FACTORS INFLUENCING ENTERPRISE SYSTEMS PROCUREMENT IN PUBLIC SERVICE ORGANISATIONS: A SOCIO-TECHNICAL CASE STUDY

Research paper

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Abstract

Enterprise Systems (ES) are often presented as a driver for business by providing business process integration and utilisation of technology in organising. However, the majority of the ES research is centred on the implementation phase and pre-implementation and post-implementation phases remain largely ignored. Another gap in the existing literature is that it usually ignores the implementation context in theorising. This study focuses on the procurement process of a public service organisation and analyses three instances of ES procurement in the case organisation. The data collection and analysis are conducted using the theoretical lens of socio-technical systems (STS) theory. It notes that while the work-system level and organisation-system level factors play some role in the ES procurement, macrosocial level factors (institutional context and the ES market) play a more important role in the public service context. It also notes the demonstrative nature of certain elements of the ES procurement process in public service organisations. In this way, this study brings out the complexity of ES procurement in public service organisations that result from the interplay of factors operating at work-system, organisational, and macro levels.

Keywords: Enterprise Systems, Procurement, Adoption, Acquisition, STS.

1 Introduction

Enterprise systems (ES), also known as Enterprise Resource Planning systems, could be defined as configurable information systems (IS) packages that provide seamless integration of information and information-based business processes within and across functional areas in an organisation (Davenport, 1998; Kumar et al, 2002). ES are often presented as a driver for business success by providing business process integration and utilisation of technology in organising. However, a major research gap in existing literature is that the majority of ES research belongs to the implementation phase (Esteves and Pastor, 2001; Esteves and Bohorquez, 2007; Eden et al, 2012; Saxena and McDonagh, 2017a), often focussing on identifying the critical implementation success factors (Finney and Corbett, 2007; Shaul and Tauber, 2013; Saxena and McDonagh, 2017b). Therefore, there have been calls for conducting research on the pre-implementation (Howcroft and Light, 2006; Pollock and Williams, 2007) and the post-implementation (Wagner et al, 2010) phases. Another gap in existing research is that it usually ignores the implementation context (Avgerou, 2001; Currie, 2009) resulting in calls for a context-aware perspective (Howcroft et al, 2004) in ES research.

This study attends to such calls and presents a processual case study of ES procurement in the pre-implementation phase. A key aspect of the study is that it explicitly incorporates the socio-technical systems (STS) framework in case research. The inclusion of the STS framework not only allows a focus on the social and the technical (Robey et al, 2013), it also helps in presenting a context-aware perspective due to its consideration of the macrosocial level (Trist, 1981). The remainder of the paper is structured

as follows. Section 2 presents the literature review associated with the adoption and acquisition phases. Section 3 outlines the research methodology of this study. A short description of the case study organisation is presented before presenting the analysis of the procurement process in Section 4. Section 5 discusses the findings of the case study in light of extant literature and brings out the unique contribution of this study. Finally, section six concludes the paper and notes the limitations of the study.

2 Literature Review

While some scholars club the procurement process into a single phase of the ES lifecycle (Markus and Tanis, 2000; Parr and Shanks, 2000), we have considered the ES procurement process to be consisting of two stages: adoption[1] and acquisition. This allows for more focus in the review and provides better granularity for the analysis. Consequently, literature review and findings are structured in terms of adoption and acquisition phase.

2.1 Research on ES Adoption

The adoption phase typically includes the decisions and activities leading up to formal project approval and funding (Kumar et al., 2002) of ES. During the adoption phase, the organisation becomes aware of the possibility of implementing an ES as against developing a bespoke IS to fulfil organisational needs. This phase may include arriving at the definition of system requirements, determining its goals and proposed benefits, and conducting an analysis of the impact on the business (Esteves and Pastor, 1999, 2001), generally resulting in preparation of a business case document (Kumar et al., 2002). ES research related to the adoption phase may be broadly classified into two categories – research related to the justifications/motivations for adopting ES, and research on the factors that affect the adoption decision.

The first strand of adoption research (e.g. Oliver and Romm, 2002; Poba-Nzaou et al, 2014; Stefanou, 2001) focuses on the motivations of the organisations or the justifications presented for its adoption decision. These justifications may be classified into three main categories. *Technology related justifications* are related to technological aspects such as dissatisfaction with the existing system, maintainability of the existing system, modernisation needs of the system, integration of IT systems, improvement in IT infrastructure, and improved information access across organisations. *Operational justifications* relate to business process aspects of the organisations. These include standardisation and integration of the administrative processes, improvement in administrative data accuracy, and improvement in effectiveness of administrative processes. *Strategic justifications* relate to long-term strategy associated with ES adoption. These include organisational vision of integration, business considerations, improvement in service and quality, supporting organisation growth and expansion, and compliance with laws and regulations. In this regard, Gallagher et al (2012) note that the stated goals for the ES adoption influence both the arguments used to 'sell' the project internally, and also later decisions on personnel assignments for the ES project.

The second strand of adoption research focuses on the factors that affect adoption decisions. Perceived or expected benefits are found to be the most important factor in determining the adoption decision (Chung and Snyder, 2000; Kumar et al, 2002; Shiau et al, 2009). The higher the level of *perceived benefits*; the higher the chances of a positive ES adoption decision. Usually, the perceived benefits are listed by the organisations as motivations/justifications for an ES adoption decision, as noted in the previous paragraph. *Top Leadership* is another important factor. Based on their study of ES adoption by 19 Canadian organisations, Kumar et al (2002) note that in around seventy five percent of cases, top management initiated the idea of ES adoption. Shiau et al (2009) also report that CEO characteristics such as their background and IS knowledge have an impact on ES adoption decisions. Based on the data obtained from 328 companies, they find a strong and positive relationship between rich IS knowledge

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[1] Some researchers take a wider meaning of the term adoption by ES deployment in organisation, this study subscribes to a narrower meaning as espoused in Esteves and Pastor (1999, 2001), and Rajagopal (2002). Other terms used for this phase are awareness (Bajwa et al, 2004), or initiation (Bhatti, 2014)

of the CEO and ES adoption. The third set of factors are *organisational factors*. Based on their study on small, medium and large organisations, Laukkanen et al (2007) note that organisation size is an important factor in adoption decision. They report that while small and medium enterprises consider resource constraints an important factor in their ES adoption, larger organisations have to consider the integration complexity and change management issues. Apart from size, Raymond and Uwizeyemungu (2007) administrative intensity, type of production method, operational capacity, innovation capacity, and financial capacity are important determinants of an ES adoption decision. Finally, *industry context* is also identified as an important factor but there are conflicting findings on the importance of external factors in the ES adoption literature. While Elbertsen and Reekum (2008) report that higher competitive pressure in the industry is associated with ES adoption, Seethamraju (2015) find that competitive pressures on the enterprise have no impact on the adoption decision. The role of external recommendations is found to have no impact on the adoption decision (Laukkanen et al, 2007; Seethamraju, 2015), irrespective of the size of the company. However, Raymond and Uwizeyemungu (2007) report that commercial dependence on certain customers, and networking intensity within the industry may affect the adoption decision. Based on the motivations and factors discussed above, if the organisation makes a decision to adopt ES, the next phase of the ES lifecycle is acquisition. The next subsection reviews the literature related to ES acquisition phase.

2.2 Research on ES Acquisition

Howcroft and Light (2010) note three main activities of the acquisition phase in the existing literature – understanding user requirements, package evaluation, and final selection and procurement. Verville and Halingten (2003) note similar activities in the form of selection, evaluation, choice, and negotiations. During this phase, normally an implementation partner (who may sometimes also be the ES vendor) is also selected to help in the subsequent phases of the ES lifecycle, especially during the implementation phase (Esteves and Pastor, 1999). Factors such as price, training and maintenance terms are also negotiated (Bhatti, 2014) in this phase, which usually form part of the contract agreement.

Literature on the ES acquisition phase reflects two distinct orientations. The first orientation is more technical-managerial in nature. In this stream of research (e.g. Gürbüz et al, 2012; Kilic et al, 2014, 2015), scholars try to isolate selection criteria and to devise algorithms for selecting the 'best' ES for the organisation using different mathematical/decision models. *Technical criteria* relate to features of the ES software such as software functionality, system reliability, compatibility with existing systems, ability of cross-module integration, underlying technology standards and protocols, compliance to international standards, ease of use, ease of customisation, maintainability of the system, and security aspect, among others. *Business-related criteria* usually flow from the business case put forward during the adoption phase and include business related aspects such as business vision, brand image, market position, better fit with organisational structure, fit with parent/allied ES, references from other organisations in the same industry, fit with business processes, among others. *Vendor related criteria* primarily relate to project cost. The cost considerations include hardware, software and network costs, license costs, consultancy costs, user training costs, and support and maintenance costs. Other vendor related criteria include vendor's market position, vendor's domain knowledge, vendor's and product reputation, adequacy of consultants, quality of after-sales service, among others. In terms of their relative importance, based on the decision criteria used by the IS managers in 126 US organisations, Keil and Tiwana (2006) report that functionality, reliability, cost, ease of use and ease of customization are the most important criteria, whereas ease of implementation and vendor reputation are not very significant in acquisition decisions.

However, the other strand of the acquisition research rejects the notion of a completely rational acquisition process and offers a **socio-political** alternative instead. This view rests upon two main arguments. The first argument is based on the fluid nature of the organisation's requirements and ES package. Howcroft and Light (2010) note that the requirements of the organisation may be unclear or continually emerging, and different units may present different and competing sets of requirements for an ES package. Similarly, although the ES package is often presented by the vendors as a complete

solution, Pollock and Cornford (2004) argue that an ES product is usually a work-in-progress which is in constant development and should be viewed in more fluid terms. The precise characteristics of an ES are difficult to ascertain without actually implementing it. Although the adopters may visit the potential 'reference site' but such sites may not be available or completely similar to the adopting organisation (Pollock and Williams, 2007). The second argument in this strand relies on the social and political nature of the acquisition process. Even if we see an ES as a static system, the same technology may be evaluated differently by different social groups in the organisation (Saxena et al, 2016). The formal evaluation process may not occur at all or it may be conducted only to support a pre-determined decision arrived at based on politics between senior management, IT managers, vendors, consultants, and end-users (Howcroft and Light, 2006, 2010).

Reconciling the technical-managerial and socio-political views of the ES acquisition process, Pollock and Williams (2007) argue that although the packaged software acquisition process is affected by social factors, organisations do not completely do away with the rational evaluation process. Therefore, although the acquisition process is not smooth and linear as suggested by the technical-managerial strand, organisations still try to rationalise and formalise the decision process. To paraphrase Tingling and Parent (2004) – processes of rationality, organisational structures, and processes of legitimisation – all have an impact on the acquisition decision.

3 Research Methodology

The research question for this study was: *what are the factors that influence the ES procurement in public service organisations?* To answer this research question, we adopted a multi-level qualitative case study involving retrospective and real time processual analysis (Leonard-Barton, 1990; Pettigrew, 1990). Processual orientation meant that process tracing (George & Bennett, 2005) was a major goal of the case study and there was a search for patterns (Pettigrew, 1997; Langley, 1999) across process instances. Since the STS framework was an explicit part of the case study, it involved focusing on the three levels, namely the work-system, the organisation system, and the macrosocial levels as defined in Table-1 (Trist, 1981; Winter et al, 2014). From a methodological perspective, this meant that data collection paid attention to the three levels in that documents were collected and interview questions were asked corresponding to all three levels. Similarly, the analysis involved a nested coding scheme (Miles et al, 2013) in which the codes were assigned to one of the levels within the STS framework.

STS Level	Definition
Macrosocial Level	Communities, industrial sectors, and institutions operating at the overall level of a society (Trist, 1981).
Organisation Level	A sociotechnical system consisting of social and technical elements intertwined in a complex web of mutual causality (Trist, 1981), defined by a formal organisational boundary (Winter et al, 2014).
Work-system Level	Systems which carry out a specific set of activities in an identifiable and bounded subsystem of an organisation such as a department or a service unit and consist of a group of personnel plus the relevant equipment and other resources (Trist, 1981).

Table 1.   Three STS Levels Considered in this Study.

The first author collected the data during January to December 2015. Data collection started with secondary data collection during the first half of 2015. Secondary data included documentation made publicly available by the case organisation (e.g. Annual reports, Board meeting minutes and strategic plans – corresponding to the organisational level) as well as the archival data from other public agencies (e.g. reports from the Public Auditor, debates of parliamentary committee, and reports by various commissions from time to time – corresponding to the macro-level), and the project documentation provided by the organisation (corresponding to the work-system level). We performed a preliminary analysis of the secondary data before conducting the interviews. Analysis of the documents served three purposes. First, it enabled us to arrive at a detailed chronology of events. Second, it guided us towards

identification of key actors who would be interview participants. Finally, it also sensitised us towards certain aspects around which interview questions could be framed.

The primary data collection phase consisted mainly of in-depth qualitative interviews with the participants who were identified based on the secondary documents. To ensure internal generalisation, we interviewed participants from top management, implementation team (with members drawn from IT and business), and user groups. Furthermore, we also asked participants if they would recommend any key actor to be interviewed. Interviews were conducted during July to December 2015 in the organisation's premises. We took special care in balancing the affiliation in terms of top management team, project team, and user groups in order to increase internal generalisation. In total, we conducted 24 interviews with 25 participants (one interview had two participants) which amounted to a total of 1312 minutes averaging to 54.6 minutes per interview. All but three interviews were recorded and transcribed verbatim by the researcher. The three interviews for which recording was not permitted, detailed notes were taken, and interviews were transcribed on the same day based on the notes and memory. Table 2 presents the interview participants' profile. In the paper, respondents are referred to as R1, R2, R3 and so on along with their affiliation as noted in the table.

Participant's Primary Affiliation	No. of Participants
Top Management Team (TMT)	6
Project Team (PT)	8
User Groups (UG)	11

Table 2.   Profile of Interview Participants.

For conducting the interviews, the responsive interviewing model developed by Rubin and Rubin (2011) was used. With responsive interviewing, the researcher generally starts with an open-ended question and devises additional questions depending on the emerging details. In executing this model, interviewees were first asked about their background, experience, responsibilities in the organisation and then subsequent questions were formed based on their response. To ensure consistency with the STS framework, interview schedule included questions related to the project (work-system), organisational, and the external context (macro-level). The interviews and the secondary documents were subsequently coded for data reduction and analysis purpose (Farquahar, 2012; Yin, 2013). Primary coding was a combination of descriptive and nested coding (Miles et al, 2013) where each descriptive code was assigned to one of the STS levels – work-system, organisation system, and the macrosocial level (Trist, 1981; Winter et al, 2014). The primary codes were then combined into second order codes or the factors that are reported in this study.

4   Case Description and Analysis

This section presents the analysis of the empirical evidence. Section 4.1 provides the case description in brief. Section 4.2 presents the factors influencing the adoption decision in the case organisation. Section 4.3 presents the factors influencing the acquisition phase.

4.1   Case Description

The case study organisation is a Health Service Organisation (HSO, a pseudonym) engaged in the processing of blood and associated products. In terms of macro-level context, HSO belongs to the public sector from one of the parliamentary democracies from Western Europe. HSO comes under the aegis of the Department of Health but it is constituted as a self-financed public service body. However, it requires the sanction of the Department in its strategic decisions and capital investment, including strategic information systems procurements. Due to the nature of its operations, the blood bank industry is information intensive. HSO respondents note:

> *Traceability with blood is a very important issue. For every unit of blood donated, we must be*

able to say what patient received it. So, if (any issue) comes, there is a look-back over a particular donor. We have to be able to say (who donated it). (R16, PT)

That's a real problem I think. Because we are such a small field and we're so information driven, it's just all information; most fields aren't in this type of need. (R19, UG)

This case study covers the three ES procurement instances in HSO since late 1990s to the present. The first instance was procurement of a system called BBS-I (a pseudonym) that covered the blood bank operation and was adopted in late 1990s. The project started around 2000 and system went live in 2003. However, this system was a file-based system that did not offer much reporting functionality. Therefore, the second instance was procurement of a new system around 2004. BBS-II was an upgrade of BBS-I and was based on a relational database system promising superior reporting capabilities. In this instance, however, the implementation was abandoned in early 2007 after facing significant challenges. Finally, the third instance of the procurement took place in the early part of 2010s, when HSO decided to procure a system suite named BBS-III. BBS-III was centred around BBS-II as a core module covering blood bank processes. Moreover, it also had additional modules to support other functions related to patient tracing, risk management, and tissue banking activities. BBS-III is the system which is currently in operation in HSO. The next section presents the description and analysis of the adoption phase in the three instances.

4.2 Analysis of the Adoption Phase

At the first instance, the adoption motivations for BBS-I stemmed from the work-system and the organisational level. At the work-system level, the limitations of the existing system played a crucial role. The existing system (BBCS – Blood Bank Control System) had limited functionality and offered limited avenues for analysis due to a lack of integration across offices, as noted below.

When I came in 1999, there was a system called BBCS, which was bespoke system. It only managed the donor records. It didn't manage anything happening at the clinic, and it didn't manage the laboratories. (R2, TMT)

Before the BBS-I, we had the BBCS and we had the separate box in [Centre 1] and a separate box in [Centre 2]. So, the results, you know, there was no link between them. (R20, PT)

The justifications for BBS-I were mostly expressed in terms of what it could offer upon implementation. For HSO, BBS-I offered the opportunity to integrate its donor information from procurement to transfusion following industry best practices and to build a national database of blood banking in Ireland. While integration motivations are justified, the 'best practices' motivation looks more like rhetoric since HSO ended up implementing the same business processes on BBS-I, as noted by one respondent:

We took BBS-I and we changed it to suit us rather than take BBS-I and say - well, okay, well that's a different way of doing things; we're going to move and do it that way. So, we did some of that, but it was slow. So, instead there was an awful lot of, and BBS-I does allow for a lot of user configuration, but we did probably too much user configuration and ended up doing more or less of what we'd always been doing... using BBS-I to, not to, not to drive that process but to record that process. (R19, UG)

A major focus of the adoption argument was also geared towards provision of increased donor and patient safety made possible by the new system. The safety could be ensured by donor recruitment and screening (aided by database integration) at the donation stage, tracking of blood from donation clinics to the hospitals (due to business process integration), and parameter checks (made possible by parameterisation of the system) at issue stage.

Within a year after BBS-I rollout in 2003, HSO decided to adopt BBS-II developed by the same supplier. Like BBS-I, adoption motivations for BBS-II also stemmed from the work-system and the organisation level. Work-system related justification included hardware obsolescence, limitations of flat-file system underlying BBS-I, and data recovery ability of BBS-II. As one respondent notes:

Because of the length of time taken to implement BBS-I; the HSO was left in a situation where the hardware on which it was operating had reached the end of its life and needed to be

> *replaced. It made good economic sense to upgrade the current blood bank control system at the same time… [BBS-I] technology has a flat-file structure which makes it very difficult to extract effective management information in a timely manner.* (R2, TMT)

The flat-file structure underlying BBS-I offered limited data recovery abilities and always had the risk of data inconsistency where the same data was updated in one file and not updated in the other. BBS-II, due to its underlying relational database system, offered to solve these two problems. A relational database design not only ensured data consistency across different tables, it also offered the facility to fully recover the data right up to the point of failure.

At the organisational level, justifications for BBS-II included introducing operational efficiency, generation of management reports, and providing strategic advantage to HSO among its peers.

> *Part of the reason we went early with BBS-II was we thought it gave us a good opportunity for improving the costs in our donor collections… We were very inefficient at the clinics. It's laborious, it's time-consuming; it's the opposite of lean. We do, we have far too many fiddly things, too many checks, too many people involved... Rather than crack that as a management team, we thought - 'No, BBS-II will give us a solution to that. Because of the so much more information flow, it will be easier. There will be much more linkages that will be automatic by, you know, wireless linkage of devices and people etc'… We saw it as solving a whole lot of problems that we had mostly at the clinic level.* (R19, UG)

The justifications for BBS-II adoption reflects the assumption that merely connecting all the information systems will solve the organisational problems, although empirical evidence shows (Hammer, 1990; Davenport, 1998) that merely automating the business processes using IT may not result in operational efficiency. Similarly, although it is known that relational databases allow generation of management reports due to the connectivity among tables, BBS-II was a new software and was not implemented elsewhere. Consequently, HSO did not have any evidence for the reporting functionality offered by BBS-II. The justification was based more on the potential reporting capabilities rather than actual reporting capabilities.

At the third instance, adoption motivations for BBS-III were primarily work-system and supplier driven although one notes organisational motivations of further integration as well. As documentary evidence suggests, end of software lifecycle and supplier support were the two main reasons for BBS-III adoption.

> *We have to do it because it the end of life [for the software]. If we don't, [the supplier] won't support any longer.* (R9, PT)

> *BBS-I software is towards the end of its operational life and… [the supplier] has indicated that they could support the existing version of BBS-I only around 2014 or so.* (HSO Board Minutes, 2010)

Consequently, HSO either needed an upgrade of the existing system or a replacement of the existing system with a new one. However, once the adoption decision was undertaken, HSO included organisational justifications in the business case. HSO sought 'an enterprise wide off the shelf computer system' which could meet 'the operational needs of a twenty first century blood, tissue and whole product distribution organisation' maximising current technology to deliver the business need (HSO Internal Documents, 2011). Although this statement portrays an organisation which is at the forefront of technology, the following comments from the respondents suggest otherwise.

> *There are lots of challenges on the infrastructure as well because like, we're running all versions of windows. We're on all versions of servers. Some of our SQL databases are on old versions. Like, we're still running some from 2000.* (R5, PT)

> *I feel that I have been de-skilled after coming to HSO. Another example I can give you is that my system is still on windows XP.* (R13, UG)

In all three instances, top leadership of HSO played an important role in selling the idea to HSO board and gaining their support. The chief executive presented the case for ES procurement in the HSO board meetings and provided the justifications for the introduction of a new system, resulting in the board accepting the proposal. As one respondent noted:

Once you get the leadership and the buy-in from the top …once you get the support at a senior administration level or whatever within the organisation, you can get the job done. (R3, PT)

In the next two instances, supplier's push also played an important role in the adoption phase. In case of BBS-II, it cannot be denied that since the supplier was offering a new system, HSO sought to adopt it. The supplier arguably played an even greater role in BBS-III adoption by indicating the end of support for BBS-I, thereby coercing HSO to look for a new solution. This is probably due to the dominant position of the supplier in a niche market, as noted by respondents:

They would appear to have about 70 percent of the blood banking market worldwide, so, absolutely a dominant player. (R1, TMT)

They've got a huge market and we're only a tiny one… we would only be like 1% of their business or 2% of their business in terms of the revenue… we're not a big customer and… that's not so great because it makes it difficult for us to get them change it our way. (R19, UG)

Based on the patterns identified in the three instances, it may be inferred that factors operating at the work-system level and the organisational level were the most important factors for the adoption phase whereas macro level factors played a more indirect role. Work-system related factors were primarily related to constraints/features of the technology. Constraints provided the justifications for moving away from the old system. For example, BBCS's inability to integrate information and limited functionality paved the way for BBS-I adoption; end of life of BBS-I software instigated the adoption of BBS-III. On the other hand, enabling features of new technology also acted as justification for introduction of the system. While BBS-I seemed to offer benefits of database integration across two centres of HSO, BBS-II seemed to offer the benefits associated with relational database in terms of data consistency and data recovery. In case of BBS-III though, existing constraints at technological level (end of software lifecycle) seem to play an important role instead of the potential offered by new technology. However, once the adoption decision was taken, organisational motivations were also put forwards in the BBS-III case.

Organisational motivations for ES adoption in the HSO seem to be mostly related to business process integration and business vision. BBS-I adoption was characterised by a focus on integration of blood operations from the blood donation to issuing blood to hospitals. It was also justified by the business vision for donor and patient safety due to the integrated database environment. For BBS-II, the business vision put forward was that of ensuring organisational efficiency, enabling managerial decision making, and organisation's strategic advantage. It was argued that generation of management reports by BBS-II would result in better managerial decision-making. Similarly, it was also argued in the case of BBS-II that implementing a system may provide a first-mover advantage to HSO. For BBS-III, organisational motivations involved pursuing further business process integration and portraying an image of a 'twenty first century' organisation. However, analysis also points at the partly demonstrative nature of the organisational motivations. While the objective of business process integration was followed in all three cases, business vision mostly seemed to serve demonstrative purpose. Although the business vision of efficiency was put forward in all three cases, there was no serious effort on reengineering business processes for efficiency. Similarly, generation of management reports was put forward as a justification although there was no prior evidence for claiming that. The use of phrases such as 'strategic advantage' or 'twenty-first century' organisation point out at demonstrative nature of organisational justifications although they may not relate much to HSO operations. Among other factors, top leadership support was crucial in generating support for adoption of a new system. Finally, supplier's push that is partly explained by the existence of a dominant supplier in a niche market also seemed to play a role in the second and third instances. Once the adoption decision was taken, HSO moved towards the acquisition phase. The next subsection presents the analysis of the acquisition phase.

4.3   Acquisition Process

While the adoption phase was marked by factors operating primarily at the work-system and the organisational levels, the acquisition phase in the case study was marked largely by the macro-level factors and partially by the work-system level factors. For BBS-I, the HSO approached first the

Department of Health for their support and went with a public tender for acquisition of a new system. Going with a public tender is a key feature of public sector procurement processes in Ireland. However, due to niche nature of the blood bank market and the supplier's market dominance as noted earlier, there was only one supplier other than the existing supplier that was short-listed for consideration. Existing supplier was (and still is) the dominant supplier of blood bank control systems to transfusion services across the world at the time, as noted by one respondent:

> When we went with BBS-I, it was in New Zealand, it was in Australia, it was in Scotland, it was in several places in the US, it was in France, it was in Netherlands, it was in Finland and one or two other places as well. (R19, UG)

Another key factor for BBS-I acquisition was the level of integration offered by the product. The solution from the other supplier did not have an integrated system. They offered two different software packages to manage the donor side and the production side, whereas BBS-I offered an integrated system to manage entire blood operations. After the evaluation, HSO selected BBS-I for the implementation.

For BBS-II acquisition though, HSO neither sought clearance from the Department of Health, nor did it go with the full public tendering process. Instead, the supplier of BBS-I sent an official proposal for the BBS-II project to the HSO which was accepted by the executive steering group. This was a move which HSO ended up justifying before the parliamentary committee as noted below:

> When [HSO] initially purchased BBS-I it followed a full tender process and there was only one other supplier shortlisted for consideration. Senior staff of the [HSO] regularly attend conferences and scientific meetings where suppliers of all major systems and equipment for use in blood transfusion services exhibit. In addition, the national blood services in Europe have formed an association that meets biannually where all areas of activity are discussed. There was no evidence at either of these fora that an appropriate alternative system to BBS-I had come to market. Therefore, it was a reasonable course of action not to go through a formal tender process when the decision was taken to upgrade to BBS-II. In fact during this time one European blood service had carried out a benchmarking exercise to examine all possible systems available or that could be customized to provide a blood bank control system and decided to purchase BBS-II.

As one can see here, the justifications for such move were primarily drawn from external market context and took recourse to the system usage in other blood banks and dominant market position of the supplier. It also made use of the benchmarking exercise conducted by other blood bank to justify BBS-II acquisition.

However, it was the acquisition process for BBS-III that saw the full impact of HSO's institutional context. After taking an acquisition decision, when HSO approached the Department of Health for its support the Department vetoed not only the BBS-III project but also other IT projects (HSO Board Minutes, Dec 2010). Interestingly, this was due to some other factors not directly related to the project, as noted below:

> We were getting at this thing, what we were getting to the decision-making points of this thing, right to the point of the crash hitting the country. So, there was whole question of how much money we are going to spend. Which were, these were very legitimate questions to ask us - 'why do you need to do this?' (R1, TMT)

> We did need to get department of health approval to proceed with the project. That was difficult to achieve because we are in dispute with them over a pension issue... I think it didn't impact on conduct of the project. It was more to get approval at the beginning of the project to commence, the project initiated. (R3, PT)

Here one can note the importance of macro-economic and institutional context in the acquisition phase. The recession at the macro-economic level forced Government to be prudent in its spending and questioning the requirement and justifications for the investment. At the same time, it also underscores the importance of institutional context in terms of getting Departmental approval. The logjam with the Department continued for some months where HSO kept trying to convince the Department and the

Department kept vetoing the implementation. Ultimately, HSO took recourse to similar arguments that were used in the adoption phase – technical constraints, and the criticality of blood operations, as noted below:

> *[The CEO] eventually wrote them, saying - 'That's okay. If the existing hardware falls over, and if the existing software is no longer supported, I'm sure you'll take responsibility for the impact of that on the national blood supply and the supply of that to the patient.'... They straightaway came back and said, okay go ahead.* (R1, TMT)

In fact, in all three instances, top leadership support was crucial in securing the approval from the Department. As minutes of HSO board meetings show, it was the CEO who was dealing with the Department of Health all the time and he represented the HSO before the Parliamentary Committee.

Apart from approval, institutional context had an impact on the entire acquisition and implementation process for the BBS-III project. The Department of Health suggested the creation of a peer review group (PRG) as an external control mechanism to review the BBS-III project from the tendering process to eventual go-live. Constitution of a PRG is mandatory for all the major IT projects in the public sector. However, since HSO is not funded through Voted monies and does not need to form a PRG by law, it still formed one, as noted by respondents:

> *One of the things that has happened on this project that has happened in no other project in HSO, is the, because it is an IT project, a peer review group was appointed.* (R1, TMT)

> *We didn't have to put in place a peer review group, which we did… it also has to do with how IT projects in the public system generally were managed, and have been seen to be managed, and then I think there was more awareness for the need for oversight.* (R2, TMT)

However, the audit report of the BBS-III project suggests that the frequency of PRG meetings, as outlined within it's terms of reference, was not being maintained during BBS-III implementation work. This also points at the part-demonstrative aspect of the acquisition process. A similar pattern was observed in user involvement for BBS-III at the organisational level. The users were involved in writing user requirement specification (URS) document for their respective functional areas.

> *We set down with all the user departments, we gathered up all the requirements, we determined what was phase-1; we determined what was phase-2.* (R5, PT)

> *We begin with defining user requirements. This has to be done by user themselves and it has to be based on hard scientific facts. So, it will not be like - we want this and that. It has to be like - this is the specific functionality we want and these are the rules for the particular functionally. Essentially, it is about writing down exactly what do you want. -* (R15, UG)

However, it was also expressed by the respondents that writing URS was probably not given much attention and time, or had the role in decision-making process. Like PRG formation, this also points to partly demonstrative nature of user involvement.

> *I think, again more time should be given to writing the URS... Probably not enough time was put in at that stage of the process.* (R16, PT)

> *I was told I was being part of URS... We were given documents from the (another) blood service and more or less told to copy and paste them… To my mind, I wasn't given any opportunity… to say - okay, what are the problems we have with BBS-I that really give us headaches, and let's try and avoid that for the next time… but it's only kind of dawning on me now. I feel that we were pushed into the project.* (R17, UG)

> *Basically, we got [module name] because the organisation decided as a whole they were going for BBS-III and we were getting this module. I never saw it operated anywhere else.* (R14, UG)

Once the project got approval, HSO went ahead with a public tendering process, perhaps learning from its earlier experience. However, external market conditions did not change much from the last time in terms of solutions availability or supplier's dominance, as noted by one respondent:

> *We held a competitive tendering process. Okay, so, we went for Request for Information first and then we had the tendering process. The request for information process came back with*

four suppliers. A lot of the responses didn't cover tissue system and didn't cover a patient or a risk system or whatever else…. we didn't have a conglomerate that came together and say we'll give you all these… [Existing supplier] came out to be clear winners because they could answer very much all the elements of it. (R3, PT)

At the work-system level, it may be noted that tender evaluation for BBS-III involved technical evaluation, business fit evaluation, project methodology, and cost. System functionality was measured mostly in terms of availability of the functions specified in the URS, though it appears that evaluation was primarily based on information submitted in the bid by the supplier. At the time of acquisition, HSO also decided to go for the complete suite offered by the supplier to further its goal of further business process integration. Although it was theoretically possible for HSO to implement different modules for different functions, they opted for the complete suite offered by the same supplier. The justifications mainly relate to interfacing between modules, as noted below:

There may be a case and some services have done it – to take individual modules like appointments systems or a customer relationship management and to buy those off the shelf from specific companies; but then they have always got the problem of bringing it back in-house and integrating the two together. So, my preference would always be to try to go for the full integrated package. (R1, TMT)

From an HSO point of view, the decision was taken by the organisation to try and to get one solution to cover everything; because what would have happened would have been multiple systems then trying to communicate with one another. Our main system was still going to be provided by [existing supplier] and we were going to have to have multiple, I suppose, systems then trying to communicate with them. They already provide a solution in that space. (R5, PT)

Supplier's push was also evident in the acquisition of complete suite since acquisition of only one module would have resulted in loss of business integration. As noted respondents note:

[Existing supplier]told us that within BBS-II, they would no longer support the patient module, but they had developed a new standalone application called eTraceline, and eTraceline is interfaced into with BBS-II. (R20, PT)

Based on the patterns identified in the three instances, it is clear the macro level context played a crucial role in the HSO ES acquisition process, with work-system and organisational factors playing a secondary role. User involvement, in whatever form, played a very little role during the procurement process. For both BBS-I and BBS-III, while departmental control was prominent in approving the adoption decision, public service context mandated the public tendering process for the procurement. In case of BBS-II where these two conditions were not followed, HSO ended up providing a post-facto justification to the national auditor and parliamentary committee of public accounts. In that sense, institutional context of HSO was influential in all three instances of acquisition phase. In all three instances, HSO top leadership played a crucial role in interacting with the institutional context. Similarly, macro-level market was also influential in all three instances due to the supplier's dominance and widespread use of the system, as noted earlier. For BBS-III acquisition, the wider economic context and inter-agency politics also played a major role respectively by generating the demands for investment justification and by departmental veto based on political factors. At the work-system level, features and constraints of the ES artefact also played a crucial role in the case of BBS-I and BBS-III. While in case of BBS-I, it resulted in its preference over another (non-integrated) system; in case of BBS-III, it resulted in acquisition of an entire product suite from the same supplier. Finally, the manner in which PRG was formed and users were involved indicates the demonstrative nature of these initiatives.

5   Discussion

A key contribution of this paper is the explicit inclusion of STS framework in a processual case study. The STS framework allowed us to identify factors emerging from the three STS levels – macrosocial, organisational, and work-system level (Trist, 1981). The processual aspect of the study allowed us to analyse the sequence of events over time and to search for patterns across process instances (Pettigrew,

1997; Langley, 1999). Therefore, the case analysis supports the conclusion that factors emerging at all three STS levels influence the ES procurement process in a public service organisation. However, the relevance of a particular level seems to vary depending upon the specific phase of ES procurement. While the work-system and organisational level factors prompted the adoption decision, macro-level factors had more influence over the acquisition process. Since the macro-level is an inherent part of the STS framework, the study is also able to present a context-aware perspective (Howcroft et al, 2004) on ES procurement.

The analysis supports the findings by ES scholars (Oliver and Romm, 2002; Poba-Nzaou et al., 2014; Stefanou, 2001; Uzoka et al, 2008) that motivations of ES adoption mostly relate to technology, operations, and strategy. Evidence from the case study identifies the work-system related motivations associated with limitations/constraints of the existing system and features of the proposed system (Alves & Matos, 2011, 2013; Oliver & Romm, 2002; Laukkanen et al, 2007; Raymond et al, 2006; Poba-Nzaou et al, 2014). Organisation level justifications include operational and strategic justifications such as business process integration, operational efficiency, and business vision (Adam & O'doherty, 2000; Alves & Matos, 2011, 2013; Kumar et al, 2002; Laukkanen et al, 2007). Empirical evidence from the case study also supports the applicability of factors such as perceived benefits (Chung and Snyder, 2000; Shiau et al., 2009), and top leadership support (Kumar et al., 2002; Verville et al, 2005). However, a notable finding of this case study is that organisational justifications largely served the demonstrative purpose and there was no serious pursuit of organisational justifications besides business process integration. This might be due to the public service context of the organisation, since Berente et al (2010) also report similar practice of demonstrative controls in their case study of ES implementation in NASA. They note that while usual functional controls are exercised for corrective purposes and intend to make work processes more efficient, demonstrative controls often serve to advance the appearance of a neatly ordered organisation, thereby focusing on the public display of compliance. Based on their study of four public universities, Oliver and Romm (2002) also note that public organisations often engage in justifying their ES adoption by alluding to what they call 'technical rationality'. They note that compliance with both accepted and emerging norms of technical rationality (e.g. following best practices, using the state-of-the-art system) becomes a way of obtaining legitimacy but never gets institutionalised in the organisation. Another notable finding is the existence of supplier's push for ES adoption by either encouraging the adoption of new system, or phasing out of the support for the old system (Khoo & Robey, 2007; Khoo et al, 2011).

For the acquisition phase, although the analysis partially supports the prescription of techno-managerial literature that organisations evaluate the ES based on the technical and business criteria (Gürbüz et al, 2012; Kilic et al 2014, 2015), it rather strongly supports the assertion (Entwistle & Light, 2008; Pollock & Williams, 2007) that it is usually difficult to evaluate the functionality of ES artefact without actually implementing it. This makes the gap analysis and evaluation process dependent on the features reported by the supplier and renders it less than rational. The analysis also supports the observation by Howcroft and Light (2006, 2010) that the acquisition process is a socio-political process and depends upon the politics between senior management, IT managers, vendors, consultants, and end-users. BBS-III acquisition in particular supports the finding by Kauffman and Tsai (2009) in recent years that firms have moved toward a unified procurement strategy for ES solutions. However, the most notable finding of this study is the influence of macrosocial factors, namely the institutional context and the ES market structure over the acquisition process. While influence of institutional context stems from the public nature of the organisation, the niche nature of the blood service seem to be responsible for influence of ES market structure in the form of the influential role played by a dominant supplier. Monopoly market structure of the niche market (Olsen and Sætre, 2007; Pollock and Cornford, 2004) constrained the choices available to HSO. Case findings also highlight the specific role played by top management (Liang et al, 2007; Dong et al, 2009) in working with the institutional context during the acquisition process. Like adoption phase, certain aspects (PRG formation, user involvement) were found to be more of a demonstrative nature (Berente et al, 2010; Oliver and Romm, 2002) and ware not found to be influential in the acquisition decision. However, HSO still engaged in a formal gap analysis of the ES during tendering process. It supports the conclusion that while the ES acquisition process is heavily

affected by the macrosocial factors especially for the public-sector organisations, organisations do not completely do away with the rational evaluation process (Pollock and Williams, 2007).

6 Conclusion and Limitations

This study answers to the call for more research on pre-implementation phase (Howcroft and Light, 2006; Pollock and Williams, 2007) of ES in organisations and for a context-aware perspective (Howcroft et al, 2004) on ES research. A key contribution of this study is an explicit incorporation of the STS framework in a processual case study. This case study analysed three instances of ES procurement process in a public service organisation using a STS lens. The findings from the study exhibit that ES procurement is influenced by factors operating at three STS levels (work-system, organisation system, and the macrosocial). While the work-system level and organisation system level factors seem to have major influence on the adoption phase, the major findings of this study relate to influence of macro level factors (institutional context and the market context) on the ES acquisition phase. The findings also underscore the demonstrative nature of some elements of the procurement process in the public sector. In this way, this study brings out the complexity of ES procurement in public service organisations that result from interplay of factors operating at work-system, organisational, and macro level.

No study is without limitations and this study is no exception either. One limitation stems from the research methodology adopted. Following a case study approach, we cannot claim for the external/statistical generalisation, as findings are context specific to a public sector organisation in a western democracy. However, what we aim for is theoretical generalisation (Yin, 2013; Tsang, 2014) in this study in which the conclusions are linked to theoretical propositions. Therefore, to achieve external generalisation, future work in this direction may engage in investigating case organisations from other sectors/countries to explore the ES procurement process in other contexts. A second limitation stems from the composition of the respondents who belong to the organisation procuring the ES, thereby excluding the viewpoints of the supplier and the Department. Although we would argue that the triangulation of data across the three levels partly remedies this limitation. Despite these limitations, however, we believe that we have presented a rich picture of the procurement process and have uncovered contextual aspects that are largely ignored in the extant literature.

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