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Exploring How The Use Of Business Intelligence (BI) Impacts Organisational Power Dynamics In The Public Sector: A Conceptual Framework

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Abstract

While studies have explored the impact of Information Systems (IS) on organisations, generally there has been a lack of attention directed towards the human factors relating to its use in organisations. Moreover, while studies also acknowledge the role of IS in shifting influence between actors, there remains a lack of insight into how the latest forms of IS, such as how Business Intelligence (BI) may impact the power dynamics within public sector organisations. Accordingly, this conceptual paper aims to provide a suitable framework to assist researchers in exploring the collaborative use of BI and its impact on organisational power dynamics. Exploring this is timely and of interest, particularly given the increasing use of BI within both private and public sectors. The paper provides an encompassing framework which incorporates not just the technology but other key factors, such as task, subject and contextual factors which may influence BI decision-making.

Keywords: Business Intelligence, Power Dynamics, Technology Enactment

Introduction

The rise in computational power, exponential data capturing capabilities and unprecedented development in deep neural networks has led to technologies such as Artificial intelligence (AI) to be considered as the most disruptive class of technologies for the years to come. Such technologies are capable of harnessing data for organisations in a way previously not seen, allowing them to adapt to new situations and solve problems beyond current capabilities (Gartner 2017a). Such technologies have drastically improved the predictive ability of both public and private organisations, enabling them to better manage their business operations, predict future behaviour of business processes, accurately planning and scheduling activities, whilst also minimising disruptions (Evermann et al. 2017). Moreover, such developments are leading to the increased role of machines that exhibit aspects of human intelligence, as seen through robots within health care, hotels, and restaurants, thus automating many aspects of our lives (Huang and Rust 2018), further igniting the debate surrounding the disruptive impact of such technologies on employability, job security and the wider technology human-technology debate (Ajoudani et al. 2018; Lehoux & Grimard 2018). However, despite the rise in technological trends such as Big data analytics and AI, BI systems continue to be widely used in many areas of business that entails making decisions to create value (Trieu 2017).

With the advancement and continued rise of computation and communication technologies, the quantity of data collected and stored by private and public sectors is constantly increasing (Domingo-Ferrer et al. 2018). Therefore, unsurprisingly according to leading information technology and research company, Gartner (2017a), worldwide BI and analytics market is expected to grow to \$22.8 billion by the end of 2020, with BI spending compared to overall IT budget continuing to rise, thus indicating the valuable insights BI is seen as achieving for organisations. In the face of technological advancements such as AI, Big Data, Machine Learning and IoT (Internet of Things) an underlying reason as to why BI remains highly relevant and a popular option in current times is due to organisations being able to use it without IT assistance and the analytical offering at enterprise levels (Gartner 2017b). As a result, BI remains a growing interest in BI in academia and importance to industry (Ramakrishnan et al 2012; Trieu 2017).

Accordingly, BI has attracted much interest among public organisations in the last few years (Henkel et al. 2017), particularly within the healthcare sector, due to the surplus data collected from a range of internal and external sources (Safwan et al. 2016). There is an underlying notion, given the nature and context of public sector organisations, that in order for BI and analytics to be successful, it should be aligned with public organisations' goals and their ways of working (Klievink et al. 2017). This too is evident in the case of the National Health Service (NHS), who are also transitioning towards a data-driven environment, with the aim of transforming patient care through the effective use of BI (Wachter 2016). However despite this, a review of the extant BI literature indicates that studies have been largely focused on architectural, design and the technologies that support BI (Chan and Lau, 2018), BI cloud design (Sangupamba et al. 2016), critical success factors (Isik et al., 2013; Olszak, 2016), BI performance (Vallurupalli and Bose 2018; Torres et al. 2018) thus largely at the consequence of 'human' factors related to BI. This has led to lack of insights into how organisational actors utilise BI for decision making purposes. Studies have previously indicated that the manifestation of technology in organisation studies is scarce (Orlikowski, 1992; Orlikowski

and Iacono, 2001), and exploring the interplay between technology and actors remains a key challenge (Karanasios 2018).

It is widely accepted that BI use within healthcare is both promising and necessary, particularly given the enormous amounts of data collected by healthcare organisations (Chen et al., 2012, El-Gayar and Timsina, 2014, Fichman et al., 2011; Gastaldi, et al., 2018) and its role through BI use in enhancing patient care (Tremblay et al., 2012), improving human resource utilisation (Crist-Grundman & Mulrooney, 2011), reducing costs (Pine et al., 2012) and offering greater efficiency of processes (Flower 2006). While, Lucas (2004) argues that the huge amounts of data collected by healthcare organisations, such as NHS is treasure for data analysts, there is little understanding of how BI is being used within the healthcare sector, more so how the analysts are utilising the data for decision-making purposes. The reasons for this are manifold, while acknowledging BI research within healthcare (Foshay and Kuziemsky 2014; Brook et al., 2015; Tremblay et al., 2012) the focus has preliminary been on the intended outcomes of using BI (i.e. improved decision making) or tools for supporting BI. However little studies to date have explored how BI is used by various organisational actors within the healthcare context, and there have been little insights into how the use of BI is impacting the power dynamics within healthcare services, particularly given the interdependent and interconnected nature of healthcare operations. For instance, while Mettler and Vimarlund (2009) appreciate the role of internal and external actors within healthcare, they largely overlook intra-organisational contestations and dissension which may occur between internal actors such as analysts and functional managers. Accordingly, the aim of this paper is to address this void through developing a conceptual framework as a starting point to fill this gap and assist researchers in exploring the role of BI from a human-centric perspective.

Literature review: Business Intelligence and Organisational actors

There is no universally accepted definition of BI, with some agreement between scholars on that it can be categorised from process, technology and product contexts (Dooley et al. 2017). Although authors continue to understand BI from technical (Watson 2009) or process perspectives (Petrini and Pozzebon 2009; Singh and Samalia 2014) many of the authors that subscribe to the technical view differ on what these technologies are in actual fact processing, similarly the process authors also differ in what they interpret as raw materials and outputs, thus indicating that there is no established understanding of BI processing and engagement, even within the same stream of literature, and rather it is open to interpretation. BI can be understood as a natural extension of previous systems designed to support organisational decision making (Negash 2004). However, there is a relative void in the academic literature relating to organisational decision makers, who are integral components in this process of BI led decision making. Whilst BI continues to grow, attract investment, and gain much interest from researchers as well as practitioners', BI research is still seen as a recent field, undergoing development (Isik et al 2011), therefore presenting an array of research opportunities. Wieder and Ossimitz's (2015) take a multi-dimensional understanding of BI by synthesizing the definitions outlined by Foley and Guillemette (2010) and Wixom and Watson (2010) and thus understand BI as 'an analytical, technology supported process which gathers and transforms fragmented data of enterprises and markets into information or knowledge about objectives, opportunities and positions of an organisation' (Wieder and Ossimitz 2015:1164).

A number of studies have examined power dynamics resulting from the use of IS in organisations such as the pertinent work of Markus (1983), who investigates power and politics within the implementation of a management information system (MIS), the use of boundary objects, communication and collaboration (Sapsed and Salter, 2004), knowledge sharing (Simeonova, 2017), the impact of technology on organisational power relations (Allen et al., 2013; Jasperson et al., 2002) and workarounds (Malaurent and Avison, 2016). Barring these studies, little is understood of the role of BI in impacting organisational power dynamics, thus by focusing on technology-human dyad through an appropriate conceptual framework can help explore this further.

Shollo and Galliers (2016) highlight the criticism of the extant BI literature for its dominance of ‘traditional’ studies focusing on the technology. However, while studies have attempted to move away from this and focus on the processes of BI by investigating the role of BI from a decision support perspective (Davenport 2010; Park 2006; Popovic et al 2012; Wieder et al 2012; Wieder and Ossimitz 2015), there remains limited understanding of the role of BI users, and decision makers in the processes of BI. Sharma et al (2014) believe the exploration of BI decision makers is a valid direction of further study, given studies in this field being largely views from technical perspectives. Holsapple et al (2014) also outline that various BI functions such as simple reporting, through to data mining and complex analyses are undertaken at the discretion of humans. Therefore, by paying attention to the users of BI within the public healthcare sector, such as analysts and functional managers can uncover insights into the human factors relating to BI use and further provide insights into BI use within the healthcare sector, which can be of interest to practitioners, academics and policy-makers alike.

According to Cavanillas et al. (2016), attention to the potential of data is key for public sector organisations, particularly given the enormous amounts of data produced as a result of daily operations such as tax and pension remittance, invoicing and healthcare reporting. It can be argued that a reasonable response of public organisations towards their data rich environments is to harness technologies such as BI to effectively support decision-making. Particularly given that an increasing number of organisations are opting for BI due to its perceived impact on business performance (Hawking and Sellitto, 2010). As such, BI success is considered imperative to the organisations which invest in technology (Gaardboe 2018). The tangible benefits attained by organisations in the private sector has prompted policymakers to consider the benefits of technologies such as BI and analytics within the public sector (ICO 2016). Local governments are increasingly experimenting with BI technologies with the aim of reducing operating costs through rearranging services (Symons, 2016).

While it is appreciated that decision-making has been explored for many decades, through varying lenses, it however requires closer attention, principally due to the technological advancements in recent times. Studies have previously indicated that broadly speaking, the manifestation of technology in organisation studies is scarce (Orlikowski, 1992; Orlikowski and Iacono, 2001), and exploring the interplay between technology and actors remains a key challenge (Karanasios 2018). As highlighted by recent studies, it is argued that this issue is further contributed by trends which show IS studies overlooking technology (Cecez-Kecmanovic *et al.*, 2014; Sarker *et al.*, 2013). However, it must be noted that this has not been neglected completely. There are a variety of concepts which help explore how individuals make sense of, practice and incorporate IT into their working practices (Koch et al. 2013). For instance, at an organisation wide level, theoretical concepts such as structuration theory

(DeSanctis & Poole, 1994; Jones & Karsten, 2008), innovation theory (Swanson, 1994; Swanson & Ramiller, 2004), organizational learning theory (Huber, 1991) and organizational change theory (Markus & Robey, 1988) have provided much insights into how and why organizations integrate IT into structure and processes. Similarly, Human-centric concepts and theories and IT practice-in-use have enhanced our knowledge relating to how humans retort to and enact technology in their daily organisational lives, which on occasions can result in expected as well as unexpected consequences (Orlikowski, 2000; Boudreau & Robey, 2005; Vaast & Walsham, 2005). These latter theories are largely oriented to understanding the changes that occur through the situated use of IT by individuals, who choose to appropriate features of an IT that fit their situation while ignoring others features of the IT (Vaast & Walsham, 2005).

Eisenhardt (1989) outlines three approaches to theory use in organisational research; as an initial guide to design and data collection; as a component of an iterative process of data collection and analysis; and as a final product of the research. While Eisenhardt (1989) takes a positivist position, these various approaches she endorses have also been applied in interpretivist IS research. For instance, theory used to initially guide design and data collection has been implemented by Walsham (1993) who draws on the theory of contextualism by Pettigrew (1987, 1990) to inform the basis of his interpretive study on IS strategy. Walsham and Sahay (1999) also use the Actor Network Theory to analyse GIS implementation in India. Furthermore, theory can also be used as part of an iterative process of data collection and analysis as done so by Orlikowski (1993) whereby she uses data derived by grounded theory in conjunction with 'existing formal theory' from innovation literature (regarding the distinction between incremental and radical types) or as the final product of a research as done by Orlikowski and Robey (1991) who draw upon their own work as well as Giddens (1984) structuration theory to construct a final product in the form of a theory. Therefore, the researcher supports the use of theory and upholds Walsham's (1995:77) view that 'it is possible to access existing knowledge of theory in a particular subject domain without being trapped in the view that it represents final truth in that area'.

The use of theory during the initial stages of interpretive cases studies assists in building a theoretical framework that acknowledges previous knowledge, and therefore generates a sensible theoretical premise to guide the topics and approach of empirical work, early on (Walsham 1995). Hence, this research will also draw upon various relevant strands of theory that will guide the approach to data collection for other researchers. While Alvesson (1996) endorses the use of one key theory, Walsham (1993) on the contrary recommends the use of multiple theories, arguing that the theoretical literature principally serves as a source for inspiration and is used to contribute in the understanding of complex social situations. Thus, in accordance with the latter, the theoretical dimensions from existing literature will aid in developing an appropriate conceptual framework for the purposes of further research.

Conceptual framework development: Business Intelligence Enactment and Organisational Power

The review of the BI literature, barring Shollo and Galliers (2016) provides limited insights into the decision-making processes associated with BI. While there is an appreciation of the stages of BI, from the gathering of data through to its output in both process and technical

literature, these studies take a rational disposition in its understanding of how BI is used for decision-making purposes, which is underpinned by the assumption that better decisions are made as a result of this BI use. In order to appreciate the complexities associated with organisational decision-making, this paper builds on the 'decision-making factors' developed by Lizarraga et al. (2009), by incorporating their first order factors which include uncertainty, time/money pressure, information and goals, consequences of the decision, motivation, self-regulation, cognition, emotion, social pressure, and work pressure. The choice to incorporate these in the proposed framework was largely due to them being underpinned by both cognitive and contextual factors relating to decision-making, which are largely overlooked within BI decision-making literature. Thus, these factors can be categorised into second-order factor structure of Task, Subject, and Context.

A review of the BI literature indicates that it has largely been investigated from its technical and architectural contexts, whilst overlooking human factors associated with BI use. Nonetheless, BI as an area of academic research is transitioning, treading a new path, as reflected through the human-centric approach recently taken by Shollo and Galliers (2016) in exploring the role of BI tools in knowledge creation. Nonetheless, more studies are required to understand the use of BI within organisations, through the lenses of various organisational actors. As such, the focus of this study is to further explore BI from a human centric perspective. The movement away from the technical aspects relating to BI and emphasis of human aspects in BI research is an emerging field of academic literature, presenting many research opportunities. As such, the aim of this is to establish the role of BI in impacting power dynamics within NHS trusts.

Focusing in on the central premise of this research, it is argued that prior research has highlighted that healthcare processes, namely decision-making are not isolated events, rather, are a combination of interrelated, reciprocal actions between processes people and technology (Foshay and Kuziemy, 2014; Thraen et al., 2012). Yet, the focus of existing BI research has been on either the former or the latter, omitting and overlooking the people element and its associated synergies with both the technology and the processes. As such, by evaluating how the organisational actors (people) utilise BI (technology) during the decision-making process (processes) will help overcome this void. Furthermore, Brooks et al., (2015) argues that in order to accomplish a successful BI strategy, it is imperative to understand how organisational actors think and work with one another. As such, by paying attention to organisational actors such as the functional managers, which include operational managers, service managers, business managers and the data analysts, will assist in offering insights into intra-organisational dynamics, thus enhancing the overall understanding of this.

Accordingly, this paper will adapt and combine existing theories to guide this research and act as a sense-making, analytical tool. Combining theories in order to gain a better understanding of the use of IS is well evidenced from within the extant literature (Gibbs o Kraemer, 2004; Hsu, Kraemer, o Dunkle, 2006; Oliveira o Martins, 2011; Zhou, Lu, o Wang, 2010). Although these theories and more specifically used to explore IT adoption, many of cases are broadly interrelated to IS use. More specifically, Chan et al., (2011) adapt the Resource-based view (Barney 2001) and the Enactment Concept (Orlikowski 2000; Weick et al., 2005) as a theoretical sense-making lens to explore e-Government system implementation. Similarly, Tassabehji et al., (2016) also take a similar approach by incorporating additional dimensions,

which in this particular research was relating to e-Government policy and the role of the Chief Information Officers (CIO), to TEF (Fountain 2005).

In order to assist in developing a suitable conceptual framework, this research intends to incorporate theoretical constructs of 'Organisational Dimensions of Power' (Hardy 1996), Enactment of technologies-in-practice (Orlikowski 2000), along with Decision-making factors (Lizarraga et al. 2009). Lukes (1974) seminal work and original conception of the multidimensional nature of power has provided much of the impetus and motivation for Hardy (1996) to explore power dynamics within organisations to achieve strategic change. The theory is founded on three fundamental sources of power, resource power, process power and meaning power. As this research is concerned with the role of BI in impacting the power dynamics within the NHS, an organisation that is driving for strategic change through its digital transformation and paperless agenda, by acknowledging these sources of power, will assist in taking a multi-modal approach in exploring the dyadic relationship between power dynamics and IS within organisations.

The Enactment of technologies-in-practice (Orlikowski 2000) refers to three types of enactment which organisational actors may opt for, namely *Inertia*, *Application* and *Change* enactments. Inertia refers to when organisational actors have limited-use technology in-practice and choose to use technology to retain their existing way of doing things with limited change to the way in which the technology is enacted. The application enactment refers to when actors use the technology to augment or enhance their existing ways of doing things, as such the technology is used with the motivation to enhance existing work processes. The final type of enactment proposed can be characterised by change, whereby organisational actors use technology to substantially alter their existing way of doing things. Accordingly, the change enactment largely related to the improvisation technology-in-practice, whereby users decide to adapt or customise aspects of their tools and its data content to refine work or achieve new ways of working. The key works on technology enactment (Fountain 2001; Weick 1979; Orlikowski 2000) considers contextual factors which may influence the types of enactments which occur. Accordingly, task related factors, including subject / actor related factors will be a key feature in the proposed framework which will offer insights into human factors, which are largely overlooked in BI studies. Accordingly, the key theoretical constructs for this research are highlights in table 1.

	Construct	Definition	Source
Organisational Power Dynamics	Resource	This dimension of power refers to the ownership of resources. Organisational actors who possess some type of resources are more likely to coerce others into behaving according to their will. Examples of resources include; “information, expertise, political access, credibility, stature and prestige, access to higher echelon members, the control of money, rewards and sanctions	Hardy 1996
	Process	Power is also attributed to the decision-making process, and refers to people who have domination over such processes are entitled to coerce others by applying or not applying “procedures and political routines”	Hardy 1996
	Meaning	Meaning power relates to the power to prevent “conflict from emerging in the first place” (Hardy, 1996, p. S8). That is, some people have control over the status quo, and by doing have the ability to overwhelm others from their cognition	Hardy 1996
Technology enactment	Enactment of Technology in Practice	Enactment enables a deeper understanding of the emergent, unprecedented, and innovative ways in which people engage with new technology in organizations and over time	Orlikowski 2000
Task	Uncertainty	The Uncertainty factor refers to individuals’ concerns about doubt, risk, and the changes caused by the decision	Cohen et al. 1996

	Time/Money	Money Pressure determines how individuals organise their activities and it predisposes them to compare the results of the decision with the time and money spent	Svenson & Maule 1993
	Consequences of decision	The Consequences factor assigns personal responsibility for the effects of the decision.	Lizarraga et al. 2009
	Information & Goals	Information and Goals show the importance of having adequate data available and of defining specific goals to appraise task difficulty	Cannon-Bowers & Salas 2002
Subject	Motivation	Motivation launches the decisionmaking process and maintains interest during the development of its successive phases	Bandura, 1997
	Self-regulation	Self-regulation helps one to plan, monitor, and evaluate the results	Dreyfus, 1997; Miller & Byrnes, 2001
	Cognition	Cognition helps individuals to process information, reason about the steps to be taken, and resolve the difficulties that may emerge during the decision-making process.	Mellers, Schwartz, & Ritov, 1999
	Emotion	Emotions create an appropriate mood in order to make the decision	Mellers, Schwartz, & Ritov, 1999

Context	Social pressure	Social Pressure helps one to consider the impact of the environment or of other persons when making a decision	Flannery, Williams, & Vazsonyi, 1999
	Work pressure	If one depends on a paid occupation, it is crucial to take Work Pressure into account when making decisions	Lizarraga et al. 2009

Table 1: Conceptual framework constructs

According to Hardy (1996), the first dimension of power stems from the possession of resource, whereby organisational actors who possess particular resources are considered more likely and successful in coercing other organisational actors to conform in accordance to their wishes. These significant resources can be in form of information, expertise, political access, credibility, stature and prestige, access to higher echelon members, the control of money, rewards and sanctions” (Hardy, 1996: S7). In the context of the NHS, this resource can refer to any of the above, particularly given the politically nuanced nature of the organisation. However, in context of BI, the resource dimension of power can be used to explore BI expertise and the analytical skill-set which certain organisational actors possess. In addition, the process power refers to the power which emanates from the decision-making process, thus certain organisational actors who have control over this process are able to coerce organisational actors through their ability to either regulate or omit this “procedures and political routines” (Hardy, 1996:S7). As such, this would to not only senior management, but also the functional managers operate within the wards and services, have the ability make decisions, enforce procedures and policies. The final dimension of meaning power refers to the ability of dominant actors to prevent conflict occurring in the first place, through attempting to alter views and norms through the control of shared meaning among a group of social actors by another group of actors. This source of power therefore is seen as operating the semantic facets of organisational life, involving the legitimation or de-legitimation of certain activities (Swan and Scarborough 2005). For the purposes of this research, this can help explore some of the more subtle, yet political influences that are prevalent as a result of the data-driven culture of the organisation.

Orlikowski (2000) states that when organisational of actors within a community engage in similar work practices, they typically enact similar technologies-in-practice, as a result of undergoing similar training, sharing values and ethos, through their similar on-the-job experiences, and with shared direction and storytelling, thus organisational actors begin to engage with a technology in an analogous manner. However, through recurrent reinforcement by the actors within a community, such technologies-in-practice may reify and institutionalize, as a result of which, they manifest and become considered as fixed prescriptions for social action. Therefore, the use of ‘Enactment Technology in practice’, can assist in examining the extent of regularised engagement of functional managers and the data analysts with BI, thus exploring whether and how organisational actors from these groups repeatedly enact a set of rules and resources which structures their ongoing interactions with the BI technology. As such, the conceptual framework for this research is depicted in figure 1.

The implications of contextual factors, such as time-related strains with specific organisational, work-related, and personal conditions of workers has previously received much attention (e.g., Vagg & Spielberger, 1998; Carayon & Zijlstra, 1999; Teuchmann, Totterdell, & Parker, 1999; Major, Klein, & Ehrhart, 2002). Therefore, this research also incorporates such behavioural factors to understand how BI is used as a result of such cognitions, whilst examining how this may impact power considerations between organisational actors.

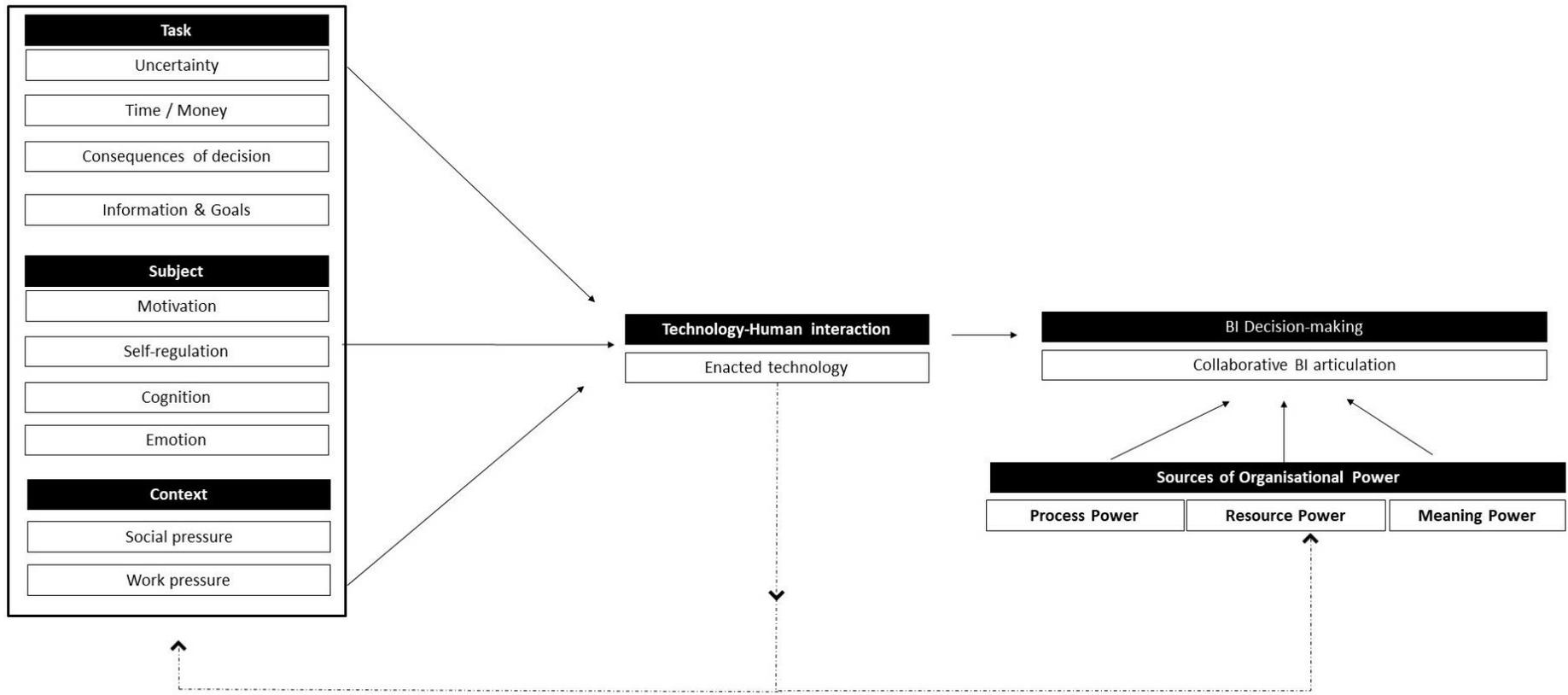


Fig 1: BI Power Enactment Conceptual Framework

As depicted in Fig 1, the conceptual framework also reflects key areas of BI literature, by acknowledging the key stages of BI, as well as incorporating recent insights into the articulation and potential contestations which occur during BI decision-making processes. The extant healthcare studies can be critiqued in their assumption that decision making processes are in place to support the effective use of BI systems in the healthcare sector. While BI is a growing trend and increasingly becoming a notable interest within healthcare, its implementation and adoption, despite all its potential, is not widespread in healthcare (Hanson, 2011). The key dimensions which form the conceptual underpinning of this research are purposely selected and can be justified in a number of ways. The organisational dimensions of power (Hardy 1996) have specifically been chosen for this research as they have previously been used when exploring strategic change within organisations. Given that the NHS is undergoing a digital transformation and the use of BI as part of a wider strategic change initiated by the organisation, these dimensions of power were deemed suitable. Furthermore, the choice to opt for TEF, and more specifically the ‘Enactment Technology-in-Practice’ (Orlikowski 2000) is due to this framework widely being recognised as valuable when exploring the influence of organisational structures and institutional arrangements of Technology use within the public sector (West, 2004; Yildiz, 2007).

Majority of studies which utilise technology enactment frameworks are largely conducted in public sector organisations (Antonio Cordella and Iannacci 2010; Hassan and Gil-Garcia 2008), as also is the case in this research. Furthermore, the critical difference between ‘Enactment Technology-in-Practice’ and other models such as The Structuration Model of Technology’ (Orlikowski 1991), is that the former begins with human action and examines how actors may enacts interactions with the technology at hand (Orlikowski 2000) for particular reasons, as opposed to the other way, i.e. the impact of technology on the actors. Dose, this perspective given the human-centric focus of this research is ideal. Moreover, existing BI studies can be criticised for not considering cognitive, behavioural factors which may determine the way in which decisions are reached. As such, this research pauses to overcome this by considering such factors which are central to the proposed framework. Furthermore, and in-line with technology enactment methodology, contextual factors based on empirical studies conducted within the NHS will also be incorporated in order to provide the contextual factors which may also play a part in BI decision-making.

Emergent research propositions

Accordingly, based on the existing literature and drawing upon the research question, this study presents the following research propositions which will assist in exploring how BI use impacts power dynamics within the NHS context:

Proposition 1: The way in which BI is enacted by various organisational actors is impacted by the nature of the task undertaken

Proposition 2 Environmental factors influence the way in which BI is enacted and used by various organisational actors

Proposition 3: The way in which BI is enacted by organisational actors impacts BI articulation and the BI decision-making process

Proposition 4: The use and BI technology enactment by organisational actors within the NHS is bringing about a shift in power dynamics through ‘Resource, Meaning and/or Process’ power dimensions.

The proposed framework has a twofold purpose. Firstly, it aims at establishing how BI is being used within the organisation, between various organisational actors. Secondly this framework aims to assess the impact of such use on the power dynamics between these users. Accordingly, these research propositions concerns how BI is used and what impact it has on power dynamics within the NHS trust. The key themes deduced from extant literature, which are also categorised in table 1 can act as an interview guide, in conjunction with the sense-making conceptual framework to further explore these research propositions, in order to help gain a more knowledgeable insight into the role of power dynamics within the NHS, through its utilisation of BI tools.

Theoretical implications

This framework can assist in unlocking the BI related dissonance between various organisational actors, providing insights into power dynamics resulting from BI use and provide an understanding of collaborative BI use. Through exploring the extant literature, this research identifies a lack of BI studies which places emphasis on the human agency and its role in the use of BI, this was a result of studies be focused on technical architecture and more technical factors. However, in building on existing stream of literature this research further to the direction laid by Shollo and Galliers (2016), by not only taking the human centric approach at exploring BI, but by also exploring the role of BI in impacting organisational power dynamics. Moreover, synthesising the literature illustrates studies exploring power dynamics from an IS context was an understudied phenomenon, while it was apparent that some studies have explored the impact of technology on intra-organisational dynamics (Pettigrew 1973; Markus 1983), this largely been overlooked from within more recent forms of IS, such as BI. This research also proposes several theoretical contributions. For instance, the ‘BI Power Enactment Framework’ proposed in this research was built on existing theory, through combining various theoretical constructs and extending earlier works on enactment theory (Orlikowski 2000) and merging it with the sources of organisational power (Hardy 1996), to create a sense tool which helps establish how the use of BI may impact various aspects of organisational power. As such, it is argued that this framework provides appropriate lens for exploring technology related power dynamics, particularly as the findings and insights from this research highlight how certain actors are able to become increasingly influential within their environmental settings.

Summary

In summation, it is argued that the extant literature is heavily geared towards organisational BI performance, BI success factors, and architectural aspects of BI, whilst overlooking the human elements. Accordingly, this research set out to develop a conceptual framework which would facilitate exploring the role of BI in impacting organisational power dynamics, through acknowledging sources of power, such as resource, meaning and process power as well as exploring human agency, through the enactment dimension, which conveys the sense of ‘to constitute, actuate, perform’ (Orlikowski 2000: 425) concept. This framework will assist in exploring how various organisational actors use BI and how this use, impacts the dynamics of power and influence within the NHS trusts.

Furthermore, as the central premise is organisational actors and their respective groups, this research also acknowledges BI from two paradigms, the first being the 'individualist actor context', which refers to the interactions between BI and a sole actor, being the data analyst. The other perspective acknowledged is the 'Actor's social context', in which various organisational actors are involved with the BI, in some shape or form. Thus, would be during the 'decision-making phase', as also highlighted by Shollo and Galliers (2016), whereby various organisational actors, such as the analysts and functional managers 'articulate' their ideas and interpretations of the BI generated data. Through utilising the proposed conceptual framework can help uncover how articulation occurs between actors during BI decision-making.

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