ISSN: 0974-5823 Vol. 7 No. 1 January, 2022
International Journal of Mechanical Engineering

Explorative study on how Technology as an agent can be a dumb or absorbing entity; a case study on EPR of UK hospitals

Dr. Firas Masri
University of Virginia

Abstract - For information systems implementation, the agency theory offers unique insight into IT implementation, outcome uncertainty, incentives, and risk. However, the main argument of the agency theory is related to identifying the principal-agent and the problem in determining the accountability that arises when delegating authority to the agents. This research has used the case study of implementing EPR technology in the NHS hospitals helps in understanding the characteristics of the healthcare systems, and the challenges facing the technology innovation and implementation. It aims to understand the IT implementation in the healthcare and must-be-principal vs the actual principal and how the scarcity of the material potentiality is acting as a dominant factor of change resistance. It is founded that this this phenomenon happens when the IT (the agent) does not belong to the practice (the principal discourse). As a result, it is possible to say that the mismatch of planning horizons between the principal (professional practice) and agent (Electronic-Patient-Record technology) occurs inversely when comparing the phenomenon in healthcare organization. From practice-based-perspective, the absorbing entity is the IT, which requires a maximum interaction between the human and nonhuman without adding value to the practice at least from one stakeholder's perspective (neither being for users nor becoming from practice). In conclusion, the structuring of technology implementation in the healthcare sector from the agency theory perspective allowed the formulation of relations that complement the generalities of the theory, contributing to better understand its application and to propose a research agenda.

INTRODUCTION

Agency theory often draws on concepts from many disciplines such as psychology, economic, cognitive science, linguistics, artificial intelligence, etc. Agent in literature is rapidly emerging as a powerful paradigm for developing complex systems which can be defined in a broad sense as an entity which is capable of enacting an action (Eisenhardt, 1989). From this definition, it can be seen that the agent could be human or/and possibly nonhuman (as Latour (1987) used to call it) regardless of debatable terms of subjectivity and objectivity of agent. Pea (1985) wrote that we can think of technology in two ways: as a set of tools that amplify or extend what we currently do (make it better, faster and stronger) which is called "Enhancement", or as something with the potential to radically change what we do and how we do it which it calls "Transformation". The argument is of the qualitative rather than the quantitative. It applies to the healthcare sector. Extending what practitioners (medical and non-medical staff) currently do only amplifies their current practices, whilst using technology qualitatively affords potentially radical change in their work. In the latter position, the impact of technology in this sector is undeniable but also the nature of the agency that the technology represents is problematic.

In the healthcare context, technology can act as an agent of significant, and perhaps radical, change in healthcare practice significantly altering the way professionals, non-professionals, and hospitals operate. But it also sometimes seems to be a huge barrier to do the practice properly which it requires what is called absorptive capacity (Cohen, and Levinthal, D. A. (1990). This could justify why the healthcare is considered as a highest environment where the IT will fail to be implemented (e.g. NPfIT).

Studying the practice is related to the characteristics of the healthcare system which is considered as opened against determined and dynamic against static. A system is open if it has no definite boundary, thus allowing new, possibly unknown agents to enter or leave from time to time in the life cycle of the system. Therefore, the collection of entities (e.g., agents) in an open system may change and cannot be completely defined at design time. Clearly, open systems present design challenges that are not found in determined ones. A system is dynamic if the system elements, especially the abilities of agents in the system and the services they provide and/or the inter-agent relationships, can change at run-time. For example, the roles that an agent plays may vary in different contexts and situations, and therefore the inter-agent relationships (e.g., the interactions and/or dependencies) may also change. For a static system, all of the system elements are invariable. Typically, dynamic systems are more complicated and more difficult to develop than static ones.

LITERATURE REVIEW

Many studies proof that introducing electronic patient records EPRs, in comparisons of paper based patient records, increase data accuracy, accessibility, and healthcare safety because of reducing errors. Therefore, they provide significant cost savings (i.e. using only EPR would create a savings of up to $81-162 billion annually in USA and almost similar amount in the UK (Giunti et al., 2019; Taylor *et al*., 2005)). EPRs promote legible, complete documentation and accurate, streamlined coding and billing. They can enhance privacy and security of patient data. They help providers improve productivity and work-life balance. Also, they enable providers to improve efficiency and meet their business goals (Ahmad *et al*., 2021; Tabrizi, & Masri, 2021; Masri *et*

al., 2017). However, many studies show that less than 20% of the EPRs projects are implemented successfully (Jones, & Furukawa, 2014; Cheung, *et al*.,2013). Challenges of implementing EPRs are related to information technology, lack of uniform definitions and concepts, cultural problems, and lack of needs assessment before implementation and the challenges of structural are due to instability enforced, violations of privacy and legal cases, compromise getting information management, and lack of integration and sharing of enterprise-level (Tummers *et al.*, 2021; Jones, & Furukawa, 2014; Cheung, *et al*.,2013; Jahanbakhsh, *et al.*, 2011).

In Management Information Systems (MIS) literature, an EPR is defined as "technology that captures digital patient information and then makes it available to those with proper access" (Angst & Agarwal, 2009). The EPR is then a record of an individual incident of care. Each EPR becomes part of a larger individual EPR, which can then be shared in different environments. EPR focused on electronically capturing only physician narratives for an encounter between patients and clinicians (Tange, Hasman, de Vries Robbé, & Schouten, 1997).

Structuring the Information System very well does not necessarily lead to be implemented successfully within an organisation. In most cases of the EPR implementation, clinicians have perception that the system is not reaching its full potential, consequently it limits their acceptance. Possible causes of such perceptions include the gap between medical professional practice and the use of key functions within the EPR such as the ability to add more information into the record. In other words, the EPR cannot be accepted and/or successfully implemented unless it supports work practices (Sequist et al., 2005). Another issue is when the IT providers/designers in the public sector, usually face dilemmas based on contradictions between policy maker and professional practice (Kyhlbäck & Sutter, 2007). For instance, the policy maker might be interested in gathering data to evaluate the organisational performance, while the professional practice essentially seeks to gather/record information for patient-by-patient care. Those issues among the others show how organisational structure and practice (i.e. organisational routine, collective practice and culture) have strong influence on the successful implementation (Swiderski, 2015; and Gortner et al. 2006).

This study is to examine a situation in which even financial incentives are still important, but they do not increase the technology acceptance alone. Therefore, it is necessary to examine technology acceptance based on other acceptance mechanisms, namely the technology and practice negotiations. It tries to understand technology/practice negotiations from different aspects to enhance our prediction and control to improve the overall organizational performance. Also, it tries to examine the relationship between technology and implementers at the practice level. In this sense, Agency Theory can be used as an analytic tool to understand the position of the information system and technology within an organizational practice/hierarchy (Eisenhardt, 1989).

The key assumption of the principal-agent relationship concerns ensuring that the agent completes their delegated functions as assigned by the principal (Kiser, 1999; Ross, 1973). Here it can be seen that there are two involved parties (principal and agency) where knowledge regarding the focal task and attitudes regarding any risks involved may be at odds with one another. In the case of this study, medical information system and EPR in specific will function as an agent in tis manner. In other word, this study will attempt to analyse EPR for medical staff in NHS from the principal-agent (PA) perspective.

In most cases, the principal will sign a contract with an agent(s), that will produce the principal's expected outcome. However, agency theory considers that actors (agent/principal) are rational entities and make decisions in their own self-interest. In the normal settings of the EPR, there would be mutable principals (e.g. medical staff, management staff, patients etc) and a mutable agents (e.g. the system itself, the IT provider, the IT department etc). Significantly fewer studies concern multiple principals with one agent (Weingast, 1984) or a single principal with multiple agents (O'Toole, 1986). For example, O'Toole, (1986) examines the agency relationship between a single principal the MEDCOM, and hospitals (i.e. multiple agents). However, this study will use the simplest settings of the PA relationship as much of the research in the field focuses on the relationship between a single principal and agent (i.e. medical staff and EPR/ IT). In general, the principal tries to establish an agreement with another agent that will produce the principal's desired outcome. In the case of the staff and EPR relationship, the principal might be able to perform the function themselves or using paper based, but they might take forever to do so.

Peterson (1993) introduces five main characteristics of the PA relationship. First, agents may differ in their types; that is, an agent may be careful in one setting, while in a different setting, it may be careless. Second, the agent's action influences the desired outcome of the relationship. For example, it is usually more costly in time for a physician to provide care and then accurately and completely fill out an electronic encounter, so physicians may be less likely to comply with having to do so. Third, there are usually random factors that influence the outcome in addition to the agent's actions and type. These random factors are normally beyond the control of either the principal or the agent. An example may be an unusually heavy flow of patients into an emergency room due to an attack on a convoy of confidential vehicles. Fourth, there is the outcome, which depends on all of the previous characteristics: the type of agent, the actions taken, and the random factors outside of either party's control. This outcome is observable to both the principal and the agent. For example, an outcome could be the total number of completed encounters, or it could be comprised of many different facets, such as the quantity and quality of several relevant factors. Fifth is the concept of asymmetrical information. With asymmetrical information, normally only the agent can observe and hold the action and type. If the principal observes any action, it will come at a cost. For example, the hospital staff will observe the number and nature of patients entering the emergency room. The staff assess and make decisions for patient care and enter information into the EPR.

In addition to the main characteristics of the PA relationship, Mantzavinos, (2004) has introduced basic assumptions of such relationship. Principal and agent act within their own self-interest, information asymmetry exists between principals and agents, and goals between principals and agents can be in conflict. Therefore, there are two types of agency problems: adverse selection and moral hazard. Adverse selection refers to the agent's misrepresentation of his/her ability, and moral hazard refers to the opportunity to shirk without penalty if the principal fails to monitor adequately. For a principal to monitor and enforce the contract with an agent, they must rely on certain control mechanisms either before or after the contract begins. Research suggests that by re-examining the necessary assumptions of agent information asymmetry with the principal and separate goal setting, better policy outcomes may occur (Agranoff & McGuire, 2001; Box, 1999; Dreher & Jensen, 2007; Feldman & Khademian, 2002; Waterman

& Meier, 1998). Viewing the context of the EPR reviles the limits of a principal's control over the implementation and deploying processes.

METHODOLOGY

As this study aims to understand technology/practice negotiations from different aspects to enhance our prediction and control to improve the overall organizational performance in the healthcare context. An exploratory and qualitative inductive approach was chosen for this investigation. In more specific the main methodological approach is an exploratory qualitative case study, which draws on stakeholder analysis of EPR implementation and practice in the operating theatres, in one of the NHS Foundation Trust hospitals in, United Kingdom. This research approach helped explore and examine relationships and concepts, including the researcher's own assumptions (Eisenhardt, 1989). It can be argued that all NHS hospitals have a certain similarity, which becomes evident due to the nature and structure of the U.K. National Health Service (NHS). All hospitals in United Kingdom are expected to implement IT projects in order to response to the modernisation policy of the NHS of being (arguably) paperless in 2018.

Methods

This research adapted Multiview analysis, which incorporates with a case study approach. Multiview is an approach described in this research as a method which needs to be undertaken as part of an interpretivist approach (Wood-Harper, Antill & Avison. 1985; Avison and Wood-Harper 1990; Wood-Harper 1990). Case study approach, according to Yin (2009), can provide an access to obtain a comprehensive understanding of rich, empirical data. This study employs ethnographic observation and in-depth semi-structured interviews as methods central for data collection.

The researcher had joined the patient journey to do an operation from A to Z which it usually starts form Pre-op assessment and it is ended by discharging the patient. The interviews focused on registering the individual point of view of participants, seventeen in total. In addition, empirical accounts of their experiences in IT implementation and development, as well as of their interactions with others in shaping medical practices in a particular hospital were included. Questions also collected answers about the participants' role in the IT implementation and medical practices, views of using materials as tools, the nature Healthcare context and stakeholders and the role of structures and leadership. Each interview was accompanied with field notes and fully recorded, and later fully transcribed. The template analysis was adapted as a main approach. Detailed close reading of field notes and interview transcripts led to assign codes, which later were categorised as first-order, second order and third-order themes (See figure 1).

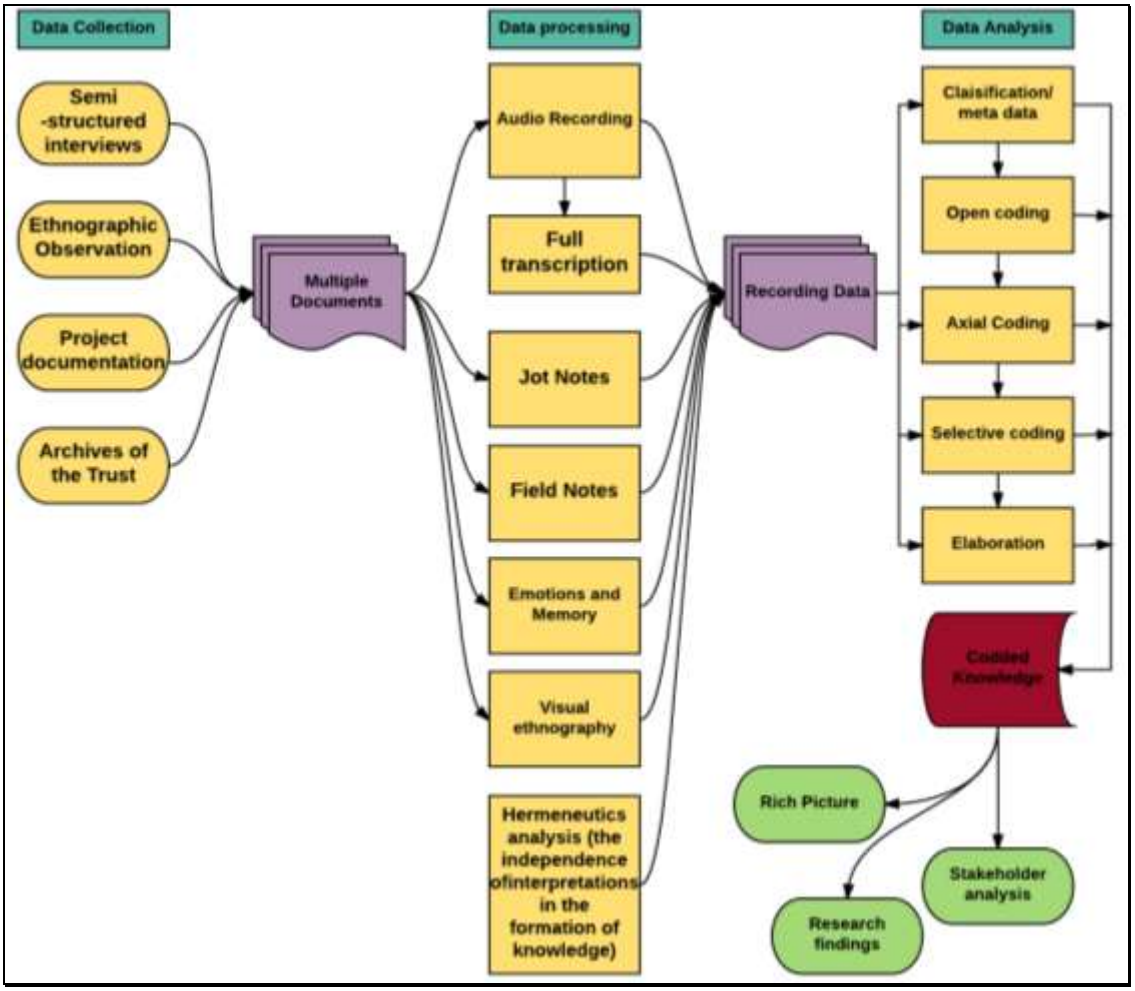

Figure (1): Data Collection & Analysis stages. Source: *Source: adapted from Strauss (1987) and Flick (2015) by* considering the Multiview.

Data collection

For data collection, 30 semi structured interviews were conducted face to face with 6 technicians, 5 project managers, 5 clinical managers, 5 clinical managers and 12 health-professionals (7 doctors and 5 nurses) (see Table 1). The interviews were one hour and half on average, but some interviews took more than three hours.

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

Table 1. Interviewees Involved in BP-Trust Case.

Data analysis

The analysis of the medical professional practice and the EPR project had been conducted through many interviews with clinicians, professional organisations, clinical managers, and administrators. This allows the researcher to understand that the digital technology agenda should be set right back to central dimension of the clinical and medical professional practice. In terms of the clinical practice, it is invaluable 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 locally what happens in order to make best clinical practices, through vital communication with the patient and health providers. For instance, it is very important to add the technology that can collect and articulate accurate data which helps the Trust to do their managerial processes (e.g. accurate patient tariff could enhance the commissioning). However, this issue cannot be dominant above the professional and clinical practice. It is important to make it clear why there is variation across the services which depend on the data and information. It is very important to the professional and non-professional to enable and to be able to share best practice and information and technology is a key to enable to do this. The data reveals that technology should enhance the communication which is crucial in a world where patient 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.

MULTIVIEW ANALYSIS

- **The administrator and medical practitioners' view** and the problem of transformation from paper to electronic with the main problem of using the system more efficiently (see figure 2).

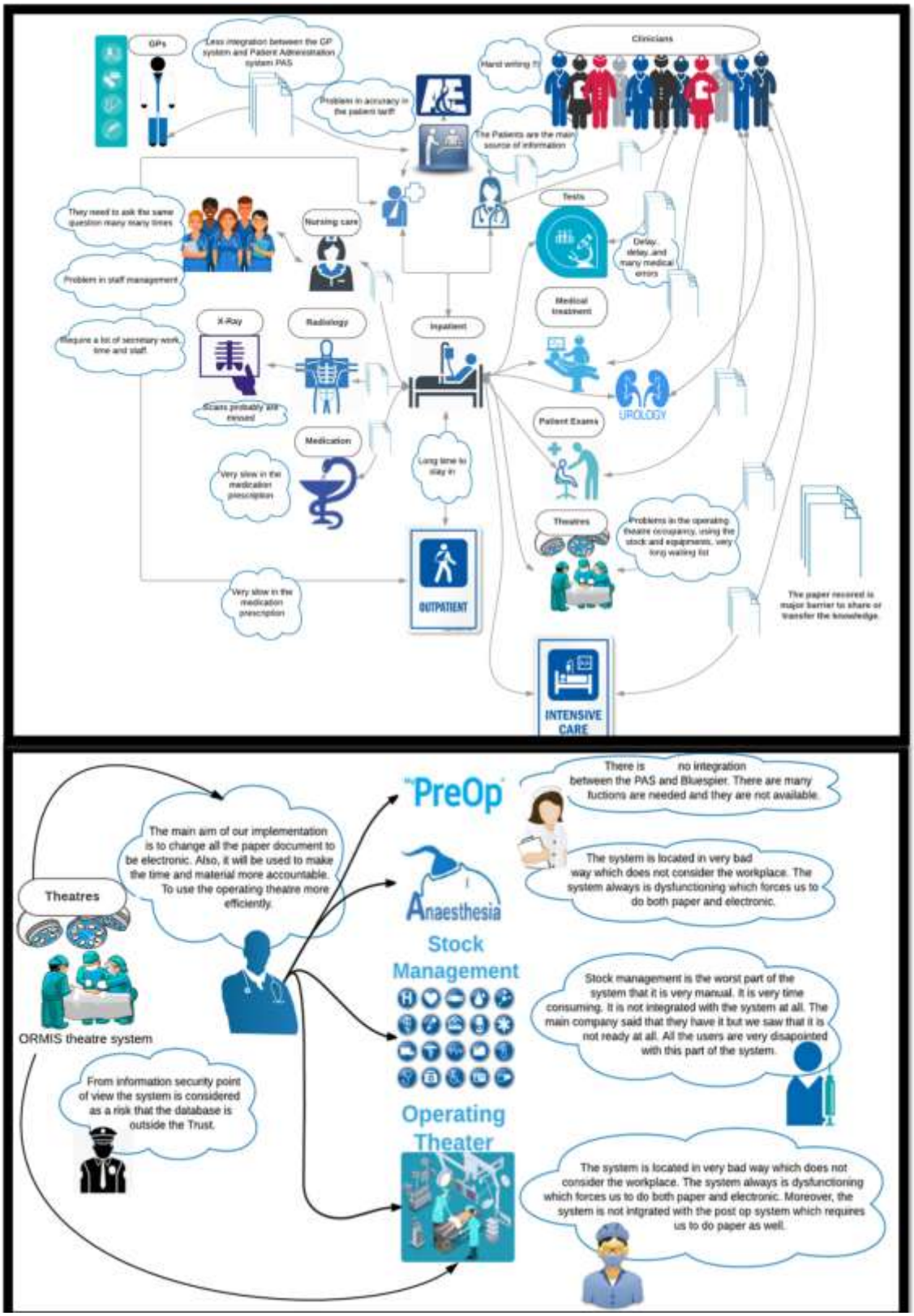

Figure (2): The analysis of the administrator and medical practitioners' view.

Figure (2) shows a rich-picture constructed from the responses, which practitioners shared to describe the situation before the EPR-system deployment.

This group identified the EPR as an IT that can facilitate their work to be done with less effort. They believe that technology should keep their work as it is, but it can make it faster and easier. They usually have huge experience in doing something which requires very close observation and managing things that requires more general view of doing things. The majority of this group sees always there is a way for best practice.

The main conflict between the practice and the technology was attributed by the professionals to many reasons:

1- **The education and training: Some participants/practitioners argued that training was an issue to use the EPR**. For example, the doctor3 argued that technology requires specific skills to get the maximum of it. He made the link between the required capacity of using the technology and the accuracy of the communication. He said:

If I want to talk about the person who can use the technology much better will transfer the knowledge much better in comparing with other who is learning about "Medicining". I think is could be accrued by training. (doctor3)

We have an information department, we have informatics centre, we have information strategy, rather than information being part of all other clinical strategies. I had rather saw informatics as someone else's business which is a different department with some really geeky people there talking a language which I do not understand.

Other participants argued the lack of familiarity with the technology has root in the education system where the nurses did not grow with using the computer during their pedagogical life. One of the nurse comments on this issue:

We have a generation who hate 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 form the staff than before. When I came here was only the blood result the only thing we were using the computer for. We have almost 30% of the staff who hate the computer. (Nurse 2)

2- **The technology intuition and the ease of use**: many practitioners argued that ease of use was an important issue to attract them to involve the technology in their work. For example, the nurses2 said:

Based on my experience with the EPR, the technology should be simple to make people easily to use it. We have a generation who hate the computer, and we need technology that reduces this feeling not to increase it. We need technology, and if we do not have technology we would not have a historical record, we have to get paper of all old notes which is nightmares… Knowledge and the technology need to be simple.

In specific, the practitioners attribute the gap between their practice and EPR to the lack of clinical practice analysis and to the lack of the experience in the implementation. The management nursing 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 did not do it before in the NHS to go for a full electronic record, and we did not know the question to do it. We did not know what we did not know. We did not specify to do it in one click, you have to click on one bottom and other and another to do it.

There are a lot of functionalities that we never used. We had map for the A&E department to know where the patients are, we know where they are.

I think we were slightly blind, because we did not really know about what we need ... we had an idea about what we want but we had no idea about how to do implementing.

We did not realise how time consuming it was to use an EPR rather down it by hand.

We did not appreciate that specialists from outside the A&E are going to use the system. (Medical management of nurses)

The lack of the functionality and disconnectivity between the clinical practices in some cases lead to medical errors as the following example:

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, when the system is electronic. I think like Electrocardiogram (ECG) told that we will be able to transmit it to the system, but it would never work. Then we had to employ new people to scan all these papers, documents into the computer system. We had prescribing on the Alert, but we stopped it. Because when the patient will be seen by the specialist will get prescription which is written by hand and then we would get double prescription which leads to medical error. Also people did not like it. (Doctor4)

3- The overlapping between the paper and electronic systems:

The nurses other professionals had suffered because of the disconnectivity between their way of transferring the medical record and the way that EPR does. This issue was discussed in details with the medical nursing manager who said:

The system was available to places for medical units, but it was not available to all of them to access to the patient record. They do not want to do it that 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 will be this way, but we ended by printing out these large documents for each patient, and they went to anywhere, because otherwise no one else would see what happened with that patient which was one of the biggest problems. (Medical management of nurses)

Also, the data showed that the power of position could affect the level of the developed technology. The researcher has seen in the technology was touched screen and mostly were not. When the researcher asked that participant only one doctor had seen it as issue of inequity. Thus, this could be considered a minor that was mentioned one time, but it is important. The doctor5 said:

At some part of the hospital, some clinicians got a touch screen that they like it, because it was more kind of user friendly and intuitive. However, most of the other doctors got a normal system (hardware and software) which was like the Windows. The clinicians maybe felt that is not fair.

(2) IT' perspective and the problem of IT integration which requires creating extra IT masks that extra work in practice. This group of stakeholders perceived the EPR implementation as a successful communication between the designers and user. Also, their main interests are related to the IT functions and integration between these functions in addition to the interoperability between the different information systems in the organisation. This study had only chance to meet with the technicians from the Trust by which it explains the perspective of the designers[1].

The data analysis revealed an important issue about the different views of the same project from different professions' views. For example, the internal IT manager (i.e. technicians' view) saw the conflict happened because the clinicians have no idea about the limitation of the IT's projects as the IT professionals see. The technicians see that clinicians do not appreciate the complexity of the programming. The technicians see that technical practice in the healthcare is less obvious and it is more related to the "Backstage practice" which has no visible beings.

[1] this will be discussed further on the research limitations

Clinicians do not understand the ways that software houses work and software houses cannot understand why the clinicians cannot do everything in the same way. So, if you want to develop a piece of software, clinicians cannot understand why if you want to move a tick box from top right to bottom lift, why does that takes six months? They will say "This is a move from there to there!!"

They do not understand the coding changes would be needed, the requirement to do it, how this will impact on every other user how it is going to impact on every other user around there, because they did not realise that this system had been used for 100-1000 of other people in other 10 hospitals. (The project manager of E-prescribing).

Another example, the clinicians discussed that one of the main issue in terms of the ease-of-use and time consuming that EPR project has many clicks to get what you want. The technicians, based on their priorities, perceived this issue is not significant. This was exactly mentioned by the technician of the lab system who said:

So, reducing the number of the clicks for example is a big one based on the clinicians' perspective. However, this is not the issue based on the software houses' perspective. The software houses because are not seen, reducing the number of the clicks clinically significant. Thus, with this kind of issues when software staff has time, they will deal with it as it is required. (technician4)

The way of prioritizing the technical and programming work was explained by another technician from the software house as follows:

If somebody came to you and says there is a major problem with this software, and if you do this you will get a wrong result, and that is going to potentially cause patient harm, and that is going to take a month to fix. Also, at the same time, someone else says there are too many clicks on this software, and that is going to have a month to fix as well, and you have only month. As a software house, you are going to the one that is going to potentially to patient harm, and that is where the clinicians got frustrated and annoyed. The conflict is happening, because the providers of the IT want to be seen as a good and forward thinker, and they will not tell you the truth. The truth is that they have different priorities. (technician2)

Other technician gave an example in order to illustrate the conflict based on real experience about moving the button of the 'add' function from one place to another. He said:

If the request is to move the bottom from the top right to the top left is not the same if you moved it to top lift or meddle. But there was a lack of communication, and there was a lack of understanding on the reasons why the clinicians needed the stuff in specific way. (technician1)

Another technician links between the way of using the language in each profession and reasons that causes a conflict between the professions.

So, in my opinion and experience, when they (the clinicians) will ask for some development in the system, they (technicians) will say yes that is 'a development' and we can do that, yes that is not going to be a problem.

They (technicians) will never say yes we will do that. They mean (technicians): yes it is developable, but it is not really sort of things that we want really to do. Therefore it (The problem) might get done, and it might not get done. If it is going to get done it is going to take years….

They will always say they can do it that is software, and they can do essentially whatever they want.., but are they going to make it? Hell knows they are not, but they can do it…..

They will say; yes we can do that, the clinicians will hear this and they will think that they (technicians) will do it, but actually they are not saying that. They are saying that they have possibility of doing it, whether they will do it or not is a completely different thing. And because of those conflicts that will get back to the clinicians who will say the technicians are not doing the development etc. (technician3).

Other technician revealed that conflict between the technicians' and clinicians' views are mainly related to the nature of the clinical profession that is based on the individual subjectivity. He said:

So, it (Internal conflict) comes from the fact that two specialists who have the same education... looking at the same patient with exactly the same information, with exactly the same patient notes in front of them, ... They will say two different ways for treatment. I think that both cannot be right, and maybe the best way could be a mixture in somewhere in the middle of the two. However, they were very cleaver people and they worked hard to get where they are, they got that believe what they say is right and they are doing the best interest to the patient that is what they are for. It is hard for their point of view, I think, to compromise their ideas. (technician4)

Other technician sees that conflict is based on the time taken for the problem to be fixed. These problems are coming from the distance between the developer and user. The distance' problems are mainly geographical and cultural; the EPR was developed in the Portugal, and based on the Portuguese healthcare system. This issue was not considered by the clinicians and other practitioners as the technician said:

And the software houses, I see the clinicians do not really understand one of the big problems with the Alert product that it is Portuguese product, and all the programmers are in the Portugal, and none of them here. We never get speak to them face to face, so we will put in requests like this needs to be changed to be like this, and then you get your request in and it would be different. Of course, this will take so long time.

They (clinicians) are not IT professional, and they are not in this job to be an IT professional. They do not want to be bothered with the upgrade, request for change etc. (The project manager of E-prescribing)

This group of stakeholders sees that the mean conflict is based on the gap between their representation and actual works behind it, in addition to the lack of understanding the nature of the technicians' work. The data shows that changing the minor changes from one angle could be a major change from the others that require sensible justifications to deliver the change with no delay. This issue could be attributed to the nature of the healthcare which is based on the health professionalized direction by which the technicians' tasks are viewed as minor domain.

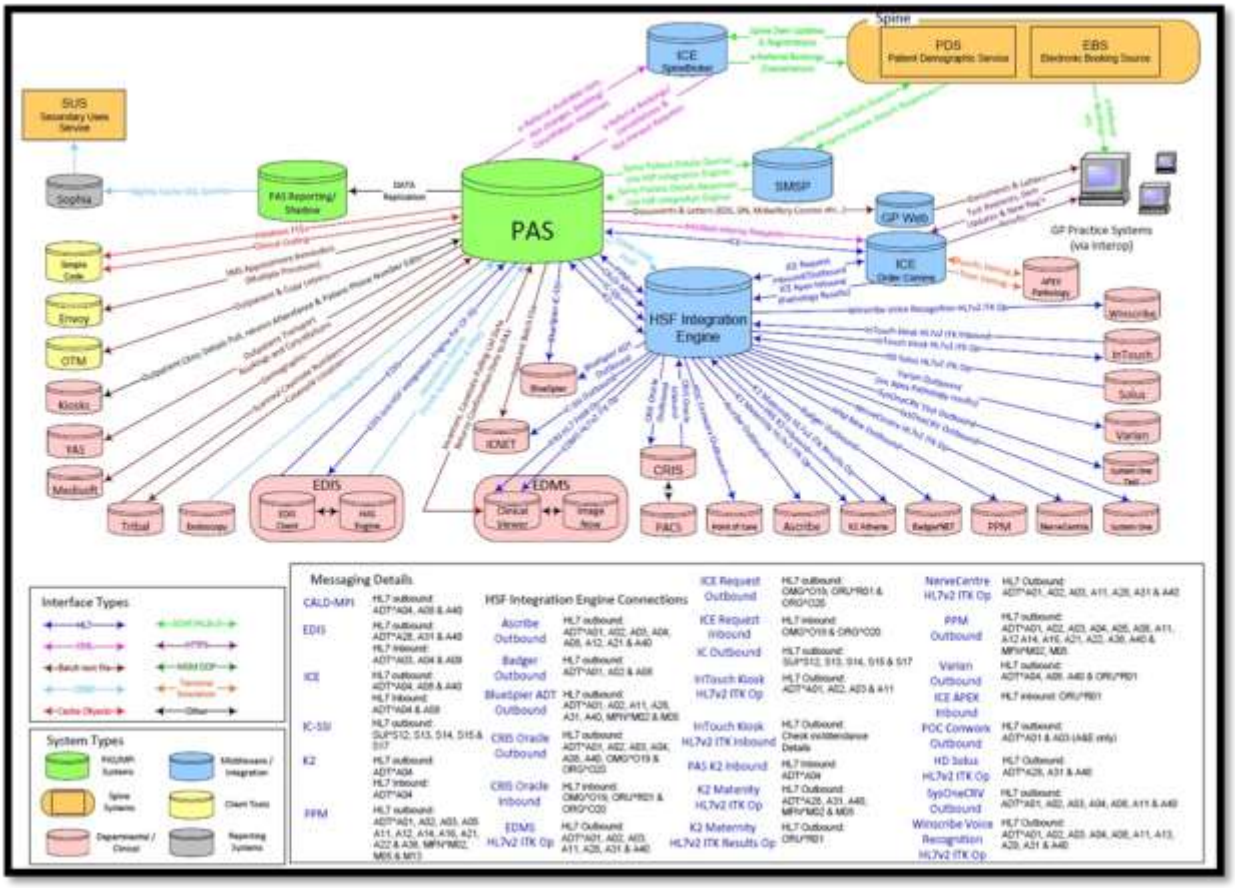

Figure (3): An illustration of the IT' perspective

DISCUSSION & CONCLUSIONS:

The first view was the administrator view which shows the importance of the IT project as a transformational change in order to overcome many problems that are related to a paper-based system (e.g. HRM, and to use time and material efficiently) which hinders the management to work efficiently and effectively.

The second was the practitioners' view which shows how they perceive this transformation as a change in the practices. It also shows how they have many reasons of their change resistance. For instance, the new project is creating a parallel work, the timeline of the implementation and issues of delay.

The IT perspective, as the third one, shows the complexity of integration between the legacy systems and new systems. This issue was clear regarding the differences between the information system structure and infrastructure in the UK and Portugal where the IT had been developed.

The Multiview analysis shows that there is no common language between the IT staff and clinical staff, which it affects the way that they perceive the system. For instance, nurses have many forms that they need them to be in the system without understanding the problem of integration which is very crucial from IT's perspective. It shows how the system would satisfy one or two perspectives where the rest of stakeholder will see the IT as a dump technology or an absorbing unit.

Dumb technology is a multidimensional concept as it disrupts the ability to value, assimilate or apply knowledge. From the Multiview analysis, it was proved that the AC requires multidisciplinary incorporation of different stakeholders and agents to integrate the processes and dimensions that are required to apply the knowledge.

The complexity of the situation appears in specifying the agent/principal. For instance, from pollical point of view, physicians in the NHS are the agent and their higher command structure is the principal. In practice, the EPR deals with the medical staff as the principal and their higher command is another principal with different interests. The problem appears when the political principal looks at the other principal as bureaucratic agents (e.g., clinicians). In this case, the higher command would decide that it is not in its own rational self-interest to control or monitor its agents that principal is unlikely to directly bear any cost incurred by the agent's continued shirking (Waterman *et al*., 1998).

This research sheds light on the nature of the IT based on practice theory and how the scarcity of the material potentiality enacts as a dominant factor of change resistance. It is founded that this this phenomenon happens when the IT does not belong to (is alienated form materialistic view) the practice. Technology in this case will be called absorbing entity which is in mathematics, a zero element. From practice based perspective, the absorbing entity is the IT which requires a maximum interaction between the human and nonhuman without adding value to the practice at least from one stakeholder's perspective. In other words, it is a technology that make the user always a looser, and it is neither designed for them nor generated out them (neither being for them nor becoming from them)..

REFERENCES

[1] Agranoff, & McGuire. (2001). Big questions in public network management research. Journal of Public Administration Research and Theory, 11 (3): 295

[2] Ahmad, G. I., Singla, J., & Giri, K. J. (2021). Security and Privacy of E-health Data. In Multimedia Security (pp. 199-214). Springer, Singapore.

[3] Angst, C. M., & Agarwal, R. (2009). Adoption of electronic health records in the presence of privacy concerns: The elaboration likelihood model and individual persuasion. MIS Quarterly, 33(2), 339-370. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=38224406&site=ehost-live.

[4] Avison, D. E. and A. T. Wood-Harper (1990). Multiview: an exploration in information systems development. Maidenhead, McGraw-Hill.

[5] Bell, S., & Wood-Harper, T. (2014). The innovation of Multiview3 for development professionals. The Electronic Journal of Information Systems in Developing Countries, 63.

[6] Bourdieu, P. (2011). The forms of capital.(1986). Cultural theory: An anthology, 81-93.

[7] Box, R. C. (1999). Running government like a business: Implications for public administration theory and practice. The American Review of Public Administration, 29(1), 19-43. doi:10.1177/02750749922064256

[8] Cheung, C. S., Tong, E. L., Cheung, N. T., Chan, W. M., Wang, H. H., Kwan, M. W., ... & Wong, M. C. (2013). Factors associated with adoption of the electronic health record system among primary care physicians. JMIR medical informatics, 1(1), e2766.

[9] Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. Administrative science quarterly, 128-152.

[10] Dougherty, E. (2004). The balance of practice. online essay, University of Pennsylvania

[11] Dreher, A., & Jensen, N. M. (2007). Independent actor or agent? an empirical analysis of the impact of U.S. interests on international monetary fund conditions. The Journal of Law and Economics, 50(1), 105-124. Retrieved from http://www.journals.uchicago.edu/doi/abs/10.1086/508311.

[12] Eisenhardt, K. M. (1989). Agency theory: An assessment and review. The Academy of Management Review, 14(1), 57-74. Retrieved from http://www.jstor.org/stable/258191.

[13] Eisenhardt, K. M. (1989). Agency theory: An assessment and review. Academy of management review, 14(1), 57-74.

[14] Feldman, M. S., & Khademian, A. M. (2002). To manage is to govern. Public Administration Review, 62(5), 541-554. Retrieved from http://www.jstor.org/stable/3110015.

[15] Flick, U. (2015). Introducing research methodology: A beginner's guide to doing a research project: Sage.

[16] Giunti, G., Guisado-Fernandez, E., Belani, H., & Lacalle-Remigio, J. R. (2019). Mapping the access of future doctors to health information technologies training in the European Union: cross-sectional descriptive study. Journal of medical Internet research, 21(8), e14086.

[17] Gortner, H. F., Nichols, K. L., & Ball, C. (2007). Organization theory: A public and nonprofit perspective. Wadsworth/Thomson Learning.

[18] Jahanbakhsh, M., Tavakoli, N., & Mokhtari, H. (2011). Challenges of EHR implementation and related guidelines in Isfahan. Procedia Computer Science, 3, 1199-1204.

[19] Jones, E.B. & Furukawa, M.F., (2014). Adoption and use of electronic health records among federally qualified health centers grew substantially during 2010–12. Health Affairs, 33(7), pp.1254–1261.

[20] Kyhlbäck, H., & Sutter, B. (2007). What does it take to replace an old functioning information system with a new one?: A case study. International Journal of Medical Informatics, 76(Supplement 1), S149-S158. doi:DOI: 10.1016/j.ijmedinf.2006.05.047.

[21] Latour, B. (1987). Science in action: How to follow scientists and engineers through society. Harvard university press.

[22] Mantzavinos, C. (2004). Individuals, institutions, and markets (political economy of institutions and decisions) Cambridge University Press.

[23] Masri, F., Wood-Harper, T., & Kawalek, P. (2017). Systems Thinking: Analysis of Electronic Patient Records Implementation and Knowledge Transfer Practice in NHS. International journal of management and applied research, 4(2), 105-121.

[24] Nicolini, D. (2012). Practice theory, work, and organization: An introduction. Oxford university press.

[25] Ortner, S. B. (1984). Theory in Anthropology since the Sixties. Comparative studies in society and history, 26(1), 126-166.

[26] O'Toole, L. J.,Jr. (1986). Policy recommendations for multi-actor implementation: An assessment of the field. Journal of Public Policy, 6(2), 181-210. Retrieved from http://www.jstor.org/stable/3998344.

[27] Pea, R.D. 1985. "Beyond Amplification: Using the Computer to Reorganize Mental Functioning." Educational Psychologist, 20(4), 167-182.

[28] Schatzki, T. R. (1996). Social practices: A Wittgensteinian approach to human activity and the social. Cambridge: Cambridge University Press.

[29] Sequist, T. D., Ayanian, J. Z., & Cullen, T. (2005). Information technology as a tool to improve the quality of american indian health care. American Journal of Public Health, 95(12), 2173-2179.

[30] Simon bill and trevor

[31] Strauss, A. L. (1987). Qualitative analysis for social scientists. Cambridge university press.

[32] Swiderski, F. A. (2015). Deployed electronic medical record compliance: An intra-departmental governance theory perspective (Doctoral dissertation, Capella University).

[33] Tabrizi, N. M., & Masri, F. (2021). Towards safer healthcare: qualitative insights from a process view of organisational learning from failure. BMJ open, 11(8), e048036.

[34] Tummers, J., Tekinerdogan, B., Tobi, H., Catal, C., & Schalk, B. (2021). Obstacles and features of health information systems: A systematic literature review. Computers in Biology and Medicine, 104785.

[35] Waterman, R. W., & Meier, K. J. (1998). Principal-agent models: An expansion? Journal of Public Administration Research and Theory: J-PART, 8(2), 173-202. Retrieved from http://www.jstor.org/stable/1181555.

[36] Waterman, R. W., & Meier, K. J. (1998). Principal-agent models: An expansion? Journal of Public Administration Research and Theory: J-PART, 8(2), 173-202. Retrieved from http://www.jstor.org/stable/1181555.

[37] Weingast, B. R. (1984). The congressional-bureaucratic system: A principal agent perspective (with applications to the SEC). Public Choice, 44(1, Carnegie Papers on Political Economy, Volume 4: Proceedings of the Carnegie Conference on Political Economy), 147-191. Retrieved from http://www.jstor.org/stable/30023940.

[38] Wood-Harper, A. T. (1990). "Comparison of Information Systems Approaches: an actionresearch, Multiview perspective." Norwich, University of East Anglia.

[39] Wood-Harper, A. T. (1990). "Comparison of Information Systems Approaches: an action research, Multiview perspective." Norwich, University of East Anglia.

[40] Wood-Harper, A. T., L. Antill, et al. (1985). Information Systems Definition: a Multiview Approach. Oxford, Blackwell Scientific Publications