Power, dominance and control: implementing a new business intelligence system

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Abstract

Purpose – The purpose of this paper is to expose the playout of power dynamics when a new business intelligence (BI) system is implemented in a central pharmacy department in a National Health Service (NHS) hospital. The authors aim to explore the assumptions, experiences and actions of organisational stakeholders and ascertain how different professional groups obtain influence, power and control during this process.

Design/methodology/approach – In this research the authors employ structuration theory (ST), to establish how and where domination is achieved. To achieve this, the authors investigate the production and reproduction of structure as part of a longitudinal assessment using interviews and questionnaires.

Findings – Constant renewal and evolution are crucial in the implementation of a BI system. During the process of implementation and change many stakeholders resent the change. Disempowering these users leads to new power structures led by BI analysts.

Practical implications – The findings from this paper can help strengthen implications of BI systems implementation and better understand the impact these systems have on wider stakeholders. With coherent communication and an engaged attitude new BI systems can be implemented without alienating the key user stakeholders.

Originality/value – This paper differs from other papers by advocating that new systems and processes alter individual power structures in organisations, disrupting internal dynamics and introducing new aspects of control and dominance.

Keywords Business intelligence, Digital transformation, Structuration theory, Work power dynamics

Paper type Research paper

1. Introduction

In this paper we investigate the dynamic hidden nature of power and dominance in a central Pharmacy department located at a hospital (Hospital N) in the United Kingdom (UK) National Health Service (NHS). The proliferation of technology has created circumstances where many health organisations are currently going through a digital transformation process moving from legacy-based systems towards business intelligence (BI) environments (Rukanova *et al.*, 2021). In this digital transformation process, we look at how change impacts on individuals and organisational structures by taking the view of Hekkala, Stein, and Sarker (2021) and Mitterlechner (2019) who argue that new technological implementations can lead to a shift in

power dynamics. Markus (1983) describes this as a transition between old and new domination structures. Domination happens when social agents use their personal influence, skills and expertise in each situation, using the facilities and resources of power at their disposal (Macintosh & Scapens, 1990), while at the same time conforming to existing codes of practice and achieving recognition and approval of other actors (Smith, Valsecchi, Mueller, & Gabe, 2008). The view of Markus (1983) is duplicated in many scenarios and there is significant research which looks at Industry 4.0 and its role in supply chains (Jabbar & Dani, 2020), finance (Jabbar, Geebren, Hussain, Dani, & Ul-Durar, 2023), enterprise systems (Apostolidis, Devine, & Jabbar, 2022), Fintech (Allen, Gu, & Jagtiani, 2022) etc.

While there is a plethora of views on what constitutes power, Giddens (1984) focuses on individual power and domination. "Power" according to Giddens (1984) is a fundamental concept in the social sciences and is in his research described as a transformative capacity, the ability to make a difference in the world. To explore this transition in more detail we investigate how users and managers produce and reproduce structures of power led domination and legitimation through the performance of BI activities which are activated during the change management process (Henfridsson & Lindgren, 2010; Smith, Erez, Jarvenpaa, Lewis, & Tracey, 2017). As part of this we look at the assumptions, experiences and actions of organisational stakeholders and how they react when different professional groups attempt to gain influence and power during this change management process (Marabelli & Galliers, 2017; Brown, Adamson, Rezazadeh, & Lipsomb, 2018). A lot of research in this area investigates the outcomes and performance indicators when a new BI system is implemented (Effah, Senyo, & Opoku-Anokye, 2018; Rukanova et al., 2019). We differ from this approach and utilise the structuration theory (ST) proposed and developed by Giddens (1984) to capture the richness and detail of this transformation process. This is not the first time the work of Giddens (1984) has been used in this context, in the past multiple research papers have successfully used the approach to understand the utilisation of technology in health service organisations (Jeffries et al., 2017; Barrett, 2018; Muhammad & Wickramasinghe, 2018). The richness collected through an ST approach is also a strong barometer in identifying the factors that hinder BI related organisational change and the interplay of the power in everyday practices (Marabelli & Galliers, 2017).

Using the ST of Giddens and Pierson (1998), we look closely at the role of stakeholders and the type of power they wield in such settings. Clegg, Courpasson, and Phillips (2006) views these stakeholders as social agents, they are defined as individuals who have the cognitive capacity to make change to their social settings, should they choose to do so. Thus, we explored the use of formal and informal power and domination of BI analyst and pharmacy workers as intelligent social agents. In the context of NHS there are many different types of knowledgeable social agents who serve as communities of professionals, such as nurses etc. (Smith et al., 2008). Therefore, in the view of Clegg et al. (2006) they carry a certain amount of power, and can exercise "dialectics of control", to achieve domination and legitimation of key stakeholders. Using this theoretical approach, we looked at the impact of BI systems on stakeholder interest and the ensuing conflict to maintain or gain authority (Prowse & Prowse, 2008; Kärreman, 2010). Due to the investigation being based on a longitudinal case study (Walsham, 1995), it was possible to use a Giddens frame of analysis to trace the production and reproduction of structures.

Thus, in this paper we start by discussing the key issues around change and resistance with a focus on its impact within an NHS environment. As part of this we tackle the key issues around digitalisation and conflict and how the dynamics of power ebb and flow. We then move onto our key theoretical underpinning discussion where we look at the role of ST to enrich our understanding of power in organisations. We then discuss our methodological approach detailing our approach to data collection and analysis. We finish the paper by discussing our findings and our contribution to this area of literature.

2. Literature review

2.1 Change and resistance

Organisations, like the NHS are made up of complex patterns of interactions with a myriad of stakeholders with various interests, aims and agendas. These relationships continue to evolve and change as stakeholders gather more experience (Bunderson & Reagans, 2010; Rose, Flak, & Sæbø, 2018). The NHS is a government managed and directed organisation, aimed to provide free health care at the point of need. The UK NHS was established on July 5, 1948, to provide free comprehensive medical treatment to the UK's 65.5 million population (1946 NHS Act). The NHS is a publicly funded service with a workforce of approximately 1.3 million people. Most of this workforce is made up of consultants, doctors, nurses, para-medicals staff, midwives, dentists, opticians, pharmacists and other medical and nonmedical staff which excludes a huge number of temporary agency staff, managers, administrative staff, information technology (IT) staff and contractors and these are all managed by the directives of the department of health (DoH).

Caring for such a huge body of people is not without its challenges, in 1996/97 the NHS budget was around £33 billion, but now stands around £96 billion per year. Governments have attempted to manage the NHS in accordance with their political orientation over the years (Ackroyd & Bolton, 1999). Over time, the NHS has evolved into a political tool, with many governments attempting to manage it in accordance with their political preferences (Ackroyd & Bolton, 1999). In this context the current administration is attempting to change how care is delivered and place more power in the hands of local medical centres and general practitioners. As part of this evolving process the onus on transparency, capability and duty of care falls to the relevant empowered centres who will require BI systems to make sure that data quality and availability of information is appropriate.

The political ideology of such an approach is aimed at improving the quality of the NHS provision in a more efficient and effective manner. Being one of the largest employers in Europe its current operating environment is one of constant change and flux with multiple stakeholders (e.g. governmental, legal, professional, consumer) with a variety of requirements. Identifying efficiency and effectiveness in this manner means to understand the key issues facing the NHS and the need for data to support decision making (Jabbar, Akhtar, & Dani, 2020). In this context, we see the importance of information systems (IS) and IT in facilitating and sustaining transformation and radical change. Furthermore, managerial control and management control systems are viewed as critical to save money through operational efficiencies. It is at this point we identify the key issue of this paper; implementation of new BI systems often results in conflict between clinical professionals and managers (Marabelli & Galliers, 2017; McCabe & Sambrook, 2019; Calnan, 2020; Amadeo, Andreazza, & Reis, 2021) We are interested in observing how these changes take place and the impact they have on internal dynamics.

2.2 Digitalisation and conflict

In research we often find that context plays a crucial role in the implementation of new ideas and technology (Geebren, Jabbar, & Luo, 2021). This is we argue also true when implementing IS throughout healthcare for fundamental change and transformation. (Effah *et al.*, 2018). Senior managers and policy makers have long understood the inherent value of information in the NHS. The challenge lies in creating the necessary IS which fulfil the requirements of data collection, organisation and finance (Hallikas, Immonen, & Brax, 2021). Another issue faced when implementing digitalisation strategies is stakeholder motivation and ownership of any such system. Research suggests that when new systems are implemented motivating staff to report accurately, promptly and completely, as well as thinking outside the box, will be required (Devine, Jabbar, Kimmitt, & Apostolidis, 2021).

The overall NHS aim is to provide clinicians and managers with the IS they need to provide the best possible care to patients and to ensure that the public have the information necessary to decisions about their own treatment and care. The implementation of the NHS National Programme for IT (NPfIT) framework is important to the NHS in terms of records management, ensuring the availability of accurate information for clinicians, managers, planners to support local health improvement programmes. As with the past, a new government policy has initiated a change in the way the primary care trusts (PCTs) commission and deliver services and has provided opportunities to influence the method to ensure good quality service is delivered to the patient. The government to monitor the PCTs and provide direction and support to ensure that commissioned services are delivered to the benefit of the patient. To achieve this aim, the DoH has set up many pathways to enable support and delivery of the Information for Health strategy and the Clinical Leaders Network is one of the proposed pathways.

3. Structuration theory

In this paper we utilise ST to enrich our understanding on the use of power in organisations, with particular emphasis on the dynamic plays of power. ST as proposed by Giddens (1984) is concerned with, first, the influence on human interaction of institutional (structural) aspects of social life such as rules, procedures and power structures, and secondly, the production and reproduction of these structural aspects through human interaction. Giddens defined structuration as: "*The structuring of social relations across time and space, in virtue of the duality of structure*" (1984, p. 376). The aspect of time and space is only one aspect of ST that is pertinent to our interest in change from the perspective of organisational actors. Several factors influence production and reproduction, core to which are domination, legitimation and significant.

ST is made up of memory traces that are constantly reproduced by people's actions. Semantic rules are involved in structure as significant. Standard codes, such as operational codes for the daily running and coordination of an organisational department and defining the breakdown of its functions, can be created, and recreated in several significant structures (DeSanctis & Poole, 1994). Many other codes are based on organisational guidelines. Legitimation structures such as policies, strategies, methodologies and objectives can be created and recreated to serve as legitimation frameworks (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021). In seeking legitimacy, individuals constantly refer to organisational ways of working, such as organisational guidelines and sociotechnical strategy to ensure that their ideas fit into relevant frameworks (Kalfa & Taksa, 2017). At other times, organisational guidelines may be discussed and customised to suit a project, which means new legitimation structures are created.

Thus, these elements become the environment in which domination can flourish. Domination occurs when social agents use their personal influence, skills and expertise in a given situation, using the facilities and resources of power at their disposal, while at the same time conforming to existing codes of practice and achieving recognition and approval of other actors (Alvesson & Spicer, 2016). Domination structures can be created and recreated, achieved, for example, through use of the management hierarchy by key stakeholders to control internal organisational resources, such as finance, IT and equipment (Smith *et al.*, 2008). Another group of stakeholders may have dominating personalities and characteristics that allow them to dominate situations within a project context. Their ideas may then become codes of practice in departmental or organisational operational strategy and thereby part of new domination structures (Dick & Nadin, 2011). Domination can also be achieved by those with expertise and skills, although their influence depends on their competence in political or leadership skills (Alvesson & Spicer, 2016). In the view of Giddens (1979, 1984) there are two

types of resources of power: command over allocative resources (economic capacity) and command over authoritative resources (ability to organise and co-ordinate). Once this domination has become embedded it can be exercised to reinforce. According to Giddens, all social actors have some sort of power (dialectics of control), as they have at least some sort of resource under their control, otherwise they cease to be social agents.

It is within this context we utilise the theoretical framework of ST to investigate the implications of digital transformation in such an organisation. As discussed, earlier researchers have used ST in creating research in the areas of technology and organisations. However recently the focus of this has switched slightly to BI elements and their influence. A little has been written about BI systems and power dynamics (Marabelli & Galliers, 2017; McCabe & Sambrook, 2019; Amadeo *et al.*, 2021). Doherty and King (1998) and Nandhakumar, Rossi, and Talvinen (2005) emphasise the need to understand the influence of technology in organisations and of organisational contextual factors in technology-led change. For example, the generation of new power structures in organisations because of acquiring technology reveals the impact on organisational factors (Bloomfield & Coombs, 1992; Nadan, 1997). During IS led changes, actors can become dominant and powerful, allowing them to steer changes, make important decisions and even negotiate better terms of service (Knights & Murray, 1994; Hart & Saunders, 1997; Doolin, 2004).

4. Methodology
Building on the theoretical frame of ST, we employed methods to explore "where support is sought, and power is evoked". To achieve this ST in the view of Eisenhardt (1989) provides for researchers a suitable sensitising frame and potential basis for theory generation. This is primarily due to the emphasis on ensemble, which includes the actions, mental structures and social power structures of stakeholders and stakeholder groups. (Riley, 1983; Macintosh & Scapens, 1990). To fully understand the data and the richness and nuance of power and conflict it was decided to undertake a qualitative approach (Jabbar & Analoui, 2018).

As part of our longitudinal case study, we investigate hospital N located in the North of the UK. The hospital is an NHS Foundation Trust with around 2,300 staff, including full-time professionals and part-time contract staff. For the purposes of this study, we focus on the pharmacy department which is located inside the hospital. The pharmacy has evolved over a period of 35 years in the hospital environment. During this period the number of staff has increased from 12 to 36. For this study we met with eight pharmacy participants with whom we held 55 meetings over a period of 18 months. While we did not interview all stakeholders as defined in Table 1, we find it prudent to mention the key roles that had an impact on this change management process. These stakeholders played a critical role in the BI system implementation, and many were key decision makers. The stakeholders were mentioned by the interview participants and thus they are critical to the context of this paper.

Through the participants the researchers obtained data which outlined the key organisational dynamics and the various social construction of participants. In Table 2 we outline the methods utilised and the process for data collection through the data source. Semistructured interviews were primarily utilised to obtain richer detail on a variety of factors, such as the nature of requirements of change and conflict in the organisation. During the interviews, different scenarios illustrated the situations representing each of the questions. Unstructured questioning was used during informal meetings of developers as they took actions concerning the project. The subsequent thread of the conversations was followed by asking developers for explanations as attempts were made to understand relevant actions, issues and viewpoints. Subsequently, a summary was generated that recorded the descriptions and relevant quotes.

The adherence to interpretivist methodology meant that the data had to be qualitative in orientation and thus we aimed at collecting as much rich data as possible. Through the data collection we collected data about the organisational context, cultural and functional issues involved in the development of the BI system. It also aimed to look at personal interests of different stakeholders and focused on their personalities, characters and aspirations that influenced the development of BI system.

We split the data collection into three key phases, each which helped developed the data understanding. In the first instance we utilised observations of project-related meetings, seminars, events and discussions. These were documented systematically and stored in a database or in the appropriate folder. Some of the meetings and interviews were also recorded on password protected tapes and kept in a safe location by the researcher. The second stage of collecting data was via questionnaires using (a) a simple stakeholder record form and (b) stakeholder profile questionnaire to collect information about each stakeholder. These initial forms provided background information about the stakeholders. For the final phase of the data collection, we utilised our main data collection instrument which was the semi structured questionnaire. At this stage respondents were asked to describe certain action(s) or situation(s) associated with the development of BI system. Table 3, below shows the key phases during the study:

During the research and data collection phase the main criteria was to identify the stakeholders with the most influence over the BI system. The status of the main stakeholders had a significant influence on situations, power and influence. The categories of questions asked and the reasons for asking these are provided in Table 4.

Stakeholder position	Job role
Senior management	Managing Director, Medical Director, Executive Director of Nursing, Executive Director Finance and Business Planning, Executive Director Personnel, Director of Estates, Director of Management Contracts, Director of Contracts and Information
Pharmacy management	Chief Pharmacist and Pharmacy Manager
IT management	IT Manager, Contracts Manager, junior IT workers
Project manager	Consultant
Pharmacy workers	Pharmacists, Pharmacy Technicians, Pharmacy Assistants, Administration Staff, Ward workers involved in ordering drugs

Table 1.
Stakeholder participants

Data source	Method	Description
Prearranged interviews	Semistructured interview	Pre-arranged interviews (attended by department member and researcher) to check, using verbal questions and answers our interpretation of aspects of developer actions, observed from a meeting or obtained from a document
Formal project meetings	Observation	In these meetings, attended by project team (with the researcher as a nonparticipant), project-related actions and discussion between department members took place
Informal meetings	Observation, unstructured questioning	In these spontaneous meetings, attended by one or more department members and the researcher, developers were carrying out activities in their project roles
Documents	Content analysis	Read project documents or minutes and meetings, identifying records of actors' actions to carry out technological change activities

Table 2.
Data generation sources and methods to evaluate structuration processes

The data gathered through observations and questionnaires was used to enable a more informed application of ST. The observations and questionnaires were used for two reasons: (1) to cross-reference stakeholder responses with the researcher's observations and perceptions and (2) to gain a better understanding of the situation and stakeholders' perspectives. Figure 1 shows the research methods used in the case study and their correspondence with the social behaviour approach.

5. Analysis

From the collected data we discovered that legitimation and dominance dimensions of ST revealed more interesting insights and highlighted issues that have a greater influence on the development of BI system-related activities. Thus, based on these initial findings we focus on the power-facility-domination (set 1) and sanction-norm-legitimation (set 2) dimensions, as shown in Figure 2.

In this study, an episode is a brief description of a BI system activity or event. A narrative is a more detailed explanation of an event. Episodes are classified into two types: A is concerned with existing structures or the shaping of situations, whereas B is concerned with

	Phase 1	Phase 2	Phase 3
Research questions	Mar 18–Sep 18	Sep 19–Mar 19	Sep 20–Mar 20

Table 3.
Longitudinal period

Question category	Reason
General project-related questions	To allow the respondent to (re)think carefully about the project
Choosing between one to three situations to discuss	To allow the respondent to choose three situations that they are most familiar with to discuss
Choosing the key stakeholders involved	To work out who the key stakeholders were in relation to the chosen situations
Application of key principles of ST	To allow the respondent to talk about the situation(s) that s/he has chosen and explain what, when how and why something happened

Table 4.
Final phase data
collection process

Figure 1.
Research methods vs
social behaviour
theoretical approach
chosen

Figure 2.
Chosen elements of ST
and the types of
episodes

the creation of new structures. These episodes demonstrate the duality of structure, in which structure is used to produce action and vice versa. To determine whether a specific structure was produced or reproduced, and whether it was a legitimation or domination structure we carried out the following procedures:

(1) Procedure: Gain knowledge of organisational context through observations, interviews and meetings.

(2) Procedure: Investigate the motives, beliefs and values of stakeholders through interviews, participation in project meetings and questionnaires.

(3) Procedure: Observation of stakeholder behaviour and actions and the resulting outcomes.

Using the data associated with sets 1 (Domination) and 2 (Legitimation) we analyse the unintended consequences of stakeholder action. We investigate the following issues through the lens of ST, by firstly looking at how the approach can help the researchers to understand the actions taken by a stakeholder. This can also shed light on the degree and types of influence held by a stakeholder in the project, which leads to a comprehensive overview of how stakeholder gains influence and domination over others. Finally, context is discussed which shoes how stakeholders gain approval of others and the nature of this approval. What follows is our analysis of the data, for ease of use we have organised them in the form of episodes that have been grouped together into the following phases to provide a more logical narrative:

(1) Phase 1: Business Information Systems (BIS) planning and aims

(2) Phase 2: BIS requirements and development

(3) Phase 3: BIS use

To reflect the logic behind the development of a BI system, each phase will show the episodes in chronological order. To organise the data into the episodes we went through an iterative process of coding and data analysis (Auerbach & Silverstein, 2003). As part of this the authors scrutinised each formal meeting with quotes and remarks that helped us to locate and evaluate actors' actions. Where the authors needed confirmation or additional explanations from the respondent's addition meetings were arranged. In addition to this we analysed and coded the stakeholder profiles, stakeholder records and project evaluation using document analysis. A comprehensive data classification regime was then followed, where data classification initially required a clear definition of ST principles. These were codified and mapped against the theory. A key criterion for this classification was to make sense of organisational dynamics using ST. A single researcher carried out the data collection. All the data were then checked and classified with the help of colleagues, then clarified by organisational actors. Here the researchers would jointly ascribe theoretical meaning to stakeholder actions and responses.

6. Findings
6.1 Contextual factors
The NHS has already gone through a significant amount of digital transformation which has created a national systems infrastructure with over 12,000 embedded systems in practice supporting over 250,000 NHS staff. The majority of this is provided by the NPfIT and they are responsible for delivery and integration on to local services. While there have been implementation failures, there are also significant success stories that have impacted on delivery of patient treatment and experience. One key system which was implemented across

pharmacies in the NHS was the electronic transmission of prescription (EPS) signed off and delivered in 2004. This resulted in the issuance of 6.5 million electronic prescriptions out of a total of 370 million prescriptions. Over 1.3 million hospital appointments have been booked electronically at a rate of 10,000 per day and rising, accounting for more than 20% of NHS referrals for treatment (Dusheiko & Gravelle, 2018). The success of this transformation process transformed pharmacy systems from old legacy-based systems to new complete BI systems that allow for cost savings and increased efficiencies (Gregor, Martin, Fernandez, Stern, & Vitale, 2006; Thomas, 2017). Our initial results in this context suggest that the majority of "voices" represented are those of senior management and very few emanate from day-to-day nonmanagement employees. How this translates into implementation, perception and usage is a key consideration as part of the business case and to deliver patient care (Adaba & Kebebew, 2018; Jabbar *et al.*, 2020).

6.2 Evolving tensions in the pharmacy department

At the start of the project initial views focused on the need to replace the existing pharmacy decision support system, with a more refined system with updated processes. These views were the catalyst for pharmacy management to make the business case and justify the need for a new BI pharmacy decision support system to employees and senior management. However, the purchase of any new system needed to comply with existing organisational standards and as part of this senior management asked the pharmacy management team to make a business and feasibility case to justify the need for a new IS. Because of "alien" cultural norms that required them to accept senior management's decision, this request put the management team in an uncertain position. This was also a precursor to the "politics" that erupted between them and the more powerful IT department. This differed from the more usual approach, where the decision would largely be guided by the professional needs identified locally within the department. This contrasted with the more common traditional approach, in which the decision would be largely guided by the professional needs identified locally within the department.

In this early part of the episode the research finds that the pharmacy department managers felt that they were in a power struggle with the IT department, with diminishing autonomy and control. This contrasts with the pharmacy manager's initial optimism, which anticipated and communicated to his department that, as in the past, small changes would be required to accommodate the new system, but the changes turned out to be more radical than expected. As a result, most stakeholders began to see this project as not only moving faster and differently than expected, but also felt manipulated by hospital executives and the BI Section of the IT Department. These negative perceptions began to manifest as resentment toward those who imposed decisions on them despite their lack of knowledge of their professional needs, while also undermining their status and power (Cendon & Jarvenpaa, 2001). The common view between the pharmacy employees was one of being dominated and a reduction in autonomy and control, removing the joy of the job and the profession. Many were of the view that this was heralding an era of managerialism (Jabbar & Analoui, 2018).

One opportunity which was seen as a mechanism to restore some power and status which was the location of the BI systems server. This was viewed as an important power play to stop the erosion of autonomy and reclaim some of the prestige of the pharmacy team. The changing system was seen as a "Trojan horse", deemed to reduce the independence of the pharmacy and centralise the services and authority of the senior strategy development team. Negotiations between the pharmacy and the BI section of IT department about the location of the server required careful planning and tactical and strategic responses. Eventually, an accommodation was reached between both parties regarding the location of the server, which both satisfied the power and status aspirations of each and, at the same time, effectively limited the exercise of power by the senior strategy development team.

One of the key outputs of this project is the view that the work in the pharmacy has become routine and monotonous. The respondents found that they had less control over their workloads and their work had become more mechanistic, which was especially true for more junior staff, as noted below:

> The system has replaced what little thinking we used to do, even the pharmacists seem to do less than they used to.

clerical employee

From the perspective of the clerical employee, we discover that the BI system aided in the pharmacy's ability to process prescriptions much more quickly by replacing the most routine decision-making tasks. Thus, the perceptions of powerlessness were felt most acutely by junior pharmacy staff and for lower-level pharmacy employees. Having little control or autonomy in many cases they had no choice but to use the system and were to some extent subjected to routinisation and deskilling of their work.

These events eventually had an unintended consequence. With most of the power was lost at the lower levels of the pharmacy department, the system had to be used as a tool to assist pharmacy management in better monitoring and control. As discussed below:

> The system is comprehensive and if used more fully it can help us to manage more effectively as well as enabling the pharmacy tasks.

The Chief Pharmacist

6.3 BI systems explained using structurational activities

In this section we investigate the results through the deep lens of ST, by showing the pharmacy in relation to technological change, simplified for presentational purposes into four chronologically ordered phases:

(1) BIS planning (phase 1) – March 2018 – Sep 2018

(2) BIS development (phase 2) – Mar 2019 – Sep 2019

(3) BIS use (phase 3) – Sep 2020 – March 2020

(4) BIS continual use (phase 4 – Two years after implementation)

The results are illustrated in the form of episodes of stakeholder activities. Some episodes are concerned with the reproduction of existing structures or shaping of situations, while other are concerned with production of new structures. The results of each phase are then summarised at the end (see Table 5).

6.3.1 Phase 1 BIS planning. In this phase we find the production of legitimation structures, conducted and created through an approval process where the management team spoke to stakeholders. A lot of this discussion took place during monthly departmental meetings, since problems and events like this were normally discussed during such meetings. This process was underpinned by a desire to produce legitimate structures by eradicating outdated pharmacy processes. The organization's normal expectation, based on its use of the standard NHS IT procurement methodology, was that a new BI system would only be acquired if it would result in financial savings. Pharmacy management, saw this project as an opportunity to automate and streamline more pharmacy processes. This goal was documented in the formal business plan, which was then submitted to strategic management.

We also saw a reproduction of domination structures, where the pharmacy management controlled all the project-related resources and made key decisions on behalf of the employees and stakeholders. The management team initially spent a lot of time on planning the system

Episode type	Description	ST element	Explanation
1 - Production of new structure	Pharmacy Management explained to Strategic Management and lower-level workers that aim was to acquire new system, also more robust and quicker than existing one	Legitimation	Initial idea was to replace old system. But systems available in the market offered much more functionality than originally wanted. They could potentially use this additional functionality to their advantage to achieve more cost effectiveness and efficiency
2 - Production of new structure	Less publicised aim of pharmacy management, explained to Strategic Management, was to change 20-year-old set-up in line with its current needs to speed up prescription handling	Legitimation	Work processes of Pharmacy were outdated and inefficient, so new BI system was to serve as lever for change. Many customers (patients and departments) had expressed dissatisfaction with pharmacy department's inability to handle prescriptions to suitable level of efficiency

Table 5.
Phase 1 – BIS planning

needs, its acquisition and management. They only revealed minimum information to their subordinates to prevent any negative rumours and fears from spreading. They only revealed the bare minimum of information to their subordinates to keep negative rumours and fears at bay. In Phase 1, the pharmacy management succeeded in getting approval from pharmacy employees, and then strategic management, to replace the existing pharmacy system. They also succeeded in getting the approval for the latest fifth generation pharmacy system, which would also fulfil their aim of using the new BI system to streamline the pharmacy processes and increase monitoring of employee tasks. However, in this phase there were challenges in getting approval from the IT department who saw this new system as an additional workload burden (see Table 6).

6.3.2 Phase 2 – systems development. In phase 2 through the lens of ST we find some key issues, challenges and opportunities. We find a reproduction of domination structures, where processes and systems were controlled by pharmacy management. This control also created an environment was all decisions about the systems and its development cycle were made by a select few managers. This acted as a buffer mechanism where all information relating to the project was withheld from subordinates. Through the ST lens we also find a reproduction of legitimation structures, where approval was sought from employees through "ultimatum" tactics where they were told "there is no choice but to acquire the new system". As expected, workers complied hoping to help their department in these difficult times.

In this episode we also find that the IT managers rejected the participation of pharmacy employees (potential users) in the project, we view this as a reproduction of domination structures. The excuse provided for this omission was one of efficiency, effectiveness and relevance. This episode also displayed a modification of legitimation structures, with the chief pharmacist having to adhere to new system processes. Changes had to be made to the requirement analysis to make better use of the new procurement process. Thus, as part of this phase approval for the purchase of a new BI system was sought and granted, with tensions still existing between the pharmacy and IT management. This tension created its own challenges and pressures, one key output was negligence from the IT manager on the end user experience after implementation of the BI system. When the IT manager was questioned about removing users from the testing process and the lack of support the manager replied:

Episode type	Description	ST element	Explanation
3 - Reproduction of old structure	Project hierarchically managed in strictly controlled development process. All technology decisions made on behalf of subordinates. More fundamental changes to set-up, together with new system, without much consultation with workers	Domination	Time-defined approach followed, made all decisions and restricted level of information to pharmacy workers. Employees had no real choice or impact on decisions made
4 - Reproduction of old structure	Employees and strategic management informed no choice but to acquire system. Workers were uniformed about the change in roles, and there was no authority to question. The initial optimism faded	Legitimation	New BI system explained, and it was expected of employees to approve the need to replace old system. Workers complied with this request although not knowing degree of change
5 - Reproduction of old structure	New IT manager disapproved of involving pharmacy workers in this system development. Also made most systems-related decisions	Domination	IT Manager aware that the more pharmacy workers knew about project, the more they were likely to question impact on daily work
6 - Reproduction of old structure	New IT manager disapproved of involving pharmacy workers in this IS-led change. Also made most IS-related decisions	Domination	IT Manager aware that the more pharmacy workers knew about project, the more they were likely to question impact on daily work
7 - Reproduction of old structure and also production of new structure	At project initiation stage, chief pharmacist assumed an easy and short process as with his first system purchased 12 years previously	Legitimation	System development would be longer process and would require internal politics to approve project. Assumption based on his purchase of old pharmacy system 12 years ago when there were very few Intranet-related standards and methodologies used in this organisation. But all new norms had to be conformed to in order to have final business plan approved by strategic management

Table 6.
Phase 2 – systems
development

What about them? . . . They simply don't have the expertise.

IT Manager

This negative perception continued with the manager also mentioning the following:

One has to be systematic about these things. What the workers want is a system that looks good but may not do its job.

IT Manager

The IT manager was very much of the perspective that the employees did not have the necessary skills or knowledge know what was required. When prompted on the reason for the omission, the manager replied:

We basically have done our best. I don't think we've missed anything, but these things can happen. We're under a tremendous amount of pressure to complete other projects, in any case more important projects than this one.

IT manager

From an ST perspective domination was used to reduce his own personal workload. The pressure to complete other projects could be the underlying cause of trying to complete the installation process as quickly as possible with minimum input from stakeholders.

In phase 3, the pharmacy management succeeded in encouraging most pharmacy workers to use the new system. We outline the ST lens in relation to this phase in Table 7 below.

6.3.3 Phase 3 IS use. In phase 3, pharmacy management was successful in convincing most pharmacy employees to use the new system. They accomplished this by emphasising the system's importance and training senior pharmacy workers on the more advanced system features to help train subordinates. They were also successful in monitoring the activities of pharmacy and medical personnel. To accomplish this, they informed staff that some of their work would need to be checked to reduce prescription handling errors, as well as the importance of checking the "accuracy" and price of prescribed drugs to comply with the clinical governance initiative. There was however some resentment with the new system which manifested in slow use of the system and initially poor uptake of the new system.

6.3.4 Phase 4 continued use of the system. In the final phase we find that the BI systems had become standard practice across the pharmacy. The system largely replicated the current organisational control structures, which then reproduced structures of domination

Episode type	Description	ST element	Explanation
8 – Production of new structure	New BI system used extensively both inside and outside pharmacy. Indirectly imposed on workers by pharmacy management. Skills of workers had to change to enable them to use system. Their values changed as result. At end of project, need emerged for system manager	Domination	Wider system usage than originally anticipated. pharmacy management told users it was only way to make return on investment. Pharmacy workers used system within department and on wards for processing prescriptions or entering prescription details. Nonpharmacy workers used it for ordering drugs, checking costs or prescribing drugs. For example, finance department would use system to check overall costs of drugs prescribed in a period
9 – Reproduction of old structure	New BI system to facilitate better surveillance and control of pharmacy management and authorised departments. Hence would reinforce existing structures of management domination and be used as control mechanism	Domination	Use of system by pharmacy workers would give pharmacy management better control over workers and finance department over cost of drugs. It would also allow strategic management better overview of types of drugs prescribed by particular doctor/ consultant and costs incurred
10 – Production of new structure	IT manager would oversee the upgrading and maintenance of system. He would also control user access to the system	Domination	IT Manager to assume overall responsibility for running and maintenance of system. Hence would also maintain system-related budget

Table 7.
Phase 3 IS use

and legitimation. The widespread use gave management unprecedented control over employees allowing them to monitor and control on many drugs were prepared, number of customers seen, and number of drugs dispensed. Furthermore, the system would enable several controls by performing routine checks for management, such as discovering drugs and automatically ordering them. It would enable hospital ward staff to place orders for their respective wards. This system decision making was a critical stage in drug purchase authorisation, where the system was now going to be used as an approval portal – a legitimation agent. The final political element which had to be resolved was the location of the BI system. the IT Department, conceptually at least, now became the owners of the system and a key stakeholder in the successful operation of the Pharmacy. Any system related requests are now made to the BI department who then have ultimate decision-making powers (see Table 8).

Thus, in our contribution we find multiple nuances in the data and the application of ST in this context provided rich data revealing that lower-level pharmacy workers enjoyed different types of power and domination. The pharmacy manager and the chief pharmacist realised this and despite already having the power to carry out their objectives without consultation to a point, saw the need to justify the new BI system to their subordinates as well as to strategic management. This justification and legitimation helped them to reinforce their domination that could have been easily threatened if they had paid less attention to their subordinates. On the other hand, despite appearing to hold certain organisationally accepted ways of working and behaviour, some stakeholders privately held very different beliefs from these and did not follow organisational ways of working "to the letter".

Episode type	Description	ST element	Explanation
11 – Reproduction of new structure	The system is used on daily bases in almost all aspects of the pharmacy by all workers	Legitimation	The system is widely used for the administration of drugs, authorisation of new drugs purchase, manufacturing new drugs. It is also used for generating accounting information for the accounts department
12 – Reproduction of old structure	The system is widely used in all activities and records the different activities performed by staff management can go back and check whether and how some of the key tasks are performed be used as control mechanism	Domination	The system was used by the pharmacy management to monitor the overall administration of drugs, the workings of the pharmacy workers and the controlled manufacturing of drugs
13 – Production of new structure	The BI department has insisted and has assured the working of the pharmacy system. They wish to be able to check, monitor and to alter the system as they see fit. They believe that all IT infrastructure should be under their direct control	Domination	The New BI system has physically been moved to the BI department and they are now responsible for the daily running of the system and its maintenance rather than it being in the pharmacy department. Hence BI department have now become the ultimate owners of the system, which is crucial to the workings of the pharmacy. Hence the BI department has now become an actual stakeholder in the management of the pharmacy

Table 8.
Phase 4 Continued use of the system

7. Discussion and conclusions

In this study the authors found a complex pattern of interactions, hidden agendas and political machinations during this transformation process. From the rich data collected and from our analysis using a ST lens we propose that our key contribution is based on changing perceptions and intentions of stake holders based on power, control, legitimation and domination. Thus, in this paper we find a key research gap which helps to contextualise this research within the technology management literature. Looking at the research within BI systems we find that a lot of the key areas of enquiry are around infrastructure (Hashem *et al.*, 2015), systems usage (Chanias, Myers, & Hess, 2019), trust (Thielsch, Meeßen, & Hertel, 2018) and systems design (Watanabe & Nakamura, 2018). We differ from these approaches and aim to investigate the challenges of power and domination within organisations when a new BI system is introduced.

Our main contribution is to the field of technology management research. We discovered that BI systems could alter individual power structures in organisations, disrupting internal dynamics and introducing new aspects of control and dominance. BI tools empower those with higher levels of knowledge, management who control access, and the individuals who sponsored the system. According to our contribution, while a BI system has benefits, it can also cause tension, friction, and animosity if not implemented in a fair and equitable manner. In this scenario, management now has an excessive amount of power and monitoring, and IT directors have significant leverage over other stakeholders, given that their system deployment underpins the organisational structure.

7.1 Implications

From a managerial perspective we find that providing a balance between all groups is critical, given that some of the stakeholders involved were extremely powerful and included several important professional groups and powerful agents (Smith *et al.*, 2008; Marabelli & Galliers, 2017). Challenges in managing this process centred around an erosion of statue and power through new policies and practices. Our research suggests that senior management is constantly attempting to balance the interests of internal, powerful groups such as clinical consultants and users (Henfridsson & Lindgren, 2010), as well as external forces such as government, unions, administrators and auditing bodies. Indeed, Sillience, Harindrananth, and Harvey (2002) investigated institutionalisation in a healthcare organisation and the shifting motives that emerge from the interplay of political manoeuvring and psychological mechanisms, highlighting many of the tensions that recede and flow over the course of contested change (Prowse & Prowse, 2008; Brown *et al.*, 2018). With all these shifting agendas and variables are what make investigating BI systems in the NHS so appealing, and an ideal area within which to develop this specific area of research.

In this paper we find that each side has its own perspective in relation to the implementation of the BI system. Each perspective has multiple implications on perspectives and implementation timelines. Without significant engagement and communication, we find that the majority of the employees have negative perspectives of the process and view this as a "Trojan horse" designed to automate their workflow and minimise their autonomy, status and control. This aligns with the management perspective who views it as a mechanism of oversight and control, disguised under the labels of "transparency". Thus, the pharmacy management used legitimation at the beginning of the BI Systems-led change initiative to gain the approval of pharmacy workers, and both legitimation and domination were used in the middle of the project to keep workers 'engaged. However, at the end of the initiative, mainly domination was used to compel the workers to use the system as intended.

7.2 Limitations

In this research we have developed a detailed understanding of the changing dynamics of power and control in an organisation through the implementation of a BI system; we

acknowledge that there are further areas for research limitations which need addressing. There is scope to develop additional research in this area developing a comparative study with a private organisation of similar size. The main aim of this research would be to differentiate between the two organisations and to address one of the limitations of this study which only focuses on one specific case study. In addition, it would be interesting to investigate any unintended consequences of organisational change which could cause misunderstanding and severing of relationship between different stakeholder groups. Another limitation we identify is in addition to an episode a process of thematic analysis should have been conducted to better understand the key issues during the timeline of implementation. This would have allowed for a richer data set.

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Further reading

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