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Conceptualising BPM Practice For Improved Patient Flow In Emergency Units Of South African Hospitals

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CONCEPTUALISING BPM PRACTICE FOR IMPROVED PATIENT FLOW IN EMERGENCY UNITS OF SOUTH AFRICAN HOSPITALS

Research full-length paper

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Abstract

Global healthcare systems are strained with higher patient loads due to longer life expectancy and higher disease burden. Due to extended services hours and easier access, South African indigent patients with no medical insurance, rely on Emergency Care Centres for all-encompassing medical services. Integrated clinical processes require crucial resources, such as hospital beds, for an even flow of patients throughout hospitals. However, overcrowding deadlocks enabling assets, which constrains care delivery. Escalating waiting times and inefficient healthcare detracts from patient health. Strained economies necessitate sustainable, cost-effective reform. This research informs more efficient patient flow practice in Emergency Centres (ECs), by way of Health Information Systems (HIS) theory.

By adopting a pragmatic, inductive stance, a practical improvement output drew from the holistic, integrated management facet of Business Process Management (BPM). Case studies yielding comparable data occurred at three hospitals, two public and one private. Systematic use of BPM theories allowed the qualitative assessment of as-is process activity at patient touch-points, which supports the prescriptive conclusions. The data contextualised the disparity arising from better funded healthcare. By correlating current improvement efforts with BPM theory, this paper argues for IS-optimised business operations in clinical settings. Thus, presenting target business-areas to feasibly transform healthcare.

Keywords: Healthcare patient flow; overcrowding; access block.

1   Introduction

More efficient healthcare saves more lives (D'Andreamatteo *et al.*, 2015). In South Africa (SA) Rising poverty related disease and a turbulent disparity-fuelling past, favours macroeconomic growth instead of service redistribution which has devastating patient impact (Chopra, Daviaud, *et al.*, 2009). Moreover, access to acute healthcare amongst the indigent is restricted by unavailable transportation to outlying medical facilities (Sun *et al.*, 2014). Consequently, ECs are plagued by fluctuating large volumes and variable conditions (Shen and Wang, 2015).

Hospitals that operate efficiently execute more procedures while moving more patients through its systems (Devaraj, Ow and Kohli, 2013). The swifter and even the flow of process instances (patients), the more productive and profitable the process (Schmenner and Swink, 1998; Schmenner, 2012). However, healthcare quality improvement is a complex endeavour (Elizabeth *et al.*, 2012); Well-motivated improvement requires processes, staff, organisational structure and culture to be patient focused and technology enabled systems to improve the quality of care and service delivery (Lenz and Reichert, 2007; Bardhan and Thouin, 2013). BPM offers a holistic approach to organisational management to overcome the lack of process control and deliver business improvements, pivotal for healthcare transformation (Reichert, 2011; Johnston, Munge and Mwalemba, 2012).

Therefore, this research informs the strategic intent to improve healthcare service delivery, given SA's struggling public sector (Mayosi *et al.*, 2012). Emphasis fall specifically on Emergency Centres (ECs) because it is a front-line 24/7 service to the majority of the population (Sun *et al.*, 2014). However, the literature does not show a rigorous comprehensive framework to address reform in complex and vast healthcare environments (Reichert, 2011). The integrated, holistic management aspect associated with the IS methodology, BPM, underpin this research. The main objective informs patient-flow processes that yield improved results and better patient outcomes (Thompson, Seymour and O'Donovan, 2009; Johnston, Munge and Mwalemba, 2012). Further support came from the World Health Organisation's (WHO) framework for stronger health systems (WHO, 2007).

In our research we examined the optimisation of EC patient flow by using BPM success enablers for implementation best practice. The following section outlines the research objectives and methods, including the research questions. Thereafter, the data collection techniques and procedures are explained, followed by a discussion regarding the analysis and findings. The paper concludes with an assessment of BPM effort at the three sites. Thereafter, by conceptualising more successful BPM actions, thus patient flow improvement practice in ECs.

2   The Research Objectives and Methods

The main research question reads as follows: "How can BPM use in Emergency Centres translate to improved healthcare outcomes?" Table 1 shows the linkage between the title concepts and objectives and how both correlate with the target research results. It indicates the approach taken to answer the main question for outset pragmatic results that elicits actionable healthcare reform (Glasgow, 2013). Moreover, prescriptions or practical implications derived from social constructs external to human actors require evidence, which warrants interpretivism (Saunders, Lewis and Thornhill, 2009). Furthermore, the lack a comprehensive, rigorous framework for HIS inquiry necessitated an inductive approach to link healthcare and IS domains (Saunders, Lewis and Thornhill, 2009; Reichert, 2011).

Research Concepts	Research Objectives	Research Outcomes Constructs
Outcomes based	Useful healthcare research results	Business strategy and management
Optimisation	IS process flow optimisation	EC business systems improvement
Patient centered	Useful to EC business	Results that benefit patients
Lifecycle	Understand patient flow	Process waste and bottlenecks
Emergency Centres, SA hospitals	Context and problem area	Relevant and useful research

Table 1.   A view of the linkage between the title, outset objectives and envisioned results.

Extending the listed objectives, the research aims to understand causes of long EC waiting times and overcrowding. This is accomplished by exploring business process areas that demand optimisations for improved operational efficiency, thereby promoting better patient outcomes. IS theories and models were chosen relevant if it satisfied these objectives. Selections and motivations follow next.

Healthcare processes are remarkably complex and often linked across organisational boundaries, also levels, while requiring the same limited clinical resources (Nordlander, Berghe and Schittekat, 2013). Therefore, adopting complementary methods to increase processing ability and that fit the intended use is crucial within organisational and operational context (Nordlander, Berghe and Schittekat, 2013; Spaulding *et al.*, 2013; Agarwal and Sebastian, 2014). Moreover, hospital systems should be able to accommodate exceptions and unpredictability, thereby supporting evolving processes agility (Reichert, 2011). The following models satisfied healthcare environment process requirements favourable research results.

The IGOE model underpinned systematic data collection, through semi-structured interviews. It is depicted by the four red interfaces in Figure 1. The IGOE acronym stands for Input, Guides, Outputs and Enablers (Harmon, 2010). This scoping diagram applied to capture and understand service-oriented process information; how specific actions within process activities combined, therefore grouped work is done within a business process (Mahal, 2010; Long, 2012). In this way, it was possible to understand which components or aspects within each process role are critical to patient transformation or flow. Moreover, how process activity differs between environments given the comparative study.
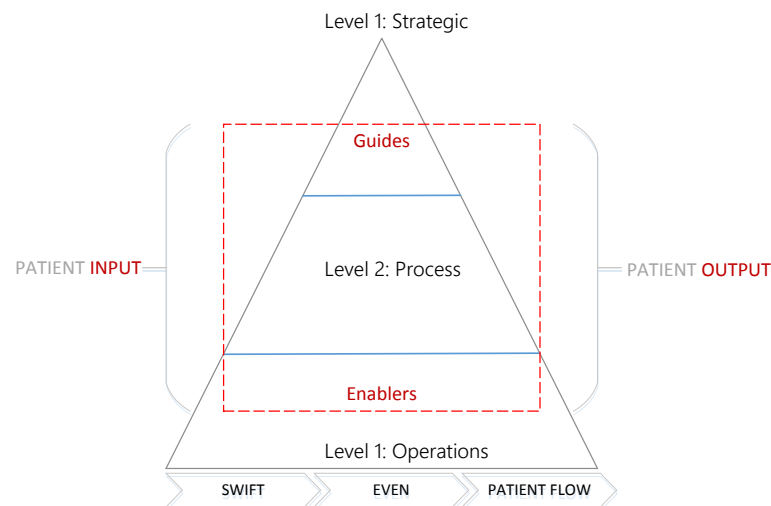

Figure 1.   The BPTrends organisational pyramid correlated with the IGOE model.

The BPTrends organisational pyramid (triangle in Figure 1 and Appendix 1) simplifies complex EC clinical settings into three levels of BPM activity for IS inquiry, toward simplified process understanding (Harmon, 2010; Dziubich, 2015); thereby, supporting the pragmatic outset agenda. The qualitative semi-structured interview questions were derived from the IGOE model.

The data was thematically coded into each of the four interfaces of the IGOE model. Thereafter, patient flow processes actions were assessed against the six enabler categories of The Expanded BPM Success Model, highlighted with red in Figure 2 (Thompson, Seymour and O'Donovan, 2009). The independent categories pose BPM success. Each category correlates with one of the four interfaces of the IGOE Model. In turn, five of the six categories formed relevant investigation platforms for healthcare, which individually correlates with each of the three organisational process levels.
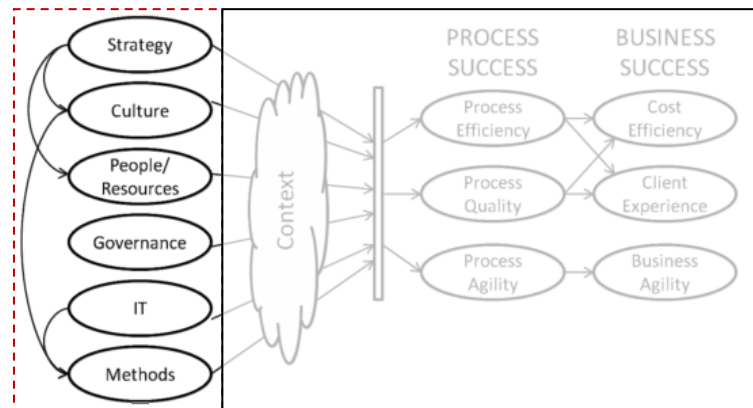

Figure 2.   The Expanded BPM Success Model.

In conjunction, a view of process efficiency, thus the result of BPM at the three sites stemmed from a short pre-interview questionnaire that evaluated respondent profiles for credibility and a view of patient management per role and each EC. Appendix 9.2 shows a summary of the data sources with corresponding references.

2.1   The research context

Cumulating increased demand pressures SA healthcare, ramifications as more patients enter the healthcare system faster than trained medical staff do (Stender and Christensen, 2013; Patel, 2014). A majority of the population and low-priority medical cases use ECs for primary care needs, which is not its designation, further increasing load (Engelbrecht, Toit and Geyser, 2015). Thus overcrowding the system, especially ECs, consequently diminishing capabilities to efficiently deliver quality care (Paul and Lin, 2012; Di Somma *et al.*, 2015). However, despite the perception that load and inappropriate EC use are the main threats, some argue "access block" most significant: the rate at which admitted EC-patients can access in-patient beds for ward stay and extended care (Affleck *et al.*, 2013).

Hence, public hospitals and public health care users suffer severely (Weimann and Stuttaford, 2014). Overcrowding exacerbates resource constraints such as bed shortage and trouble retaining qualified and specialist experienced staff, especially in ECs (Higginson, 2012). The aftermath is a shortage of funds and a universally overburdened setting, which necessitates change (Chopra, Lawn, *et al.*, 2009). Moreover, cost reducing service expectation requires hospitals to operate optimally efficient, which means processing more patients with current system configurations to improve financial performance (Devaraj, Ow and Kohli, 2013).

There is little empirical support to show how technology impacts healthcare quality improvement (Lenz and Reichert, 2007; Reichert, 2011; Antony and Kumar, 2012). Moreover, rapidly expanding research concerning healthcare-IT and patient-flow improvement, does not translate practically useful

(Oredsson *et al.*, 2011; Jones *et al.*, 2014). Despite evidence that "patient-centeredness" increases patient response which yields better outcomes, and ultimately improves the quality of life, scant research persists (Lorig, 2012; Bardhan and Thouin, 2013; Mirzaei *et al.*, 2013).

The literature furthermore shows an escalating disparity between SA's private and public healthcare (Epstein *et al.*, 2010; Weimann and Stuttaford, 2014). Healthcare organisations therefore demand more focused effort regarding efficient hospital management and operations (Spaulding *et al.*, 2013). Past studies neglected to enquire in this context, which complicates reform and compromises the consequential impact of transformative effort (Chopra, Lawn, *et al.*, 2009); subsequently motivating holistic solution and management inquiry. Herein the summed aim of this project: an updated management strategy to address patient flow, optimal resource usage for better patient response and change in a complex organisational setting and sector. The paper next presents the explorative discoveries per enabler category across the three suggested process levels in a BPM organisation. It concludes with a summarised view of BPM proponents across all the sites.

3 Analysis and Interpretation

3.1 Organisational level 1: Strategic

This theoretical level of the organisational pyramid, articulates strategic BPM activity. Process components involved here include architecture, performance measures, strategic alignment, thus planned BPM priorities (Thompson, Seymour and O'Donovan, 2009; Harmon, 2015). Although not exclusive at this level, associated enabler categories that would require BPM effort here are "Strategy", "Culture", "People / Resources", "Governance". Some are also relevant at levels 2 and 3, for example "People / Resources".

3.1.1 Managed improvement

A suited stance for top-down organisational improvement through BPM, requires an as-is strategic view of the current healthcare business systems, in order to methodically identify improvement areas (Henrique *et al.*, 2016). A this high level of abstraction, Value Stream Mapping (VSM) exemplifies a fitting method to indicate what the organisation tries to achieve (Harmon, 2010). A suited formalised method encompasses business dependencies, for example cross-departmental functional integration, especially crucial for healthcare (Henrique *et al.*, 2016). Herein, the BPM benefit which, subsequent to selection, poses to overcome then predictable implementation challenges. Commitment to a rigorous top-down BPM tactic and associated environmental business proponents brings a sure delivery infrastructure, which in a controlled way traverses the subsequent levels, down to business operations (Level 3) (Harmon, 2015). Next, the paper covers strategic BPM enabler considerations per category.

In support of a clear BPM approach, the "Strategy" enabler suggests a defined value stream that is linked with process subsets. It is furthermore crucial to merge explicit management of credible BPM business cases across the enterprise and with existing implementation delivery methods (Thompson, Seymour and O'Donovan, 2009). "*In primary care of Emergency Medicine, what we want to be able to do is save your life*" (INT2B). The sites unanimously subscribe to a core competency of life-saving care which warrants a tailoring strategic BPM top-down. However, process improvement initiatives at the sites rather suggest a bottom-up, operational efficiency approach (Harmon, 2015). Fixing operational inefficiencies does not appear an explicit BPM strategy and rather indicates a lacking strategic commitment. Consequently, it would be difficult to follow methodologically prescribed BPM. This claim is supported by a reactive approach concerning BPM education, which would better serve strategic implementation if it was done controlled beforehand. "*I should have gone for to more management courses, more inter-personal relationship courses, more lean courses, so just a better under-*

standing of the methods because it is learning (Lean) on the job" (INT2D). The contrasting and more management view: "*Lean training certainly made me aware that one can streamline processes and that there are quicker, more efficient ways of doing things…and by not doing your own role you may be creating inefficiencies in the system, so I did gain a lot of principles*" (INT1F); thus enforcing principled BPM behaviour and accountability.

Generally, the bed management competency receives an increased operational efficiency focus. However, other process competencies and communal commitment appear lacking as exemplified by this perspective: "*We desperately need the patient folders and that's a huge issue. I don't think they actually, as clerks, they don't realise the urgency of getting the folders upstairs.*" (INT1C). Herein, clear and guided BPM would mitigate inefficiencies deterring the execution of core business competencies through better process understanding and compliance. However, a lacking BPM strategy does not attract sufficient funding (Thompson, Seymour and O'Donovan, 2009). BPM then integrates as a "business as usual" priority which makes it difficult to articulate a credible business case to secure funding for process improvements. "*I actually timed it. In an 8-hour shift, a doctor spends 30% of his time seeing a patient. So 30% of 8 hour shifts is the core function of the doctor*" (INT2B). Doctors are the most expensive resources; however the EC only benefits 30% of core value. If there was more organisational support or budget, cheaper labour could rather perform routine process tasks that are not clinical.

Organisational culture is a major contributor to BPM success or failure (vom Brocke and Sinnl, 2011). Smaller, incremental changes are less disruptive and build better process encouragement and support. It is important to hold staff accountable for process non-compliance to process, however, theory advises against associating BPM with staff reduction and cost saving. It deters adoption and by negatively associating BPM with job-losses. Moreover, organisational change and cross-functional teamwork are crucial aspects of process management. Another major success factor is Business-IT alignment, a top IS concern since 2003, which hinders harnessing of business relationships for productivity and success (Thompson, Seymour and O'Donovan, 2009; Luftman *et al.*, 2013).

Triage is a pre-admission regulatory utility system for EC patient entry. It has predefined controls to confirm patient status through quantitative decision support. Thereafter, the human-executed tool applies to swiftly eliminate life-threat and classify patients according to a colour code and per clinical severity symptoms (Buys *et al.*, 2013; Engelbrecht, Toit and Geyser, 2015). Triage designation favours Emergency Medicine due to the core competency and is crucial to EC operations. However, non-trauma medical cases presenting at ECs detract from the core life-saving competency by occupying resources, which intensifies EC overcrowding (Crawford *et al.*, 2014). The history behind global operating standards for Triage urges related process maturity (Augustyn, Hattingh and Ehlers, 2007). Triage requires a safe, private area, equipped with a clock and medical aids to measure patient vitals. It is therefore a key indicator of organisational BPM readiness, due to the maturity of the quantitative decision-making aspects which developed over time. The most appropriate empirical support came from HOSP2. Although triage processes are manual, thus no electronic support or also termed automation, there are signs of triage process maturity. HOSP1 appear in an earlier development phase regarding triage processes, due to a recent re-structure of triage roles. "*We had to give names for a triage champion, and certain of senior doctors will go on a refresher course in order to teach all the staff*" (INT1B), while HOSP3 has electronic triage support, suggesting process automation. The management of triage education at HOSP2 supports this finding. "*We have formal triage training that I am responsible for. The informal training is where someone is doing something wrong. I correct them and I will ensure that they do it properly*" (INT2D). "*People don't want to change. When they are overworked, they revert to old ways instead of implementing the new triage correctly. Then you get their interpretations of triage scoring and that is not the South African Triage standard. If you trust the triage system then you are backed clinically. If someone triaged incorrectly I correct them and request they revert to the accepted Triage conduct. I do it immediately*" (INT2A). This quote shows pitfalls associated with this enabler category. Due to core EC competency, inaccurate triage scoring brings

escalated EC business risk by delaying care from patients that should have received a critical triage score and might die while waiting to be treated. Findings here support the importance of formal and informal training to mitigate business risk and pro-process adoption for accurate results and process trust. Moreover, how crucial timing is to for on-going incremental behavioural change to support process quality and uphold process behaviour standards.

The research confirms that strategic process improvement may fail due to adoption that can be mitigated by better change culture. A respondent confirms bottlenecks in bed shortage and lack of cooperation between wards, however, rejects remedial action (improvement tactic): a telephone to support more efficient and immediate communication. *"We have this telephone now, and I have to find the nursing staff to call and make sure that the phone does not disappear. I will give the telephone a chance but I am very against it"* (INT1B). A small change such as this, which advocates patient flow, faces resistance. Smaller change is cheaper and easier to execute and potentially brings great value to improve flow. Moreover, BPM intent translated operationally. However, if change resistance among staff fails the embrace of strategic improvements, it hinders process development and healthcare transformation.

BPM governance requires transparent process accountability, thus clear process ownership to drive incentivised decision-making (Thompson, Seymour and O'Donovan, 2009). Better Triage process control brings additional management activities. *"If there is a problem with the triage audits, my role has to investigate it. Our triage task team consist of myself, the Medical Officer that does the audits, our nursing manager, sisters that can do the triage and a finance and admin person as well"* (INT2D). Herewith, evidence of formal process roles at HOSP2 supporting better process control a maturing Triage process. Clear process ownership is pivotal for inter-departmental integration (Thompson, Seymour and O'Donovan, 2009). *"If you phone the bed bookings lady, she will put your name on the list. We had a bed bookings sister as well, that would look for a bed. But the best process to follow is to go to the ward and look for a bed yourself"* (INT3E). This example shows how crucial bed access is to healthcare service, patient handling and process management across departmental boundaries. If patients cannot move to available beds efficiently, the delays show in the EC (Shen and Wang, 2015). A mature patient-flow process, recruits available bed resources for optimal access, thus consistent patient flow; EC to hospital (Higginson, 2012). Moreover, the quote shows that there have been attempted iterations of bed-access process improvements. The various roles, specifically implemented for better bed management, support this argument. However, effort to improve bed management failed because there is process distrust due to haphazard results.

3.2   Organisational level 2: Process

This level requires the prioritisation of process redesign and improvement projects. Subsequently suggesting a formal improvement agenda for consistent process actions (Harmon, 2010). The "Methods" enabler category match here, however, BPM effort draws from some of the strategic enablers also. However, to remain consistent at how the theories are applied, only BPM actions related to "Methods" are covered here. Also important at this level of organisational BPM is process success, which involves measures for efficiency, quality and agility.

3.2.1   Process improvement

An environment that advocates consistent process actions is pivotal, subsequent to the chosen improvement strategy (Thompson, Seymour and O'Donovan, 2009). Moreover, consolidated process measures should be a true reflection of efficiency, quality and agility (Trkman, 2010). Organisational changes supplement the BPM delivery infrastructure (Trkman, 2010). An example would be defined process owners for better control and management (Bandara, Harmon and Rosemann, 2011). Next, the paper covers requirements that enable process control.

The triage process at HOSP2 which is not automated, however, exhibits signs of maturity, demonstrates top-down improvement. Assigned triage champions reinforce the following two enablers: consistent and accurate process actions and explicit improvement (Thompson, Seymour and O'Donovan, 2009). To re-iterate, accurate triage is vital to the clinical and core EC strategy as well as the patient because it eliminates life threat. The predefined quantitative scoring system depends on training for qualitative decision-making context. Training must always remain current and consistent knowledge among the staff that executes triage scoring. If not, the business risk escalates by increasing miss-scores thus inefficiency due to rechecking of patients, which are already triaged. Due to the pivotal role of triage in regulating patient-flow, a lot of effort goes into maintaining consistent triage process actions, to retain quality process outputs, thus upholding process efficiency and quality.

The biggest conceptual disparity consequent to a lacking comprehensive and well-linked framework for strong healthcare systems presented in the "Methods" enabler. This enabler requires defined process mapping, with central technological support (Thompson, Seymour and O'Donovan, 2009; Reichert, 2011; Jones *et al.*, 2014). In this instance, financial services for which The Expanded BPM Success Model was derived, and healthcare differ greatly. Process mapping is a documentation process which represents the current process in the organisation and is a tool use to navigate BPM changes (Armistead, Pritchard and Machin, 1999; Thompson, Seymour and O'Donovan, 2009). BPM methodology prescribes a central repository to keep process maps that are linked to a core strategy (Thompson, Seymour and O'Donovan, 2009). The data does not show a documented BPM value stream, as explained in the "Strategy" enabler. Expecting technological support for a committed improvement strategy is therefore premature, as the financial organisations in this instance had also not yet fully reached this goal or level of maturity at the time of review (Thompson, Seymour and O'Donovan, 2009). Following BPM maturity, the next process enabler suggests a defined improvement methodology (Thompson, Seymour and O'Donovan, 2009). Although improvement initiatives exist at all sites, it is unclear how it was discovered and prioritised because unstructured concepts of Lean theory appear at all the sites. Due to inconsistent process control it is furthermore unclear whether improvement is guided by a formal methodology or approach. Instead, effort seems driven by operational needs rather than business requirement. In only four of the 20 interviews is there an explicit reference to "Lean".

A change in organisational structure promotes conscious application of BPM. There should be a culture to design processes around the customer, patients healthcare (Trkman, 2010). All three sites created an initial human touch-point for a patient that is not security guard. HOSP1 terms the role an "eye ball" nurse. HOSP2 terms it a "queue marshal". HOSP3 terms it a "meet and greet nurse". The function of this role is to regulate patient flow. It brings care access closer to the patient. If not occupied by a clinical specialist, which is the case for HOSP2, these resources are trained to assess basic clinical emergency signs in order to escalate any medical case, which triggers the appropriate triage avenue. Thus bringing agility to EC input events. This example substantiates how organisational structure affects process flow. Moreover, it shows how processes design revolves around the customer, patients in healthcare, to benefit patients with an efficient EC uptake processes, thus access to medical care.

3.3   Organisational level 3: Business Operations

This is the implementation level of BPM activity. Strategic intent and tactical effort becomes operational to generate designated process results (Harmon, 2010). The matching enablers are "People / Resources", "IT" because these business assets either directly or indirectly execute process activity (D'Andreamatteo *et al.*, 2015).

3.3.1 Operational results

Many organisations struggle to realise expected benefit due to challenges associated with implementing BPM (Armistead, Pritchard and Machin, 1999; Reichert, 2011). It is at the activity level of business process operations where the execution of day-to-day tasks generates process results (Armistead, Pritchard and Machin, 1999). Operational aspects for BPM results are covered next.

Linking with the "People / Resources" enabler discussed in organisational Level 1, widespread process understanding becomes especially vital at the execution level (3). All employees should understand process and continuous improvement. A clear BPM strategy can solve many human resource management issues like training and capacity required for improvements (Thompson, Seymour and O'Donovan, 2009). Change resistance and a lack of consciousness regarding important process-enabling activities in porters and clerks strengthen this argument. "*Porters are wonderful, they are on duty but they are nowhere, then nurses have to take patients to the wards. The porters seldom do*" (INT2G). There are pockets of BPM knowledge at HOSP2, at various levels. Under leadership of the CEO, who also worked clinical EC shifts eight hours a week, HOSP2 shows less disparate and unambiguous EC vision, which translates to unanimous effort, pro-BPM. This observation was not explored in more due to the research limitations. Further support BPM awareness and education, HOSP3 has an innovative approach to triage training. "*We all have tasks for the month. You have to audit three people in our own department*" (INT3F). Revealed with this quote is an inventive training mechanism at a site that shows signs of triage maturity, but also recruits a business-operations function to dually educate and uphold consistent process behaviour.

Process improvement requires capacity (Thompson, Seymour and O'Donovan, 2009). This includes human, capital and infrastructure. This is perhaps one of the most crucial enablers differentiating healthcare business from other industries. The Expanded BPM Success Model was developed for financial services organisations. However, not all of the constructs apply to healthcare. A main discrepancy is that the "People / Resources" enabler entails human and IT investment in a finance organisation. However, according to the IGOE model, this includes infrastructure or equipment and beds as process enablers for healthcare. It is important to emphasise awareness about this dependency for healthcare organisations that wish to undertake BPM. The transformation essence lies within the relationship between hospital beds and healthcare service. Specifically, because beds enable healthcare processes. If there is no access to an available bed, there is no relief for EC process which then becomes overcrowded. Moreover, the amount of available beds dictates, and limits by national policy regulation, the amount of expertise hospitals can recruit. "*You can train 10% of the total amount of beds you that are available. We have 200 beds which means I can only train 200 people*" (INT3A).

Another observation regarding a healthy BPM culture shows the role of smartphones on healthcare service. Smartphones bring a benefit as a positive technology enabler and a service disabler in private healthcare. All the sites make use of a widely adopted smartphone app[1] for communication. The application smartphone combination enables rapid human-resource access through instant messaging. Instead of having to phone or email individuals until you find someone to work at short notice. A reliable communication tool is also used to convey pertinent information to EC staff, to one group and at any time. The essence is in the rapid access, therefore the ability to distribute communication wide and receive an almost immediate group wide response. The technology furthermore offers customisation

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[1] An application downloaded to a smartphone which enables instant messaging between shared contacts.

for specific groups, for instance, management in business context. "*We use the [communication] technology to setup a communication group. It is very good and keeps everyone informed, which helps with the processes as well, because it happens instantly. What is more advantageous is that you will not forget [acts as a reminder]. You are less likely to forget to [actually, suggests action] implement something. Or to remind people of things if you got the [communication] group because if you say: 'The ward round is later', because that's another time that we spend focusing on telling people how to run things better in the [EC] ward*" (INT1F). It is interesting to note that behavioural change forms part of implementing this smartphone communication tool, which is predominantly free. Suggesting process improvements do not have to be costly. It also emphasises the importance of ward rounds as an education mechanism in the EC. This constitutes an information exchange between the doctors on site when they rotate after shifts. Here ward rounds are used as a training mechanism. BPM strategies and education can link with this existing means, for implementation support and integration to ECs because behavioural change is a result already achieved here.

A possible downside associated with technology also emerged with regard to patient smartphone usage in ECs, especially at HOSP3. "*Having an open area in the private sector will not work because of the type of patient that you have here. They are quick to put everything on social media, very quick. The person next door will see listen to what the other one is saying you will see it on Facebook. 'I was in the trauma unit and the person next door had this and this…' so the fact that there is a bit of wall, you don't have the [confidentiality issues]*" (INT3E). This theme risks patient confidentiality and impacts staff behaviour. Being objectified on social media potentially invokes fear and restricts crucial free and even communication, thus, impacting the behaviour of clinical staff. None of the public respondents mentioned this. The main difference and most likely explanation is the pay-for-service model at HOSP3. "*…the patients do not actually understand [the priorities assigned by triage]; they just feel entitled because they are private paying patients*" (INT3E). The frameworks used for this study cannot explore this argument, which makes it a viable topic for future research.

4 Conclusion: Favourable Healthcare BPM

Healthcare reform does not beholden any single entity. In this context, this paper infers causality argumentation from a stance by philosopher St. Thomas Aquinas: "*For it is manifest that any cause is the more powerful inasmuch as it extends itself to more effects. Whence also good, which has the notion of a final cause, is the more powerful inasmuch it extends itself to more things*". Accordingly, cause becomes greater by extending causality to more effects (Schwindt, 2016). This notion extends reinforcement, specifically when the "cause" implies "good" or "for the better". We superimpose "BPM for healthcare reform" upon the "cause" aspect of this argument to conclude. Rationale on how it applies to EC business follows the three organisational levels of the BPTrends model.

4.1 Level 1: Clear BPM cause for common good

This cause must be clear: healthcare can draw value from BPM practice. It would therefore serve BPM to become a communicable and shared common healthcare good that is not positioned superior to clinical care. Established at the strategic level, this then becomes a belief internal to the organisation which serves reform as a shared business improvement goal; an end goal and cause for which all can act. Enterprise BPM practices will draw from this foundation to generate organisation-wide desirability for BPM action, thus invoking structured activity at all subsequent levels. It is important for healthcare management and improvement custodians to note that BPM does not jeopardise clinical directives (Schwindt, 2016). It is therefore crucial to articulate the results of common BPM goodness for healthcare reform. Ultimately then, a strategic course for with which all in the organisation can unanimously plan and act to improve the quality of life of patients through more efficient healthcare.

Here, specialist skills and knowledge is advised to inform the practice and integration of improvement effort parallel to clinical management.

4.2 Level 2: Purpose as a shared action course

From strategy, derive the methods to achieve the shared purpose and a course along which all employees by default know to act. In whole, the plan involves active participation in healthcare reform, which includes stakeholders at many levels. Government is the guiding coalition which is linked to patients through healthcare service, which is in turn enabled by healthcare organisations and proponents. Given this arrangement, effective healthcare service measures evidently include patient satisfaction. Healthcare policy plays an important enabling role, however if not appropriately positioned, may have adverse impact. It would therefore greatly benefit organisational BPM practice if understood how the various actors arrange and where they engage with enabling resources for the common purpose of improved patient flow. It should be noted that healthcare provides foremost a clinical service and that a BPM strategy cannot exist without it. Therefore, the clinical function is not superseded by a BPM function; it rather shares patient care as a common goal which BPM extends with efficiency. Moreover, emphasising how both order relevant to the shared end goal and valuing associated actions in the correct context (Schwindt, 2016).

A measure of resistance to quantify BPM associates can be expected if the two parallels are not respected for how differently each contributes to healthcare improvement. Subsequently, a main part of any transformation plan involves illuminating IS for shared healthcare improvement knowledge at each organisational level. If this purpose and context is well articulated, BPM practice can be organised healthily to achieve desired outcomes. Moreover, this approach poses outcomes where EC business grows proportionate to the knowledge associated with the chosen improvement strategy (Schwindt, 2016). Thus, as BPM knowledge grows, so the BPM practice and strategy grows alongside clinical practice. It is imperative to assign this planning and management duty formally; else clinical directives dissolve any BPM or improvement agenda. Moreover, roles and responsibilities can be assigned for a shared purpose to invoke the right action in the correct context (Schwindt, 2016).

4.3 Level 3: Informed and guided BPM action

It therefore stands to reason that BPM value unlocks as clinicians begin to understand how action or inaction in roles contribute to BPM. Thus, accepting the inherent dichotomy associated with BPM healthcare improvement alongside the primary clinical focus. A clear association between how daily tasks contribute to the BPM parallel of EC business therefore shows how the actions of all employees contribute to a shared, common purpose, which strengthens clinical and patient outcomes. Thus, enticing employee action pro-BPM and the committed improvement plan which serves adoption and implementation success. Consequently, this research argues that patient value derives to the degree which BPM participants are allowed extend the common purpose with informed tasks, thus guided BPM action, which effects reform. Herein the challenge: holistic management toward a well-articulated business strategy. Thus, a business environment that is able to draw BPM benefits to develop common understanding and unite staff for a purpose, which in turn cultivates a culture that enables more patient value through the good of BPM. It is crucial to develop methods to manage all employees and arrange proponents in a way that generates a desire to participate in the promoted BPM cause. This moves healthcare BPM development into the domain of organisational learning, which is beyond the scope of this research, however could support future research.

4.4   In practice

To this end, this paper argues that reform cannot occur unaided. However, that aid rather implies an interdependency as the data suggests. The data further urge a strong dependency upon theoretically informed and governed, thus guided improvement practices that would unite improvement effort. It therefore becomes a question of how to access the existing transformation potential in a methodical manner which secures action for more tangible results; which moreover sensitises existing literature for standardised BPM practice. An assessment of the three sites deliberates this discourse next.

Improving the quality of healthcare service will inevitably invite higher load. "*As soon as people started to realise that there is actually a doctor on the floor, then they started coming. Pretty soon the doctor couldn't cope*" (INT2F). Thus, imposing the need for an actionable, compressive framework for healthcare transformation which requires the support of a common understanding as described above. More rigorous inquiry begets concise and useful results which needs sustainable implementation processes (Ruelas *et al.*, 2012; D'Andreamatteo *et al.*, 2015; Shabani *et al.*, 2015). The literature body harbours a plethora of knowledge to guide streamlined healthcare practices. Illuminating the transition between BPM theory and healthcare practice could cause hospitals and actors within to respond with more favourable default behaviour that is informed by proven BPM practices.

The data confirms similar environments at all the sites, regardless of the perceived private and public disparity. Each site is unwaveringly devoted to the main task of saving lives. Private institutions are better funded. This contributes to a crucial difference of more rapid access to hospital services. Therein, more rapid information access, thus quicker delivery of patient-care; in turn, reduced waiting times, thus more efficient processes. It is at the process level of EC business where the disparity between public and private is most prominent. HOSP3 (private) confirms better access to in-hospital services and equipment due to better funding and a pay-for-service model. Moreover, HOSP3 even have "divert processes" across organisations, which brings control over processes to direct patient load when there are no beds. The irony is that, when a patient cannot pay for service, HOSP3 stabilises, however transfers to a public hospital allowing the private hospital to process more patients; thereby, reinforcing the scale at which healthcare reform requires interdependent effort. Moreover, HOSP3 predominantly has one doctor on-site at all times, while public hospitals have many doctors on site during the day. Despite only having one doctor onsite, HOSP3 has the ability to process similar patient loads. In this context the data confirms that nurses play a crucial part in navigating patient flow operationally. Herein, suggesting how elevated process control and management brings better results. This shows the importance and benefit of optimal resource management, clear roles and responsibilities.

Assuming Triage as a sample of a developed and developing pre-care supporting process, HOSP2 appears the most process mature. However, being public, funding prevents explicit process improvement projects compared to HOSP3, which is also triage process mature. It begs the question: What indicates process maturity? The process and funding maturity at HOSP3 shows in the electronic process support for triage and EC patient waiting time management. Whereas, HOSP1, adopts a "make-do" approach in getting a phone, due to the lacking view of current bed status. The main difference is that more stringent financial control drives improvement strategies and thus the value stream at HOSP3. It necessitates operational efficiency to foremost optimise cost though optimal resource usage. Although it goes against prescribed BPM practice, there are operational process benefits. Despite increased process control, there are still inefficiencies when nurses, at this same site, rather walk to search for available beds. Thus indicating the need to separate a BPM agenda from clinical and financial directives which requires additional management and enabling activities entirely (Ruelas *et al.*, 2012; Harmon, 2015).

Focused BPM should be an asset. All the sites show adversity to a BPM. Clinically, a "call to arms" summons clinicians to adhere foremost to patient-aid through expert knowledge. Any additional duties

are perceived as detracting from the clinical calling as the following quote expresses: "*These management duties become so much that you don't actually have time to participate and help your staff on the floor*" (INT2E). Any perceived disparity creates a hindering culture of disagreement at the health expense of patients. Therefore, a chosen BPM methodology at the strategic level of EC business guides improvement standards that can be widely accepted (Thompson, Seymour and O'Donovan, 2009). This facilitates theoretically guided and supported implementations and promotes better operational result, through targets derived from elevated process control (Harmon, 2015). Constitutionally supported equitable care thus demands policy level inclusions, for the incentivised national integration between private and public hospitals because a healthcare system is integrated; "everybody's business" (WHO, 2007; D'Andreamatteo *et al.*, 2015).

4.5   Contributions

Process improvement beyond waste reduction is crucial if there is a need to not just optimise, but mature processes (Harmon, 2012). By empirically positioning TSEF for healthcare, this research informs practice on why, going forward, hospitals should consider structured improvement beyond waste reduction. The data unveils that, although bed shortage is a major problem, more beds will not solve overcrowding. Therefore, this research shows what ECs could do at sundry organisational and process levels to relieve operational pain-points in a theoretically informed manner. The discussion section structures access to actions in the enabler categories, which supports practical usage. The posed arrangement of BPM proponents suggest that patient centricity can become clearer though BPM research. However, the existing knowledge body would benefit from understanding the linkage context and relationships between proponents for business success and relative to measured patient outcomes.

Appendices

4.6   Appendix 1: The full BPTrends Organisational Pyramid
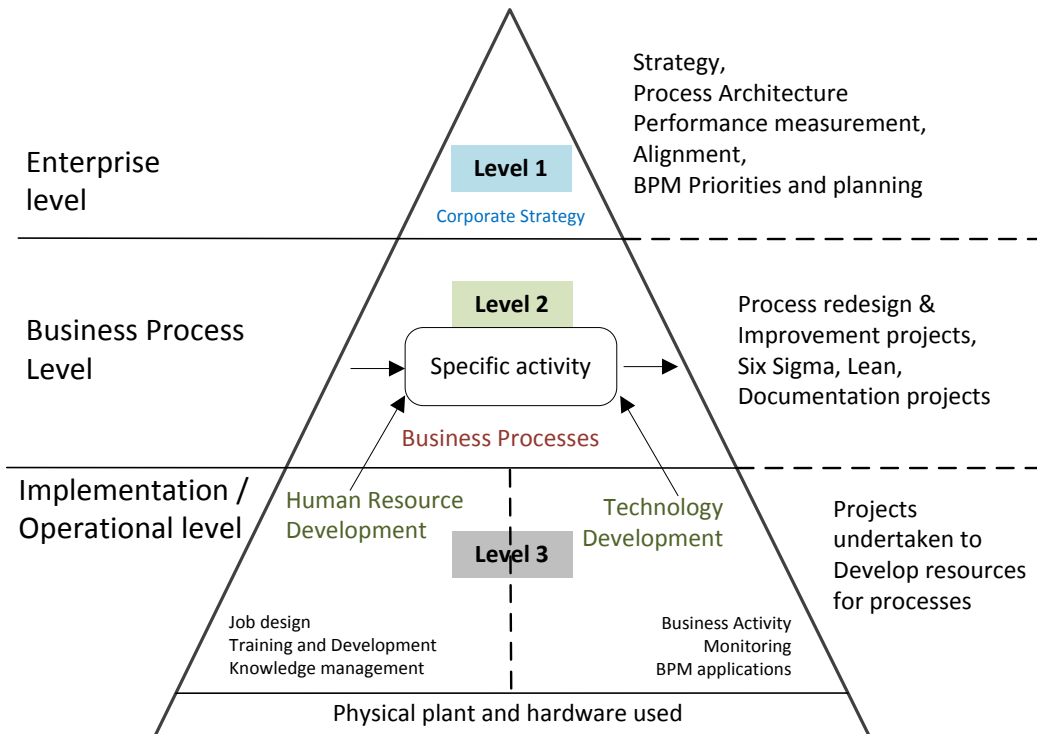
4.7   Appendix 2: Data source references

HOSP1 (Public)		HOSP2 (Public)		HOSP3 (Private)	
Ref	Role	Ref	Role	Ref	Role
INT1A	MD	INT2A	MD, COO	INT3A	Hospital GM
INT1B	Patient Flow Manager	INT2B	MD (EM), HOD	INT3B	Nurse, EU Manager
INT1C	Registered nurse	INT2C	MD	INT3C	Registered Nurse
INT1D	MD	INT2D	MD	INT3D	Clinical Nurse Specialist
INT1E	MD	INT2E	Nurse	INT3E	Nurse
INT1F	Physician, Senior	INT2F	MD, CEO	INT3F	Enrolled Nurse
-	-	INT2G	Assistant Director Nursing	INT3G	MD

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