevail over the role of technology. Actually boundaries can inhabit the KT-practice. Here, the professional hierarchy between and among the occupations makes one of these boundaries (e.g., professional hierarchy between doctors and nurses and/or between physicians and consultants). The key issues and factors affecting the KT-practice are summarised in Figure 7.3.

## 7.5. Conclusion

This chapter discusses how knowledge-in-practice was identified in the healthcare-context. First, knowledge is a contingent and dynamic flux that comes into reality through processes of inquiry. Second, the discussion extends to the fluid dynamics of the EPR technology, which can be operated upon through two ways of human-interface interaction (actuality and potentiality). This chapter examined how the actors involved in such a context also were engaged in a dynamic state of being, which can be identified based on their purposefulness. The discussion was built on the basis of multiple perspectives (managerial, technical and professional), which this research found conflicting each other. The actual 'clashes' were due to the ever-changing emerging reality of the KT-practice and the actors involved.

Following the thesis framework (cited in Chapter 4), the present discussion has illustrated issues and influences of the KT-practice at different levels, namely (organisational issues, group-based and individual issues, influences of professional boundaries, and technological influences). This study is contextually grounded and was conducted on the basis of an interpretive analysis approach, since doing research in the healthcare-context entailed a situated participant observation to be the most appropriate. Systems Thinking was used to understand the actual KT-practice in the making, rather than on the basis of any theoretical concept. The interpretive analysis was aligned with the following KT-practice in real time of the contextual knowledge in the healthcare-context. This was in order to understand how the actors (managers, technicians and health-professionals) circulated their knowledge side-by-side with the implementation and development of the EPR-project. This investigation detected that the EPR was generally perceived as a surveillance artifact in an imminent emerging condition. This reaction to the EPR somehow informed about the socio-technical perspective rooted in the clinical work activity in the healthcare-setting because the actors involved could not see other possibilities beyond the known ones. In other words, the EPR-project gradually increased a state of uncertainty at the organisational level, making more and more difficult to deal with the learning-process and overall implementation relevant to the participant actors.

The empirical analysis aimed to explore the health-professional activities in a practice-oriented healthcare situation. Therefore, this study was built on the basis of an inductive approach and primary data in relation to pre-existing studies. Through this exploration, this research qualifies knowledge in healthcare as personal, contextual and multidimensional because it is reflective of the perspectives of

the practice and health-practitioners (i.e., the professions and professional intentionality). The profession's intentionality requires knowing-what and the professional intentionality requires 'knowing-how' in a specific context. Through a deeper understanding of the practice, and from multiple perspectives, this study displays a spectrum of professional intentionality control over the objectives and the profession's autonomy. The context also represents a level of tacitness through routine and artifact. The healthcare-settings can also emphasise the importance of considering knowledge inquiries as a first trigger for knowledge-creation. The KT-practice in healthcare is constitutive and relational. This study thus claims that deep understanding of the knowledge source and knowledge-inquiry is central to account for knowledge-circulation.

Considering the EPR-implementation was crucial to reflect on the socio-technical aspect of the organisation under focus, and to understand the KT-practice (elements and dimensions) (Wood-Harper and Wood, 2005; Fitzgerald *et al.*, 1985). Essentially, knowledge analysis showed that knowledge is impassive and that it has multidimensional aspects which depend on knowledge gaps and inquiries. The inquiries could be temporal or permanent, but they would not be completed on the basis of the subjectivity of the actors (i.e., reading, saying and doing need imagination). Moreover, this study found that organisational, individual and professional factors negatively affected the KT-practice in the context of the EPR-project in the NHS. In short, the professional boundaries between the actors were not transformed as the policymakers expected. Thus, the KT-practice was still conducted at the local level rather than at the organisational level because the practitioners relied on old modes of doing to acquire knowledge about their inquiries. Furthermore, the empirical findings show that 'time' and 'training' are crucial constraints to knowledge dissemination as for hospital professions (a nursing profession in the A&E, in particular), hence, the professional boundaries between the practitioners might remain hard to overcome in practice.

In the stakeholder analysis, this study demonstrated that the relational field of the stakeholders is dynamic at many levels (the intensive level and at the extensive level; as they were clarified before in this chapter and in Chapter 6). These dynamics were not expected before the introduction of the EPR-project. The extensive level means that the KT-practice has no geographical or disciplinary limits. For example, the police officer could be interested in the patient report. So could the GPs and consultants. The intensive level means that the same actor could take many roles through the communication and interaction with knowledge seekers or knowledge interpreters. Interestingly, these analyses were profoundly affected by the knowledge sources and knowledge inquiries.

Understanding the KT-practice can facilitate changes in healthcare as well as enhance professional practice and decision-making. The many dimensions of the KT-practice in healthcare entailed different layers of contextual complexity. Drawing on Systems Thinking, these dimensions could be analysed on the basis of multiple perspectives (managerial, technological and professional).

The multidimensional reality of the medical practice in healthcare involves a mixture of practices of administration, communication management and health-professionals. The management practice of the organisation can handle its own tangible and intangible resources, in order to provide the best services possible. This view is based on an economic view of the organisation. The communication and technology practices are mainly based on the interoperability that enables health-practitioners to exchange and make use of the available information. The professionalised practice is concerned with healthcare organisations on the basis of sociological views, in order to study the social and the cultural dimensions of the professionalised environment. In relation to the EPR-implementation, the main outcomes of the KT-practice analysis, accounted in the chapters focusing on the discussion and on the analysis, are summarised in the following paragraphs.

The managerial perspective considers that the project implementation, when successful, is cost-sensitive, according to the timetable and the main mission of that project. Thus, the defenders of this view understand that the KT-practice is a means towards a successful implementation of the project. They also perceive that the project is an external knowledge, and a successful project implementation a successful 'Knowledge Transfer'. This perspective sees the EPR as a project that can enhance organisational performance on the basis of rationality and costs and benefits (e.g., cost saving, data saving and speed of data accessibility, and information exchange through the BP-Trust).

The technical perspective of the healthcare-setting deals with maintaining and reaching a successful communication between the designed technology and the users. As a group, the EPR users identify a key conflict as the gap between their expectations of efficiency and the actual beneficial side-effects behind the technological application. This gap needs to be accounted with regards to the lack of understanding by other perspectives around the reality of the technical views and work. For instance, changing the location of a button, from a technical perspective, is a major change that requires sensible justifications from the user's perspective. Moreover, rarely, health-professionals may intuitively consider that such a command would need a strong practical justification or upgrading technological efforts beforehand. This issue may be also overlooked by the healthcare organisational structure, whose professional culture is somehow privilege-based, where the technological tasks are viewed as a minor domain. The conflicts amongst the institutional, technical and professional discourses come from the heterogeneous reality of healthcare stakeholders and professional practice, *and also* from each stakeholder's objectives and interpretations. These conflicts reveal that multiple interpretations can live side-by-side as contradictory forces in healthcare organisations. In this regard, the institutional and technical perspectives regarding system efficiency authorise the implementations' plans at national level, whereas the professional practices enact the EPR at the organisational and group levels. Thus, the discourse of the technical-positioned stakeholders is based on doing a successful communication between the designed technology and users.

The professional perspective detects the procedural and declarative dimensions of not just of knowledge-in-practice, but of the medical knowledge in particular. This research deduces that the professionals' engagement and disengagement with the EPR-system would be always interpreted and justified according to the personal and professional interpretation (i.e., cognitive intentionality and identity, in line with the view provided by Weick *et al.*, (2005). The health-professionals perceive that the EPR's changes are affecting positively and negatively their states of being, professional autonomies, daily practices and inter-professional relationships. At the practice level, the EPR-project was interpreted according to subjective and intentional processes of the professions and professionals. The data-analysis illustrates that professionals did not accept the additional secretary and administrative tasks along with their own routine work (e.g., typing and printing tasks). The EPR-in-practice, in addition to imposing administrative procedures to the professional practice, caused knowledge anxiety ('*Infobesity*') by providing too much information that eventually and negatively affected the clinical decisions and the professional autonomy (Bawden and Robinson, 2009; Duftschmid *et al.*, 2013). This perspective was in-formed not only by the professional practices but also by the tensions between their practice and the EPR-technology. This conflict between practice and technology turned upside down the predetermined policies of the EPR through the implementation process. Precisely, studying the KT-practice in healthcare professionalised-context on the basis of conflict became central to fine-tune the methodological approach.

The following chapter (Chapter 8) discusses the summary of the research outcomes, through linking research questions and answers. It also discusses the research contributions and implications before addressing the research limitations and suggesting further research directions.

# Chapter 8: Conclusion and Implications

## 8.1. Introduction

The multi-component reality of KT-practice in NHS entails a study of a highly complex and multi-faceted context. This research employs different perspectives to analyse the reality of KT-practice and the practitioners involved as well as how the practitioners perceived the practice of circulating knowledge. In the case of the EPR, the research approach of this study is from three perspectives (technical, managerial, and professional). KT-practice was actually introduced to reduce the gap between what was expected and what was perceived by different stakeholders during the process of implementation. This chapter draws on the lessons I learnt at each stage of the research process (including identifying the area of concern, developing the KT-practice framework, selecting the research methodology, and defining the research gaps). My conclusion includes theoretical, methodological, and practical contributions and implications, which will be discussed respectively.

Findings have two theoretical implications for the existing KM-literature. First, KT-practice requires special consideration as it was spotlighted in the review of KM-literature in Chapter 3. Second, KT-practice needs to consider 'craft knowledge' that is produced on a daily basis among the professionals and the technologies (humans and non-humans), multiple perspectives (from the micro- to the macro-levels). Professionalised-contexts usually develop their own craft knowledge; a fact which has been repeatedly confirmed in this research. However, recognising the crafty engagement is still missing in the managerial design of the KT-practice. Craft knowledge is co-dependent with the use of the EPR technological application (Duguid, 2005b; Duguid, 2005a). There is a particular managerial perspective upon the KT-practice that usually excludes this craft knowledge from the implementation of the network platform. Why does managerial perspective disregard craft knowledge? This is because the recurring tendency of managerial perspective is to understand tacitness in organisational routines in order to pursue a high level of command and control in the project at hand.

This issue becomes more problematic since craft knowledge is highly resistant to any form of control. Craft knowledge is highly subjective as it is mainly based on contingent and emergent inquiries. Drawing on the gaps identified in the literature (Chapters 2 and 3), this thesis study aims to contribute to the fields of KM and KT-practice by addressing a transversal interrogation, as follows: '*How do different actors perceive and conduct the knowledge transfer practice, from different managerial, technical and professional perspectives?*

By reflecting on the Framework, Methodology, and Area of interest (FMA) elements in the first chapter, it can be seen that particular linked ideas (F) are used in a methodology M to investigate an area of interest A. In light of the FMA, the current study revises the research questions and their answers, and illustrates the main contributions in the theory (F), methodology (M) and practice (A).

## 8.2. Research Questions Revisited

### RQ1. How do healthcare actors practice Knowledge Transfer?

### RQ1.1. How are the KT relevant methods investigated in the healthcare-context?

This question is addressed by analysing the KT-practice alongside with the EPR-project implementation. In order to investigate this practice, this study discussed several themes such as characteristics of knowledge, the definition of technology, the definition of success implementation of the EPR-project and the implementation progress.

### *Characteristics of Knowledge and Healthcare Practice*

Looking at the characteristics of knowledge from multiple perspectives helped expose a few tensions between what is knowledge and where it comes from (e.g., the perception of knowledge and the actual emergence of knowledge in the organisational practice). Each perspective has its own definition about these questions. Among the different perspectives used in this research the main ones were managerial perspective (i.e., knowledge is what to do), technical perspective (i.e., knowledge is the design) and health-professional perspective (i.e., knowledge is how to do). For example, knowledge as an objective entity is represented in the way of *transferable* facts, decisions and practical understandings interested in accountability and control of the organisation.

The practice-based view is realised as a clinical situated-practice which delivers solutions. The objective-based view of knowledge considers the clinical practice as a series of procedures which require *decision-support technologies*. Thus, the managerial perspective sees that the EPR can play a role of decision-support technologies, although that needs to be designed and implemented properly (Greenhalgh *et al.*, 2009). Regarding the health-professional perspective, Greenhalgh criticized this view by saying that "testing decision support systems and other algorithmic components of the EPR have not substantially improved the quality or efficiency of frontline clinical work yet" (p. 763).

Alternatively, the health-professional perspective sees the clinical practice as *knowing by doing* rather than a decision-making and it always address the question of 'how to do something'. Accordingly, clinical work is considered as personalised and context-bound, as Berg, (2003) put it: "the nature of health care work sets natural limits to the possibilities of IT to revolutionize this work. They [the ITs] are unlikely ever to produce dramatic gains in these areas" (p. 337). Aligned with the technology-in-practice, this study argued that human work can reduce the gap between medical reality and socio-technical design. This argument requires KT-practice to make EPR be more local, modest *and also* more engaged with the workplace practice through bridging gaps between the everyday-based clinical practices and technological adjustments to the implemented technical designs.

Technology-based biomedical literature generally argues that most of the IT in healthcare describes clinical information availability as an issue beyond the locality where data are gathered

(Andersson *et al.*, 2003; Greenhalgh *et al.*, 2009; Levina and Vaast, 2005). The idea of transmitting the meaning, seen later by the health-professionals as a flawed assumption, was adopted by many international IT-projects, such as the IT-infrastructure in United States, and National Program for IT in England[32] (Berg, 2003; Berg and Goorman, 1999; Pentland *et al.*, 2011; Pentland *et al.*, 2014).

Studying the KT-practice in relation to the technology shows that the clinical data can only be interpreted on the basis of the origin of knowledge before becoming meaningful. Thus, this study criticises the objective view of knowledge that regards technology as a tool, by which information can be exchanged and distributed among decision makers. However, in line with the interpretive view (Andersson *et al.*, 2003), this study puts more emphasis on understanding context and communication in relation to decision-making issues that are locally situated (Hartswood *et al.*, 2003; Berg *et al.*, 2003; Fitzsimmons *et al.*, 2013).

### *What is the EPR-technology?*

In order to approach the question "What is the EPR?" the data-analysis showed that the EPR has many different meanings by and for the diverse stakeholders (Håland, 2012; Greenhalgh *et al.*, 2009). For example, the EPR, based on conceptualised context, is a detailed electronic file in the making, which informs the user about the patient's record through a national network. This network can offer subordinate uses such as evaluation and auditing. The potentiality inherent in the EPR is related to building this network and requires building in interoperability with and within different social and technical structures. The social structures aim to understand the meaning and the purpose of the EPR-technology, through the interpretation of stakeholders in specific, relative, and constantly changing contexts. In this line, the EPR is studied as a flexible and fluid artifact that works in a dynamic reality (e.g., ANT, SSM, Sociomateriality, Socio-technology, and Multiview) (Cecez-Kecmanovic *et al.*, 2014; Wood-Harper and Wood, 2005). This view claims that the influence of employing technology, such as the EPR, would not be predetermined. Thus, looking for a positive effect of the EPR on the organisational outcome has a limited value. Practice-analysis shows that the EPR allows multiple functions of the patient-record, by which different actors such doctors, nurses or managers require and expect different types of data. Thus, practice-analysis shows that holding the idea of a predetermined or an "agreeable" outcome by the EPR is problematic (Chiasson *et al.*, 2007; Berg and Goorman, 1999; Burns, 2016; Berg and Bowker, 1997).

Therefore, the research approaches (i.e., determinism and interpretivism) of the STS literature have different focuses on accounting technology. Determinist's views usually compare two extreme/general realities (e.g., reality with EPR, and reality without EPR), and how the medical decisions can be supported *per se* or not (Junni and Sarala, 2011; Jensen and Aanestad, 2006). The interpretivist's views, nevertheless, put more emphasis on the meaning of technology, through the

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[32] These are discussed by Department of Health, 2008; Institute of Medicine 2009.

actual practice, by which the potentiality of the technology can become more meaningful on the basis of the particular use (Greenhalgh *et al.*, 2009). For example, the research on the technology-in-practice considers that the EPR's properties are central to the practice-analysis, which are reconfigured through the enactment of knowledge (Suchman, 2007). The interpretation of the EPR is considered through the actual use and observation involved in the field of practice (Jensen and Aanestad, 2007b).

Hence, this study recognises three potential conflicting views, regarding the work processes: IT support, clinical care and management. The IT support mainly focuses on building interoperability functions between multiple social and technical systems. This view fits more with the determinist's view that mainly believes that the IT can predictably improve the clinical practice and outcome, if it is designed and implemented properly (Håland, 2012; Greenhalgh *et al.*, 2009). The immediate professional practice represents primary uses to transfer the patient-record to other units. Whereas, the management processes, such as auditing and research generating, are considered as secondary uses. Usually, conflicts take place when the EPR imposes data to be coded by using structured templates that were built to accelerate the secondary uses of the coded data. In other words, the primary interviewed users in my study did not see that the EPR can indeed save time or help the clinical care to become more efficient. Conversely, the users did see that the EPR required more time and effort (i.e., extra and paralleled work). The appropriate incentives were required to guarantee that extra work would be probably rewarded.

### *Definition of Successful Implementation of the EPR*

The literature shows an array of concerns in order to evaluate and measure the success of implementation. These concerns can be summarised as two positions: 1) Success is objective and prospective, and 2) Success is negotiated and socially constructed. The objective view argues that success can be measured through answering questions such as 'Is the technology working?', 'What is the rate of usage?', and 'What is the rate of users' satisfaction?' (Mitchell and Sullivan, 2001). Thus, the empirical studies are needed to deduce the success factors that are objective and transferable (Greenhalgh *et al.*, 2009).

The interpretive view argues that success is socially constructed, by which it can be differently defined using multiple perspectives (Berg and Toussaint, 2003; McCracken and Edwards, 2016; Berg *et al.*, 2003). For example, interpretive views look at the direct impacts of new projects on the organisational performance and professional practice (e.g., issues such as the reality-gap model and time for entering data) could fail when recognising that the potential benefits only exist/materialise in the long run (the issue of more reliability and capacity of research) (Suchman, 2007; Bass and Heeks, 2011). Thus, the failed and the successful projects cannot be dismissed out of the context of practice and practitioners (Berg *et al.*, 2003). In addition, the success of an EPR-project, in relation to the KT-

practice, has an ethical dimension. This is because the EPR-project seeks to know who has the influence to label the success (the political reason), who is responsible for the success (the managerial reason), and who can make the success (the practical reason).

### *Implementation Progress*

The EPR-literature detects tensions between two opposite ontological positions: determinism versus dynamism. For example, the determinist position is focused on linear change and causality (e.g., to go from A to C needs one to pass by B; when technology X does Y, Y should be measurable) (Plsek and Greenhalgh, 2001; De Savigny and Adam, 2009). This view claims that human interactions and technology would operate formal and predictable outcomes. Thus, IT-implementation and change process requires decent project management including clear strategic plans through involving most of the stakeholders toward the organisational goals.

Nevertheless, Greenhalgh *et al.*, (2009) claimed that the dynamic view can be inherently more contingent and fluid where the conflict is involved. Based on this approach, a good project management would require responsible managers who can lead an implementation  through "action research and accommodation" (Checkland and Holwell, 1998), "negotiation among different communities of practice (CoPs)" (Lave and Wenger, 1991), "sense making" (Weick, 1995), or "translation" (Latour, 2005).

The EPR-literature usually discusses two approaches of epistemology. The participatory approach (which is rooted in interpretivism that focuses on social meaning), and the conventional approach (which is rooted in the positivism, and it focuses on engineering approach of design and implementation) (Greenhalgh *et al.*, 2009). The findings of my study, in contrast with the findings of Hartswood *et al.*, (2003), add sets of principles of co-design by observing that development requires shared, participatory practice between the designers, decision-makers and users. Thus, the implementation progress requires considering the natural growing of networks, rather than building the IT-system in order to achieve synergy among different stakeholders (i.e., a network that naturally grows to crystallise a technical system, clinical care and auditing) .

### RQ1.2. How are the KT actors identified in the research process?
### *Nature of Actors and Clinical practice*

The main features of healthcare are complex, multidisciplinary, dynamic, massively dated, and knowledge- and value-based (Alderwick *et al.*, 2016; Walshe and Smith, 2016; Pentland *et al.*, 2014; Pentland *et al.*, 2011). This situation shows that generative learning practice is central to the present research, which draws on Systems Thinking along with the KT-practice.[33] The KT-practice is regarded here in relation to Systems Thinking as a perspective that integrates actors, events, activities,

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[33] "Systems thinking" emerged from systems theory and is the basis for organisational learning and learning organisation (Senge, 1990).

processes, and conditions associated with knowledge-inquiry and its transfer in healthcare organisations. Indeed, the complexity of the healthcare-context provides an opportunity to understand the influence of varying actors on the KT-practice. More specifically, this study discusses the influence of professional power upon medical practice-analysis. This practice received little attention by the KM-literature so far. The reason of this situation could be that KM usually adopts the perspective of the decision-maker, a top-down approach. To better understand this issue, this study examined knowledge from multiple perspectives, managerial, technical and professional, along with the EPR-project implementation.

The findings suggest that the KT-practice should have different definitions based on the perspective taken by each practice (e.g., medical practice, technician practice and managerial practice). However, some other practices in the NHS-context could also share specific aspects (e.g., IT for health, eHealth). Not always the different definitions are in disagreement. Also, the findings confirm that the KT-processes are dynamic and uncertain. For example, health-professionals argued that the EPR-project was not reflecting the actual medical procedures, as they would be used to some extent, and that they were not able to handle the EPR-project endogenously. This was because they were more engaged in medical practice than what was usually recognised in the existing organisational structure. When the KT-processes are enacted, there would be a ripple effect, propagating actions and behaviours of actors that may change the situation of other sub-systems. The KT-processes are considered as reinforcing dynamics that are triggered by a situational gap (Iyengar *et al.*, 2015; Krylova *et al.*, 2016). The KT-processes are able to lead to outcomes, either desirable or undesirable, by which each KT-process may produce a reactionary solution or a thorough generative practice.

As this study took place in a professionalised organisation, the findings show that professional issues prevail over the organisational factors, in terms of the influence on the KT-practice. In effect, the context of my study showed that the KT-practice to be influenced by the professional power and in turn to influence the means by which the organisational practice develops. For example, the study showed that the lack of practice-analysis and workplace analysis may have caused a considerable gap between the applied technology and the antecedent practice. An observation of the workplace (A&E) revealed that technology allocations may have caused notable distractions to the practitioners, when they were dealing with patients. As a result, the interviewed practitioners argued that understanding the contextual practice of capturing and retrieving knowledge was an essential feature to design means and tools. Here, from the professional perspective, the analysis of the KT-practice and processes plays a crucial role from the socio-technical aspect in the healthcare-context.

The dynamics of the system shows that knowledge actors (e.g., knowledge seekers) represent better the state of 'the professional' than that of the senders and receivers, which could be more suitable to entities of rather passiveness (Majchrzak *et al.*, 2015). The end users differentiation should

also be included in a KMS initiative since it can affect the KT-practice between professions. In this study, nurses performed routine tasks in opposition to the medical interests and thus medical consultants and doctors tried to handover kind of secretary work to the nurses. At the same time, nurses also received extra work by the system (EPR) that increased the load of tasks over their assigned roles. This additional work was often with no rewards or incentives. Hence, although the EPR-projects may add small value from a cost-effective perspective, these projects do not enhance the existing relationship between doctors and nurses, as highlighted by other studies (Martin *et al.*, 2009). As such, this new EPR-project might not be as conducive as originally expected by implementers regarding changing the current boundary between these two professions. Surprisingly, in my study, I found that this issue did not matter to nurses who often preferred to view their involvement as a stretch of their existing nursing role rather than an opportunity to move into the counselling occupation. In short, the EPR-project enhances neither the KT-practice nor the relationship between doctors and nurses.

The findings of my research also provide implications for developments in the KT-literature. By examining the potentiality of the tacit and the explicit as well as of the impact of known barriers to KT-practice, the findings allow for recognition of the complexity of the processes of transfer (sending/receiving) upon the KT-practice. My findings demonstrated that the KT-practice (mode of transfer) has a substantial impact that is related to known barriers such as the willingness of the source or the absorptive capacity of the recipient and the state of actors who can simultaneously be a sender, a receiver, or a seeker. Thus, this study argues that the knowledge-inquiry, the dynamic state of actors and the timing of methods are important determinants of the difficulty of the KT-practice. Methods are not just about which methods or how many of them are in use (Almeida and Kogut, 1999; Fei, 2009). Methods should be understood on the basis of 'when' and 'who', as well. In other words, the same practice may produce different results depending on their times and temporality (i.e., when they are deployed during the transfer), and who is doing what for whom.

The findings suggest that the KT-practice in the professionalised-context can be analysed by using a degree of intentionality and purposefulness (i.e., the 'why' question), by which the social practice affords personal and group interactions and suggestions through the practice of observation, and participation. For example, in the A&E, health-professionals are mostly concerned about patient cases, which are usually very urgent. When health-professionals cannot have access to the needed information, they usually find their ways to do the investigation that requires dealing with the ITs on the basis of different degrees of potentiality. In most cases, the many degrees of potentiality include technological facilities, which afford safety, belongingness and practical solutions. The findings of this thesis study may help explain the persistent difficulties of outcomes in the KT-practice. They also show how the implementation is affected by the distance between professional practice and leadership

practice. In addition, the findings contribute to the understanding of the heterogeneous qualities of actors when dealing with the workplace and the tacitness that constrains the KT-practice.

Moreover, the notion of the KT-practice implies situations where human and non-human actors within a context do inquiries, sending/receiving of knowledge, collectively dependent on the complexity of the knowledge that is requested to be shared. This could sensitise organisational studies by encouraging the consideration of structural and practical dynamics as potential methods to explain the existence of differences in characteristics of knowledge-exchange, over the emergence of the KT-practice. In addition, focusing on the knowledge-inquiry as a source of knowledge implies that the study of organisational outcomes should focus on the emerging events, and also on the individual and dynamic impact of specific events. For example, Majchrzak *et al.*, (2015) noticed that little scholar attention has been drawn on the impact of the KT-practice because KM-studies usually focused on top-down rather than bottom-up understanding of the individual stakeholder motivation and creativity. The KT-practice allows focusing not only on technologies or users, but also on the fundamental interaction between both.

More specifically, my study indicates that the modernisation-agenda proposed by policymakers is less likely to be successful than removing or eroding professional boundaries. Professional boundaries at different levels (i.e., inter-professional or intra-professional) have an impact upon knowledge-creation and KT in such a context. As a result, researchers willing to investigate the KT-practice in professionalised-contexts should pay attention to the impact of different aspects of the KT-practice, as well as paying attention to the internal factors of the particular organisation.

The dynamic qualities of actors and knowledge also should be included in a KM theory since it can also affect the KT-practice between professions. In this study, nurses performed routine tasks in opposition to other important duties. In so doing, specialists remained in control of services; whereas nurses were given secretary tasks. Also, nurses squeezed new tasks into their existing roles, often entailing a loss of their time and energy. I advocate that the EPR-project can add value from a cost-effective perspective. However, it could not add value to the professionalised practical situations (Martin *et al*., 2009). Thus, the EPR-technology could not redefine the current boundaries between these two professions. This issue can be attributed to the dominance of the managerial perspective over other perspectives, and to how this perspective should always be reflected on the original design of the external knowledge. In short, as deduced from my work, although the EPR could have the required potential, the KT-practice through the EPR-project could not change the relationship between doctors and nurses positively. The circulation of knowledge and actors should be addressed in the KM-literature because it can reveal the dynamics of supervision dominance among professions in one context/establishment. As such, this understanding can help liberate the boundaries among professionals toward much better organisational integrity and productivity.

### RQ1.3. What is the relationship among actors, methods and contexts?

*Organisational Context*

In the KT-literature, usually different disciplines have different ways to deal with the healthcare-context. The varied approaches usually reflect the varying focuses of the stakeholders. The literature shows that context is either the setting where the EPR is employed, or where the EPR is in use (Greenhalgh *et al.*, 2009). For example, data-analysis confirms that the implementers look at the context as the setting within which the project is taking place, but the practitioners look at the context as a project in use. Based on these views, the organisations can be identified as the sites where works take place or as the processes by which the works unfold.

In the KT-literature, the context mostly is discussed based on three views (objective, critical view, and interpretive). The objectivist literature regards the context as an accumulation of variables that should be discovered and controlled (e.g., randomized controlled trial 'RCT' design) (Vibe Fersum *et al.*, 2013). However, the critical view sees the structure as an exterior reality that consists of collective communities which controls the actions of the users (Bratianu, 2016). As such, the critical view emphasises the roles and the regulations in order to generate the desirable outcomes.

Interpretivists regard the context as multi-faceted and constantly changing (Jennex *et al.*, 2014). Therefore, the context is perceived with an emergent quality of action through the intersection or interaction between people and technology. Analysing different perspectives, studying technology and *users' involvement* in the implementation show that the EPR is usually dismissed through the organisational practice (i.e., this case was when the users realise about the gap between the plan and the actual practice). Thus, the EPR in my research proves that studying technology and context cannot be understood as separate realms, but instead they can be comprehended through the reality that emerges from the intersection between human and non-human actors that eventually shapes the EPR (Levina and Vaast, 2005; Cecez-Kecmanovic *et al.*, 2014; Orlikowski, 2010; Mazmanian *et al.*, 2013). In sum, analysing different perspectives of the KT-practice in relation to the EPR-project suggests that EPR will always require re-contextualising knowledge. This became clear through detecting the conflicts between the clinical practice, as primary activities, and managerial practice, as secondary supports (e.g., audition, evaluation and research).

At the professional practice, the EPR requires extra activities with less return at the clinical level of practice. The EPR ultimately makes the medical practice less efficient. For example, the EPR requires disrupting health-professionals by assigning extra tasks to them such as data entry and standardised records/procedures that may jeopardise the professional dimension of practice. Additionally, distributed electronic record brings potential hazards such as controlled society. Here, the stakeholders consider that the paper-based system offers high level of flexibility; whereas the EPR shows high level of surveillance and complexity. From another angle, the managerial perspective

regards the EPR as a transformation project that can make healthcare cheaper, safer, and better integrated. The EPR could reduce the lost records, duplication of work, drugs management and errors, personal medical decisions, and medical stock management.[34] The managerial perspective views the causes of failures based on the reasons of delays, escalation of costs, lack of integration, technical bugs, and electronic system crashes. Studying the KT-practice supports all of these reasons, but it puts more emphasis on the gap between primary activities (to facilitate the practice) and secondary supports (to measure the performance). The political power and returns also influence this relationship.

### Scale of Complexity

The KT-literature regards the scale of complexity as central to the practice. Some healthcare-centred social studies regard the EPR as a replacement of paper using electronic means. Other studies view the EPR as a paradigm shift that requires strategic plans to be applied to the NHS as whole and international organisations (Alderwick *et al.*, 2016). Thus, the EPR is a concomitant project which needs to explore new, inter-organisational, and cross-cultural styles and standards (Haux, 2006). The view of the EPR a small project gives less attention to the cost saving, efficiency gains or magnification of political arguments among stakeholders. However, this view also focuses more on the contextual local details (Mantzana *et al.*, 2007). The isolated projects could have small value when the EPR would not be integrated within the bigger system. This was the case of the EPR within one hospital, by which EPR cannot move outside the A&E department after four years of implementation. The integration could be extended inside one hospital among its different departments and systems (e.g., Theatres, Radiology, and Pathology). Therefore, the policymakers in most countries, including England, justify bigger scale of the EPR-projects (Kreps and Richardson, 2007; Greenhalgh and Russell, 2010). They argue that alternative views will never realise the efficiency gains, and thus it will not realize the loss of knowledge. In order to demystify this issue, Berg and Goorman, (1999) claimed that "The further information has to be able to circulate (i.e., the more diverse contexts it has to be usable in), the more work is required to disentangle the information from the context of its production. The question that then becomes pertinent is; who has to do this work, and who reaps the benefits?" (p. 51). Studying the KT-practice in healthcare gives a very insightful opportunity to understand complexity. The data of my work show the complexity in healthcare to be inherent to the system regardless of the scope of analysis. In my study, I originally endeavoured only to understand the organisational, technological and personal factors of the KT-practice including professional boundaries in one hospital. Yet, the fieldwork provided that understanding this scale might require an overview of the whole system, structure, stakeholders. Indeed, the empirical data can add new dimensions to the question posed by Berg and Goorman, (1999): who has to do the work for whom? Contemplating and answering this question could explain most of the failures of the EPR initiatives.

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[34] Department of Health, UK 2008, and Institute of Medicine, USA 2009.

## RQ2. What are the issues that affect the approaches in the KT-practice?

### RQ2.1. Which issues affect in particular the KT-practice at the BP-Trust healthcare-context?

*The Organisational Barriers and KT Practice*

One of the main concerns of this study was to explore the impact of organisational, group and individual factors of the KT-practice. Drawing on the empirical findings, organisational factors often inhibit the circulation of knowledge, even though individual factors may facilitate it, especially when acquiring new knowledge (Rechberg and Syed, 2016). In effect, learning about new knowledge often involves self-directed learning, rather than formal organisational means. In this study, the organisational structure does not facilitate KT-practice with mediation. For example, even when the EPR was considered as network-based organisational structures, it could not facilitate the flow of knowledge. Since the gap between the professional aspect and other aspects causes high resistances against the EPR, individuals were not likely to collaborate in a highly bureaucratic organisational structure. By such forms of 'resistances', this study means that the EPR was not adapted enough to act upon the contingencies of the real daily work-flow, but rather it forced the validation of what was knowledge by dismissing other less interesting aspects of knowledge along the way.

Furthermore, even when the EPR was implemented in specific sites, at the initial stage, in order to acquire and share knowledge effectively, the KT-practice depended on the nurses' previous relationships with the doctors rather than on the cross-functionality of the patient-records. Therefore, the relations and interactions within the wider community was what contributed to the success of the KT-practice therein, since health-professionals had known each other before the project started. Thus, this research supports the critical revisions around the modernisation-agenda of the NHS, by which policymakers should accelerate the move away from the organisational structural reforms to reach the KT-practice in full (Currie *et al*., 2008a; Currie *et al*., 2008b). Thus, this research argues that the structural change upon the NHS would not necessarily encourage greater interaction among the health-professionals. As such, this study suggests that the NHS modernisation policies in the KT-debate need to respond to policy reforms based on structural changes.

This research has found the expected and the actual effects of structural change by the KT-initiatives to be inconsistent, given that these initiatives left little impact on the existing organisational boundaries of the NHS. This study argues that the NHS reforms, based on restructuring patient-records of management, or on blurring boundaries between health-professionals, may be unresponsive to the existing problems related to the obstacles of the KT-practice. In line with the KM-literature, this research argues that culture is a vital aspect of the KT-practice, which requires day-to-day micro-structural changes (e.g., professional hierarchical divides or range of privileges) to enhance the organisational culture (Intezari *et al.*, 2017). In my research, moving from a traditional patient-record

238

towards a network-based approach, by way of the EPR-project, did not change indeed the dynamics of the relationships among health-professionals. Since the transformational EPR-project was aimed to improve communication networks, the design was expected by the health staff to be more socially fluid. Put differently, the EPR was not expected to be designed in order to change the hierarchal structure of the healthcare-professions. This is because the EPR-design was not envisioned, in the first place, to resolve professions' conflicts. In fact, the EPR also partly exacerbated the hierarchical differences between professions instead of bridging the professional interests along the use of technology. Essentially, the professional culture started to show a form of resistance against structural changes because the work of the nurses, for example, was still mostly subordinated to the doctors' views, even in indirect ways. The new practice, thus, increased the power of doctors over nurses.

The current health-professional culture at the Trust-setting was less likely to be affected by the communication technology because the latter could not change the professional boundaries between professions. The culture remained the same, and the EPR-project had a limited space and life span that made it difficult to see how changes would happen. As a result, in this study, I argue that the KT-practice can be inhibited by professional and organisational boundaries. One of the major boundaries, as discussed earlier, was the professional hierarchy which prevented nurses from moving into different positions and practices.

Moreover, the fieldwork-findings showed that acquiring knowledge in the workplace had only some effect in the sense of informing 'how to work better', but it did not play a crucial role in improving inter-professional relationships and careers prospects. The findings are consistent with the argument that daily relational co-habitation, career prospects and circulation of knowledge are strongly related (Rechberg and Syed, 2016). This interconnectedness was substantially affected by the little interest of the health-professionals in terms of engaging and improving a constructive method of transferring shareable knowledge. This issue is reflected by the recurrent tactics inside the professional hierarchy, which prevents people to move into new modes of practice, by which the motivation to seek for more knowledge is reduced. Sometimes, there are very knowledgeable people who want to circulate knowledge, but they face constrains hindering or preventing them from doing so. This study attributes this issue to the 'unrevised tendency' of the public health organisations to obey rules and regulations more than the private sector where employees might receive more encouragement to innovate.

In terms of managerial knowledge and Human Resource Management (HRM), I found that the management team perceived that supporting the KT-practice provided accountability processes, martial control and clear lines of authority. Supporting the KT-practice can facilitate the feedback mechanism by which organisational performance can be evaluated and improved. This study argues that: 1) On the one hand, the lack of support from line managers can change and even inhibit the

streaming of knowledge. 2) On the other hand, the feedback mechanism and support is only justified by the management perspective. The support perceived by the medical-professionals has one direction, which can increase the control and reduce the professional autonomy. The interviewed professionals raised the point that managerial issues were not often seen as enabling of organisational performance. Regularly, the health-professionals did not see that the HRM activities had similar objectives to those of their professions. As a result, health-professionals came to the understanding that the feedback mechanisms were not actually reflecting the actual practice. As such, health-professionals were not able to deal with the EPR-project endogenously. This was because health-professionals were more engaged in processes that seemed to be less formally recognised in the existing feedback mechanism. The KT-practice in healthcare reflects the asymmetry of the organisational structure, where employees may be more knowledgeable than assistants and/or line managers. Therefore, the line management involvement in HRM activities seemed to be a rhetoric kind of engagement rather than a truthful one. This study regards that the NHS needs to develop the existing organisational structure, by which health-professional's boundaries and relational interactive involvements would be taken into account. Moreover, a hybrid approach of management in the public healthcare could facilitate a new space of possibilities to enhance professional engagement (Masri *et al.*, 2017; Currie *et al.*, 2015; Hernandez, 2009).

In general, this study confirms that knowledge is difficult to transfer across organisational boundaries of different divisions without management support. The lack of support includes lack of feedback and poorly designed HRM practices. Furthermore, the findings revealed that the structural change did not affect the existing interactions between health-professionals as expected. I regard the individual motivations to be very important in the enhancement of the circulation of knowledge via communication technologies. As a result, this research confirms that knowledge in healthcare is situated, local and, most importantly, sticky. As such, the outcomes of knowledge sharing initiatives, through the EPR, would not match the policymakers' expectations; as the expectations required knowledge to be isolated from the daily work flow practices and embedded and re-contextualised in the system. Basically, the lack of professionals' involvements, for improving the conditions of learning about the new projects of transformation, led to the lack of reflecting around their own practice with regard to such EPR-project. I conclude that the EPR-project ended up with limited returns on its investment. The issue of differentiation between the professional expectation and the project actualisation is discussed in the next section.

### The Distance between Professional Practice and KT Practice

Considering the EPR as new knowledge reveals that professionals usually depend on self-directed learning, in order to know about the project. For example, the nurses and the doctors tended to engage in self-directed learning as a response to the lack of organisational support. Here, acquiring knowledge from and about the EPR was motivated through individual attitudes of the professionals

who perceived and/or expected that EPR would have positive effects on their practice. The health-professionals, in this case, were motivated to move into the new system because they wanted to help patients and reduce medical errors by saving the historical data and by taking advantage of the quick accessibility. They viewed the EPR-project as a benefit rather than an extra-cost. Afterwards, their motivations were largely retreated, when they started to see the disadvantages derived from the EPR as their medical practice started to become overloaded.

In healthcare, the professional factors, by which the KT-practice is influenced, are prioritised above the organisational and managerial factors. This context provides an opportunity to understand the influence of the professions over the KT-practice and the EPR-technology. The case-study shows that health-professionals started by welcoming the EPR-project based on the preliminary promises. The health-professionals initially considered the transformational EPR-project that involved many potential capacities so as to enhance care-delivery. They expect EPR-technology to provide direct advantages to their daily practice and hence to ease their patient-records sharing. However, EPR gradually started to receive unsympathetic reactions and considerable resistance when the health-professionals started to recognise that EPR represented a mechanism of control (e.g., panopticon-like[35]) over their daily practice and thus created new parallel work for them, which used to be completed differently (e.g., by secretaries) (Greenhalgh *et al.*, 2009). The greater difficulties that the health-professional faced in their daily practice were due to the impositions of their managers in terms of why they needed the EPR. For example, scheduling in addition to the specific way of doing the transformation, while dealing with other issues, were driven based on the use of specific spatiotemporal frameworks of efficiency and effectiveness.

Studying KT-practice clarifies the multi-dimensional process of adoption, communication and learning practice. The empirical research approach is based on the relational dimensions of the organisation, with the aim to study the social and technological actualities, which are different from the usual IS implementation studies, such as technology acceptance model (TAM). This approach shows that an understanding of the KT-practice lies on the different perspectives, and day-to-day activities. This, in turn, allows for a better understanding of how an apparatus becomes meaningful, or meaningless, among its users. The presented case-study illustrates how professionals and technology can play active roles at the operational levels, by shaping and influencing each other (Brigham and Introna, 2006; Avdimiotis, 2016; Jensen and Aanestad, 2007a). The respective analyses of the human capital and technology, as stand-alone factors, would not configure the issue of meaning, since both human and technological dimensions need to be considered as interdependent events. Moreover, human actors and their attitudes cannot be reduced to a single and static state of being because they are always dynamic and multi-faceted. For example, the idea of looking at the recipient as an actor

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[35] This concept, introduced by Michel Foucault, in his *Discipline and Punish* (1975), means that structural design is to allow all inmates of an institution to be observed by a single watchman.

requires admitting the limitation of the evidence-based (practice) application. In this regard, the main criticisms of the evidence-based approach are: 1) It does not admit the human as an actor, where knowledge and resources are in a continuous cycle of creation. 2) It does not recognise knowledge, which can be enacted, situated and cared for. Therefore, as the state of the involved actors (e.g., being a sender, a receiver, or a seeker), and technology (e.g., control mechanism and communication methods) can change the attitudes over time. Such critique highlights the need not to not neglect the importance of the evidence-based medicine practice, which is important to understand the professions' intentionality (Wastell, 2011). Focusing on the issue of professional intentionality can shed more light on the human side, as Tsoukas, (1996) put it, it is in the sense of people contributing to reality-making as dynamic actors.

The presented empirical case also provides aspects of how the relationship between human and non-human changes through the KT-practices as in the situations where professional and workplace settings are different and dynamic. Thus, when the KT-practice combines the socio-technical dimension with the multi-perspective approach of the stakeholders, the human and non-human are perceived as actors (Obreja *et al.*, 2017). KT-practice thereby can answer the contrast and the struggling with the dualism between the technology and the social. At this point, the practice can look at the material potentialities and affordance as long as it is looking at humans' intentionalities and individual and social factors.

Therefore, the socio-technical analysis of the KT-practice is useful to investigate the organisational implications of the healthcare situation. KT-practice draws attention onto this dynamic aspect of the relationships between the NHS-context, healthcare knowledge, and professional and non-professional actors (i.e., states of being, knowing, doing). This analysis helps appreciate the different views of the actors within uncertain and complex situations at different levels of practice. Thus, this thesis study recommends considering different aspects of practice in further knowledge and technology studies on the dynamism of actors and stakeholders.

### The Professionals' Experience and Actual Use of EPR in Practice

Many professional expectations were met in practice while engaging with the EPR such as accessibility and security. In addition, the standard procedures were functioning correctly, which eased some of the health-professional practices (e.g., giving alerts when the results were ready). However, the professionals generally criticised the system for the time-consuming condition implied by the interaction with the new technology, and for creating parallel works that were not included in their responsibilities. For example, in the medical-prescription case, the doctors had to spend more time in typing tasks, than the secretaries when writing the clinicians' dictations. This caused wasting valuable time for doing non-valuable procedures, in comparison with their profession's objectives. In addition, health-professionals criticised the retrieving process by using the EPR system. Doctors were

required to retrieve the X-rays in the EPR, while this procedure was carried out by the nurses before the implementation of the system. Also, doctors were required to do patient referral to the next consultant(s) or therapist(s), by themselves, which was performed by the nurses before the EPR was implemented. These and many other tasks were considered to be very time-consuming, and made the doctors feel that the EPR was affecting their privileges. The EPR fragmented the medical profession into little yet time-consuming tasks. These little tasks were re-distributed in ways that the doctors did not feel comfortable or agree with. They complained about losing their profession's privileges, once they realised that their capacities were being gradually automated by an 'alien' technology.

The main complaint of the health-professionals signalled the top-down politics applied in the decision-making process to implement the transformational EPR-project. They felt that their privileges and autonomy were challenged. They sensed that that was not really invited to get involved in the decision-making process, but their opinions were neglected. One of the doctors said, "It is impossible to have such a system working if you do not involve the professionals in the decision making. They [managers and implementation team] ask us to choose, but they did not consult us during the processes." Some professionals (including both doctors and nurses) felt that the EPR was challenging their professional identity. They believed that the EPR was procured mainly to satisfy the administrative perspective, which could not reflect the professional perspectives or needs. One consultant said, "EPR is very artificial and procedural equipment, which could not meet the craftsmen [professionals] requirement." The majority of the professionals implied that the EPR reduced their autonomy and increased the level of control as the EPR required each professional to document every time they checked results; a task that was not required before the EPR (panopticon effect). From the receiver's perspective, the health-professionals were astonished when receiving most of the information about patient just in one 'cell' of the record. The health-professionals also criticised the discrimination by way of using different classes of technology hardware. For example, managers had laptops, the clinical manager had a touch screen, and the ordinary doctors and nurses only had old computers, with frequent crashes.

The nurses shared with the doctors a good deal of criticism of the EPR regarding the extra-work it added to their daily routines, such as regular typing tasks and moving/transferring of data into different system allocations. The computers were allocated next to the walls opposite to the patient allocations, causing notable disruptions of how the professionals would take care of patients. Also, the nurses claimed that they were not trained in computers, often justifying their lack of confidence in using computer in their medical tasks. The nurses also criticised the EPR because it affected their professional identity in a structural way. They believed that the EPR allowed doctors to use their privileges over them because after the EPR's implementation, they passed increased work to them.

## *The Interprofessional Boundaries*

This study explores how the health-professional intentionality and motivations, derived from the state of being towards action, may affect the KT-practice through the EPR-project implementation by investigating the role of technology. As it was discussed in Chapter 2, analysing the KT-practice in a professionalised-context requires understanding issues of willingness and motivation. In addition, the KT-practice interplays tacit capacities with tacit boundaries among professionals. These issues can be discussed in relation with the jurisdiction and competition across professional levels. In terms of the health-professional practice, the boundaries between specialists (doctors and nurses) do not easily change according to what policymakers anticipate. This study has found that transformational communication technologies (EPR) should not be overrated in the professional practice.

Managers think that organisational transformation can happen through communication technologies. Likewise, health-professional defend and confirm that communication technologies can actually facilitate many tasks and practices. In this line, health-professionals think that the transformational-project takes place by way of intertwining with technology, context, practice and cognitive engagement. Thus, only by concentrating on the new technology, the KT-practice can be carried out at the lowest level of professional practice and transformation. This perception of transformation reveals that the historical dimension plays a crucial role in KT-practice, by which the dissemination of patient-records can be difficult in the nursing profession. This could be attributed to the lack of time and resources to support nursing professional education. Moreover, this study also shows the pragmatic attitude of the doctors when using their position to endorse and delegate work to the nurses (e.g., delegated mundane tasks). Therefore, the professional boundaries between the nurses and the doctors may remain difficult to remove in daily practice. In this study, in cross-functional teams, coordination between nurses and doctors often depended on existing relationships rather than on the EPR-project. Thus, my study contributes to the KM-literature by highlighting issues associated with working across organisational and professional boundaries (Currie *et al.,* 2008b; Currie *et al.,* 2008c; Procter andCurrie, 2002; Scarbrough *et al.,* 2004; Zarraga *et al.,* 2005). For example, this study argues that learning is often difficult to share beyond the scope of a project-based team, *and also* that the problems of coordination are usually associated with working across organisational and professional boundaries (Currie *et al.,* 2008b; Currie *et al.,* 2008c). In other words, the KT-practice seems to be difficult in settings where little similarity among team members can be observed. In short, professional similarity is important for the KT-practice.

At the individual level, this study found that motivational factors, such as perceiving benefits, interpersonal trust and justice, have crucial effects on the KT-practice including technology implementation. This study shows that health-professionals may engage in self-directed experience as a response to the lack of organisational support in order to handle new knowledge. However, they also may give up the new technology when they somehow perceive lack of belongingness in the

relationship between their daily practice and the advantages of the communication-technology. For example, at the beginning of the implementation stage, the professionals were strongly motivated to move into the new project because they felt that the EPR could help them and their patients. However, they lost interest in getting involved when they realised that the technology did not contribute enough to meeting their expectations.

There are many examples at the hospital of how the counselling profession and medical doctors distance themselves from the nursing profession. For example, patient differentiation tactics are used to pass all uninteresting cases to the nurses. Keeping a two-tier structure in the case of the EPR is difficult to enhance the KT-practice across the professions. The two-tier structure keeps delegating unchallenging patient profiles to nurses. By using this structure, the doctors play their power over the nurses. Thus, this study argues that healthcare-professions engage in patient differentiation tactics as a tendency to undermine the efforts from nursing incumbents. This issue shows that some professions such as nursing are actually controlled by other professions. As a result, this study argues that the vision set out by policymakers of moving healthcare to the full collaborative zone is not yet taking place in practice, since professional boundaries exist between nurses and doctors (as one sufficient example). Furthermore, the EPR contributes to the reinforcement of the boundary between doctors and nurses by creating an organisational structure around patient differentiation. In short, there is no change in terms of team-based structure or allocation of tasks as a result of EPR-implementation.

All in all, this study proposes that knowledge is difficult to transfer across professional boundaries of different professions. It is also important to address such issues given that some key actors are not entirely aware and not necessarily willing to use the EPR as part of their daily routines. I note that the health-professional practice and the differentiation tactics confirm that knowledge is mainly situated, local and, most importantly, sticky. Therefore, the outcomes of the professional KT-practice could not be isolated from the context, constituted by projects such as the EPR, which requires enhancing the human and non-human networks through facilitation rather than transformation of the practice; and perhaps that should come first as a priority before implementing advanced technologies. In other words, the operations of the EPR were designed to *integrate* 'knowledge' through *isolating knowledge-in-practice* from the context. These operations were also engineered through extracting 'objectively' the *knowledge-in-practice* from the core of the daily relational interactive networks of processes, activities, capacities, professionals and occupations. However, this might not be a trivial task according to the professionalised-practice. This is one major reason to justify why professionals could not see the EPR as a transformational-project from the core of their daily activities and occupations.

### RQ2.2. What is the role of the EPR as a technology in facilitating the KT-practice?

*The EPR Agential Role*

Regarding the role of the EPR, the literature shows different views of human and non-human interactions on the basis of two views (cognitive and relational). The cognitive view perceives technology users as decision makers and information processors, while the relational view remarks the users on the basis of their state within the social system (Leonardi, 2012; Cecez-Kecmanovic *et al.*, 2014). This thesis study shows that the (re)construction of health-professional practices are intimately related to the interdependence of the social and the technical elements and analysis. Technical considerations alone are insufficient to assess the situation of the KT-practice at hand. What is indeed required is to account for the quality of other interactions at the BP-Trust such as paper records and bed location. Introducing the EPR, therefore, helps acknowledge the fact that technology is an indispensable element for organisational processes today. It is not just the 'computational' technology what matters, but practice and participatory materials as well, which play an equally relevant role in socio-technical practices. The managerial perspective based on pure economical risks draws little attention to social and technical agencies. In this regard, what is needed presently is to anchor the socio-technical aspects as part of the dynamic and complex transformation phenomena.

The application of socio-technical aspects along the research of this thesis was based on two assumptions. The first is concerned with social agencies and technologies, which are active elements, while the second is concerned with the health-professional practice, which is inseparable from materiality. The dynamics of the health-professional practice makes the social and technical aspects interdependent' a matter that shows an inseparability from the EPR, paper records, other materials as well as the professionals themselves (nurses and physicians) in the performativity of the KT-practice. The relationship between the KT-practice and the health-professionals is socio-technical. However, the KT-practice implemented in the healthcare-setting could not develop or be subjected to a state of constant change. This was because the interaction with other socio-technical contexts was somehow prevented or limited. This study shows that creating parallel work to use and integrate the EPR was just a temporary concern. Thus, the EPR performance somehow prevented its own technological involvement in the daily practices by ignoring the deepest social dimensions of the KT-practice.

What could constitute the transformational EPR-practice was not really a straight-forward process for the stakeholders, as it was at first expected by developers, policymakers and users. Instead, the transformational-project could to be implemented through a bottom-up practice and signification process, which would be influenced by other unknown actors (human and non-human). The implementation would include the many uses and processes that surround the actors, such as artifacts (e.g., paper records) and professional practice as well as the implementation's own potentials and limitations, as reflected by the practice in the A&E. In other words, the performance of the KT-practice heavily depends on both the social and the technical structures in the circulation of the

shareable knowledge. This study confirms that the health-professionals (nurses and physicians) usually respond to the dynamism of the context embedding them through negative and positive interactions via, and with, the EPR. The positive and negative interactions of the nurses were re-configured by ignoring and/or by contributing to additional procedures through the EPR.

This study highlights important aspects of the health-professional interactions (professional intentionality) that have been taken for granted through the paper-based system. Therefore, introducing the EPR requires all the professionals to reconsider the various socio-technical encounters between the professionals' and professions' objectives. Within such interactions there are (re)configurations in the professional-paper and the professional-professional interactions, respectively. This responds to the aim of including new transformational processes, such as the professional-professional, the professional-technology, and the professional-profession interactions. What makes these arrangements and events non-deterministic is that such interactions were a matter of emergence, rather than being preconceived notions of what the EPR really was (e.g., the encounters between the human intentionality and the technological potentiality). The empirical findings show that these interactions result in various degrees of material arrangement, adjustment, improvisation, and feedback mechanisms. Yet, all these aspects were partially taken for granted by the EPR-implementation team.

### The EPR User

In terms of the outcomes, the cognitive view expects that the outputs of work or information are the collective effects of their single inputs (Kamal *et al.*, 2011). Unlikely, the relational perspective attributes the users to the social system or to the socio-technical relationships by which the EPR will be shaped rather than be used. The cognitive view argued that the group is more than the sum of the parts (Gestalt) (Gavrilova *et al.*, 2015). The relational perspective uses specific language to explain socio-technical relationships (e.g., embedded, accommodated, ensemble, networked), which adopts strong emphasis on collective practice rather than on the individual one.

On the one hand, technology-in-practice and Actor-Network Theory (ANT) have the relational view and thus they consider the human as an agent, but they have disagreement about the central entity of the analysis. For example, technology-in-practice uses human identity as the central entity of analysis by including the agents' autonomy and internalised social structures in the system design. On the other hand, ANT considers agency as a combination between human and non-human entities, as a processual outcome of the network. Thus, it sees the human factors (e.g., motivation, skills and knowledgeability) as only theoretical concepts out of the context under focus (Mutch, 2002; Cecez-Kecmanovic *et al.*, 2014; Leonardi, 2012; Orlikowski and Scott, 2008). Based on the KT-practice, the data-analysis of my study showed that users or actors had dynamic states that relate to their practice. These dynamic states are usually related to the social position and knowledge-inquiry. For example,

when the patient was introduced by the admission, different views would be required, and each view could play a partial role to hammer out a compelling investigation. These processes would entail a high level of interaction through sending and receiving knowledge within the context and in specific cases between and across contexts.

## 8.3. Reflections on the Research Contributions

### 8.3.1. Theoretical Contribution (Reflection on the Framework of Ideas; F)

Drawing on the empirical philosophy used by (Latour and Woolgar, 2013), this research embarks a contingent epistemological lens to explore the KT-practice in action through multiple perspectives. The multiple-perspective application encompasses the philosophical categories of inquiry systems (what, how and why). The philosophical categories that this study contributes to the existing KM-literature are based on modes of practice and notions of process possibility, material potentiality and human intentionality (see Figure 8.1).
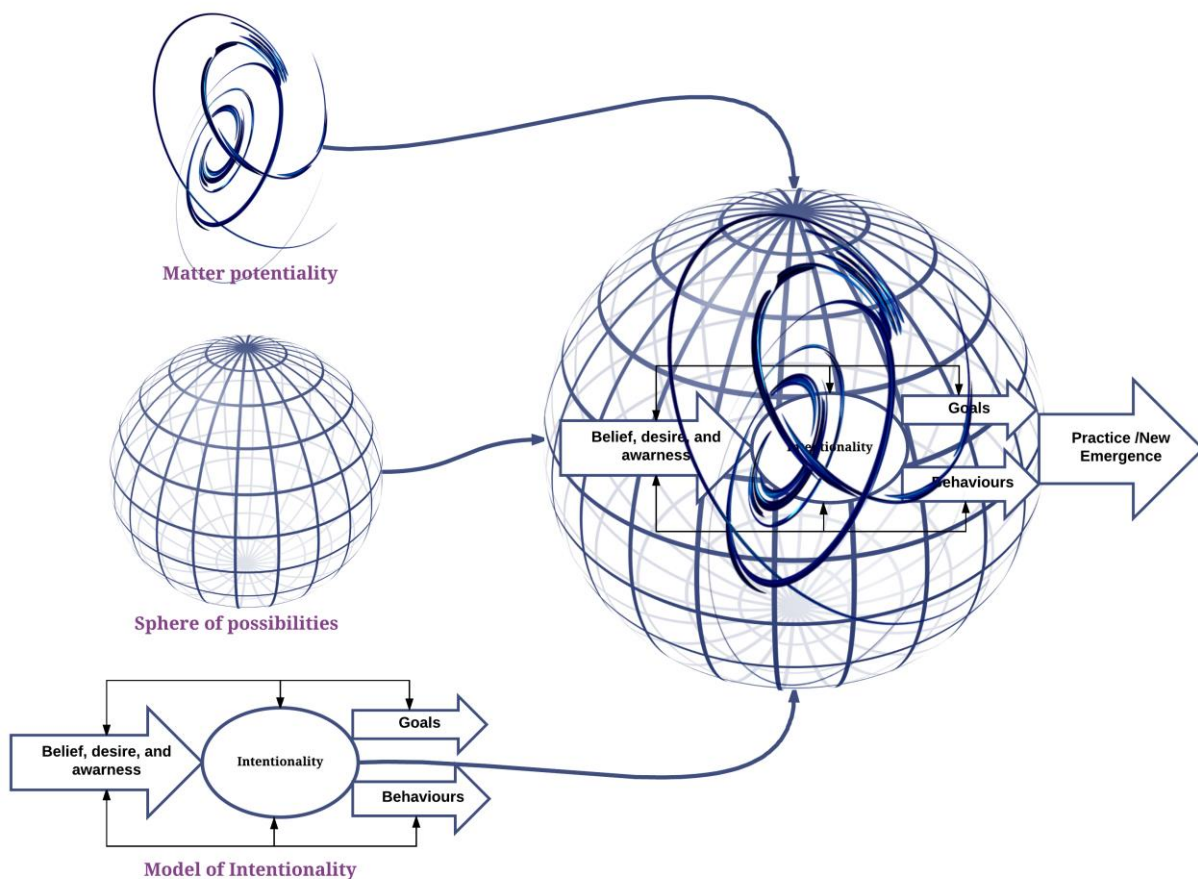


**Figure 8.1. The Representative Framework for the Modes of practice**

Drawing on healthcare and KM-literature, this study recognises critical differences between organisational, professional, and technical perspectives with respect to a variety of issues such as the ways of perceiving the information system (Boyce *et al.*, 2014), the professional autonomy (Budge *et*

*al.*, 2003), control (Budge *et al.*, 2003), hybrid management (Masri *et al.*, 2017), organisational configuration (Correia and Denis, 2016), and the managerial knowledge (Blackler, 2002), and embedding professional knowledge (Cranefield and Yoong, 2009). In addition, the literature reveals complex issues around social networks within an inter-professional level of KT-practice analysis (Tasselli, 2015; Xyrichis, 2014; Foss *et al.*, 2010). The cited studies attribute in general the problems or conflicts to the lack of a balanced position between management and professional practice in the context of healthcare. In this regard, in my study I borrowed and applied features of Systems Thinking (De Savigny and Adam, 2009) and multiple-perspectives theory (Linstone, 1989) to build a theoretical framework that works as a benchmark for healthcare cases.

Previous studies conducted on the KT practice in healthcare have extended our understanding of the medical work, particularly of doctors and nurses (discussed in Chapter 3) (e.g., Ferlie et al., 2005; Currie and Guah, 2007; Lin et al., 2008; Gibbons et al., 2010; Currie and Lockett, 2011; Ferlie et al., 2012; Lin et al., 2012; Ferlie et al., 2013; Erosheva et al., 2014; Ferlie et al., 2015).

The majority of these studies focused primarily on one aspect of the medical or non-medical staff members. This led other studies to suggest that more research should take into account and implement conducting multiple-perspective analysis (e.g. Spence and Reddy, 2007; Bossen et al., 2012; Bossen et al., 2014). As such, in this research I have striven to identify the mechanisms that constitute the KT practice from multiple perspectives, and to identify the interrelatedness of the KT components and their characteristics. Analysis from multiple perspectives also included KT processes of both professional and non-professional processes and the resources (including human resources and ITs). In order to achieve that, I undertook the approach of a qualitative case study in a care setting located in the UK, BP Trust. Accordingly, this study is intended to contribute to a better understanding of how healthcare-settings are (re)arranged through the professional and the informational practices supported by a communication technology. For example, I have argued in the chapter 6 and 7 that in order to set up a paper-less environment, there is a need to study the existing practice and, leveraging at the same time on the good features of the new technology in implementation.

This research argued that previous knowledge transfer models have lack capability to demonstrate the dynamic nature of KT practice, but they demonstrated a rather stable workflow. For example, previous knowledge transfer models considered that the patient registration process in the A&E leads to classification of medical assessments and decisions (Salimifard et al., 2013; Ajmi et al., 2015).

The findings revealed that the current KT-theories are still far from being developed within the professionalised-context. With regard to the application of the KT-practice and the EPR at the BP-Trust, I noticed that some professionals were able to provide effective solutions for patients, whereas

some could not, based on their experience. Furthermore, the interviewed professionals often enjoyed getting involved in the practice according to patient safety and patient care narratives. Nevertheless, notions of disseminating knowledge, crossing boundaries or blurring professional boundaries, as promoted in modernisation policies, were not materialised in the EPR-project because the policies did not take into account the long history of relations that define professions within the NHS system.

With regard to an overall knowledge circulation within healthcare, this study specifically focused on the sets of issues involving the interconnectedness of medical and non-medical perspectives. Thus, the analysed KT practice identified that the healthcare workflow in the investigated context was not as straightforward as it was previously assumed. Variability, emergence and exceptions occurred along the way of any trajectory of practice. Indeed, KT practice is embedded within organisational practices, driven by staff intentionality, and availability as well as patient's presenting conditions and changes in their conditions; all of which contribute to the fluidity of knowledge circulation within healthcare. The characteristics that contribute to the mutability of the KT practice are graphically shown in Figures: 6.6, 6.8, and 6.9. This thesis has, therefore, provided novel insights, from multiple perspectives, on this previously unreported dynamics of knowledge flow.

The first theoretical implication of this study is to propose that managing knowledge is managing conflict. This proposition illustrates how the KT-practice in action can make an issue of the professions' intentionality (i.e., occupations' objective). As an addition to the sociology literature discussing about professions, this thesis research regards specific professions as practices that somehow routinely seek to establish a dominant position[36] over other occupations. In other words, any profession can use the KT-practice in order to gain position of dominance over other professions.This intentional practice is mediated through demarcation strategies, governmental support and public opinion approval (Tallis and Davis, 2013). In accord with this view, profession management may attempt to regulate the division of labour inside a profession and between interacting professions and other occupations where all engage in similar differentiation strategies (Campling, 2014; Kyratsis *et al.*, 2012). Often, professions get involved in settlement tactics in order to solve potential conflicts arising from competition with other occupations. For example, professions may participate in a process of actors' dynamism (e.g., patient differentiation) to parcel out professional practice. In so doing, professions may avoid an overt conflict, but remain in a powerful position in the ecology of professions. The result of such settlement is indicative of the dynamics of control among occupations (Noordegraaf, 2015). For example, the EPR roles entail settlement strategy, as doctors distribute services into discrete tasks, some of them interesting, and others uninteresting or just routine-based.

In this context, the group of interviewed doctors at the BP-Trust were able to subordinate the in-house group of nurses, by stepping away and loading extra labour work to the nurses, while

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[36] Monopolistic or objective.

remaining in charge of high-risk tasks. In this division of labour, knowledge skills and time spent on using the EPR by nurses was not sufficient to control the provision of services. In fact, knowledge was required to help nurses achieve such routine tasks. In contrast to the KM-literature, this study found that the KT-practice depends on occupations' objectives (professions' intentionality).

The second theoretical implication of this study is that KM research should be more concerned about power and cultural issues (occupations' subjectivity and the professional intentionality[37]), when investigating in professionalised-contexts. My research considers that KM studies, at the practice level through explorative research methods, need to be supplemented by qualitative techniques in order to grasp the tacitness of the practice and its purposefulness. The issue of tacitness of the practice and its purposefulness requires improvising questions and techniques to detect implicit dimensions and to understand the complexity that escapes any speculative exploration that is limited to the professional. The KM-literature reveals managing and transferring knowledge to be considered as potential for harmonious outcomes (Bratianu, 2016). Conversely, this thesis study assumes that the tacit dimension of knowledge entails a deep listening to human nature, and intentional perspectives behind the practice, not just following the situation of the doctor-nurse rivalry. For example, it also requires a slow-paced understanding of verbal and non-verbal micro-conflicts as well as other everyday-life contingencies of all kinds and from multiple perspectives. In brief, further research on KT-studies with regards to practice within professional contexts should involve a more calibrated epistemological approach in order to detect relational-organisational patterns that can serve to develop new philosophical categories. It is important to somehow limit the area of concern, as the more a research question is pursued, the more the research may become endlessly complex.

The third theoretical implication of this study centres on the professional power and how it affects the KT-practice. More specifically, the power privileges and intentionality of doctors will affect the KT-practice. As a result, the KT-practice is constantly contested because it works against the pre-existing, yet dynamic professional values and systems (Currie *et al.*, 2009a). This issue has been highlighted in previous studies, notably in the sociology of professions literature (Carlile, 2004; Currie *et al.*, 2008). In effect, healthcare is a heavily professionalised-context with dominant professions controlling the KT-practice between and across all the involved professions (Mintzberg *et al.*, 1995). In such a context, the KT-practice becomes a difficult process for transformation of practice  where sometimes healthcare-professions rely on knowledge to subordinate other occupations. Therefore, projects such as the EPR, aimed at potentially changing the existing culture based on power relationships between professions, may be perceived by the dominant professions as a threat (Armstrong, 2002). For example, one could re-interpret the EPR as a threat of high-control over the medical profession, to the extent that it would allow managers or nurses to acquire knowledge of

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[37] Digital and analogical, percentages of engagement. Aicher, Otl. *Analogous and Digital.* < http://eu.wiley. com/WileyCDA/WileyTitle/productCd-3433031193.html >

practice. As a response, the medical profession engaged the secretary work of the EPR by further subordinating the nursing profession. Therefore, less interaction with the EPR by doctors may have added little value to the professions than it was anticipated by the EPR-project. The issue of power privilege and intentionality requires the KM to be conducted at the level of practice.

As such, power differences among professionals (doctors and nurses in my example), and between the professionals and managers, create conflicts, which seem to be difficult to overcome due to the conflict of interests or self-interest of each profession in trying to control competition from within and outside the profession. For example, in my study health-professionals showed a tendency to fill in less amount of information than it was required by the system. Furthermore, the professional roles were then more institutionally-determined than other organisational roles. However, they were in turn more autonomous at the level of creation and emerging. More specifically, changes in the organisational structure may not be effective, if there are no positive changes taking place in the ecology of professions. Also, these changes should be perceived positively in the actual practice. In other words, if there is a limited professional support for change in practice in addition to strong inter-professional conflicts, then any professional effort may result in little value to the involved professions. Hence, a limited professional support would squeeze any new possible knowledge into the lowest organisational effect. As a result, the challenge is not only organisational but professional, given that nurses, for example, may not be realistically able to achieve certain professional goals beyond their current occupations.

These issues imply that most professionals are reluctant in general to any kind of change. This observation was informed by shadowing the interviewees at work and noticing how usually they responded over-reactively to any sudden change. As I discussed with the board management and clinical leaders, to understand change from different views, the participants of this research suggested that what would be right for their professional needs would be a much smoother and gradual sort of change. Smooth change takes place when transformation matches the behavioural reflection and development schemes in the practice; the change should have space for improvisation. The change should answer many questions such as 'How are the practitioners performing their practice?' and 'How will their practice be reflected by the new project from different perspectives?'

### *Implication for the Human Intentionality*

Intentionality is based on the assumption that each work or occupancy should have goals that justifies its existence (High and Nemes, 2009). Thus, intentionality has important implications regarding furthering the understanding of the orientation and the tacitness of the KT-practice (Nonaka and Von Krogh, 2009; Nonaka and Peltokorpi, 2006). However, this concept has not received much attention in the KM and KT-literatures yet. This may be due to the lack of a professional context in KT-studies. In the literature of philosophy, Jacob (2003) cited that "intentionality is the power of

minds to be about, to represent, or to stand for, things, properties and states of affairs" (p. 1). In the field of KM-studies and according to Nonaka and Peltokorpi (2006), "...intentionality, embedded in the categories of perception and basic orientation to the world, explains the process of social change" (p. 75). Thus, my research regards intentionality analysis of the work ethics as a leading factor to consider the full range of stakeholders in making professional decisions, including management, employees, customers, shareholders, and the influence of their environment. Intentionality describes natural tendencies toward desirable end-conditions that outweigh the bad of the absence of such conditions. Intentionality is a feedback-controlled purpose that requires external observation, where the purpose of observing is respectively distinguished by the system's subjective and inter-subjective autonomy and interaction along with objective control (Nonaka and Peltokorpi, 2006; Ortner, 2006).

Regarding the fieldwork, my thesis research recognises two types of intentionality (professions' and professionals' intentionalities) that work together and support each other. For example, the practice-analysis revealed that healthcare-professions had intentionalities such as quality of care that would justify the practice of the professionals. However, this kind of intentionalities could be in agreement or in disagreement with other professions. Also, different stakeholders, who are intensively dynamic, could perceive the professionals' intentionality differently. For example, when participants were dealing with the knowledge or technology as receivers, their attitudes were critically different from their attitudes when being in different states (e.g., senders); in both states of being they attributed their practice to the professions' objectives. In addition, when the administrators talked about efficiency and effectiveness they attributed their discourses to the same objectives.

### *Implication for Technology Potentiality*

Del Giudice *et al.*, (2016) argue that many ITs are designed and developed especially to facilitate transfer and integration of knowledge, although empirical studies consider that KM and KT-strategies should not be reduced to tools for facilitating knowledge distribution (Soto-Acosta *et al.*, 2016; Rubenstein-Montano *et al.*, 2001; Alavi and Leidner, 2001). KM empirical evidence indicates that people, workplace culture, routines and processes have special effects which govern the success or the failure of KM-initiatives (Edwards *et al.*, 2016; Edwards *et al.*, 2005). Moreover, the potentiality of technology entails an accumulative process of knowledge-becoming with no end (Iyengar *et al.*, 2015). Analysing the KT-practice in relation to the EPR-project illustrated that users did not show any tendency to interpret the technology as it was. However, users mostly regarded the EPR, in comparison to the paper-based system, as a temporary event whereas the paper-based was considered a permanent one. This view can simplify the interpretation of the EPR as a passive object. This study argues that health-professionals intended to use and judge the EPR critically, according to two main directions (their practice [how they needed to do something], and their expectation [how the EPR should have been more engaging relevant to the day-to-day practice). The potentiality of the

EPR technology can be identified through three categories (concealed, fake, and visible). These categories were reflected by the EPR.

Looking at the EPR as a set of technological tools to transfer knowledge can illustrate a little limited effect on the actual organisational innovation. For example, instead of perceiving the EPR as a transformational-project, the professionals used the EPR only as back-up tools for clinical decision-making. The interviewed professionals argued that subjective judgement had more power than IT tools for most of the patient cases that were usually difficult and ambiguous enough to be taken by the technology. Thus, this study gives an important theoretical implication of the technology which is to understand its potentiality anew through the situated lens of the day-to-day practice. The communication technology needs to be re-orientated, therefore, in order to facilitate the KT-practice in the professional contexts, instead of understanding the IT just as a ready-made facilitator and an automated procedure.

### 8.3.2. Methodological Contribution (Embodied in the Methodology: M)

Sociological inquiry has been used in conducting research in the healthcare and knowledge transfer using the case study approach where contextual dimension plays a significant role. Along with the employment of data collection methods such as semi-structured interviews and observations Abraham and Reddy, 2010; Feufel et al., 2011; Park et al., 2012), in this study, additional sources of evidence were used. For example, this research gest a benefits from the availability of organisational documents, particularly the business case, handbooks and guidelines, which outlined substances related to the delivery of care and deployed EPR into the focal organisations (i.e., the BP Trust). These documents have provided a more comprehensive interpretation of multiple perspectives about KT practice that might have been missed otherwise during the interviews and observations.The methodological contributions of this study are intended to orient other researchers interested in conducting research on KT-studies situated in professional contexts. This research is in-depth case-study based.

Drawing on the analysis of textual and observable data, this study develops three main methodological contributions, which are stakeholders analysis, material potentiality and human intentionality. These methodological contributions take into account the dynamics of the professionalised-context and the dynamic-relational field between humans and technology. In this research, I do not discuss tools or methods in detail, but rather I focus on assumptions that are needed to be considered by other research in related topics. As such, I propose that these assumptions, suggested by different perspectives of the KT-practice, are to be added to qualitative studies whereby future researchers may be able to figure out more clearly the relational field among humans, technology and professional practices.

### *Methodological Implication for Stakeholder Analysis*

The stakeholders' analysis defines how the implementation of communication technologies, in relation to KT-practice, is mediated by normative, regulative and cultural domains, where the EPR carries organisational logics (i.e., the business case) and influences organisational practices. While the KM and OL as organisational theories are well-studied towards finding an explanation for the general outcomes of organisational modifications, they pay little attention to the dynamic role of human activities in co-producing the reality of the organisation (Rechberg and Syed, 2016; Gillespie *et al.*, 2010). For example, the implementation and modernisation strategy in the NHS considers the recipients as being passive entities, who use available scripts provided by the government, the management department or other official bodies to (re)structure their activities. The stakeholder analysis at the organisational level, in my work, provided a reasonable explanation about the organisational effects on the implementation of a transformation project, but it does not illustrate how dynamic actors such as health-professionals may impact the professional practice in relation to the healthcare organisations. Thus, studying the KT-practice in action adds new dimensions to understanding the dynamic reality of the actors in practice, and their local contexts, by which the organisational changes are enacted.

With its origin in social constructionism, the KT-practice emphasises local and subjective micro-level of the KT-analysis (Tsoukas, 2002). It also focuses on how human actors and localities affect the external transformation from a subjective practice-based view (Rechberg and Syed, 2016). Thus, understanding intentionality is central when investigating how and why actors agree or disagree with a specific technology in their local context (Orlikowski and Robey, 1991). This study considers intentionality as a mode of intuitive, multi-faceted and contextual thinking, by which individuals and social structures aim to perform/do or to act accordingly (Bird, 1988). Thus, focusing on the micro-level of doing can include not only the individuals' attributions, but also may involve social and organisational constraints. The findings of this study suggest that identifying knowledge seekers is central to account for the state of actors in a complex dynamic system. It is the fluid interactivities of actors what configure such a complex dynamic system, rather than the conceptual categories of senders and receivers that represent the human and non-human actors involved as passive entities.

### *Methodological Implication for Human Intentionality*

Drawing on the different views of the stakeholders, the study of the professions' intentionality can help policymakers understand the multiplicity of actions in the healthcare-contexts (Mantzana *et al.*, 2007). It can also illustrate the subjective, inter-subjective and objective dimensions of the practice. The subjective dimension is illustrated by the *action* part of the practice. The inter-subjective dimension is illustrated by the communication and *interaction* parts of the practice. The control and governance parts of the practice illustrate the objective dimension. These three dimensions work together in the professional practice and profession with no priority of one over another. For example,

KT-practice requires a level of interaction and discipline for individuals in order to move from the stage of observation and acting to the stage of acquiring the procedural knowledge. These kinds of interactions would justify the status of the actors of being a knowledge sender or a knowledge seeker. These interactions can also be interchangeable within the organisation, dependent on the KT and knowledge source, reciprocity, and the experts involved and their needs. Concomitantly, the subjective dimension of the intentionality, with regard to the objective dimension, will justify, when properly applied, the enactment of the inquiry in order to address day-to-day problems and needs. Furthermore, the relationships between inter-subjective and objective dimensions of intentionality will lead to what KM-literature calls 'socialisation'.

In this study, individual motivations (subjective intentionality) play a central role in facilitating the KT-practice in the professionalised-context of the NHS. In such a context, this study focused on individuals and subjective intentionalities, and on the KT-practice in the KM-project, rather than the organisational processes and factors. As discussed above, this approach adds new dimensions of individuals and subjective intentionalities to the KM-healthcare literature in accord with the findings and suggestions provided by (Currie *et al.*, 2008b; and Foss *et al*., 2010). However, it is important to emphasise that this study considers intentionality as a relevant onto-epistemological proposition in order to understand the dynamics of human actors and actions. In other words, the motivations and the abilities to share and to knowledge application are mostly dependent on human willingness and purposefulness in regard to conducting the KT-practice; this is often overlooked in the KM-literature. As such, as Currie *et al*., (2008) argued, the circulation of knowledge and human motivation in the transferring processes can fill the organisational gap in relation to the KT-practice.

### *Methodological Implication for Technology-Potentiality*

The EPR was first introduced into the A&E department as an off-shelf system. It was considered as an electronic practical application to replace the paper-based records. The EPR contained Web PAS, patient notes, e-prescribing, PACS, Lab system, *et cetera* (see Figure 6.6 in Chapter 6). The Trust board introduced the EPR as a project for interoperability of the whole systems at the BP-Trust  in order to provide the best pathway for patient care. What is referred to as "The Business Case" of the EPR-project assessed a number of potential benefits to be eventually gained and this mainly included: 1) Multi-accessibility of real-time data; 2) More secure e-prescribing; 3) Alerting function to inform about the readiness of the test results which would speed up the processes EPR-implementation. The professional and non-professional staff (users) expected that the project would facilitate their daily procedures through retrieving patient information. This would help them access the declarative knowledge by the Web PAS protocol. This would help them access the declarative knowledge by the Web PAS protocol. The Web PAS would establish standard procedures for some common diseases, by which EPR could be utilised to make medical decisions, when specific

conditions about one case were (re)presented. This protocol had the ability to distribute responsibilities and speed up care-delivery.

Accordingly, the health staff would be able to have mutual accessibility patient-records from different locations. For example, some professionals would have applications to access patient-records remotely. The professionals would anticipate that the EPR could secure and assist the prescribing processes. The EPR would remove the dictating processes, by allowing the doctors to type the prescriptions through using touch screen and Database of Medicines. In this case, the prescriptions would always be in the system, which could reduce the risk of medical mistakes caused by using the paper forms. E-prescribing had the potential to establish standard prescriptions for some common cases (e.g., groups who had inflammations), which could facilitate the next procedures. However, for most of the health-professionals, the EPR relatively failed to provide direct advantages, as it was estimated by the NHS policy-makers, into the daily medical practice of the health-professionals.

With regards to the functional atomisation, the EPR-technology may help differentiate between aspects, potentialities and possibilities of professions. However, if the EPR does not allow doctors to make new linkages among those aspects, the EPR not only disempowers these professionals, but also may prevent them from engaging with the circulation of new knowledge at the hospital. If the EPR does not respond beyond this capacity of atomisation, or differentiation, of the multiple tasks that help doctors articulate new associations of practices and processes, support professions and the day-to-day professional practice, the capacities of the communication-technology become not only useless but also disturbing. Thus, the EPR needs to be revised corresponding to the possibilities and potentialities of enabling doctors to make new cognitive and intentional linkages. This is also relevant to the culture of new modes of sociability and belongingness between humans and non-humans. As such, the EPR could be optimised in implementation and application to become able to help redefine and reactivate the medical profession, with regard to the everyday real-life conditions of the hospital work.

### 8.3.3. Practical Contribution (Applied to the Area of Concern: A)

This study has several empirical implications for the KT-practice managers and policymakers. Firstly, for the managers, the study draws on the dynamics of knowledge in the healthcare-context. The managerial practice should prioritise the facilitation of the KT-practice. For example, even when knowledge is professionally controlled, the managerial practice can trace and track and evaluate the professional performance for future work. This research reveals that local managers in the NHS can facilitate the KT-practice by enhancing the relationship between the performance records and feedback mechanisms conducted by health-professionals. Regarding line management, these mechanisms can provide an adequate return and valuable feedback to the different employees of the hospitals. For example, the managers in the current case-study needed to enhance these mechanisms, so that they would be able to enable the staff to access the data on the performance of the

professionals, whether involved in their usual roles or in other secondary roles (such as the EPR recording). In this way, evaluating performance could motivate the professional contributions by storing all activities in dealing with the technology. In addition, evaluating performance can help bridge the gap between the original work and the extra work (resulting from the creation and implementation of new projects).

The question is 'In what way/s this gap would be filled?' Straightforwardly, by looking at the social media, we can see that communicative interactions are encouraged regarding sharing of information and sharing of opinions, emotions (emoticons), comments, related information, etc. In this way, social media make its own dynamic networks both engaging and engageable to develop knowledge, while keeping the participants interested in the collective act of sharing and circulating. Therefore, this research regards this tendency as an organic logic that resonates with further explorations of the EPR.

This research also recognises rewards and incentive policies as central to the KT-practice. This should be tailored in a meshwork in order to reflect the professionals' involvement in discrete interventions, such as implementing the EPR-project. The lack of involvement can cause reluctant reactions, and thus may lead to higher attrition rates among different professions. For example, the EPR case-study revealed that a new promotion could be applied to reward the staff in order to transform the organisation. Similarly, a certification program could be established in order to recognise participation in such projects, especially when topics such as the EPR-projects are envisioned to become central to the future of healthcare in the UK. As such, recruitment could be re-designed as to attract qualified individuals. In this sense, job descriptions need to be clearer to attract suitable candidates at a national level. Similarly, managers are required to focus their priority on the retention medical records by securing funding beyond the scope of certain projects such as EPR. Managers need to provide references to professionals so that they can build capacity to deal with the EPR challenges. In addition, managers could seek support from associations, such as universities, in order to provide credentials when professionals move into such specific roles, where little harmonisation of formal education exists between health practice and universities. Managers also need to re-adapt professional career plans accordingly to take into account the EPR-project (including its pros and cons). Regarding these issues, the knowledge acquired in such projects may be lost at both the individual and the organisational levels. Evidence-based guidelines should receive less consideration for they are not really used for clinical-decision making.

In the light of the national level, the computerisation literature of healthcare work in the UK has mainly been focused on the implementation of different IT programmes, including National Programme for IT. The literature mainly discussed that failures of the IT are a result of a lack of integration of the technology into the healthcare practice through imposing only one perspective of

the transformation project (EPR project) 'one fits all' (Robertson et al., 2010; Eason, 2010; Sheikh et al., 2011). It has been suggested that work and knowledge circulation practices of the healthcare need to be understood based on different perspectives (Robertson et al., 2010; Eason, 2010; Sheikh et al., 2011). Consequently, understanding multiple perspectives could spare the health sector the unintended negative effects resulting from the use of computerisation and ITs. Limited research, however, was found with regard to the understanding of KT practice of healthcare in the UK; a gap in the current knowledge that this thesis work was calibrated to fill.

Studying different perspectives has contributed to a better understanding of the emergent nature of the healthcare structure and practice in terms of medical and non-medical processes that form the overall KT and workflow across the UK. Within these perspectives, the variability of the knowledge nature and KT processes are also highlighted in this thesis (Chapter 7). Here, this study offers an important contribution in highlighting what processes make up the overall transformation policy and KT practice, how these processes are executed, and what possible variations can exist in the execution of these processes (Chapter 7). Additionally, as a result of conducting the study at the confluence of different disciplines that are under the same management of one Trust, this study has revealed that the KT practice is highly contextual and subjective to the experience of actors. Thus, practicing the same case with the same information could be conducted differently by different staff as long as the objective of the profession is justified.

The practical implications regarding the policymakers are discussed according to the following points. The complexity of the healthcare situation requires structural reforms to become more flexible and active. This is also important with regard to taking into account interactions at an inter-professional level as well as the deep-seated divisions that exist between professions. This could be facilitated by adapting managerial theory based on practices such as KM and KT within the professionalised-context. Moreover, such adaptations require an understanding of the endogenous power and the in-house communication and the dynamic actors that control the knowledge flows in the organisation. Additionally, policymakers need to review modernisation policies aimed at changing career pathways so that they can be rewarded for using the communication-technology (i.e., the EPR-project). In the empirical research, most professionals did not see the new suggested roles by the EPR as helping them move up the career ladder in their professions. But, there was a view that the professional roles were spelled outside their usual work path or instead were perpetuated as interims. Such regard is not useful to address the issue of employment concerning the retention with which policymakers are often concerned. Specifically, these additional loads of work are not useful to provide tangible career routes for health-professionals. The professional involvement and support need to be taken into account and aligned accordingly to maintain better provision within the NHS. For example, the NHS system should consider ways of providing a certification system for

experiential learning. Thus, all of the aforementioned implications entail that there are specific needs that require the transformational-projects to become more practice-based internally.

There are many implications of the KT-practice regarding the project management. In this regard, transformational EPR-projects at the macro-level are perceived as external knowledge in the context of implementation and integration in the NHS (i.e., EPR is 'one stop' in the government services) (Greenhalgh *et al.*, 2009). This perspective underestimates the importance of internal and external stakeholders involved in the EPR-implementation processes; this issue was clear when the BP-Trust could not find enough adequate alternatives for the EPR providers in the market. The findings of my work offer valuable practical understanding for the decision-makers, the policy-makers, the project managers and the IT developers involved in transformational-projects that take place in the public sector. In particular, these projects require a high level of integration, and understanding of the dynamic and heterogeneous qualities of the stakeholders at different levels. The policy-makers and managers need to identify the intensive stakeholders at different stages of project integration. At the practical level, the use of the intensive dimension contributes to a deeper understanding of the stakeholder theory and change management.

The multi-perspective analysis carried out in this research, focusing on the KT-practice and EPR-project, proves that enabling transformation requires integrating activities that help use the EPR to upgrade the NHS organisational innovation. In this context, developing a good understanding of the key actors and their dynamic state and roles can contribute to a more informative decision-making process, and to a smoother implementation of the transformational EPR-projects in the NHS. The present research shows that common challenges to the EPR are related to the lack of a synthesised understanding between the different stakeholders. For example, the decision making for the EPR-implementation is influenced by the modernisation-agenda at the national level as well as by the local government agenda. More specifically, the EPR is encouraged by the central management of the NHS, and thus the decision-makers at the BP-Trust are influenced by the modernisation guidelines, while they take decisions for implementing the EPR at the establishment. Moreover, the majority of professionals perceive the EPR as a facilitation tool able to endorse and embed much potential into the everyday health practice such as e-prescription, lab management, and order communications. Furthermore, the communication-technology signified by the EPR provides instant accessibility to accurate and updated information. As such, the use of the EPR helps save time considerably when doing office work. This was not the case in the actual practice at the hospital, even though the management board kept pushing the active enrolment in the implementation process.

As shown in this study, KT practice in the healthcare is complex, variable and uncertain. For example, the workflow does not only constitute medical processes but also non-medical processes that are highly contextual and entangled with each other. Therefore, I recommend that system analysists

should pay more attention to these contextual characteristics in terms of technical issues parallel to the interaction among professionals/nonprofessional of the healthcare practice. This is necessary to obtain requirements for system designs, upgrades and optimisation. As this study has shown, KT practice is fluid and interactive in such a way that it is variable and exception-filled. For instance, when different perspectives are analysed, specific healthcare processes are revealed to not simply branch out to the next process. Thus, efforts should be made to understand the contextual elements of a knowledge transfer and workflow of healthcare practice. In addition, legacy systems are also important components of the knowledge workflow. The case study of this thesis shows that the Trust has its own legacy systems as a result of past procurement processes (Department of Health, 2006).

This research advocates that KT practice as non-technological systems plays a vital role in supporting the overall workflow functioning of the EPR. It also presents certain integration solutions between different perspectives. A better way of achieving such integration is suggested through paying more attention to the existing practices. This requires recognising the potentiality and flexibility of the new technology in order to support local practice (Park et al., 2015).

Since the NHS project implementations are actually triggered by top management, healthcare staff should be provided with sufficient time and space for learning, practicing and revision. In the light of the analyses showcased and the recommendations highlighted in this thesis work, it is indeed necessary to have an EPR that is constituted to support local requirements of KT practice, hence minimising negative workflow effects. This approach could also offer a better understanding of the mechanisms underlying healthcare technology acceptance which can then be used to develop more successful implementation strategies such as user training and knowledge applicability and transferability.

## 8.4. Limitations and Further Research (Learning About)

This study highlights the need for further investigation that integrates the professional dynamics and differentiations for the articulation of knowledge in professionalised-contexts at the public sector. Accordingly, researchers willing to study KT in such contexts will be able to better follow the relationship of intra- and inter-professions across disciplines, and to better understand the power differences among them. Researchers thereby can learn from the professional boundaries between such professions and, simultaneously, understand the reasons why specific modes of knowledge would be facilitated or inhibited in a particular context.

Further research should also consider the ways in which management is associated with varying modes of practices on a day-to-day basis. Examining the historically situated features of the field of NHS administration might provide a deeper understanding of the intentionality and the decision-making processes of the actors involved in the implementation of the transformational-technology.

This research reflected on a period of four years of the EPR-implementation through KT-practice analysis. This four-year plan allowed tracking many important issues in the KT-practice and the EPR. Since, in pragmatic terms, this study focused on one single case-study in a limited period of time (one-year fieldwork), it did not follow up the completely new direction of implementation with the subsequent project. Thus, this study suggests conducting further research using the same case, with a focus on exploring those possible new EPR-implementations. By examining the situated KT-practice, new research may forward additional elaborations of how the organisation learns from previous experiences, which can add insightful contributions to the body of knowledge on OL.

This research proposes a more longitudinal research approach in order to understand the relationship between the organic network of the KT-practice and the new knowledge implementation. Considering the impassivity of knowledge, it is important to compare and examine different knowledge and technology uses, during an extended period of time, and at stages in which the healthcare/professionalized field might consider the integration between the organisational practices and the new projects complete and fruitful.

Further research should also address crucial perspectives such as the outcomes associated with the more widespread and vital usages of technology in the KT-practice and the eventual usage/non-usage. For example, an emerging issue during this research was how the KT and mobile devices empower women's needs in the healthcare industry.

This research regards that KM studies at the professional day-to-day practice level need an ethnographic research approach in association with psychological tools in order to grasp the tacitness of intentionality. This approach would need the design of specific questions to detect unknown dimensions and to understand the complexity, uncertainty and *post-disciplinary*, which escape any speculative exploration limited to the professionalised context.

The tacit dimension of knowledge entails a deep listening to human nature. Thus, this kind of research entails a multi-faceted approach rather than just following the situation of the doctor-nurse rivalry. For example, such a study requires the understanding of conflicts, micro-conflicts (verbal and non-verbal), as well as the everyday contingencies relevant to all kinds of multiple perspectives. In brief, further research on the topic of KT-practice within the professionalised-contexts would involve a more fine-tuned epistemological approach.

Studying the KT-practice in action requires understanding the dynamic state of being, where most the professional actors usually are assigned more than one singular role. This research limits the scope of analysis by focusing on the dominant job title of the professional participants. Further research would rather focus on a group of multiple-role participants, who would attain a 'kaleidoscopic' view of the circulation of knowledge within the organisation. Conversely, it would

have been argued that those who remained in the same professional position(s) or occupation(s) would offer a less compelling view of the organisational performance. Indeed, the depth and span of the qualitative data can be improved with further multi-faceted investigation.

This investigation on the KT-practice in the professionalised-context justifies how the professional-work primacy, over other practices, could not be controlled without affecting the professional autonomy and/or professional identity. Thus, demystifying the modes of the KT-practice (becoming) on the basis of the professionalised, and *post- professionalised* context (along with 'onto-epistemological' propositions of possibility, potentiality, and intentionality) can expand the horizon for novel understandings of the vital domain of purposeful practices (the KT-practice).

These propositions can motivate new modes of understanding correlation as a space to access to the relationships among being, thinking and innovating, and never for any of those processes to be considered apart from the others. This original academic contribution of this doctoral thesis can enhance the current understanding on the transformational agency of knowledge-in-practice in the healthcare. This creates an agency that is able to integrate activities to help utilise the EPR to upgrade the NHS organisational innovation. This study will inspire how to learn about transformational agency of knowledge-in-practice, as well, starting from the basis of the contingent reality of the professional boundaries. It also will orient new approaches to explore how specific modes of knowledge can be facilitated or inhibited in professionalised contexts. In brief, this research deepens and broadens the *circulation of knowledge studies* by articulating the transformational agency of knowledge-in-practice to generate a new prospect of navigating complexity in a time of uncertainty.

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# Appendix A.1: Summary of Literature Review

**Knowledge Management and Knowledge Transfer Studies**

| Author and study type | Aims | Findings |
|---|---|---|
| Mitton *et al.,*(2007) Systematic review of 81 papers | To examine and sum up the evidence base for KTE. | "Successful knowledge transfer and sharing can be achieved at the individual, organisational and communications levels and factors related to time/timing. Key factors include: ongoing research practitioner collaboration built on trust and clear roles and responsibilities fostered by ongoing face-to-face communications; healthcare organisations should build capacity to encourage readiness for change and foster collaborative research; research outcomes should be summarized with recommendations tailored and relevant to specific audiences and delivered whilst timely. The value of knowledge brokers to facilitate these is indicated." |
| Fixsen *et al.,*(2005) Meta-syndissertation of 377 papers including 22 experimental studies | To synthesize the implementation science in the fields of mental health, social services. | "Information dissemination methods alone (research literature, mailings and practice guidelines) are ineffective as is training as a stand-alone method. Employing longer term multilevel approaches to implementation are more effective with evidence for the inclusion of: skill-based training; practice-based coaching; practitioner performance evaluation; program evaluation; facilitative administrative practices; and methods for systems interventions." |
| Best *et al.,*(2008) Mixed-method review | To review evidence supporting knowledge integration methods. | "Key translational research and knowledge integration factors include: improved communications; collaborative research; support systems; funding and incentives; and consideration of policy development and organisational change principles." |
| Harrington *et al.,*(2008) Synopsis | To synthesize the key approaches to increase linkages between research and decision-making processes in healthcare. | "Key enablers of knowledge translation identified as: early, ongoing and face-to-face involvement between knowledge users and researchers; incentivizing knowledge-exchange activities; allowing adequate time for collaborations to become established; capacity building both for researchers and practitioners/policy-makers; use of effective and multifaceted dissemination strategies; and use of knowledge brokers to link researchers, research users and policy/decision makers." |

| Author and study type | Aims | Findings |
|---|---|---|
| Wang and Noe., (2010) Systematic literature review. | To review qualitative and quantitative studies of individual-level knowledge sharing | "The framework identifies five areas of emphasis of knowledge sharing research: organisational context, interpersonal and team characteristics, cultural characteristics, individual characteristics, and motivational factors. The paper concludes with a discussion of emerging issues, new research directions, and practical implications of knowledge sharing research". |
| Mougin et al., (2015) Qualitative methods | To investigate on improving a framework for modelling knowledge transfer. | "These investigations enable the study to provide a new input to the state-of-the-art of knowledge transfer studies in organisations, and to define and model more finely the knowledge dynamics that occur between knowledge workers and knowledge management systems." |
| Canestrino and Magliocca., (2016). Qualitative research | To explore the use of CoP as way for managing knowledge. | "The study explains the role of the global managers as 'cultural bridges' in multicultural teams. The study argued that CoP arises as the best suitable way to transfer knowledge at international level when the firms from developed countries encounter firms from emerging countries." |
| Kitson, A. (2009). Conceptual paper | To demystify many concepts in relation to Knowledge translation (i.e., transfer, translation or transformation process) | "These concepts are complex communication vehicles that are used as catalysts to stimulate discussion, learning and debate across knowledge boundaries; current evidence on guideline implementation reinforces the need to look at complex, multifaceted interventions based on specific diagnosis of barriers to implementation; this process poses conceptual, theoretical and methodological challenges to the research community; the implication of such a move would be investment in more process studies before the setting up of expensive causal or intervention studies; refocusing of implementation research away from theories of behaviour change to more consideration of knowledge management is to be encouraged and organisational theory and theory formulation and testing ought to be heterogeneous rather than narrowly focused." |
| Harvey et al.(2002) Literature review and concept analysis (75 papers) | To present a concept analysis successful implementation of evidence into practice. | "The presence of a facilitator who provides face-to-face communication and uses a range of enabling techniques has some impact on changing clinical and organizational practice despite variable effect sizes and differing costs. It is difficult to isolate which aspects of the facilitation process or the facilitator role are more or less effective in influencing change." |

| Author and study type | Aims | Findings |
|---|---|---|
| Conklin and Stolee (2008) Qualitative Study | To test a pilot model for evaluating knowledge-exchange in a network context. | "Large KT networks may enable the better communication and use of knowledge. The organizational context afforded by Communities of Practice can support the flow of knowledge among participants and enables research evidence and expert opinion to be delivered; variable evidence for cited methods having a direct effect on the behaviours of caregivers." |
| McWilliam *et al.,*(2008) Mixed-method evaluation | To show the effectiveness of a knowledge translation evidence-based home care through social interaction. | "Facilitators at the organizational level include: geographic proximity; remuneration of efforts; recognition for outcomes achieved; team working is generally seen as highly facilitative of KT; time to build trust important facilitator of KT and more attainable in smaller groups; individual practitioners respond to adequate remuneration for time/effort." |
| Bowen and Martens (2005) Multi-method qualitative study | To explore the characteristics of effective knowledge translation initiatives from the perspective of community partners | "Knowledge Translation approaches should include efforts to: create an environment of interest and openness to research (providing a setting for KT to occur in, including building trust and confidence between partners); provide opportunities for collaborative research; develop and use a shared vocabulary and conceptual base; facilitate an understanding of research findings; foster an understanding of implications for practice. Quality is an important factor in interactions; organizational barriers are an ongoing impediment to KT and capacity building should focus at this as well as the individual level." |
| Pentland *et al.,* (2014) SSM | Knowledge acquisition to facilitate evidence-based practices. | "They found that the factors found to impede effective research knowledge acquisition and management and the development of more integrated knowledge management processes designed to improve the situation." |
| Visram *et al.,* (2014) Using focus group and face to face interviews | To explore how various public - health stakeholders make sense of, and experience, KT and related concepts. | "There was some agreement in terms of meanings and interpretations of core concepts relating to KT, although stakeholders spoke of the differing 'languages' across disciplines and sectors. Access to funding, targeted messages, the nature of the evidence base, and wider contextual factors were identified as barriers or facilitators to KT. Various KT roles and responsibilities were highlighted for the different stakeholder groups." |
| (Siron *et al.*, 2015) Systematic review of 28 articles | To describe KT strategies to improve public health in low-income countries. | "The articles were analysed, dealt with the evaluation of transfer strategies that employed multiple activities, mostly targeting health-professionals. The review highlights the great diversity of transfer strategies used, strategies and many conditions for knowledge use." |

| Author and study type | Aims | Findings |
|---|---|---|
| Fong Boh, Nguyen, and Xu, (2013) Questionnaire among 70 employees in subsidiaries | Identified the factors influencing the effectiveness of knowledge sharing from the headquarter to subsidiary | "Trust to headquarter and individuals' openness to diversity play a significant role in impacting local employees' ability to learn and obtain knowledge from the headquarter. Cultural issues, however, make little difference to knowledge sharing from the headquarter" |
| Ghobadi and D'Ambra, (2012) Questionnaire among 115 project managers | Presented a model for predicting effective knowledge sharing behaviours in cross-functional project teams | "Cooperative task orientation, communication, and interpersonal relationships are directly and positively associated with effective knowledge sharing behaviours" |
| Husted, Michailova, Minbaeva, and Pedersen, (2012) Questionnaire among 1639 respondents | Identified the impact of KS on hoarding, rejecting knowledge and attitudes toward mistakes | "More tangible and incentive KSGM e.g. reward strength the individuals' reasons for hoarding and rejecting knowledge and negatively impact individuals' attitude towards mistake; other types of KSGM diminishes individuals' reasons for hoarding and rejecting knowledge, and attitudes towards mistakes" |
| Casimir, Keith Ng and Cheng, (2012) 483 Questionnaires among full time staff | Investigated the role of IT on knowledge sharing and identified the enablers of knowledge sharing | "IT plays a significant role in knowledge sharing but organisations need to make sure that technologies are compatible, match the requirements of staff, train staff and provide technical support; tangible rewards have negative impact on knowledge sharing, in contrast socials ties have a positive impact on knowledge sharing" |
| Xue, Bradley and Liang, (2011) Questionnaire among 434 students of team-projects | Investigated the impact of team climate and leadership support on team members' knowledge sharing | "Both team climate and leadership support have a significant impact on knowledge sharing" |

| Author and study type | Aims | Findings |
|---|---|---|
| Suppiah and Sandhu, (2011) Questionnaire 362 from 7 organisations | Explored the impact of organisational culture on tacit knowledge sharing | "Friendly working environment encourage tacit knowledge sharing, however, market and hierarchy have a negative impact and risk taking culture necessarily does not encourage tacit knowledge sharing" |
| Holste and Fields, (2010) Questionnaire among 202 professionals and managers. | Identified the impact of trust on willingness of individual to share their knowledge | "Trust greatly impact the willingness of people to share and use knowledge" |
| Yang, 2007 499 questionnaires | Explored the impact of knowledge sharing and organisational learning on organisational effectiveness | "Knowledge sharing impacts the transformation of individual knowledge to organisational knowledge which results in increasing the organisational effectiveness" |
| Ragsdell, Espinet and Norris, (2014) Semi structured interviews and focus group | Identified knowledge sharing effectiveness in the voluntary sector | "The impact of trust on knowledge sharing appeared to be dependent; laissez-faire approach hinder knowledge sharing when volunteers have lack of knowledge; no evidence found for the impact of financial reward on knowledge sharing" |
| Addleson, (2013) Literature review | Identified the role of storytelling in facilitating knowledge sharing | "Story telling plays a significant role in facilitating knowledge sharing practices" |
| Jackson and Klobas, (2013) Qualitative: observation | Explored the role of Web 2.0 in knowledge sharing | "Web 2.0 facilitates knowledge sharing practices" |
| Ford and Staples, (2006) Mixed method: 20 interviews and 237 questionnaires | Identified the role of perceived value of knowledge in knowledge sharing practices | "Perceived value of knowledge (PVK) may impact the enablers and barriers of knowledge sharing; PVK impacts intentions to share knowledge" |

| Author and study type | Aims | Findings |
|---|---|---|
| Martin, Guzman, Urbano and Llorens, (2012) Experimental validation | Identified the role of Software Development Project Pattern in facilitating knowledge sharing | "Software Development Project Pattern plays a significant role in facilitating knowledge sharing practices" |
| Horwitz and Santillan, (2012) Literature review | Identified the role of IT in facilitating knowledge sharing | "IT i.e. thinkLets plays a significant role in facilitating knowledge sharing practices" |
| Noblet, Simon and Parent, (2011) Qualitative: open interviews | Explored the concept of absorptive capacity in terms of dynamic capabilities and provide a review of the relevant literature | "Four-stage model for absorptive capacity found i.e. acquisition, assimilation, transformation and exploitation" |
| Michailova and Sidorova, (2011) Literature review | Investigated the drivers of knowledge sharing in group based work | "Effectiveness of knowledge sharing in group based work depends on whether people are supported culturally and trust each other" |
| Lin, (2006) 154 questionnaire | Examined the impact of organisational support on knowledge sharing | "Organisational support i.e. perceived relative advantage, compatibility, and interpersonal trust positively impact knowledge sharing" |
| Liao, Chang, Cheng, and Kuo, (2004) 155 questionnaires | Investigated the issue of employees relationship within firm and attitude toward knowledge sharing | "The better the relationship between employee and firm, the more knowledge sharing" |

| Author and study type | Aims | Findings |
|---|---|---|
| Klein, (2010)<br><br>Literature review | Identified the role of storytelling and communities of practice in facilitating knowledge sharing practices | "Both storytelling and communities of practice play a significant role in facilitating knowledge sharing practices" |
| Franssila, (2013)<br><br>Mixed method: 6 semi-structured interviews; 115 questionnaires, 59% response rate | Identified the role of mobile technologies in facilitating knowledge sharing practices | "Mobile technologies play a significant role in facilitating knowledge sharing practices" |
| Kodama, (2013)<br><br>Mixed Method: questionnaire and interviews | Identified the role of video-based information network in facilitating knowledge sharing practices | "Video-based information network facilitate knowledge sharing practices especially in terms of reducing time and distance" |
| Franssila, (2013)<br><br>Qualitative: 7 interviews | Investigated the challenges of experience knowledge sharing | "Problem space assembly and narrowing in urgent support request situations; assembly of the hidden experience-based knowledge; and new component and product knowledge acquisition and updating are identified as challenges of experience knowledge sharing" |
| Santos, Soares and Carvalho, (2012)<br><br>Qualitative: 24 interviews | Identified knowledge sharing barriers in the context of project management | "Codification process, inadequate information technology, lack of initiative and strategy by the workers, and lack of time and resources are identified as the main knowledge sharing barriers" |
| Ellis, Margalit and Segev, (2012)<br><br>Quantitative: questionnaire | Conducted a comparative study to Investigate the role of organisational learning mechanisms | "Customer satisfaction is higher when there is an organisational learning mechanisms in place" |
| Verburg and Andriessen, (2011)<br><br>Literature review | Identified the different types of knowledge network i.e. communities of practice | "Strategic networks, informal networks, question and answer networks, and on-line strategic networks are the main types of communities of practice identified" |

| Author and study type | Aims | Findings |
|---|---|---|
| Wang, Meister and Gray, (2013) Quantitative: questionnaire | Identified the adoption of KM system behaviour | "Social influence patterns differ significantly across groups in an organizational setting; in all likelihood, much depends on the ways in which work is arranged in that organization, and the purpose that the information system serves" |
| Chang and Gurbaxani, (2012) Literature review | Examined the IT outsourcing on the role of IT-related knowledge | "IT outsourcing does lead to productivity gains for firms; IT-related knowledge held by IT services vendors enables these productivity gains" |
| Bera, Burton-Jones and Wand, (2011) Experimental study | Introduced a guideline for knowledge identification | "Theories of philosophical ontology and cognition can guide the construction of more effective visual representations" |
| Adipat, Zhang and Zhou, (2011) Laboratory experiment | Identified the role of mobile technology in facilitating information searching | "Mobile technology is important for information sharing and searching and results suggest practical implications for the design and implementation of mobile Web applications" |
| Kim, Krishnan and Argote, (2012) Qualitative: interviews | Identified the learning curve Relationship between problem-solving experience and performance enhancement | "The extent of learning transfer depends on the kind of problems being solved" |
| Ravishankar, Pan and Leidner, (2011) Qualitative: 60 interviews | Developed a subculture model, which depicts the intersection of alignment and implementations | "Support of senior executives for IS and IT management sophistication are important for alignment, and factors such as individuals' perceptions of the system do influence the implementation" |

| Author and study type | Aims | Findings |
|---|---|---|
| Ghose, Goldfarb and Han, (2012) Exploratory research | Explored the differences in mobile and fixed technology usage | "Mobile technologies suggesting higher search costs but the benefit of browsing for geographically close matches is higher on mobile phones" |
| Ko and Dennis, (2011) Mixed method: interviews and survey | Identified issues around using knowledge management systems | "More experienced workers can better use the KM system but over time less experience workers can use the system properly" |
| Ma and Agarwal, (2007) 232 questionnaire | Investigated identity based view to understand how the use of IT-based features in online communities is associated with online knowledge contribution. | "Perceived identity verification is strongly linked to member satisfaction and knowledge contribution; community IT artefacts positively impact identity verification" |
| Robert, Dennis and Ahuja, (2008) Experimental study, 46 teams | Examined the effects of the three dimensions of social capital on team performance | "Social capital affect knowledge integration in teams and that knowledge integration in turn has a direct impact on team performance" |
| Majchrzak, Malhotra and John, (2005) 236 questionnaires | Identified IT support for contextualization impact individual collaboration knowhow | "IT support for contextualization is related to individuals' collaboration know-how development moderated by task non-routineness" |
| Slaughter and Kirsch, (2006) interviews, observation, meetings, mail, documents and manuals | Investigated KT portfolios in terms of the types of mechanisms used and the frequency with which mechanisms are utilized | "Mechanisms are used when the source and recipient are proximate, when they are in a hierarchical relationship, or when they work in different units" |

| Author and study type | Aims | Findings |
|---|---|---|
| Niculescu and Whang, (2012) Exploratory research | Explored the parallel market evolution of the two main categories of wireless services voice and data | "The willingness of voice consumers to consider adopting data services is positively related to both time and penetration of 3G-capable handsets among voice subscribers" |
| Staples and Webster, (2008) Quantitative: questionnaires from 985 individual members of teams | Examined the potential effects of different aspects of virtuality on a knowledge-sharing model | "A strong positive relationship was found between trust and knowledge sharing for all types of teams" |
| Oshri, Fenema, Kotlarsky, (2008) Qualitative: interviews, project documentation and observations | Explored the role of transactive memory in enabling knowledge transfer between globally distributed teams | "In order to overcome differences derived from the local contexts of the onsite and offshore teams the standardization of templates and methodologies need to be in place to support the development of codified and personalized directories" |
| Huang, Davison and Gu, (2011) Quantitative: 204 questionnaires | Explored the impact of selected sociocultural factors, viz. trust, guanxi orientation and face, on the intention to share explicit and tacit knowledge | "Cognition-based trust has no effect on the intention to share either tacit or explicit knowledge, but affect-based trust has an effect on both, face-gaining behaviours have a positive effect, while face-saving behaviours have a negative effect on the intention to share knowledge, guanxi orientation has a strong impact" |
| Davison, Ou and Martinsons, (2013) Exploratory research | Explored the use of interactive Information technology (IT) applications for informal knowledge sharing (KS) | "Chinese employees prefer to engage in informal KS practices that are not subject to central control. In principle, these informal communications could occur on any suitable IT platform, whether based on the public Internet or a corporate arrangement" |

| Author and study type | Aims | Findings |
|---|---|---|
| Mueller, Hutter, Fueller and Matzler, (2011) Qualitative: interviews | Explored the potential and current usage of virtual worlds for knowing activities | "Virtual worlds facilitate global and simultaneous interaction, create a common context for collaboration" |
| Wang and Haggerty, (2009) Literature review | Explored the impact of competence on virtual knowledge sharing | "Virtual competence influences the effectiveness of knowledge transfers through its direct impact on the effectiveness of communication in virtual settings" |
| Williams, (2011) Quantitative: 140 questionnaires | Developed a model of client–vendor knowledge transfer at the level of the individual offshore IS engineer | "Client–vendor knowledge transfer to the offshore vendor engineer is positively associated with formal training and client embedment" |
| Venters and Wood, (2007) Qualitative: Over 50 semi-structured | Explored how, the organization attempted to engender communities of practice among a strategically significant | "Downsizing which created the impetus for communities of practice led to an increasing individualization and a loss of trust, which turned the potential communities into 'underground movements'" |
| Meso, Musa and Mbarika,( 2005) Quantitative: questionnaire | Described factors that impact mobile ICT use and formulated a series of hypotheses about them | "Access to mobile ICT, and cultural influences on mobile ICT diffusion, impact individuals' perceptions of the usefulness and ease of use of mobile ICT. Individuals' perceptions about the reliability of mobile ICT influence use of these technologies significantly" |

| Author and study type | Aims | Findings |
|---|---|---|
| Hong and Tam, (2006) Model based | Investigated mobile technology adoption beyond work setting | "The determinants of application adoption decision are not only different from those in the work place, but also depend on the nature of the target technology and its usage" |
| Kankanhalli, Tan and Wei, (2005) Quantitative: questionnaire | Identified the cost and benefit factors impacting electronic knowledge repositories (EKS) usage | "Self-efficiency and helping others encourage user to share their knowledge via EKS; trust, pro-sharing norms and identification moderate the impact of reward on EKS; loss of knowledge power or image does not impact EKS usage" |
| Ko, Kirsch and King, (2005) Quantitative: 96 matched pair survey instrument | Examined the antecedents of knowledge transfer | "Communication factors, absorptive capacity, shared understanding, relationship and motivational factors impact knowledge transfer" |
| Bock, Zmud and Kim, (2005) Quantitative: 154 questionnaires | Investigated the factors impact people's intention to share and hoard knowledge | "Reward and self-worth do not impact knowledge sharing intention but relationship, fairness, affiliation and innovation impact knowledge sharing behaviour" |
| Wasko and Faraj, (2005) Mixed method: document analysis and 93 questionnaires | Identified the issues around the use of electronic network of practice for the purpose of knowledge sharing | "People share their knowledge when they feel that it improves their professional reputation, when they have the experience to contribute, and when they structurally embedded in the network" |

**The Knowledge Transfer and Healthcare Industry**

| Author and study type | Aims | Findings |
|---|---|---|
| Mura *et al.*, (2013) Questionnaire among 198 employees. | To investigate the reasons for health-professional to be intrinsically motivated to share their best practices and mistakes | "Knowledge sharing has positive impact on the sharers' innovativeness. Incident and best practice knowledge are different and need different attention strategies. Social capital, e.g. social ties, directly impact knowledge sharing behaviours". |
| Jennings *et al.*, (2013). Interviews with 37 members of four communities in | Discussed the impact of CoPs on improving public health problems by sharing relevant knowledge | "Indicated that CoPs has clear benefits to members and public health organisations e.g. daily work efficiency". |
| Kim *et al.*, (2012). (220) Questionnaire with employees who had direct contact with the patients. | To investigate the impact of institutional structures on knowledge sharing and their impacts on patient safety. | "Knowledge sharing is strongly impacted by institutional structures and considerably enhanced patient safety; "a leader serves as a champion who institutionalizes new practices", punitive practice is still deeply rooted in the healthcare culture which limited knowledge sharing opportunities". |
| Lilleore and Holme (2011) 47 interviews with staff from two Departments responsible for developing new drugs | Explored knowledge sharing enablers and barriers in pharmaceutical R&D | "Individuals have different views on participating in knowledge sharing, enablers of knowledge sharing are social relations, physical proximity, no stupid question culture, informal spaces, work involvement and interests, things making job easier, the satisfaction of helping colleagues, being taken seriously and barriers of knowledge include: the absence of the enablers and knowledge as power". |
| Radaelli *et al.*, (2011). 150 questionnaires | To investigate knowledge sharing behaviour among health-professionals | "Intellectual capital impacts professionals' knowledge sharing behaviour but it is impacted by organisational knowledge sharing climate". |
| Komporozos *et al.*, (2011). Document analysis and 12 interviews, 6 in the UK and 6 in Canada | To investigate the role of policy in impacting the sharing of best practices and identified the differences between Canada and UK | "Policy impact best practices sharing, policy differences between Canada and UK in terms of concepts of knowledge translation, user empowerment, and a service innovation construct different account of the health service is identified". |

| Author and study type | Aims | Findings |
| --- | --- | --- |
| Azan and Sutter, (2010). qualitative survey and interviews about the Healthcare in Greece. | To identify the health-professionals perception on role of KT in improving the performance and explored the factors impacting KT-practice | "Knowledge sharing is seen as an important element impacting performance; timing and work load, IT infrastructure, motivation factors, reward, HR, trust impact knowledge sharing". |
| Dixon et al., (2009). Interviews, Healthcare in USA. | Explored the role of IT in facilitating knowledge sharing practices | "Health IT is supporting the improvement of patient care and safety by providing healthcare organizations and professionals access to scarce knowledge resources" |
| Mansingh et al., (2009). Interviews | To identify a methodology for mapping knowledge sharing outsourcing | "Knowledge maps can be used to facilitate Knowledge sharing in health care organisations". |
| Arnaert and Delesie, (2005). Mixed method | Knowledge for the management of tele-home care for the elderly using the video-telephone | "Visualisation is a good technique for providing a synthesis and overview of the data and for discovering knowledge". |
| Ford and Angermeier, (2004). Mixed Method | To delineate the process principles in managing a supportive environment necessary for the sharing of knowledge | "These attributes facilitate knowledge sharing and idea generation: understand different views, recognise participants' ability in problem solving, commitment to hear diverse ideas before judging them, risk taking in voicing others' ideas". |
| Evans and Alleyne, (2009). Non-empirical study Healthcare | Developed a model to explain how knowledge is shared between numerous healthcare communities | "The proposed model provides a more detailed understanding of the knowledge processes related to the delivery of healthcare services". |
| Zigan et al., (2010). 22 semi-structured interviews with managers and frontline Staff. Healthcare in Germany | To identify the impact of contextual factors on KM activities (including knowledge sharing) | "KM activities can be effectively done at departmental level without having the support of top management of the hospital. In addition, factors such as the effective utilisation of other intangible resources contribute to effectiveness of KM activities". |

| Author and study type | Aims | Findings |
|---|---|---|
| Mørk *et al.*, (2008). 35 semi structured interviews. Healthcare in Norway | To investigate the impact of culture on communities of practice (electronic version) | "Communities of practice approach could be enriched by looking at diversity and discontinuity in the epistemic cultures and networks that the different communities of practice are associated with". |
| Angst and Agarwal, (2009) 366 questionnaires | To identify the challenges around using EPR i.e. concern for information privacy | "Concerns for privacy can be positively altered with appropriate message framing. They find that an individual's CFIP interacts with argument framing and issue involvement to affect the attitudes toward the use of HER". |
| Davidson and Chismar, (2007) An indepth, interpretive field study | To investigate how technology triggered change interacted in complementary processes to engender alignment. | "Aligning social structures and technology capabilities continues to be a significant barrier to IT-related organizational change in the healthcare industry as elsewhere". |
| Miscione, (2007 ) Interview, focus group, and observation | To investigate the ways to improve medical knowledge sharing by using telemedicine | "Telemedicine is a powerful tool for improving health care services" |
| Fichman *et al.*, (2011). Literature review on Healthcare | To explore the role of IS in the delivery of healthcare | "Electronic sharing of medical knowledge can increase administrative efficiency, reduce healthcare costs, and most importantly, reduce medical errors". |
| Aron *et al.*, (2011) Observation and interviews Two Asian hospitals | To examine how the automation of core error prevention functions affects two types of medical errors | "The automation of the sensing function (recording and observing agent actions) will have the greatest impact on reducing error rates". |
| Anderson and Agarwal, (2011). Questionnaire | To investigate the people willingness to disclose their personal health information and permit it to be digitalized. | "Type of information requested, he purpose for which it is to be used, the requesting stakeholder all play a role; Emotion plays a significant role". |
| Ozdemir *et al.*, (2011). Healthcare in USA | To examine the issues around EHR usage and role of EHR in facilitating data sharing | "Health-care providers may not have an incentive to share patients' records electronically even though EHR systems will increase consumer surplus, especially in the presence of provider heterogeneity and myopic consumers". |

| Author and study type | Aims | Findings |
|---|---|---|
| Légaré and Witteman, 2013 | To explore the elements and barriers to shared decision making | "Time, patient characteristics and clinical situation are the main barriers to shared decision making". |
| Evans *et al*., (2015). Healthcare, literature review | To synthesize the conceptualization, management and measurement of IC in healthcare through a review of the literature. | "The primary research method used was cross-sectional questionnaires focused on hospital managers' perceptions of IC, followed by semi-structured interviews and analysis of administrative data. Empirical studies suggest that IC is linked to subjective process and performance indicators in healthcare organizations. Although the literature on IC in healthcare is growing, it is not advanced. The review offers an introduction to the concept of IC, its potential value to healthcare management and delivery". |
| Barnett *et al*., (2011). | To investigate whether connections between physicians based on shared patients in administrative data correspond with professional relationships between physicians | "Primary care physicians were more likely to recognize relationships than medical or surgical specialists. Patient sharing identified using administrative data is an informative ''diagnostic test'' for predicting the existence of relationships between physicians". |
| Gaylin *et al*., (2011). Qualitative: interviews | Explored Americans' attitudes concerning health IT's potential to improve health care and differences in those attitudes based on demographics and technological affinity | "Large majority favour uses of electronic medical records believe EMRs could improve care and reduce costs; believe benefits of EMR use outweigh privacy risks; and support health care information sharing among providers". |
| Davies *et al*., (2011). Delphi and Nominal Group | Investigated the ways to encourage the exchange of information | "The hybrid panel process facilitated information exchange and tightened rating distributions" |
| Crabtree *et al*., (2011). Longitudinal study primary care practice settings | Identified the issues around knowledge transfer | "People working in practices are well educated and want to do well; however, they need support in finding ways to interact and collaborate with colleagues; forcing" time and space for reflection may be one of the more important components a change management strategy". |
| Embi *et al*., 2013 | Aimed to enumerate some of the knowledge management and informatics issues common to such data re-use | "The informatics challenges commonly encountered by those conducting CER studies include issues related to data information and knowledge management (e.g. data re-use, data preparation) as well as those related to people and organizational issues (e.g. socio-technical factors and organizational factors)" |

| Author and study type | Aims | Findings |
|---|---|---|
| Kane and Labianca, (2011) interview and questionnaire | To investigate the impact of postadoption resistance to performance | "Information System avoidance is significantly and negatively related to patient care". |
| Mishra *et al*., (2012) 206 questionnaires among physicians | To examine the role of electronic health record in facilitating information sharing | "Physician community identity reinforcement and physician community identity deterioration directly influence the assimilation of EHR". |
| Venkatesh *et al*., (2011) interview and questionnaire | To investigate the issues around using: Electronic healthcare-system | "Doctors negative feelings toward technologies can have impact on other doctors, also on paraprofessionals and administrative personnel; key result given that e-healthcare system use has positive effects on various quality metrics that in turn influence patient satisfaction". |
| Garfinkel *et al*., (2007) Literature review about healthcare | To develop a technique to release Individually identifiable microdata while providing protection of confidential data | "Results indicate that the model is practical and viable and that useful data can be released even when the level of risk in the data is high". |
| Fichman, *et al*., (2011). Literature review | To explore the role of IS in the delivery of healthcare. | "Electronic sharing of medical knowledge can increase administrative efficiency, reduce healthcare costs, and most importantly, reduce medical errors". |
| Hussain and Cornelius, (2009). Mixed methods NHS | To identify the issues around use of IT for the purpose of knowledge sharing. | "The success of IS implementation depends on the actions of the IT Management". |
| Bradley *et al*., (2012). 164 questionnaires: USA. | To investigate the role of enterprise architecture in IT implementation in healthcare. | "Enterprise architecture maturity directly influences the effectiveness of hospitals' IT resources for achieving strategic goals". |
| Buntin *et al*., (2011). Literature review | To explore issues around EHR adoption for the purpose of knowledge sharing | "Most of the literature on HER adoption in healthcare confirms the benefits of EHR". |
| Buntin *et al*., (2010). Literature review | To investigate the role of IT in improving healthcare services | "Health IT can make information sharing more relevant, effective, and timely". |

| Author and study type | Aims | Findings |
|---|---|---|
| Fazey *et al.,* (2014). Systematic analysis of the literature | To develops principles for the evaluation of knowledge-exchange in interdisciplinary, multi-stakeholder environmental change research. | "A typology of seven knowledge-exchange evaluations is presented to guide discussions about the underlying assumptions of different approaches to knowledge-exchange and its evaluation. Five principles for knowledge-exchange evaluation are also identified: (i) design for multiple end users; (ii) be explicit about why a particular approach to knowledge-exchange is expected to deliver its outcomes; (iii) evaluate diverse outcomes; (iv) use evaluations as part of the process of delivering knowledge-exchange; and (v) use mixed methods to evaluate knowledge-exchange. We conclude that a catch-all approach to evaluation is neither appropriate nor desirable. Instead, approaches that focus on understanding the underlying processes of knowledge-exchange, assess the relative contribution of other factors in shaping outcomes in addition to knowledge-exchange, and that involve multiple stakeholders in implementing evaluations, will be the most appropriate for evaluating knowledge-exchange in interdisciplinary global environmental change research." |
| Nicolini *et al.,* (2008). Systematic analysis of the literature | To review the current literature on KM concepts, policies and practices in the healthcare sector. | Based on the analysis of the most relevant contributions in the last six years, this paper finds three overarching themes that have occupied the interests of authors are identified and discussed: the nature of knowing in the healthcare sector, the type of KM tools and initiatives that are suitable for the healthcare sector, and the barriers and enablers to the take up of KM practices. The paper considers on what the literature tells us about the state of the art and the future of KM in this important sector of Western economies. |
| Rajic and Young (2013). | To assist a broad spectrum of science-to-policy professionals on how to ensure that relevant and credible research is generated and utilized to inform policy- and decision-making. | The authors describe detailed methods and practices related to knowledge synthesis, KT and dissemination, knowledge-exchange and stakeholder engagement, and knowledge application and evaluation. This book includes a practical exercise to apply the concepts on a public health issue and key methodological references applicable across sectors. |

# Appendix A.2: a visual mapping of the process of the literature review analysis

Error Correction • Error detection

Choice

Decision Making

Psychology

Information processing

**Individual Learning 1978**

Interpretive systems

Group/Org Learning 1990s

CoP

Dialogue

Organisational memory

2000s

How organisations evolve, transform and renew themselves in order to face the challenges of a continuously changing environment.

The levels of evolving and stored knowledge

Individuals Groups organization and infrastructures

encompasses

Cognition

Change

Behavior

**Learning Organisation**

How should an organisation learn?

How does an organisation learn?

**Organisational learning**

emphasizes the processes through which knowledge changes or it ows

understanding the nature of knowledge

Input • **Learning Processes** • Outcome

Understanding

Acting

Interpreting

Knowledge is embedded in non-human repositories

**Strategy**

Support

Implementation Process • Formulation Process

Strategy | Culture | Structure | Systems | Routines

Barney, 1991

Resource-based view

Prescriptive

Knowledge based view

**Organisational Knowledge**

the creation

integration of knowledge

why firms exist

**Knowledge Management**

**The types of Knowledge and Theory**

postmodernism Interpretivism

Gioia and pitre 1990

Positivism

Knowledge is Subjective/Socially constructed

Multi-paradigm approach

Knowledge is Objective

Knowing by doing (dependent on action)

knowledge is codifiable as True

Comprehensive understanding

**Integrating**

(Blackler, 1995; Cook and Brown, 1999; Nicolini and Meznar, 1995; Polanyi, 1967)

Tacit | Explicitly

(Nonaka and Takeuchi, 1995), Gioia and Pitre (1990 Polanyi (1967)

Possession | Possibility

In action

Practice

Cook and Brown (1999)

**KM Processes**

By using advanced technology

Knowledge Creation | Knowledge Capture | Using Knowledge

Distributing Knowledge & Organisational performance

**Computational view of KM**

Technological capability

Process

Managing the facts through the technology | Process to identify validated facts

Relevant social content

Integrated socio-technical approach to managing actual and potential flows of Knowledge Creation, Transfer and Retention

**Organic view of KM**

Emphasizes

People and group dynamic

Social and cultural factors

Networks

Learning | Knowledge | Knowing

change in action

Doing

reflection

change in cognition

Practice

**Know how** Body procedural knowledge

**Know what** Mind declarative knowledge

Competitive advantage comes from the fi rm's capability to continually create, integrate, and reconfi gure new resources.

**Dynamic capabilities**

Teece, Pisano, and Shuen (1997)

DC as process

Eisenhardt and Martin (2000)

Best Practice

competitive advantage lies in the resource confi gurations that they create, not in the capabilities themselves

Zero-level operational capabilities (how a company earns a living now).

Dynamic capabilities, which are mathematically speaking 'fi rst derivative' of operational capabilities, i.e. their change.

'Second-order' capabilities are second derivative of operational capabilities and the 'fi rst derivative' of dynamic capabilities, i.e. their change.

Winter 2003

Routine | Process

capacity (1) to sense and shape opportunities and threats.

capacity to seize opportunities

capacity to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfi guring the business enterprise's intangible and tangible assets

Dynamic impairment

**capabilities are** The basic functional activities

capabilities as 'high level routine(s)' which in turn are 'learned and repetitious behaviors' (Winter, 2003: 991).

Teece argues DC/KM perceptive where learning is viewed as a way of development and maintenance of knowledge assets.

# Appendix A.3: The Nature of the Knowledge

The prevailing understanding of knowledge according to KM and KT studies departs from approaches concerning what makes knowledge available and understandable (Hislop, 2013; Nonaka, 2008; Nonaka and Takeuchi, 1995; Mårtensson, 2000). In other words, these studies approach knowledge by looking at the formats that give access to different forms of articulation and projection. Knowledge availability is crucial to KT and its degree (Kogut and Zander, 1996; Kane, 2010; Argote, 2012). Knowledge availability is supported by KT-processes that are structured to deliver knowledge (e.g., Nonaka and Takeuchi 1995: Spiral Dynamic). KM and KT studies argue that knowledge can be defined from two points of views: objective-based and practice-based view (Hislop, 2013; Easterby-Smith and Lyles, 2011). Some studies differentiate between knowledge gained from success and that resulting from failure. Others differentiate between simple knowledge and complex knowledge (Kumar and Demir, 2013; Ambos and Ambos, 2009).

From the objective point of view, knowledge is commonly divided into 'tacit' and 'explicit' (e.g., Nonaka and Takeuchi, (1995); Polanyi, (1966)). Availability of knowledge should be distinguished from explicit knowledge. For example, knowledge can seem explicit, but at the same time it can be monopolised by an individual or a group, or it can be owned by someone who hesitates to share it with others. These situations are obvious, especially in high-risk environments such as healthcare. Sammer *et al*., (2010) argue that the availability of knowledge is crucial to KT as a whole. Specifically in healthcare, one form of knowledge availability is studied by means of evidence-based practices that include checklists, standardisation and guidelines (Sammer *et al.*, 2010; Robinson and Dearmon, 2013). These practices are regarded useful in improving healthcare quality (Apold *et al.*, 2006; Boyce *et al.*, 2014; Clarke *et al.*, 2007; Bishop and Boyle, 2016). From the practical point of view, studying the characteristics of knowledge can unveil elements that inhibit KT. For example, Reed and Defillippi (1990) disclosed that the locality, tacitness and complexity of knowledge are factors that cause ambiguity, which may hinder communication and knowledge-circulation practice (Szulanski and Jensen, 2006; Venkitachalam and Busch, 2012).

Regarding practice as a source of knowledge, scholars not only see knowledge as tacit or explicit, but also they have examined ways in which organisations can learn. Organisation can learn through developing the organisational routine, structure and processes (Becker *et al.*, 2005; Leonardi, 2011; Argote, 2012). For instance, many studies consider crucial events, whether from failures or successes, as sources of transferable knowledge from which organisations need to learn (Maslach, 2016; Madsen and Desai, 2010; Muehlfeld *et al.*, 2012). These studies proved that these dimensions of knowledge are crucial in the learning cycle, because organisations can learn more from the failures than the successes. However, organisations tend to focus on organisational knowledge in response to successful occasions in organisational memory (Muehlfeld *et al.*, 2012). Moreover, at the individual

level of analysis, Zhao, (2011) argued that subjects (i.e. human/s) usually share successful experiences instead of ones related to failure. These issues imply that studying KT based on practice has high potential for understanding the question of knowledge.

## The Dichotomous Nature of Knowledge

The dichotomous nature of knowledge has been discussed in the literature from many angles (e.g., Tacit versus Explicit, Situated versus General, and Stickiness' versus 'Leakiness'). These dichotomies are discussed as follows.

### 'Tacit' Knowledge versus 'Explicit' Knowledge

Arguably, tacit and explicit modes of knowledge are central to KM (Grant, 1996; Teece *et al.*, 1997; Nonaka and Takeuchi, 1995; Nonaka and Von Krogh, 2009). On the one hand, tacit knowledge becomes problematic when it is to be transferred, for it cannot be articulated in verbal or discursive expressions. On the other hand, explicit knowledge can easily be articulated, codified and transferred via many methods including verbal or written communication. For example, as Polanyi, (1966) put it, riding a bicycle needs balance along with self-control skills in the flow of the movement. These three factors, balance, self-control and movement, are mandatory principles of the act of riding (i.e., explicit knowledge). However, making these principles explicit does not assure that riding is successful. In other words, riding (as tacit knowledge) requires some guidelines and demonstrations (explicit knowledge) and knowing by doing. Therefore, tacit knowledge is different from explicit knowledge in the forms of expression and doing. Many scholars view tacit and explicit knowledge as contradictory concepts (Hall and Andriani, 2002; Hall and Andriani, 2003). On the contrary, Polanyi and like-minded scholars (Nonaka, 1994; Smith, 2001) resist the view of contradiction. For them, tacit and explicit are rather complementary concepts and both are essential to one another to fully achieve a task (Brown and Duguid, 2001; Suchman, 2007). This admits that the tacit format is more difficult to apprehend than explicit knowledge, because the latter does not need to be verified by action (Brown and Duguid, 2000; Duguid, 2005a; Duguid, 2005b).

KM scholars study the synergies of knowledge-circulation and learning activities through the lens of the tacit and the explicit facets of knowledge. Szulanski, (1996) illustrates how KT activities require some level of trust between knowledge actors (e.g., sources and recipients); a boosted trust might be needed when knowledge is tacit (Levin and Cross, 2004). For example, in the healthcare domain, when the patient-record is vague, health-professionals would ask close friends for further information about the patient. Health-professionals may depend on social ties based on their integrated knowledge (i.e., bounded rationality) (Waring, 2010; Butterworth *et al.*, 2011). Moreover, tacit knowledge requires more direct methods and tools of communication and interaction than explicit knowledge in order to acquire an acceptable level of application or certain skills (Jensen and

Aanestad, 2006). In effect, tacit knowledge entails a personal dimension, which is not the case for explicit knowledge. For example, anyone can read a book, but very rarely can the book be translated into action, unless the reader has some kind of practical competency. Thus, processes of acquiring tacit knowledge are open to interpretation from knowledge actors (e.g., sources and recipients). Furthermore, tacit knowledge is a crucial source in the organisation including health organisations as a competitive advantage for its unique and inimitable characteristics/properties (Tsoukas and Mylonopoulos, 2004; Duguid, 2005a; Brown and Duguid, 2001; Grant, 1996; Grant and Baden‐Fuller, 2004; Teece *et al.*, 1997; Bratianu, 2016; Bratianu and Orzea, 2010).

Tacit knowledge only makes sense to knowledge participants within a given context. Without understanding the specific local practice, transferring tacit knowledge may become difficult to achieve due to the myriad variables that exist in that context. In other words, going back to the example of riding a bicycle, the instructor needs to tell the learner the actions that help make balance in the course of movement. However, balance will not be achieved unless the learner attempts to ride and tries at least once to move without falling over. Thus, tacit knowledge is viewed as an important resource for organisation studies, because of its hidden properties in helping organisations achieve a competitive and inimitable advantage in a given sector (Avdimiotis, 2016). In total, the tacit as well as explicit form of knowledge represents the most popular dimensions used in KM studies. Arguing that conversational connections entail a kind of representative practice, the tacit and explicit dimensions of knowledge seem to be intertwined and inseparable from actions or practice. Thus, human actors and organisations are in an ongoing feverish need to for knowledge and to hunt for knowledge, process the knowledge, interpret the knowledge, apply the knowledge, transfer the knowledge, draw on and innovate the knowledge. They need to be utilising and dynamically alternating the 'tacit' and the 'explicit' in their search for and management of knowledge.

## Situated versus General Knowledge

The second argument in KM studies addresses the following question: *Is knowledge contextual or general?*

Many scholars consider the following as an ontological question: Is the world outside or inside our brains the way we individually and collectively perceive it?[1] For example, the concept of "local knowledge" is driven by a social construction approach, by which all the social facts are local and are socially constructed (Tsoukas, 1996; Tsoukas and Chia, 2002). The possibility of knowledge being general is driven by a positivist approach, arguing that societies have considerable mechanisms by which groups function (e.g., the functionalism theory of Emile Durkheim) (Newell *et al.*, 2009). The

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[1] The Treachery of Images by Magritte, where the picture shows a pipe. Below it, Magritte painted, "*Ceci n'est pas une pipe*" ("This is not a pipe"). This example shows the argument between language and images in order to do the representation of the reality.

local dimension of knowledge is built upon its tacitness—knowledge, inherently exclusive, is dependent upon the context where it is created (Tsoukas, 1996; Tsoukas, 2002; Brown and Duguid, 2001; Venkitachalam and Busch, 2012). Tsoukas and Chia, (2002) consider reality as a dynamic by which a specific context constantly generates knowledge. Local knowledge is the outcome of the social practice specific to a context (e.g., workplace routines). Locality is usually represented by the culture, the norms and the structure of the organisation (Brown and Duguid, 2001; Nonaka and Peltokorpi, 2006). Organisations are, therefore, reluctant to transfer knowledge across groups and/or other organisations, because of the uniqueness of the context in which it was initially created. According to Patriotta (2003), the local knowledge is embodied by the local culture and practice by which employees use the technology in a particular way to enable KT between groups and individuals (Patriotta, 2003; Von Krogh *et al.*, 2012).

Local knowledge becomes the backbone of the *Community of Practice* (CoP), which means that knowledge can only be created and shared in specific contexts (Lave and Wenger, 1991). CoPs are usually defined as groups of people who share a craft or profession under specific conditions and roles. Roles and local conditions are usually created by the senior members of the group. In other words, only the human part of the practice is in charge of placing specific roles and permissions throughout the actual practice for creating and transferring knowledge. In the case of CoPs, the more interaction among practitioners and the community engages in, the more knowledge is shared and also the more individuals skilfully benefit. Thus, local knowledge, based on the social construction approach to reality, is intertwined with the practice whereby knowledge is not general but situated. This contextual dimension of knowledge affects the KT-practice between individuals (Duguid, 2005a; Brown and Duguid, 1998; Tyre and Von Hippel, 1997; Kothari *et al.*, 2012; McIver *et al.*, 2016).

Studying KM in professional contexts, such as healthcare, shows that knowledge locality is important in order to understand how health-professionals work, along with their resistance to change in specific contexts (Pentland *et al.*, 2011). Local knowledge is compared with the objective and general forms of knowledge, which regard context as an object for change. For example, in CoP studies, norms, roles and values are responsible for individuals' participation in such communities. These norms are specific and local, and when the communities feel that some change will affect the norms, they show a high level of resistance (Duguid, 2005a; Brown and Duguid, 1998; Duguid, 2005b; Orlikowski and Gash, 1994). As such, knowledge developed locally will face many difficulties in its transfer to another context by other people. In this regard, successful KT-practice may require two processes, de-contextualisation and re-contextualisation (Strambach, 2008).

## 'Stickiness' versus 'Leakiness' of Knowledge

The contextual source of knowledge is studied using the concept of stickiness (Szulanski, 1996; Szulanski, 2000; Szulanski *et al.*, 2016; Voelpel and Szulanski, 2006), which involves an important dimension of the tacitness of knowledge (Pinch and Henry, 1999). The concept of stickiness originally comes from material sciences, and refers to a situation that prevents a continuous amorphous matter, such as a liquid, from free flowing or circulating (e.g., the fluid's inherent viscosity). According to Szulanski (1996), stickiness is the tendency or propensity of a particular practice to stay within particular professional boundaries or other specific contexts. Thus, stickiness illustrates the difficulty of knowledge to move outside the context of its creation (Araujo and Novello, 2004; Jensen and Szulanski, 2004; Szulanski and Jensen, 2006; Voelpel and Szulanski, 2006; Szulanski, 2002; Szulanski *et al.*, 2016). Sticky knowledge depends on the existing professional and contextual practice or routines, and indeed contextual factors often increase its stickiness. They inhibit its flow and prevent it from moving or being transferred across contexts or organisations. Stickiness not only involves the tacitness of knowledge, but can be represented by explicit knowledge. For example, when an organisation tries to import a new practice or technology externally (e.g., from an international to a national context), it often fails to meet management objectives (Szulanski *et al.*, 2016). Here, for international studies, Szulanski signals trust as a main requirement to face these difficulties, and by which individuals can adopt a new technical practice. The cited work attributes stickiness to three main causes related to: 1) the receiver (i.e., the lack of absorptive capacity); 2) to the knowledge itself (i.e., causal ambiguity); and 3) to the relationship between sender/receiver (i.e., the arduous relationship).

Conversely, the leakiness of knowledge can be seen as the opposite of stickiness (Brown and Duguid, 2001; 2000; Ritala *et al.*, 2015). Studies show that some knowledge seems to easily leak outside the boundaries of the context or organisation (Almeida and Kogut, 1999; Brown and Duguid, 2001; Smith *et al.*, 2012). Sokhanvar *et al.*, (2014) give an example of such an event, when an employee with unique experience or skills, or a patent, leaves the organisation to work for a competitor such that the original organisation loses its competitive advantage. Therefore, the leakiness of knowledge could be considered as a disadvantage to an organisation and perhaps as a threat to strategic analysis in general. However, this threat is more serious at the organisational level than for individuals (Brusoni and Geuna, 2003). This implies that the attempt to manage sticky knowledge would give an opportunity for knowledge to be leaked outside the organisational boundaries. For example, some patents or trade secrets could be threatened by short-term contracts when employees move to a competing firm/organisation. Also, these short-term contracts could prevent knowledge

from being articulated.[2] Thus, the sticky quality of knowledge could be a reason for failing to acquire new knowledge. Such definitional problems around the question of knowledge have led some researchers to question knowledge relevance and pertinence to organisational studies (Alvesson and Robertson, 2006). An extensive body of the KM-literature argues that if knowledge is sticky, yet leaky, policies for transferring knowledge may also pose significant challenges for transformation projects at the implementation stage (Indarti, 2010; Szulanski *et al.*, 2016).

## The Multi-dimensional Nature of Knowledge

Just as some authors discuss the dichotomous quality of knowledge, others consider it to be multi-dimensional (Nelson and Winter, 2009; Nissen and Jennex, 2005; Blackler, 2002). The multi-dimensional classification of knowledge also depends on ontological and epistemological assumptions, as there are many classifications for organisational resources such as context, routine, actors, networks, culture and means.

According to Blackler, (2002), knowledge has five dimensions, 'embrained', 'embodied', 'encultured', 'embedded' and 'encoded', all discussed below.

*Embrained (cognitive) knowledge* belongs to the cognitive ability to conceptualise reality or to put it in the abstract. Ryles (1949) called this type of knowledge "know that" or "know what." The main theory on embrained knowledge in KT was double-loop learning (Argyris and Schon 1978). Peter Senge (1990) synthesised personal insight and Systems Thinking to justify the shared visions model of KT and organisational learning (Senge, 1990). In this regard, Senge developed the concept of embrained knowledge by applying mental models in order to understand how the world functions and how human actors take action.

*Embodied (perceptual) knowledge* belongs to the physical ability to perform oriented actions (i.e., the tacit knowledge). According to Ryles (1949) in his book *The Concept of Mind,* this type of knowledge is called "know how" and has an explicit part (Ryle, 2009). As Zuboff, (1988) put it, knowledge can be embodied only by people through *face-to-face* discussions and conversations along with the physical interaction that is acquired by doing so in a specific context. Suchman, (2007) became interested in such knowledge through studying the interpretations of spontaneous interactions between people and technology. Interestingly, Scribner, (1986) contribution was through questioning "how to make things happen." It is related to the intimate knowledge of a problem or a situation rather than to concepts or abstraction as this involves problem solving.

*Encultured (social) knowledge* is a process by which a society or a group can have shared understandings. It is gained through the processes of socialisation and acculturation (Blackler, 2002;

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[2] As it will be displayed in the data analysis, one of the implementation barriers is related to the circulation of employees every September.

Rechberg and Syed, 2016; Alvesson, 2012). Shared understanding and meaning systems work through communication based heavily on experience and language to construct the reality and keep it open to negotiation. Encultured knowledge is rooted in sociological studies that believed that reality is not objective truths waiting to be discovered through positivist scientific inquiries (e.g., 'social constructionism' implicates a macro-level analysis Blackler, (2002), and symbolic interactionism has a micro-level analysis Blumer, (1986)). Regarding macro-level analysis, social constructionism was used to define how the knowledge is encultured through language and communication (Shotter, 1992; Blackler, 2002). The social constructionists admit that language has a crucial role in constructing reality, so they see language not as a mirror but rather as a constituent part (Fairhurst and Grant, 2010).

As for micro-level analysis, Mead, (1934) described encultured knowledge by using the symbolic interactionism theory. This theory has individual dimensions for things and people; people act according to the symbolic meanings that they find within given situations and communications, and the aim of communication is to create a shared meaning. According to Blumer, socialisation and acculturation have three principles: meaning, language and thought (Blumer, 1986). Meaning is seeing the world as it is, for a particular purpose. Language is a means by which people negotiate meanings through symbols. Thought is an interpretation of symbols based on language.

In the early KM-literature, Swidler (1986) indicated that social transformation formulates ideologies by which the culture promotes a new formula for action. These processes of becoming are widely discussed by organisational theorists. For example, Srivastva and Barrett (1988) illustrated how the meanings in the language of a group can change over time. When people comprehend' or new meanings, they introduce new symbols into their dialogue which others may take up and develop further. Czarniawska-Joerges, (1990) in her study in the public sector discussed explicitly how consultants always try to enculturate a new transformation. Orr, (1995) argued that knowledge can be enculturated through the stories shared by employees about their complex problems. Nonaka, (2008) also discussed encultured knowledge to illustrate the knowledge-creation model in organisations (socialisation).

*Embedded (systematised) knowledge* exists in organisational routines. David and Fahey, (2000) differentiated between three types of embedded knowledge (structured, social and human) to illustrate the level of tacitness. Important work in this field was conducted by Nelson and Winter (1982-2009) who configured the capabilities of organisations (Nelson and Winter, 2009; Winter and Nelson, 1982). They analysed the organisational skills based on complex relationships among interpersonal, technological and socio-structural factors. They considered the individual's skills as a sub-element of the overall performance that coordinates with organisational skills interpersonally. Granovetter, (1985) was the first author to introduce the concept of 'embeddedness' by which he justified the theory of economic action which sees economic behaviour as a routine configured by social and institutional

arrangements. Badaracco, (1991) developed Granovetter's ideas to explore the importance of relationships and material resources in order to understand the emergent routines. In other words, embedded knowledge describes the routines as emergent events by analysing the relationships amongst technologies, governance procedures and roles. The concept of organisational routines was developed by Levitt and March, (1988), who suggested it to make historical events accessible to future members of an organisation. Organisational routines are also called 'organisational competencies' (Blackler, 2002). Furthermore, Henderson and Clark, (1990) in their study of organisational routines, distinguished between component knowledge more of a cognitive element and architectural knowledge as more of a structural one.

*Encoded (formal or symbolic) knowledge* is manifested by signs and symbols (i.e., explicit knowledge), classically written materials such as books and guidelines, or electronically typed or scanned such as emails and portable document formats. As a pioneer of this view, Zuboff, (1988) explained how knowledge could be encoded by using the power of the technology, through processes of de-contextualisation, abstraction and representation. He believed that encoded knowledge is the main process in KT whereby knowledge is available through technology for everyone with access. It is noteworthy here to mention that Poster, (1990) did significant work to explain and analyse the role of technology in the organisation; it can be an ally, if belongs to the local culture, otherwise it becomes "culturally alien."

At any rate, four dimensions of professional knowledge were recognised by Quinn *et al.*, (1998). The first dimension is self-motivated creativity to justify why we care (care-why); it shows how organisations care about their intellectual property. Second is systemic comprehension (know-why), by which professionals are permitted to move beyond the operational problems, to see a larger view of the world and to create additional value (e.g., aesthetics, happiness). Third is to acquire an advanced skill (know-how) by which professionals can translate guidelines into actual execution. The final dimension is informative and cognitive knowledge (know-what), which is essential but not sufficient for professional success, because it does not illustrate the procedural dimension.

The KM-literature hence suggests that the question of knowledge is fundamentally multi-faceted. For example, Nissen and Jennex, (2005) argued that knowledge must be considered as a multi-dimensional construct, and should not be seen as a one-dimensional view. Questions such as (know-what), and (know-how) specify the position which is consistent with the KT-practice in healthcare. This position has both tacit or procedural and explicit or declarative components (Nicolini *et al.*, 2008). These components are linked together and should be explored in combination. This conceptualisation not only helps us in clarifying the types of knowledge relevant to healthcare, but also emphasises the multi-dimensionality of knowledge.

In summary, the reality of knowledge is difficult to define, although it is agreed to be multi-dimensional aspect and strongly dependent on the ontological and epistemological assumptions of the research actors. Further dimensions are still being identified, such as actionable knowledge (Cross and Sproull, 2004) or the concept of architectural knowledge (Kruchten *et al.*, 2006; Henderson and Clark, 1990). While each of these represents influential work in the KM-literature, they all integrate some of the dimensions described above. Therefore, tacit, sticky and local qualities of knowledge emphasise the importance of studying the practice of knowledge generation, and the application which is called KT-practice in this research. The knowledge inquiry motivates studies to understand the contextual and structural dimensions (e.g., local settings or technologies) that enable the KT-practice. As my study aims to understand the KT-practice in the healthcare-context, the focus will be on the craft (professions and professionals) and the artifacts (professional context).

## Appendix A.4: Grouping the Enablers and Barriers of the KT

### Enablers of Knowledge Transfer

The literature is plenty of examples based on the factors which support KT in line with the theoretical approaches described above. However, most of these studies focus on KT's determinants such as knowledge availability and perceiving organisational rewards (Burgess, 2005; Sarker et al., 2005). Recent review studies done by Frank *et al.*, (2015), Lin *et al.*, (2012), Paulin and Suneson, (2012) and Minbaeva, (2007), collectively indicated a series of KT factors, which can be divided into four distinct groups: the characteristics of the knowledge itself, sender/s, receiver/s, the relationships between/among individuals, organisational context and the communication tools.

### Characteristics of Knowledge

Scholars argue that the role of factors leading to the availability of knowledge, such as simplicity versus complexity (Ambos and Ambos, 2009) or tacitness versus explicitness (Carlos Bou-Llusar and Segarra-Ciprés, 2006) is crucial. Thus, the degree of knowledge availability is a main enabler of KT. However, the availability of knowledge is supported by the KT-processes which are structured to deliver knowledge (e.g., Nonaka and Takeuchi 1995: Spiral Dynamic). But, the availability of knowledge is different from the knowledge being explicit. For example, knowledge could be explicit but monopolised by an individual or group, or owned by someone who hesitates to share it with others. These situations are very obvious, especially in a high-risk environment such as healthcare (Avdimiotis, 2016; Sammer *et al.*, 2010). In healthcare, one form of the availability of knowledge is studied as evidence-based best practice; it includes checklists and guidelines and is considered to improve the quality of healthcare (Sammer *et al.*, 2010; Apold *et al.*, 2006; Clarke *et al.*, 2007). In all, the availability of knowledge has an important influence on KT.

### Characteristics of Human Actors (Sender/receiver)

Individual performance is well known to depend on the both ability and willingness of the employees to deduct special performance, often distinguished as internal and external motivation. Vroom, (1964) suggested the equation: *Performance = Ability x Motivation*.

Similarly, KT depends on the ability and motivation[3] of the knowledge sender (Gillian Ragsdell *et al.*, 2016; Riege, 2007; Easterby‑Smith *et al.*, 2008) to articulate knowledge and to effectively communicate and transfer it to receivers. This will also depend on the ability and motivation of the receiver/s to absorb, accept and use the communicated knowledge (Walshe *et al.*, 2010; Mu *et al.*, 2010; Minbaeva, 2007; Minbaeva and Santangelo, 2016).

Efficient KT requires two important conditions. The first condition is the ability and motivation of the knowledge holder, and disseminative capacity (Mu *et al.*, 2010; Ju *et al.*, 2016; Gupta and Govindarajan, 2001; Szulanski, 1996). For instance, the study of the characteristics of the sender in the context of a distributed environment, in a study by Sarkar *et al.*, (2008), revealed that communication, credibility and cultural values would have strong effects on knowledge-exchange. The second one is the absorptive capacity of the receiver (Mu *et al.*, 2010; Cohen and Levinthal, 1990; Szulanski, 1996), which is defined as "the ability to exploit knowledge" (Ali *et al.*, 2011; Zahra and George, 2002). It is considered as one of the main factors contributing to extending the knowledge sharing capacity of KT. For example, Ko *et al.*, (2005) found that the absorptive capacity and the communication competence of the receiver are important enablers of KT. The ability of the receiver refers to having the necessary skills, prior to the acquisition of experience, to the shared language and to the values within the knowledge field (Minbaeva 2007; 2016). Motivational mechanisms showed that the giving organisational rewards enhances KT (Burgess, 2005).

### Characteristics of the Relationship between Sender/receiver

The methods of communication and the relationship between sender/s and receiver/s strongly affects KT (Bonache and Zárraga-Oberty, 2008). The level of trust that exists between sender/s and receiver/s may influence whether or not the knowledge is shared and how it is received (Ho *et al.*, 2012; Barson *et al.*, 2000). Significantly, such a trust is influenced by context and culture. The development of trust between agents of different nationalities or cultures requires a higher investment by the organisations to build up shared values than that required between agents with common cultural base (Roberts, 2000; Foos *et al.*, 2006). As such, the communication that is so important for KT is worthless without trust.

According to Levin and Cross, (2004) the important types of trust in this case are 'benevolence based' and 'competence based'. Benevolence-based trust means individuals trusting that each party

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[3] By motivation, this research means the willingness of individuals to transfer knowledge in order to solve problems and improve organisational performance.

intends to show goodwill. Competence-based trust refers to trust that the receiver of the knowledge has about the sender. This is more applicable in non-profit organisations such as the NHS.

## Characteristics of Organisational Context

Like the individual's characteristics and relationships, the organisational context, specifically organisational culture and trust, has a crucial effect on KT in the workplace (Alavi *et al.*, 2005; Ho *et al.*, 2012). According to Yih-Tong Sun and Scott, (2005), the cultural values within an organisation foster KT by increasing familiarity and closeness between sender/s and receiver/s. Collins and Smith, (2006) found that the existing organisational culture might encourage trust and cooperation, and the existing common language could increase knowledge-exchange. According to Li-An Ho, (2012) trust in the workplace has a positive effect on the knowledge sharing, where the structure of organisation can be either an enabler or a barrier (Seba *et al.*, 2012; Ali *et al.*, 2011; Kachra and White, 2008).

## Characteristics of Tools (Technology as a Communication and Repository for Knowledge)

The characteristics of the tools used in KT depend directly on their definition and type. They include the technology or infrastructure by which to deliver, find, categorise, interpret and implement knowledge for successful progress of KT. Technology is also required to handle the large amounts of research and case data generated every day in healthcare, allowing doctors and other staff to update their knowledge (Soto-Acosta *et al.*, 2016; Albino *et al.*, 2004). The debate whether knowledge is objective (Davenport and Prusak, 1998) or socially constructed (Lave and Wenger, 1991; Duguid, 2005) results in conflicting opinions about the role of technology for KT. Where knowledge is objective, technology plays a crucial role not only in facilitating KT, but also in storing and utilising the available knowledge. Where it is socially constructed, technology is still crucial in facilitating the communication, delivery and transfer of knowledge.

Albino *et al.*, (2004), in a theoretical study, claimed that technology to transfer knowledge can increase the speed of learning and decrease the cost of time and distance for the organisation. However, the value of technology depends on how it is used. Likewise, for KT technologies to be effective there must be facilitators and a repository for knowledge to be reused (Goodman and Darr, 1998). These considerations are consistent with the Technology Acceptance Model (TAM), which measures the perceived usefulness and ease of use of a particular technology (Davis, 1989; Venkatesh *et al.*, 2003). Seba *et al.*, (2012) concluded that appropriate, reliable, and easy-to-use IT resources would facilitate KT, while a less effective IT infrastructure could cause functional inadequacies. Most KT researchers consider technology insufficient without human involvement, and organisations are always in search of the right balance between technology- and human-centred approaches. In other words, it is not enough for the technology to exist; it must also be accepted by its users (Alavi *et al.*, 2005; Alavi and Leidner, 1999).

Despite the mounting evidence on the importance of technology and other enablers for KT and learning, the study of technology in healthcare situations in developing countries is still limited (see Table D.1 for a summary of the enablers of KT). There is an increased need for conducting comprehensive studies which address the of KT-practice in healthcare-settings (Pentland *et al.*, 2011; Tasselli, 2015; Masri *et al.*, 2017; Nicolini *et al.*, 2008). In the UK, the NHS offers a unique opportunity because of its own unique culture, distributed locations and special resources.

**Table D.1 The enablers of Knowledge Transfer**

| Category | Factor (s) | Definition | Study |
|---|---|---|---|
| **Characteristics of knowledge** | Availability (simplicity and explicitness) | The extent of possible opportunities to make knowledge available and easily accessible for use | Zander and Kogut, (1995); Bou-Llusar and Segarra., (2006); Apold et al., (2006); Ambos and Ambos., (2009); Marella., 2007; and Sammer et al., (2010); Bratianu (2016). |
| **Characteristics of sender's capacity (dissemination).** | Ability | Abilities to find, manage and share knowledge | Szulanski, (1996); Gupta and Simonin, (1999); Govindarajan, (2000); Minbaeva, (2007); Mu et al., (2010). |
| | Motivation | Willingness and belief in the value of sharing | Grant, (1997); Zahra and George, (2002); Riege, (2007); Easterby Smith et al., (2008); Mu et al. (2010) |
| **Characteristics of receiver's capacity (absorptive capacity)** | Ability | Having necessary skills, shared language and related prior-experience | Ko et al., (2005); Walshe et al., (2010); Mu et al., (2010). |
| | Motivation | Willingness to contribute to organisational performance | Szulanski., (1996); Zahra and George., (2002); Minbaeva., (2007). |
| **Characteristics of the relationship between the sender and receiver** | Closeness of the relationships between the sender and receiver | The degree of involvement of sender and receiver in communication channels and integrative mechanisms within a firm. | Szulanski, (1996); Minbaeva., (2007); Bonache and Zarraga., (2008); Li-An Ho et al., (2012). |
| **Characteristics of contexts** | Supporting culture | The existence of values and behaviours that increase interaction among individuals and promote KT | Sun and Scott, (2005); Collins et al., (2006); Li-An Ho., (2012); Seba et al., (2012); (Bishop and Boyle 2016). |
| **Characteristics of** | Technology | Design the tools, technology | Davis et al., (1989); Alavi and |

## Barriers to Knowledge Transfer

Substantial barriers and noise complicate KT within organisations (Szulanski, 1996) and certainly across networks (Mu *et al.*, 2010). These barriers are dynamic and multi-dimensional, and they depend on the perspectives of analysis (i.e., individual level has different barriers than the

organisational level of analysis). This section reviews the limited literature that has addressed the barriers to KT, using Szulanski's categories (Szulanski, 1996; Szulanski, 2000; Szulanski *et al.*, 2004; Szulanski *et al.*, 2016).

### Characteristics of Knowledge

Previous studies have identified stickiness, ambiguity and complexity as the main barriers to KT among units. Szulanski (1996; 2004) explored the internal stickiness of knowledge (the factors that impede the intra-firm transfer of knowledge). He identified two sets of factors that create internal stickiness to be ambiguity and tacitness. Junni and Sarala, (2011) and Simonin, (1999) found that knowledge ambiguity is caused by many variables (e.g., tacitness, prior experience, complexity, cultural distance and organisational distance); whereas other studies emphasised the influence of complexity (Carlos Bou-Llusar and Segarra-Ciprés, 2006; Easterby‑Smith *et al.*, 2008; Lin *et al.*, 2012; Lin *et al.*, 2008). Furthermore, Lin *et al.*, (2008; 2012), in their study of KT in healthcare, found that tacitness, uncertainty, complexity, lack of standards, and lack of evidence-based solutions are the main barriers to KT relevant to knowledge characteristics. On the whole, there is, however, a consensus in the literature on the three potential barriers (ambiguity, tacitness, and complexity). However, these barriers still need further investigation especially in the healthcare-context.

### Characteristics of Human Agents (Sender/receiver)

KT efficiency has been established as dependent on participants' motivation (Mu *et al.*, 2010). Pérez‑Nordtvedt *et al.*, (2008) argued that lack of motivation and communication skills reduce KT, which in turn decreases learning. Similarly, if knowledge holders had insufficient ability to transfer the required knowledge to receivers, the effectiveness and efficiency of KT would be significantly reduced (Mu et al., 2010). Mirani (2006) also stressed that lack of communication skills has a negative impact on KT. He claimed that employees are usually positively treated when they hold unique knowledge within organisations; conversely losing their uniqueness in relation to colleagues may reduce their willingness for KT. Paradoxically, sharing knowledge might reduce the individual's position of uniqueness (Wang and Noe, 2010). Easterby‑Smith *et al.*, (2008) argued that receivers need to use their absorptive capacity to diffuse and assimilate knowledge in their daily practice. Otherwise, they are unable to evaluate the potential value of KT efficiently. Joshi *et al.*, (2007) specifically focused on the receiver's side, arguing that unless a source is reliable and reputable, or has good disseminative capacity, it will negatively affect the KT. Other studies confirm such a proposal: when the ability and motivation of employees are high, KT is significantly improved, and *vice versa* (Minbaeva and Santangelo, 2016; Wang and Wang, 2012). All in all, the lack of motivation, ability, and absorptive and disseminative capacity are all potential barriers to KT.

### Characteristics of the Relationship between Sender/receiver

In addition to the previous factors are the exchange of knowledge itself and the relationships type between KT units. In different manner, the methods of communication and the relationship between sender/s and receiver/s strongly affect the KT-practice (Szulanski, 1996). The literature indicates that the lack of trust, the lack of credibility (Joshi *et al.*, 2007; Intezari *et al.*, 2017) and the lack of communication competence, including language, are all significant barriers.

## Characteristics of Organisational Context

The barriers related to organisational context include culture, leadership and structure (Mueller, 2015; Mueller, 2012). Usually, these barriers are implanted in organisational practices where they impact the communication processes. Throughout problem-solving, actors progress and adjust their appreciative as the context emerges and undergoes transformation. Context influences people's attitudes and choices, and the influence may extend to affect the problems that are considered to be solvable or being solved. Further barriers to KT at the organisational level include the lack of supporting leadership (Roberts *et al.*, 2012; Degafu, 2016), a rigid structure(Bohorquez Lopez and Esteves, 2009; Small and Walker, 2011; Ivory *et al.*, 2006) and the lack of supporting culture and trust in the workplace (Jones *et al.*, 2006; Mueller, 2012; Moon *et al.*, 2016; Ajmal and Koskinen, 2008; Wiewiora *et al.*, 2013). It can be concluded that the culture, structure and trust at the workplace in organisations are key factors in KT-practice.

## Characteristics of Tools (Technology as a communication and repository for knowledge)

Bourouni *et al.*, (2015) argue that in addition to personal, cultural and organisational obstacles to sharing knowledge, the technology used to transfer and store knowledge (i.e., communication and information systems) may be itself a barrier, especially if the means of KT are difficult to use. Riege, (2007) recognised the main technology barrier as unacceptance resulting from insufficient training in the new technologies, lack of technical support and maintenance of IT, lack of integration of processes and technologies, and unawareness of the advantages of technology. In their study of knowledge sharing in the public sector, Seba *et al.*, (2012) concluded that a less effective IT infrastructure dominated by functional inadequacies or conflictive political agendas may act as a barrier to KT. Moreover, in a healthcare study, Pentland *et al.*, (2011) argued that the technological barriers to KT include clinicians' lack of access to up-to-date information sources, reluctance to accept the available technology, lack of time for inquiry, complexity, and poor organisation of the information. These issues make KT more sensitive to technology-laden factors.

The problem of technology acceptance frequently emerge when the software is designed and developed without input from the users of the system (Mortenson and Vidgen, 2016), resulting in a cognitive gap*;* the gap between a user's mental model and the system's reality (Norman, 2013). This happens when the mental image of the creator of a tool, with regard to the sought solution, is different

from the mental model of the user, with regard to the tool operation. In summary, the technological barriers such as unacceptance, lack of infrastructure and the cognitive gap have a crucial effect on KT. Table D.2 summarises the barriers to KT.

## Table D.2. The barriers to Knowledge Transfer

| Category | Factor (s) | Definition | Study |
|---|---|---|---|
| Characteristics of knowledge | Ambiguity | Degree of lack of understanding between elements and consequences of actions | Szulanski, (1996); Simonin (1999) Szulanski et al., (2004), Junni and Sarala (2011). |
| | Tacitness | Degree to which knowledge is not modifiable | Szulanski, (1996: 2004); Lin et al., (2008). |
| | Complexity | The amount of related practices, individual, skills etc attached to a knowledge set | Bou-Llusar and Segarra, (2006); Easterby Smith et al., (2008); Lin et al., (2008; 2012). |
| Characteristics of sender | Lack of motivation | Lack of personal tendency to participate in organisational practices | Szulanski, (1996); Perez-Nordtvedt et al., (2008); Wang and Noe, (2010); Mu et al., (2010). |
| | Lack of disseminative capacity | Insufficient capability of a source to be reliable and reputable | Joshi et al., (2007); Mu et al., (2010); Wang and Wang (2012). |
| Characteristics of receiver | Lack of absorptive capacity | Inability to assess assimilate and apply acquired knowledge | Szulanski, (1996); Easterby Smith et al., (2008): (Wang and Noe 2010); Minbaeva and Santangelo (2016). |
| | Lack of motivation | Lack of personal tendency to absorb in organisational practices | Szulanski, (1996); Smith et al., (2008); Yeoh, (2009). |
| Characteristics of the relationship between sender/s and receiver/s | Lack of trust | Lack of eagerness to be vulnerable based on reliance on other parties' knowledge | Inkpen and Tsang, (2005); Lin et al., (2008); Najafi-Tavani et al. (2012). |
| | Lack of communication competence | Lack of skills to perform appropriate communicative behaviours | Ko et al., (2005); Xu and Ma, (2008). |
| | Lack of source credibility | When the receiver perceives the source of knowledge as unconvincing | Sarker, (2005); Elwyn et al, (2007); Mueller (2015). |
| Characteristics of the context | Lack of supporting culture | Lack of supporting norms and values regarding KT in the organisation | Cline and Ryan, (2006); Liebwitz et al., (2007); Jones, Ajmal and Koskinen, (2008); Mueller (2015); Mueller (2012). |
| | Rigid Structure (bureaucracy) | Inflexible organisational culture | Grant, (1997); Ivory et al., (2006); Lopez and Esteves, (2009); Small and Walker (2011). |
| | Lack of supporting leadership, and trust at workplace. | When the manger has no tendency to support the KT practice or culture | Disterer, (2001); Volpel, von Pierer and Streb, (2006); Xu and Ma, (2008); Roberts et al. (2012); Degafu (2016); Moon et al. 2016. |
| Characteristics of tools and methods for KT | Lack of acceptance | When the participants consider that the technology is not conforming to standard usage | Detmer and Shortliffe; (1997); Riege, (2005); Drummond-Hay and Saidel (2004); Seba et al., (2012). |
| | Lack of integration of infrastructure | Internet, intranet, security and maintenance services. | Brandon and Hollingshead, (2004); Seba et al., (2012). |
| | Cognitive gap and lack of familiarity | The gap between the user's model and designer's model | Norman, (1990); Lin et al., (2012); Mortenson and Vidgen (2016). |
| | Lack of trust in a system (security); Lack of training regarding new IT systems. | | Lin et al., (2012); Norman (2013). |

## Appendix B.1: The effects of the trust on the KT-practice

The absence or presence of trust plays a crucial role in mediating the relationship between the HR leadership and knowledge mobilization (Pervaiz et al., 2016), as summarised in the following six points.

First, many studies pointed out that the organisational innovation implementation and KT are supported by feedback mechanisms. Likewise, these studies indicate a lack of consistency across the NHS (Currie *et al.*, 2008; Correia and Denis, 2016; Berridge *et al.*, 2007). The assessment of professional work, during the implementation of change, did seem to contribute to promotion and rewards in this professional body. Correia and Denis, (2016) argued that a hybrid management approach (i.e. clinician-manager) is a key to enhancing accountability and trustful inter-professional relations. They found that managerial tools by themselves usually increase external control and decrease professional autonomy, whereas, the hybrid managers could use managerial tools to evaluate the trust-based relationships with no effect on professional autonomy.

Second, HRM and leadership practice inform the role of performance appraisal in the KM context and KT-practice. For example, Berridge *et al.*, (2007) argued that healthcare performance appraisals are often perceived to have less value when they are conducted by managers. Their study also reveals a lack of integration between the performance appraisal and opportunities for development and promotion, e.g., the healthcare performance evaluations at the nursing level were ineffectively addressed. On the one hand, a lack of performance appraisals can have a negative impact on the organisational and individual outcome, reducing the opportunity to develop new skills and increasing demotivation as skills are no longer traced through a sustained fabric of relationships. On the other hand, systematic performance appraisal is critical to provide empirical evidence of organisational learning and development, and is useful for planning the development of health personnel's skills across the whole organisation (Arora and Sevdalis, 2010; Kang *et al.*, 2014; Mitchell and Flin, 2008).

Third, rewards and incentives are central to the development of the healthcare sector in order to capture and implement new knowledge successfully (Ford *et al.*, 2010). Especially at the professional practice level, many studies have found only a limited relationship among tangible rewards and incentives and the KT-practice (e.g. Bjerregaard *et al.*, (2016); Bjerregaard *et al.*, (2015) and Heyes, (2005)). Conversely, rewards and incentives can become more relevant over time, when they can attract students to choose a specific profession (Nelson and Folbre, 2006; Nelson, 2011). Thus, the role of rewards and incentives in the KT-practice remains controversial and in need for further investigation to assess what kinds of rewards and incentives could facilitate KT in the NHS.

Fourth, HRM practices involve recruitment and retention policies, but affecting KT-practice and the introduction of new projects only to a limited extent in the NHS (Price, 2009; Evans, 2003; Runar Edvardsson, 2008; Madhoushi *et al.*, 2010). However, other studies have shown that major, such as the ongoing shortage of doctors and nurses in the NHS, actually stem from HRM policies (Duffield *et al.*, 2006; Rondeau *et al.*, 2009). Many studies reveal that given the current problems these professions face, nursing is becoming unattractive for young people (Hernandez, 2009; Matsushita and Kijima, 2014; Harvey *et al.*, 2004). This means that recruitment policies are ineffective in providing sufficient nursing staff. The less active the professionals, the more pressure there is on current staff (Iwuala *et al.*, 2015). Many professionals accordingly may work for more years, longer than what used to be common, before retirement (Ingersoll *et al.*, 2002). In turn, this makes the healthcare environment more difficult for individuals to find the time and energy to transfer knowledge (Schopman *et al.*, 2017). In conclusion, the recruitment and retention practices affect the dynamics and vitality of healthcare-professions, reducing the opportunities for KT.

Fifth, the relationship between career development and KT in the NHS has received little scholarly attention. Recent developments, such as the Knowledge and Skills Framework (KSF) (Curran *et al.*, 2013) suggest that the career development does not take into account retention issues; as in the case of a professional that does not share or contribute to KT (i.e., low morale). Nevertheless, the KSF framework has implications for research on the KT-practice, such as staff development, health, safety and security, equality and diversity, and quality (Department of Health, 2006).

Sixth, several studies suggest that restricted professional mobility and professional values and norms may inhibit the KT-practice (Currie and Suhomlinova, 2006). Despite the aim of recent reforms on resolving blurred professional career pathways and promoting alternative career moves, health-professionals are still controlled locally by organisational and professional boundaries (Goodman and Clemow, 2010; Tracey and Nicholl, 2007).

## Appendix B.2: The Doctors-Nurses Relationships

The literature about doctor-nurse relationship shows that nurses usually have a wide range of strategies to legitimise their position while enhancing their professional work before medical specialisation. The reasons for this ongoing conflict are as follows:

First, the doctor-nurse relationship is traditionally one in which nurses obey doctors' instructions (Muller-Juge *et al.*, 2014; Ramji, 2016; Chua and Clegg, 1990), with little opportunity for discussion or negotiation (Muller-Juge *et al.*, 2014).

Second, as identified by many studies conducting a role-playing games of "Yes, doctor," Weaver, (2013) deduced that the 'Face-Saving' strategy is a key game in which doctors and nurses are often involved upon making clinical choices. (Weaver, 2013; Stein, 1967) proposed that the

fundamental rule of this 'Doctor-Nurse Game' is that open disagreement between the players is not acceptable in a professional environment, whatever the cost, citing that "The physician, in requesting a recommendation from a nurse, must do so without appearing to be asking for it" (p. 699). This fifty-year old study has been a subject for some criticism for major empirical errors: It primarily examined brief telephone conversations, resulting in fallible and unreliable data. Nevertheless, Stein's study was a seminal endeavour in the accountability of interpersonal and cross-functional teamwork in the healthcare-context, because it provides a sociological illustration of the relationship between doctor and nurses, where both players are getting what they want (Sander, 2008; Muller-Juge *et al.*, 2014).

Third, the interpersonal doctor-nurse relationship has been regarded as a form of "negotiated order," i.e., a social order in the workplace negotiated between physicians and nurses (Bezemer *et al.*, 2011). According to the view provided by Svensson, (1996), the negotiated order highlights the existence of structural constraints which, at times, either enable or hinder the doctor-nurse relationship. The negotiation-order as an analytical aspect was recognized as more powerful than the actual doctor-nurse game, because it admitting the conflictive *relationscape* among the professions (Goldman *et al.*, 2016; Håland, 2012). Thus, because an insuperable boundary between doctors and nurses continues to exist, the relationship will be never released from its inter-professional boundaries. Indeed, this relationship has a dynamic property within its context, and NHS studies have shown empirically that the negotiated order between doctors and nurses exists even when they are working in the same team (Nancarrow and Borthwick, 2005; Sanders and Harrison, 2008; Håland, 2012). However, the participation of nurses in the clinical decision-making process is often disputed or neglected, especially when their contribution reverses clinical decisions made by doctors (Goodwin *et al.*, 2005; Xyrichis, 2014; Harsh and Kumar, 2016). As such, doctors may not be willing to accept the recommendations made by nurses. This professional propensity makes KT from nurses to doctors, and across the healthcare-system, very difficult. Therefore, opportunities for the KT-practice may be limited to interpersonal and cross-functional team levels.

Conceptually, the doctor-nurse game and negotiated order disclose additional dimensions of the everyday professional reality to better understand the KT-practice in the NHS-context. They reveal how social/interpersonal relationships affect the social life of the healthcare environment as much as the KT-practice does. For example, Finn and Waring, (2006), drawing on a hospital-based empirical study, found that the conflict of the negotiated order often constrains the KT-practice. Indeed, health-professionals, including —doctors and nurses in the operating theatre— usually do not share or transfer knowledge as expected by the NHS organisational goals because these goals often conflict with professional objectives (Finn and Waring, 2006). For example, when a particular doctor gives an order, s/he does not wait for feedback from nurses or allow any interaction with other staff. Moreover, professional/technical knowledge developed by the medical occupation often overwhelms contextual

knowledge developed in the workplace. In a few words, even when working as a team in operating theatres, the professional hierarchy remains where coordination may act as to overrule hierarchical conflicts and professional boundaries.

## Appendix C.1: Other Philosophical Approaches

Up to this point, I have reviewed the main philosophical assumptions emphasising the practice of social studies, and specified the main position of this research.[41] These assumptions were discussed openly in order to provide consistent justified position for this research in relation with the focal context and interests. However, I note that there are other philosophical approaches that have been used in the social and management studies such as critical realism, pragmatism, postmodernism, feminism and critical inquiry. Although these named things exist, and based on the research inquiry I preferred to take a brief discussion of them into account while doing this research. Although the theoretical perspectives are already defined now, I advocate it is still worthy to briefly spotlight a selection of those philosophical approaches.

*Critical realism* has a key feature in its analysis which is represented as "structured ontology" which can be explained by three levels of domains; empirical (combination of experiences plus perceptions of people), actual (combination of events and actions detected by observations), and real domain (i.e., combination of events and appearance to know what all things are) (Bhaskar, 2014). This approach claims that social worlds are generated through external impact (e.g., due to social conditions) on individuals and their interactions (Ackroyd and Fleetwood, 2000). However, my study considers that critical realism in healthcare could reduce the position of actors in certain cases (e.g., being fixed in only one role-play, and with not much consideration towards the dynamic state of being, such as being a doctor and a manager at the same time).[42] Also, based on the Indeterminacy Principle (Wheeler and Zurek, 2014), discussed above, the limitation of the observation tools or mediators keeps the question opened for delivering interpretation or a meaning(s) but this fails to specify truth. In other words, the "structured ontology" should be based on the meaning and interpretation as long as observations are limited.

*Critical inquiry* is based on the Frankfurt School that attempts to study and criticise the effect of social structure and technology on the development of human (Easterby-Smith *et al.*, 2012). Habermas, (1970) was the pioneer of this movement, who argued that social interactions lead to alienation and inequalities through unseen systems. Therefore, all societies have levels of irrationality, which creates fabricated consciousness regarding desires and necessities. Thus, people in capitalist communities would be tempted to and lured into wanting or paying for or products that they do not

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[41] The researcher considers that the difference between the epistemological aspect and the theoretical perspective is more related to the differences between knowledge creation process and the context of that very process.

[42] Speculative realism overturns the privilege of human being over other entities.

really need. Habermas, (1970) argued that the knowledge of "Truth" is subjective, but it will be articulated by the interests of the most powerful groups in a society. He differentiated between social and natural sciences by emphasising that natural science is one way of observation (i.e., Monologic), where the observer investigates inert objects. However, social scientists usually conduct a two-way communication research method (i.e., dialogic), where knowledge, therefore, can be reached through communication and rational consensus rather than imposing one opinion over another.

The healthcare in the UK, which is both based on political processes and intensive organisation, always increases the relevance of the practical philosophical approaches in order to apply potential solutions. However, regarding the material as an inert objective (EPR) would reduce the meaning of its potentiality (Håland, 2012; Jensen and Aanestad, 2007b).

*Postmodernism* is used to criticise the literature since 1926 (Easterby-Smith *et al.*, 2012). However, the first academic attention about this approach was delivered by Lyotard, (1984), followed by Derrida (1978), Deleuze (1988), Pierre Bourdieu (1979) and Foucault (1979). Postmodernists discuss three major points. In the first they criticise the scientific endeavours by claiming that they are not very necessary. Lyotard, (1984) argued that sciences make many companies more powerful than states by controlling, and knowing knowledge-creation. The second point of postmodernism links human, architecture and arts through the experimental movements which can compensate for traditional forms of modernism. The third is related to the ontological position, where postmodernists, based on the dynamics and change of process of being, reject realism, but they support relativism and mere nihilism (Lyotard, 1984).

In the management studies, postmodernists define the organisations based on the flux and flexibility of reality by studying the organisational dynamics and change. Also, they emphasise the invisible elements of the organisations such as dynamic routine, tacit knowledge and informal communication and decision-making. For example, immanence by Deleuze, (1997) criticises the role and motivation of having industrial organisations, and whether such organisations have permanent values to the public. Thus, the state of being within or not going beyond a given domain underpinned the researcher criticism about the constrained ontology of any context including healthcare.

*Feminism* basically has grown critical of the status quo, but based on the gender perspective that women's involvement has been undervalued by societies in all fields including leadership and science. Blaikie, (2007) argued that the lack of women's involvement in the scientific field created a gender bias in research problem definition, in research-design, and in research interpretation. For example, in healthcare most of the nurses have gender bias (i.e., mostly women), and by ignoring the gender dimension it would be not possible, in this context, to understand the practice and human behaviour such as knowledge sharing, technology acceptance or resistance, *et cetera*.

*Pragmatism* originally generated by two main American philosophers; William James who based his ideation on the internal realism of ontology, and John Dewey who based his philosophy on relativism of ontology in the early of the twenty century (Van de Ven, 2007). Pragmatists in their epistemology do not accept the prior law of theory by which the reality is shaped, and also they doubt that people construct their views or what is right or true out of nothing (Creswell, 2013). In other words, pragmatists try to characterise the relationship between the theory and praxis, but they predetermine the outcomes of the knowledge inquiry. Thus, the social structure can only come from the own experience of the actors. Pragmatists endeavour to reach the balance between the abstract and the observation (Easterby-Smith *et al.*, 2012). In learning theory, for example, Kolb learning cycle, which defines learning as continual movement from experience to action and back to experience, was based on the pragmatic philosophy (Kolb, 2014). In my research, I have used specific assumptions that can agree with the pragmatism approach, that reality can become through the collective practices.

## Appendix C.2: Qualitative versus Quantitative

### Research Approach (Qualitative versus Quantitative)

Danermark, (2002) argued that quantitative and qualitative methods are usually considered as two main approaches in social science methodology. Qualitative research is broadly defined by Strauss and Corbin, (1990) as *"any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification"* (pp. 17-18). In other words, while quantitative researchers usually try to produce general findings, the qualitative investigators look for extrapolation, interpretation and understanding of the phenomena under focus. According to Creswell, (2013) quantitative research tests a phenomenon through assembling and analysing numeric data through using mathematical and statistical methods. While, qualitative research is defined by Shank, (2006) as *"a form of systematic empirical inquiry into meaning"* (p. 5). These differences in the definitions impose differentiations in methods of gathering and analysing data and also in the writing style of each approach.

In this section, I elaborate on the differences between the quantitative and qualitative methods by comparing the main characteristics of both. First, quantitative assumptions are mostly conclusive, but the qualitative ones are mainly exploratory. The conclusive assumption seeks to develop objective quantities in order to describe an observed phenomenon. Whereas, the exploratory one uses resilient, dynamic methods to comprehensively explore the phenomenon (Malhotra and Birks, 2007). Therefore, the fundamental ways of conclusive verifications use quantitative tools to test specific hypotheses (e.g., questionnaires). But, the primary methods of exploratory verifications, such as interviews and observations, use insightful techniques to understand the subject of a specific phenomenon. In other words, qualitative methods rely on meaningful interpretations of data generated from various perspectives of a phenomenon under research (Hesse-Biber and Leavy, 2006).

According to Tewksbury, (2009), the main focus of the qualitative endeavours is to conduct in-depth interpretation of the social realm. Moreover, the qualitative methods do not seek to identify 'facts' that could be replicable, but they try to explore how the research could improve an applicable understanding on a specific subject (Hesse-Biber and Leavy, 2006). The level of flexibility in the qualitative methods encourages better understanding of the phenomenon being explored in a complex environment such as healthcare (Yin, 2013).

In order to compare between the quantitative and qualitative techniques of data-collection, surveys, questionnaires and experiments are considered the main tools for data-collection in the quantitative social science (see Table 5.5). However, observation and interviews represent the main tools of qualitative social research (Myers and Avison, 2002; Onwuegbuzie and Leech, 2005; Denzin and Lincoln, 2011).

**Table C.3.1. Differences between the Quantitative and Qualitative Methods**

| Quantitative researchers | Qualitative researchers |
|---|---|
| Quantitative researchers mainly look for a cause and effect relationship or try to prove a causal relationship. | Qualitative researchers mainly look for meanings in the social context. |
| Quantitative researchers favour the formal writing style when writing up their conclusions. | Qualitative researchers favour writing informally and they prefer to write very rich and detailed descriptions about the phenomenon being studied |
| Quantitative researchers also randomly choose large samples and employ a deductive process whereas | Qualitative researchers carefully select a relatively small sample and employ an inductive process in their research. |

*Source: King and Horrocks, (2010), Creswell, (2013), and Boeije, (2009).*

All in all, there are crucial differences between qualitative and quantitative approaches and the choice between them will be strongly influenced by the researcher's ontological and epistemological assumptions. Likewise, research processes such as choosing area of concern, framework and methodology are dynamic and they are influenced by the researcher's epistemological attitude (Hesse-Biber and Leavy, 2006; Checkland and Holwell, 1998). In short, qualitative research not only means that reality is unaccountable, but also means that reality is unquantifiable. Thus, the social inquiries are not descriptive endeavours, but more of interpretive activities.

## Appendix C.3: Guideline for the Fieldwork and Interviews

### Pilot Study

Pilot studies are defined by Prescott and Soeken, (1989) as *"small-scale versions of the planned study, trial runs of planned methods/measures, or a miniature version of the anticipated research"* (p. 60). A pilot-study is central to projects studying the interaction and communication between participants on the basis of different perspectives to get prior understanding of their perceptions and practice. A well-defined structured methodology for using a pilot-study to investigate the field is necessary in complex situations such as healthcare. Therefore, a thorough design for the pilot-study and careful interpretation of its results are critical for getting an effective pre-understanding of the new environment. Hence the pilot-study would be considered as the systematic fashion to evaluate the situation and the protocol used to develop the semi-structured interview for the second stage of my study. The pilot-study in my work aimed to detect problems of the interviews protocol (e.g., wording of questions, and meeting time). It was also designed to help clarify the logical style of the research tool. In addition, the pilot-study aimed at testing the ability of the interviewer to manage the research techniques and to know whether further training was needed.

## The justification of the Semi-Structured Interviews

Qualitative semi-structured interviews allow researchers to collect data about sensitive topics and help them get private information that interviewees might be less confident to share via other techniques (Denzin and Lincoln, 2011). Moreover, a qualitative semi-structured interview allows for collecting detailed information on perceptions, feelings, and experiences of the respondents (Myers, 2013). Qqualitative semi-structured interviews help researchers get rich and comprehensive descriptions from the participants about a phenomenon which is under investigation.

Semi-structured interview techniques is deployed in my work to achieve a much better understanding of the ways in which medical knowledge is transferred and how lessons are learned from agents such as individuals and groups within hospitals. In fact, the semi-structured interview is advisable especially when sensitivity of the context in which knowledge and KT is based is a factor (Szulanski, 1996; Argote and Ingram, 2000). However, the value of this technique lies in its ability to provide rich insights and directions for future inquiries. At each semi-structured interview, I provide a briefing to help respondents understand the phenomenon of interest and to avoid any terminological confusion.

## Interview Protocol

This Appendix introduces the Interview Protocol applied in the semi-structured interviews that were conducted during the present research. These interviews were selected as a means of data-collection, in addition to participant observation and documentation of the case analysis, according to two primary considerations. First, the semi-structured interviews are

well suited for the exploration of the respondents' perceptions and opinions, regarding complex and sometimes sensitive issues. Besides, these interviews enabled the researcher to collect tacit information and contrasted clarification of issues, the varied professional, educational and personal stories of the sample group help deploy the use of a standardized interview schedule.

Subject: **An exploration into knowledge management and knowledge transfer practice within the healthcare.**

Date:

Interviewee:

Researcher: Firas Masri

Supervisors: Professor Trevor Wood-Harper, Professor Peter Kawalek.

Main topic/title: **An exploration into knowledge transfer practice within Healthcare based upon Electronic Patient Record Development: a case study hospital in the NHS.**

**Background**

This research considers that information with objective(s) is Knowledge. Thus, the EPR can be regarded as a project of knowledge management, transfer and learning. Moreover, this study aims to explore knowledge transfer practice on the basis of multiple perspectives of different actors (sender, receiver, relationships, knowledge, technologies and methods, and context).

**Interview questions**

General questions regarding the participant's role and experience:

- Question: What is your current role? And how long have you been in that role?
- Question: What was and what is your experience(s) in Electronic Patient Record systems?

**A. General Hospital Information (most of these questions were asked only to the management board)**

a) How many subsidiaries or branches does the Trust have?
  - If there are subsidiaries or branches, are there administratively close links between the hospital and the other branches? Please, explain.
b) What is the hospital policy with regards to the purchasing, adoption and implementation of IT applications?

c) What are the rules imposed by the IT department regarding the implementation policy?

d) Do you have a specific department concerning health informatics issues?

e) If yes, what kinds of rules are imposed by the particular department regarding the purchasing, adoption and implementation of IT applications?

f) Is there any particular interest in the health informatics field, and/or participation, at the national and international levels? Please, explain.

## B. Technological Issues (most of these questions were asked to the managers and/or technicians)

a) Did you use any evaluation tools for the EPR before the adoption process? Please, explain.

b) Have you carried out any pilot projects or viewed any demonstrations regarding the EPR?

c) How does the actual state of affairs, regarding health regulations, impact on the adoption of the EPR in the organisation?

d) What is the overall cost of the adoption and the implementation of the EPR?

e) What are the main costs (e.g., hardware, software, development, maintenance, consultancy, employees' training, business process re-engineering, organisational restructuring, and standard body membership) associated with the adoption of the EPR?

f) Were the costs expected, or were there hidden additional costs? Please, explain.

g) What are the main characteristics or aspects of the EPR that must be taken into consideration before the adoption process?

h) In your opinion, how can healthcare organisations predict and respond to these aspects effectively and efficiently before the adoption process?

i) What impact did the prior knowledge of the staff have on the adoption of the EPR?

j) In your view, what other technological factors are likely to influence the adoption process of EPR in the organisation?

## C. Organisational Issues (most of these questions were asked to the managers and/or technicians and/or medical staff)

a) How is the EPR infrastructure organised?

b) What is the big picture of the integrated IT infrastructure in your hospital?

c) Is there any central integrated infrastructure, or does each subsidiary have its own infrastructure? Please, explain.

d) Could you specify the name of Information Systems (IS) that are implemented in your organisation?

e) Who initiated the idea of adopting ITs?

f) What are the main motivations for adopting the EPR?

g) What were the main practice and business problems the organisation faced before adopting the EPR?

h) What are your rules in the adoption and implementation process?

i) Were there any concerns about the current IT infrastructure before adopting the EPR?

j) How are the selected standards being supported?

k) What was the impact of the adoption of the EPR?

l) What benefits are derived from the EPR in the organisations?

    (1) Were the benefits of the EPR realised within the expected time-frame? Please, explain.

    (2) Do the benefits of the EPR outweigh the costs? Please, explain.

m) What kinds of barriers derived from the EPR in the organisations?

n) What solutions are being introduced to overcome those barriers?

o) In your opinion, what other organisational factors are likely to influence the adoption process of the EPR in the organisation?

**D. Environmental Issues (most of these questions were asked only to the management board)**

a) How did the government and/or other parties encourage and support preparatory activities (e.g., promotion and awareness-raising, pilots and demonstrations, sponsorship, information and technical support, resource allocation, vendor support, consultant support and government support) for the uptake of the EPR? Please, explain.

b) Have you carried out any consultations with regards to the ITs? If yes, what kind of impact did the consultants have on the adoption of the ITs?

c) What are the roles of the vendors in supporting the adoption of the EPR? Please, explain.

d) How does participation in the ITs activities, either at a national or an international level, impact on the adoption of the standards? Please, explain.

e) In your view, what other environmental factors are likely to influence the adoption process of the EPR in the organisation?

f) In your opinion, what kinds of solutions can overcome other environmental barriers during the EPR's implementation?

**E. Questions about practicing Knowledge Transfer (most of these questions were asked to the health-professionals and clinical managers).**

a) What is the meaning of knowledge for you?

b) How many types of knowledge do you deal with?

c) What is the source of knowledge in your view?

d) Do you think failure can be a knowledge resource? (Why?)

e) Do you have any tendency to share knowledge in general?

f) Do you share experience? How? And, with whom?

g) How do you share knowledge? Please, give an example.

h) What are the factors that affect the sharing of knowledge (technology relationship, complexity)?

      i.  Enablers

     ii.  Benefits

   iii.  Advantages

   iv.  Barriers

i) Do you encourage people to share their knowledge? How?

After the above-listed questions, participants were invited to focus on issues about the KT-practice, regarding the following elements, in relation to the EPR.

1- How would you evaluate the elements of Knowledge Transfer?

- Characteristics of knowledge.
- Characteristics of sender/receiver.
- Characteristics of relationship.
- Characteristics of context.
- Characteristics of technologies and methods.

2- Would you please discuss the following enablers?

**Characteristics of knowledge**

- The availability of knowledge.

- The simplicity of knowledge.

- The explicitness of knowledge.

**Characteristics of the sender**

- The ability to articulate or disseminate knowledge (skills and training).

- The credibility of information, communication and shared values.

**Characteristics of the receiver**

- The ability to exploit knowledge.

- The motivation to use knowledge.

- Trust in the source of knowledge.

- Rewards from the organisation to apply knowledge.

**The relationship between the sender and the receiver**

- Close relationship between the professionals.

- Intangible mechanisms: unscheduled meetings, informal seminars, or coffee break conversations

- Trust (Benevolence-based trust and Competence-based trust).

- Trust at the work place.

- Increasing familiarity and closeness between sender and receiver.

- Existing common language.

**Characteristics of context**

- The flexible structure of the organisation.

- Culture and cultural characteristics.

- Organizational structure (work environment/spaces to share/excessive size of business units).

- Organizational incentives.

- Leadership.

- Complete or standard.

**Characteristics of technology**

- Technology which is easy to use has an important role in the KT practice.

- Technology is useful to facilitate the KT practice.

- Trust in the technology will increase the use of it.

- The technology infrastructure is applicable for conducting the KT practice.

3- Would you please discuss the following barriers?

**Characteristics of knowledge**

- Ambiguity/complexity.

**Characteristics of the sender**

- Lack of time.
- Fear of reducing the own job security.
- Low awareness and realization of knowledge sharing.
- Fear of losing the ownership of intellectual property.
- Not adequately rewarded.
- Sense of self-worth.
- Poor community skills.

**Characteristics of the receiver**

- Lack of trust in people
- Technophobia.
- Lack of absorptive capability.
- Lack of retentive capacity.
- Lack of trust in knowledge.
- Lack of trust in the IT system (security).

**Characteristics of the relationship between sender and receiver**

- Untrustworthiness.
- Lack of contact time and interaction.
- Differences in experience level (i.e., individual perceptions, approaches, abilities).

- Difficult relationships.

**Characteristics of the context**

- Culture and cultural characteristics.
- Organizational structure (poor physical work environment/lack of spaces to share/excessive size of business units).
- Lack of organizational incentives.
- Lack of leadership.
- Lack of complete or standard.
- Lack of coordination between units (geographical dispersion / context differentiation / competitiveness).

**Characteristics of technology**

- Different languages.
- Failure to develop a transactive memory system.
- Lack of integration of IT systems and processes.
- Lack of compatibility among diverse IT systems.
- Unrealistic expectations of employees and mismatch with individual needs.
- Lack of systematic knowledge documentation.
- Employees lack familiarity and experience with new IT systems.
- Lack of training regarding new IT systems.
- Lack of communication with employees about the advantages of the new system.

4- Please help to confirm the effect of enablers of the KT-practice in each element.
5- Please help to confirm the effect of barriers of the KT-practice in each element.
6- Any further recommendation?

Thanks for your participation and assistance.

# Appendix D.1: The Non-Departmental Public Bodies of the DH

Table D.1.1.The executive non-departmental public bodies of the DH.

| The name of the non-departmental public body | The definition |
|---|---|
| NNHS England | Oversees the NHS in England, commissions specialised healthcare services and primary care services and oversees Clinical Commissioning Groups. |
| Monitor | Oversees Foundation Trusts and applications from NHS Trusts seeking foundation trust status. It also has the new role of examining pricing and competition in the NHS |
| NHS Trust Development Authority | Has the function of helping NHS Trusts achieve successful applications for Foundation Trust status. |
| Care Quality Commission | Has the primary function of inspecting providers of health and adult social care in England, ensuring that they meet essential standards of safety and quality |
| National Institute for Health Care Excellence | Provides advice on treatment procedures and assesses healthcare interventions for cost-effectiveness. |
| Public Health England | Supports the development of the public health workforce, jointly appointing local authority directors of public health, supporting excellence in public health practice and providing a national voice for the profession. Improves the nation's health and wellbeing and work to reduce inequalities. |
| Health & Social Care Information Centre (NHS Digital) | Provides statistical information and informatics support to the health and care system |
| Health Education England | Is responsible for ensuring enough high-quality training is available to develop the healthcare workforce |
| NHS Health Research Authority | Protects and promotes the interests of patients and the public in health research. |
| NHS Blood and Transplant | Is responsible for the supply of blood, organs, tissues and stem cells; their donation, storage and transportation. |
| Medicines and Healthcare Products Regulatory Agency | Regulates medicines and medical devices underpinned by science and research, and investigate the harmful incidents. Through the National Institute for Biological Standards and Control (NIBSC), They promote international standards and harmonisation in biological medicines. |
| NHS Business Services Authority | Provides business support services to NHS organisations, including the administration of the NHS pension scheme. |
| NHS Litigation Authority | Handles negligence claims and helps the NHS learn lessons from claims to improve patient and staff safety. |
| Human Fertilisation and Embryology Authority | Which regulates and inspects in vitro fertilisation, artificial insemination and the storage of human eggs, sperm or embryos. It also regulates human embryo research. |
| Human Tissue Authority | Regulates the use of human tissue in research and therapeutic treatments |

*(Source; Department of Health).*

# Appendix D.2: The EMRAM model

The EMRAM Europe model identifies the levels of EMR capabilities ranging from limited ancillary department systems through a paperless EMR environment. HIMSS Analytics Europe has developed a methodology and algorithms to automatically score hospitals in its database relative to IT-enabled status.

**Table D.2.1. The Healthcare Information and Management Systems Society (HIMSS), Analytics Electronic Medical Record Adoption Model (AEMRAM)**

| Stage | Capabilities | Benefit |
|---|---|---|
| Stage 7 | Medical record Fully electronic, Able to contribute CCD as by product of EHR/EMR, Data Warehousing | Paperless environment for better care & medical outcomes . Clinical analytics derived from EMR data used to improve outcomes by inputs back to operational EMR. Rich analytics due to ability to capture data at every point. |
| Stage 6 | Physician Documentation, Full CDSS | Higher level of Patient Safety, Patient Care, Enhanced Effectiveness of Care |
| Stage 5 | Closed Loop Medication Administration | Patient Safety, 5 Rights |
| Stage 4 | CPOE, CDSS | Patient Safety |
| Stage 3 | Clinical Documentation (Flow sheets), CDSS | Allow Team-Based Care |
| Stage 2 | Clinical Data Repository | Force Standardisation. Single source of Truth |
| Stage 1 | Ancillaries | Automation of Departmental Workflow. Basis for Electronic Orders |
| Stage 0 | -- | -- |

# Appendix D.3: General Potentiality of the Project

**Figure D.3.1. The general potentiality of the project**
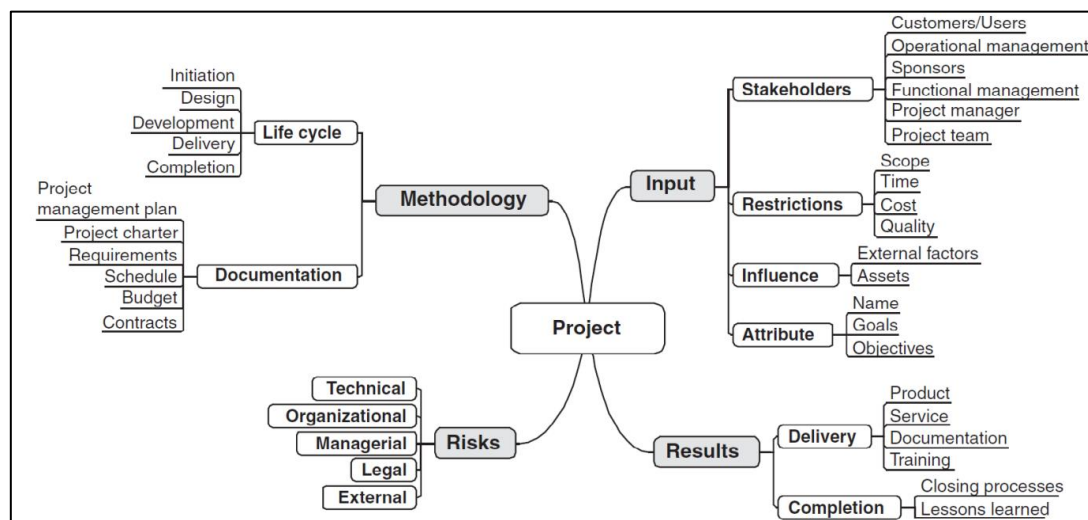


*Source: the business case of the BP Trust*
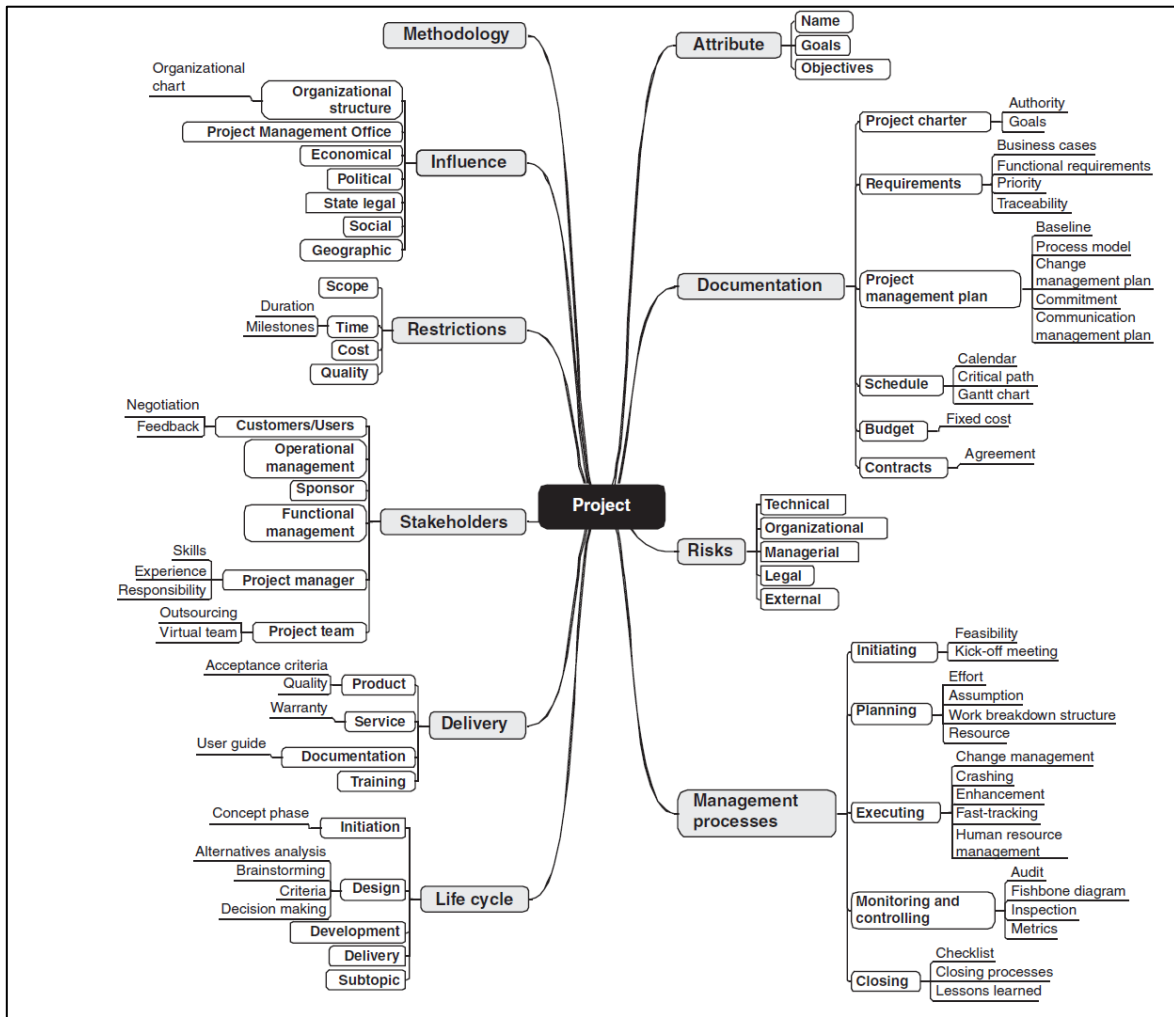
*Source: the business case of the BP Trust*

## Appendix D.4: Seven Main Potential Benefits of the EPR

The managers interviewed identified the main implication of the EPR that can support KT-practice. This relates directly to the strategic objectives of the Trust's management board. Seven main aims, and potential benefits, are detailed below.

1.   **Hold patient-records electronically**

  - Ensure clinical information is collected electronically as part of the clinical process, and forms the patient-record which is accessed easily by appropriate staff

2.   **Underpin and enable improvements to clinical care and patient safety**

  - Introduce standardised evidence-based protocols to be used in the assessment of patients, to support decision making and clinical management by all staff

  - Introduce clinical pathways to improve support for the management of patients including those with long-term conditions, providing a more responsive service

  - Improve monitoring and prevention of infections acquired in the hospital

- Provide better management information so the Trust to identify and monitor areas for improvement in quality and outcomes
- Improve patient safety via measures such as at risk alerts and positive patient identification (PPID)
- Provide order communications and electronic prescribing to reduce clinical risk and errors
- Introduce electronic prescribing and medicine administration to increase the convenience and efficiency of prescribing and to reduce drug costs
- Active patient monitoring to alert clinicians to deteriorating patients

**3. Sophisticated enterprise-wide scheduling**

- Deploy patient-centred systems, with enterprise-wide scheduling to utilise expensive resources in the most efficient way
- Provide support for scheduling and running 'one stop shop' clinics

**4.    Tracking and communication systems**

- Utilise radio-frequency identification (RFID) technology to monitor patient progress in real-time and minimise delays
- Provide the ability to locate patients and track movements in real-time and provide an audit trail in the event of infection outbreak

**5. Patient access to, and eventual control of, their own health records**

- Offer patients access to an electronic summary of their own health record via the Patient Portal, which they will be able to share with other health-professionals involved in their care
- Increase patient satisfaction via improved communication, by providing transparency about timescales and care option choices, for example (tools may include the ability for patients to access their record online, highly configurable patient letters, access to patient information leaflets and providing two-way SMS communication)
- Ability to communicate via the Patient Portal with their clinician

**6. Provision of systems that actively support best practice and efficiency**

- Support clinicians through system-generated work lists, which will prompt them for action and help move patients through the care process
- Provide access to guidelines and knowledge which will support decision making about patients' treatment and care
- Support life-long learning including access to best practice, evidence and online databases
- Allow clinicians to communicate rapidly with each other within the Trust, as well as across organisational boundaries (this could include forwarding results or documents to clinical colleagues for advice/opinion)

- Provide access to information to evaluate the effectiveness of treatments and care given to patients, including clinical outcome indicators such as rates of perioperative deaths, complications, and complexity of case-mix

- Incorporate decision support to encourage clinicians to make requests which are cost effective, avoid duplication and are in line with clinical best practice

- Take a change management approach to systems implementation, to optimise benefits by transforming existing process, introducing new working practices and reducing clinical time spent on administration. For example, streamlining the process for passing referral letters to consultants

- Record data once as part of the operational process (less duplication, more clinical involvement), leading to improved data quality to support coding and costing

## 7. External stakeholders: partnership working outside the Trust

- Provide high quality, timely clinical correspondence, including discharge information to GPs and communication with other agencies such as social services

- Enable a Health Information Exchange system across the health and social care economy to share information in the best interests of the patient.