

# IMPROVING KNOWLEDGE-INTENSIVE HEALTH CARE PROCESSES BEYOND EFFICIENCY

*Completed Research Paper*

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## **Abstract**

*Health care has been one of the most important domains for Business Process Management (BPM) research and practice for many years. Through an exploratory case study conducted in a real organization, here named “SpecialClinic”, this research aims to investigate what lies beyond “traditional” BPM, in particular process efficiency, as practiced by many organizations today. It focuses on customer-facing knowledge-intensive BPs in the case organization and aims to investigate their ongoing improvement. The main findings of this research challenge the main objectives of BP improvement (i.e. reduced costs, improved efficiency) as they show that some organizations are making their “to-be” processes slower and more expensive, yet significantly improved in terms of quality of patient care. In addition to its main research contribution related to new approaches to improvement of knowledge-intensive BPs, this work offers some important lessons for the BPM practitioners interested in expanding the current boundaries of BPM.*

**Keywords:** Knowledge-intensive Business Processes, Continuous Improvement, Case Study

## Introduction

For many years, the main objective of Business Process Management (BPM) has been on improved process efficiency. “The main area of benefit is BPM’s ability to increase the efficiency of a core business process” (Harison-Broninski, 2010, pg. 444). This has been achieved through automation of manual tasks, standardization, elimination of non-value-adding tasks/activities (i.e. “waste”), reorganization of functional units and overall organizational structure, job reduction, and so on. The effectiveness of these improvements efforts are then measured by quantifiable indicators, such as process throughput, number of units produced, task duration etc.

Furthermore, the main target of these improvement activities has been the operational level with highly structured, repetitive transactional business processes (BPs). In fact, it is their predictability that has made the above improvement activities possible to perform in a project management like manner, with the main focus on process modeling and redesign. Consequently, well-trained process analysts even with a very little contextual and domain knowledge have been in a position to make measurable improvements, just by analyzing process models.

Thus, in a typical improvement method, various problems with the current (“as-is”) BPs are found, analyzed and solved, resulting in improved (“to-be”) processes. The more obvious candidates for “easy wins” (i.e. problems easily fixed), include manual tasks that could be easily automated, but are currently slowing down the overall process and creating the additional costs, due to human work involved.

If successful, process improvement methods are expected to result in process efficiency improvements i.e. faster but more importantly, cheaper processes. “A surprising number of firms simply do not get beyond the phase of deploying Six Sigma for cost containment and never reach its true potential” (Spanyi, 2010, pg 230). Hence, having more expensive or even slower “to-be” processes, would certainly defy a common logic and fundamental assumptions about the very nature of BP improvement itself. Especially, considering that the improvement methodologies still remain within the domain of consulting firms (Kettinger et.al., 1997). They are expected to show the quantifiable outcomes of their work, with measurable cost reduction widely perceived to be the most important one. “In many instances Black Belts receive bonuses for bringing in the targeted cost savings...In other words, while the rhetoric may emphasize customer centricity the action is focused on cost reduction” (Spanyi, 2010, pg. 230).

However, in very recent times some powerful trends have started to emerge, challenging the existing approaches to process improvement and their expected outcomes. First of all, the previous two decades of workflow automation of routine transactional BPs have resulted in a very high level of process efficiency. “Most processes have already been made efficient over time.” (Harison-Broninski, 2010, pg. 444). Consequently process efficiency is no longer considered to be a sustainable source of competitive advantage. “This means that in due course most organizations will achieve a similar level of efficiency in their routinized business processes – i.e., improving and (semi-) automating these processes will be the norm, rather than providing any competitive advantage.” (Harrison-Broninski, 2008, pg.2). This in turn raises an important question: *If processes are already made efficient in the given context through for example process automation, what else could be done to improve them even further?*

The increased rate of automation across all industry sectors has prompted the BPM community to start considering more complex processes that involve knowledge work. These BPs that are highly dependent on human judgment and expertise and involve semi-structured and unstructured decision making are now termed “*knowledge-intensive*”. In fact, these BPs have been recognized as the most important processes for organizations today (Davenport, 2005). While in the past, these complex processes “haven’t really been the focus of most organizations –improving administrative and operational processes has been easier – but they must be in the future” (Johnson et. al., 2005).

Furthermore, even when knowledge-intensive processes are considered, the improvement methods still focus on process efficiency, as demonstrated later in the paper. “All serious approaches to improving work have largely escaped knowledge work” (Davenport, 2010, pg. 19). These observations lead to another important question: *How do organizations improve their knowledge-intensive processes beyond efficiency?*

This paper focuses on this particular question in the context of knowledge-intensive BPs in health care. More precisely, through an exploratory case study conducted in a real organization, here named “SpecialClinic”, this research aims to investigate what lies beyond “traditional” BPM and process efficiency, as practiced by many organizations today. It focuses on customer-facing knowledge-intensive BPs in the case organization and aims to investigate their ongoing improvement. The main findings of this research challenge the main objectives of BP improvement (i.e. reduced costs, improved efficiency) as they show that some organizations are making their “to-be” processes slower and more expensive, yet significantly improved in terms of quality of patient care.

The paper is organized as follows. The following section gives a brief overview of the related work. After setting up the research aims and objectives, the paper proceeds to describe the chosen case organization. This is then followed by a brief description of the research method. The subsequent sections summarize the main research findings and lessons learned. This is followed by the final section that offers some concluding remarks, describes main limitations of this work and offers some directions for the future BPM research and practice in this domain.

## **Related Work**

The main objective of this section is to further motivate this work and position this research in the context of the currently available literature in BPM and KM, before focusing on the domain of health-care processes.

### ***Business Process Management***

Business Process Management (BPM) continues to be perceived as the number one business priority by CIOs worldwide (Gartner, 2010). Even though BPM is still considered to be an emerging discipline, companies have always been looking for new ways to support and improve their work, with or without technology. Compared to its predecessors, such as Total Quality Management (TQM) and Business Process Reengineering (BPR), BPM of today represents a fundamental shift that focuses on business value creation via ongoing BP improvement and innovation supported by BPM-enabling technology.

From an earlier focus on workflow automation and process modeling, business leaders are now extending the boundaries of BPM to include strategy and people components. Figure 1 depicts a widely known model of BPM by Harmon (2010) called the BPTrends pyramid. The model was originally derived from a worldwide survey of BPTrends members – the largest international community of BPM industry practitioners – hence its name.

Harmon’s model defines three levels of concerns (“views”) within BPM: the Enterprise, Business Process and Implementation levels. This separation is very important, as “projects or activities at different levels require different participants, different methodologies and different types of support”, (Harmon, 2010, pg. xxvi).

As depicted, the Enterprise level focuses on end-to-end enterprise wide processes, defining process governance and measurement systems while seeking to align processes with organizational strategy. At the process level, organizations are focusing on process improvement and new methods for process analysis and design. Finally, at the implementation level organizations are focusing on development of technological and human resources designed to support processes. They include process support systems and people - process participants in different formal roles. Thus, people are seen as supporters or “implementers” of a strategy-driven process.

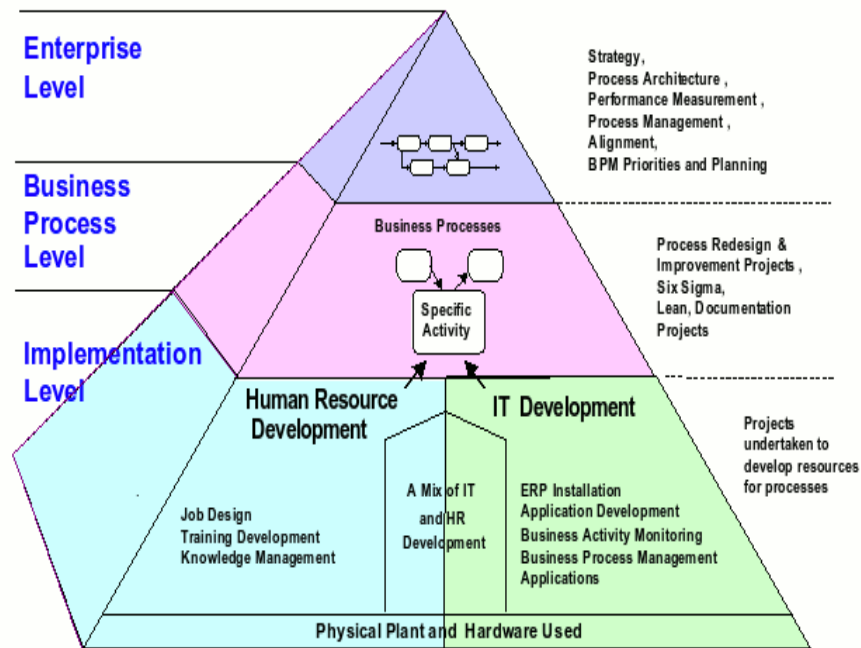


Figure 1. The BPTrends Pyramid by Harmon (2010)

The previous two decades saw BPM practiced predominantly at the *Business Process level* and within the *Technology component* of the Implementation level. The main focus was on highly repetitive, transactional BPs and manufacturing organizations. These processes were improved through methodologies such as BP Reengineering, Six Sigma, Lean, Total Quality Management (TQM) – all highly suitable for highly repetitive processes that could be captured and represented by process models. At the implementation level these processes were supported by BP systems including workflows and Enterprise Resource Planning (ERP) systems. The main focus was on process standardization, elimination of “waste”, and most importantly, on process efficiency achieved through automation.

As the BPM systems entered the *mainstream* enterprise applications across industry sectors and organizations started to reach higher levels of BPM maturity, their BPM focus has gradually expanded to include all four areas of the pyramid. “As organizations become more mature in managing their processes, they are working on all levels simultaneously.” (Harmon, 2010, pg. 53).

The process management lifecycle represents another key BPM concept widely used by researchers and practitioners alike. A cycle starts with the creation/documentation of a formal process (called “as-is”), and after various performance gaps are found, intervention plans are designed and enacted, the final outcome is an improved or brand new process, called a “to-be” BP (Hammer, 2010). The process management cycle illustrates another very important point about BPM and that is its “problem-solving” nature, with new processes being designed to “address the performance gap” or “fix execution problems”. Although the actual steps may vary, the same process management cycle has been at the core of many BP improvement methods today.

It is important to point out that most of the existing BPM concepts, including the above described BPTrends Pyramid and the process lifecycle, were originally designed for manufacturing processes. This turns out to be the main reason why the reported quantitative estimate of the return on investment from a BPM deployment today very low (Butler Group 2004; Gartner 2004). “However, while 15% makes a BPM project worth doing, it does not provide the rate of return one might expect from technology originally heralded as “disruptive”. The underlying reason for this is that the management techniques underpinning current mainstream BPM, such as Lean and Six Sigma, derive from principles that have been standard

practice for over 50 years: Scientific Management from the 1910s (Taylor), Statistical Quality Control from 1930s (Shewhart), and TQM/Hoshin Kanri from the 1950s (Juran and Deming).” (Harison-Broninski, 2010 pg. 444).

In very recent times knowledge-intensive BPs are being considered in the context of the so-called Case-oriented BPM. “Case Management requires supporting knowledge work, where many of the important steps take place in people’s heads or through collaboration with colleagues, making knowledge-intensive processes difficult to analyze and structure. Also, because cases are primarily driven by human participants reacting to changing context, cases do not follow a predetermined path defined in advance – they lack predictability, making them very difficult to automate” (Singularity, 2010, pg. 6). The well-known examples of case management BPs include: immigration applications, insurance claims processing, fault reporting and resolution etc.

The work presented in this paper aims to open some important research challenges to help the BPM researchers and practitioners to improve our current understanding of knowledge-intensive BPs and their ongoing improvement. The chosen domain of health care offers a rich context for in-depth analysis of these complex processes, as demonstrated by this paper.

### ***Knowledge-intensive Business Processes***

Between 25% and 40% of the workforce can be classified as knowledge workers today, and this proportion is expected to increase.” (Singularity, 2010, pg. 4). Knowledge workers think for a living, solve problems, understand and meet the needs of customers, make decisions, and collaborate and communicate with other people in the course of doing their work. (Davenport, 2005). They are reflective practitioners who reflect *on action* and *in action* (Schon, 1983).

Knowledge is a combination of experience, context, interpretation and reflection and involves more human participation than information (Davenport, 2005). As such, it is inseparable from individuals and their actions (Davenport and Prusak, 1998).

Both BPM and knowledge management (KM) communities now recognize that knowledge is deeply imbedded in all types of BPs (Amarvadi and Lee, 2005). Business processes provide the context and the purpose (goal) for the so-called *knowledge processes* of creating, sharing, transferring and applying knowledge. Consequently, they could be viewed as the nexus around which knowledge sharing and creation can thrive (El Sawy and Josefek, 2003). “The most important processes in most organizations involve knowledge work – they add the most value and have the greatest impact on long-term success. But processes and the knowledge required to execute them have generally been badly integrated.” (Singularity, 2010, pg. 6).

But at the same time KM research confirms that, “it is still not clear how to integrate knowledge management more thoroughly into business process management... Connecting knowledge activities to the core business processes is the second and more effective stage of knowledge management in an organization” (Smith and McKeen, 2004). “There was (and still is) a general lack of understanding of how valuable the fusion of processes and knowledge can be” (Records, 2005).

Process-related knowledge requires us to reconsider our understanding of a business process itself, most importantly, suitability of the current approaches to *process improvement*. For example, in the past, popular classifications of organization’s BPs were very much focused on process structure, thus reinforcing the underlying assumption that processes need to be modeled. Consequently, BP improvement methodologies were therefore predominantly focused on the improvement of models, often achieved via *analytical methods* i.e. analysis of “as-is” and design of “to-be” models.

While this is a widely accepted practice when dealing with highly structured processes, it is *not* suitable for the knowledge intensive processes. These processes involve experiential knowledge in various forms and complex-decisions, and therefore, cannot be easily reduced to well-structured models that could lend themselves to the popular *BP improvement methods*. If possible at all, modeling could be done only at a very high level. However, in the case of these processes, this offers very little value-add to the process participants, in terms of better insights and improved understanding. El Sawy et. al. (2003) calls for a new

type of BP improvement methodology that needs to be knowledge-based i.e. needs to focus on BP-related *knowledge processes* rather than BP models.

Even though recent studies have noted the benefits of incorporating knowledge considerations into business process improvements (Seely, 2002) and proposed some approaches and applications (Kim et. al., 2003; Papavassilou et. al., 2003; Remus and Schub, 2003), their efforts were neither systematic nor applicable to a wide range of business processes (Dalmaris et. al., 2007). “Process improvement has mostly been for other workers: transactional workers, manufacturing workers, people in call centers. All serious approaches to improving work have largely escaped knowledge work” (Davenport, 2005, pg. 32).

As already stated, this paper focuses on a special case of customer-facing knowledge intensive processes. The research adopt the term *human-driven*, introduced by Harrison-Broninski (2008) to better describe the health care and other knowledge processes, where “humans engaged in such processes must participate in definition of their own activities, rather than slavishly carry out a pre-defined set of tasks” (Harrison-Broninski, pg. 2008, pg. 2). These human-driven BPs are different from those that are *human-centric* – where the latter term is being used by the mainstream workflow tools to indicate human participation in technology-supported processes.

### ***Business Processes in Health care***

Health care provision involves a whole suite of processes including highly structured and repetitive administrative processes as well as knowledge-intensive processes, with different degree of knowledge intensity. Lenz and Reichert (2005) distinguish between *generic process pattern* and *medical treatment processes*. The former type helps to coordinate health care processes among different people and organizational units. The later are the actual health care processes, which involve domain expertise and complex decisions that need to be made case-by-case (Panzarasa and Stefanelli, 2006), on the basis of situational information and expert knowledge. Obviously, these BPs need to be flexible and human-driven. As their structure cannot be defined in advance, they could be best described by a number of iterative *diagnostic-therapeutic cycles* (Lenz and Reichert, 2005), which consists of observation, reasoning and action.

Owing to their importance and complexity, health care processes are an obvious domain for the BPM research and practice. There are many exemplary projects that focus on various aspects of BPs in this domain including coordination support, collaboration within and across functional units, risk management, emergency care processes and so on. Also, when dealing with process improvement, most of the reported BPM-related projects in this domain follow the previously described process lifecycle and focus on *process automation* and *improved coordination*. For example, Becker et al. (2005) described an action research BPM project that focused on the “Infections Control” process - a process of preventing hospital acquired infections and their spread. The reported project went through the process lifecycle, starting from as-is modeling, to-be modeling, implementation, testing and evaluation, resulting in significant improvements in process efficiency (turn-around time) and significantly reduced time-to-notification by 86.22% (Becker, 2005). Similarly, Lenz and Reichert (2005) described a design science research project focused on more flexible coordination support achieved through an application of the so-called adaptive workflows. Even though both exemplary projects demonstrate significant improvements in terms of process efficiency and automation of coordination patterns, none of them challenges the acceptable practices related to process modeling and improvement in this domain.

In addition to these examples published by the mainstream BPM literature, similar approaches could be also found in the world of health care practice, as reported by the very recent literature published in this domain, such as (Becker et.al, 2007; Dixon, 2006; Bohmer, 2010). For example, health care providers are applying the mainstream BP improvement methodologies, redesigning their “as-is” BPs creating cheaper and more-efficient “to-be” BPs, some even successfully borrowing practices from the manufacturing domain, including the well-known “Toyota principles” (Bohmer, 2010).

These examples illustrate an important observation that BPM-related projects in health care are still predominantly focused on cost-cutting and improved coordination. “Confronted with the trade-off between improving patient outcomes and maximizing short- term revenues, many organizations routinely choose the former” (Bohmer, 2010). In this respect, they are quite similar to the other industry domains, both in services and manufacturing.

However, more mature BPM organizations, especially those with fully automated “generic patterns” (Lenz and Reichert, 2005) (i.e. administrative processes), are now looking beyond workflow automation and even beyond mainstream BP improvement methodologies, structured around the process lifecycle. For example, in order to improve their clinical processes, some organizations develop systematic routines for creating, capturing, and disseminating knowledge related to everyday care (Bohmer, 2010). Others are training their nursing staff in principles and practices of design thinking, thus giving them tools for ongoing innovation and improvement of their everyday knowledge-intensive processes (Brown, 2008). Slowly, but surely, evidence is emerging that “the technology that can revolutionize healthcare is not high-cost or high-tech” (Dixon, 2010). The essence is in human-driven innovation and the associated knowledge processes. Most importantly, it is now becoming clear that process improvement and redesign needs to come from “within organization” (Bohmer, 2010, pg. 69), shaped by many factors beyond consideration of the traditional BPM.

As with the other domains of BPM practice, where an important shift to knowledge-intensive processes has already begun, one could expect a similar shift to occur in the domain of health care, especially with the increased level of BPM maturity. This shift is certainly demonstrated by the case organization, as described in this paper.

### **Research Aims and Objectives**

This research focuses on a complex example of knowledge-intensive BPs and investigates research and practical issues related to its ongoing improvement. It aims to address the following research question:

*How do organizations improve their knowledge intensive processes beyond efficiency?*

In order to investigate different aspects of BP improvement, the above stated research question was explored via the following, more detailed research sub-questions:

- *When and why do organizations start to look beyond process efficiency?*
- *What are the main objectives of their BP improvement projects?*
- *Who is in charge of process improvement?*
- *What methodology do they use? How do they measure the effectiveness of their improvement methods?*
- *What do they see as the next step in their BPM-related journey? What are their future BPM needs?*

### **The Case organization: Business Processes at SuperClinic**

This section offers a brief introduction to the chosen case organization and their customer-facing knowledge-intensive BPs that have been the main focus of this research.

For more than 30 years the chosen case organization, here named “SuperClinic”, has been one of the leading providers of breast cancer screening and diagnostic services in Australia. With a multidisciplinary team of co-located specialists covering all aspects of patient care, this clinic has been at the forefront of innovation in this area, both in terms of their medical services as well as innovative approaches to patient care.

Looking from the BPM perspective, SuperClinic currently offers three different types of customer-facing knowledge-intensive BPs that correspond to three different types of services, or “Clinics” as they are called by this organization. It is important to note that even though they use the term “Clinic”, they are not running three different “physical” clinics at the same time. They could be briefly described as follows:

- *Screening Clinic offers routine screening to women who have no signs or symptoms of any change.*
- *Risk Assessment Clinic offers more specialized screening to women with a potentially increased risk of developing breast cancer and who need close observation, due to their family history or other medical factors known to increase the risk, irrespectively of their age.*

- *Diagnostic Clinic offers a diagnostic assessment to determine the cause of a suspicious change detected by the patient or her doctor that may be diagnosed as breast cancer.*

All incoming patients are streamlined (“segmented”) into the most appropriate type of the processes, based on the referrals provided by their general practitioners. However, their allocation is flexible, as a patient may be reallocated to a different Clinic, even in the middle of their “process instance” on the basis of their progressive results (e.g. from Screening to Diagnostic clinic).

To some extent all three processes follow the same coordination pattern. However, the diagnostic and risk assessment are more complex than the routine screening processes, and therefore likely to involve additional tasks. The high-level coordination patterns describing typical “pathways” for three different clinics are known in advance to a very large extent, based on many years of accumulated experience in treating three different types of patients. They are used for the initial scheduling of staff and patients to ensure that the patient flow is as smooth as possible, with minimum waiting times for the patients.

Very simple descriptions of these processes are posted on their web site to help their current and future patients to understand what their future visit is going to involve, in terms of process tasks and medical procedures. At the time of its introduction, this example of customer-focused description of their Clinics was considered to be very innovative.

Irrespectively of its type, each process involves a multidisciplinary team of knowledge workers (medical experts) that may include: a Radiologist, a Breast Surgeon, a Breast Physician, Radiographers, Sonographers and a Clinic Nurse. The size and composition of this team is likely to be different for different types (e.g. a screening process may not initially involve a breast surgeon).

All team members have access to highly sophisticated medical equipment fully integrated with their shared repository of patients’ medical information. For example, X-ray films are no longer developed. Instead they are digitized and automatically sent from the X-ray machine to the shared repository, along with any other relevant information.

Furthermore, regardless of its type, duration, composition of the team and tasks they perform, the main objective of each instance of a knowledge-intensive process is to assess each case and if required, detect and diagnose breast cancer within a single day. The average time to complete this process ranges from two to five hours, depending on the results of each assessment and overall complexity of each case. Each required test is completed, evaluated and reported while the patient is still at the clinic. After all necessary tests and steps are completed, the multidisciplinary team then correlate and analyze all findings and communicate the result directly to the patient.

From the patient perspective, this team-based approach is confirmed to significantly reduce very stressful waiting time between appointments, eliminating the need for multiple return visits to various specialists. As all team members are co-located and working together on each case, while accessing the shared repository of electronic records, they all share the same process context. This, in turn, reduces the risk of medical errors due to the poor data quality and eliminates the need for the patient to provide their own version of the “context” (i.e. information about their previous visits to other practitioners).

At the time this team-based approach was introduced, it represented a significant innovation in health care processes as coordination, communication and collaboration patterns among all team members and their patients were significantly improved. However, this is no longer the case, as there are other providers of highly specialized co-related health-care services,

The following section briefly outlines the research method used to explore the above-described example of knowledge-intensive processes at SuperClinic.



## Research method

In line with the exploratory nature of this research, a case study method that involved an interpretive approach was adopted to capture its corresponding contextual richness and complexity (Yin, 1993). Interpretive research offers an opportunity to understand the phenomena through the meanings that people assign to them (Deetz, 1996) in the particular context.

The case organization was selected on the basis of its complex customer-facing knowledge-intensive processes and its leadership position in Australia. The exploratory case study (Yin, 1993) involved a number of semi-structured interviews with the available process participants including all types of medical specialists, as well as their management to gain a strategic perspective. The interview questions were exploratory, retrospective in nature and designed by the researcher, around the stated research question. Additional data was collected from their publicly available web site as well as process-related documents describing their services from the clinic's as well as patient's perspectives.

Due to the highly sensitive nature of these processes, their patients were not interviewed and their data stored in the shared repository, were not accessed and used in any way. However, the researcher also sought to understand patient's perspective because of its importance for the ongoing evaluation of organizational innovations.

Data related to the patient perspective was collected in two different ways. The first one included collection and analysis of the customer feedback publicly available on their company web site. Even though this feedback was primarily provided for the marketing purposes, it was still very useful. It enabled the researcher to understand and confirm different aspects of service-related value, as perceived by the previous patients.

However, the most valuable source of data came from the researcher's personal experience. More precisely, the researcher went through the screening process (Screening Clinic), as a customer – and at the same time, observed different aspects of the process, from “inside-out”, as a BPM professional. This first-hand experience was then used to fine-tune the interview questions that enabled better sharing of process-related experiential knowledge during the interviews conducted at the later date.

After all qualitative data were collected, data analysis was supported by the qualitative analysis tool (NVivo). To ensure that the interpretation made were correct for the given context, the researcher sought a feedback and, when required, additional information to better understand what was in essence highly contextual knowledge.

Like all qualitative studies, this study sought a subjective understanding of the conditions, practices and consequences of social action as expressed by the stakeholders and facilitators in their particular social context and are expected to reveal complexities and details that are commonly omitted in quantitative studies (Mason, 2002). As data collection and analysis were related to the *process* rather than the medical aspect of their services, the researcher was in a position to understand and interpret the collected data from the BPM perspective, due to her extensive experience in this area, both theoretical and practical.

## Research Findings

This section describes two different phases of this organization's BPM-related experience. It also illustrates a gradual change of their focus from process efficiency to knowledge-intensive human-driven BPs, with later being the main focus of this research.

### ***BP efficiency***

All routine administrative BPs at SuperClinic have long been automated, eliminating unnecessary paperwork and reducing the overall costs for the SuperClinic and its patients. Furthermore, scheduling and coordination of individual tasks including task allocation to different team members have also been fully automated by a workflow system. Similar to the other workflow implementations, this scheduling system is designed to “make the right task, available to the right person, at the right point of time, along

with the resources needed for the tasks”. In this case, resources include patient’s progressive record that gets updated with the results of each test/task. The shared repository enables the allocated experts to correlate different results in order to come up with the final outcome. Looking from the BPM perspective, the scheduling system is designed to allow flexible processes, including addition of new tasks, flexible duration, reordering of individual tasks and their re-assignment to different/new roles (e.g. when a patient needs another test).

As all three types of their BPs have their own typical pathways enabling optimization of the available resources for the typical cases. The shared repository and its integration with medical equipment have further improved the overall process efficiency in terms of time, cost involved and reduction of unnecessary tasks, such as development of X-rays films.

Therefore, some aspects of their knowledge-intensive processes have already been automated and thus made more efficient through task coordination and shared repository. However, as far as BPM is concerned, all expert tasks have remained “black boxes”. This is because they involve complex decision-making that is human-driven and requires domain expertise, and therefore, cannot be fully automated by the BPM systems. According to the participants interviewed in this case, any additional level of automation of their knowledge-intensive processes would be not bring any additional value to the clinic and their patients. They perceive the existing processes to be “sufficiently efficient”.

Looking from the BPM perspective, one could ask what else could be done to ensure further improvement of their knowledge-intensive BPs? The next section describes their next level of innovation in customer care fully implemented within their knowledge-intensive processes.

### ***Knowledge-intensive, human-driven BPs***

This section takes the BPM perspective to analyse the ongoing improvement of knowledge-intensive, human-driven BPs at SuperClinic. The main research findings are structured around previously stated research questions, as follows:

- *When and why do organizations start to look beyond process efficiency?*

The case organization experienced a gradual evolution in their approach to BP improvement and innovation, rather than in two distinct phases. In fact, the underlying process automation continues as new machines become available (e.g. as in the case of digital X-Ray) and is expected to continue to enable this organization to keep up to date with the latest technological developments. At the same time, human-driven innovations were also implemented in the past, even at the time when their administrative processes were mainly manual. However, with increased automation, their main focus has gradually shifted from process-efficiency towards process effectiveness via improved customer care. Therefore, this shift was not a result of a deliberate “process-thinking” or an application of a BP Improvement method, but has gradually evolved from their practices and allowed to grow in an environment where innovation is encouraged and supported.

- *What are the main objectives used to guide their BP improvement projects?*

Even though more traditional process-related Key Performance Indicators (KPIs), such as the overall cost, are still relevant and used to determine feasibility of possible improvements, their BP improvement projects are primarily guided by their collective aim to continuously improve the quality of patient care. Moreover, their BP improvement objectives are fully aligned with their overall strategy and organizational values. In the words of their managing director: *“We are very proud of our patient focused health care model and continue to invest our time and resources to continually improve our performance in this area”*.

- *Who is in charge of process improvement?*

The customer-facing BPs at SuperClinic are continuously improved from “inside-out”, by the process participants themselves. While ongoing improvement has been an integral part of everybody’s job, a pivotal role has been taken by a senior clinical nurse (here named “Sue”). This has resulted in her work being re-positioned from the individual task she was in charge of to a new type of role at the process level. More precisely, while working as one of the team members in charge of her own assigned task within the

overall process, Sue observed the importance of process-level work and in particular, process-level care for the overall patient experience. While the individual specialists took excellent care of every single patient within their own allocated process tasks, Sue noticed that the time spent waiting between different tasks, regardless of its duration is always stressful for the patient. So she has gradually assumed the role of *human-interface* for each patient's process instance.

In this new process-level role, Sue started to provide patients with additional information at the process level i.e. between different tasks, or even within tasks, whenever needed. She gradually got to learn and even preempt what kind of support, information or even process modification was likely to be needed for each patient currently at the clinic, based on their prior history, progressive results, emotional state, needs and preferences for different types of information and in-process support.

In this capacity, Sue also gradually assumed the power to change the order of different tasks (in consultation with the allocated specialists), reallocate tasks to different specialists to better meet patient needs and expectations (even taking into account their personalities) as well as to create additional process tasks (such as counseling or preparation for the next task). Quite often all that was needed was to simply "*provide patients with a breathing space between stressful medical tasks, away from everything*" <Sue>. All process modifications are done on-the-fly and in agreement with all team members, ensuring that the flow of patients is not disturbed in any major way, that would create unnecessary delays and more waiting time for the others.

Sue has been so successful in this role that the management decided to employ a small team of clinical nurses, all trained by her. At the time of writing Sue has two team members and all three of them are working very closely together constantly sharing their observations and ideas about new initiatives and possible further improvements of the processes "they truly own".

- *What BP improvement methodology do they use? How do they measure the effectiveness of their improvement efforts?*

The ongoing process improvement initiatives have not been driven by any analytical or deliberate BP improvement methodology, used in the traditional BPM. Even more, their improvement efforts are not predominantly "problem-driven". They could be best described as a series of small-scale experiments, initiated, designed, tested and analyzed by individuals and/or team. If proven to be useful, these innovations are then adopted as the next practice.

From the methodological point of view, this approach closely resemble Schon's model (Schon, 1983) of reflective practice incorporating the ongoing cycles of collaborative action learning, which in this case is also multidisciplinary. The effectiveness of the proposed innovation is assessed through very careful observations of the effects from several different perspectives (staff, patient, process, resources) taking into the account staff and patient feedback. However, as they pointed out, their approach is not reactive, waiting for the customer feedback to be reacted upon. Their innovations efforts are very much proactive and guided by their collective ability to anticipate patients' needs, carefully observe their progress and then turn these combined insights into value-add, initially within a single process instance, and if effective, adopt across all Clinics.

- *What do they see as the next step in their BPM-related journey? What are their future BPM needs?*

While they were unable to predict their future BPM-related initiatives and other innovations in patient care, they expect that IT-related innovations will continue, even though process efficiency is becoming more and more ubiquitous. They did not believe that increased process efficiency would bring them more patients. On the other hand, there was a strong agreement that continuous improvements and innovations in human-driven care coupled with the leading-edge medical expertise will enable them to sustain their leadership position. They expressed a need to learn about innovation patterns and the ways they were implemented and evaluated in other health care organizations as well as in other areas of "human-care" (e.g. as offered by various government departments). As Sue was previously employed by one of these government agencies, she fully appreciated the importance of cross-pollination of ideas across organizations and industry sectors.

When asked about future BPM support, including for example support for their own collaborative processes, they did not envisage that any collaborative environments would greatly improve their collaboration. This is because their collaboration is by nature highly situational, highly dynamic and always face-to-face. However, further research would be required to confirm this statement.

## Discussion

Based on the research findings described in the previous sections, the paper calls for a new BPM-related thinking in the context of knowledge-intensive processes, especially in relation to their ongoing improvements. This is also supported by the professional literature. For example, in a very recent article published by HBR, Dixon (2010, pg. 67) argues “The technology that can revolutionize health care is not high cost or high tech”. Using an example of a simple innovation (a phone call) that a physician decided to add to their patient care process and test its effectiveness, a 75-old patient avoided return trips to the hospital for six months. This was very important, having in mind that prior to this “human-driven” innovation, the same patient was hospitalized 6 times during the period of four months. This innovation did result in a significant improvement of patient care but it was not an outcome of a deliberate, problem-solving BP improvement method, focused on fixing the problems in as-is BPs.

Furthermore, while the above cases may create an impression that the required shift in thinking applies only to very specific human centered services, it is interesting to point out that similar patterns have also been observed in the areas of customer-facing BPs in financial and insurance sectors. Here, additional human-driven tasks are being added, effectively making processes slower and more expensive but more knowledge-intensive and harder to replicate. For example, while in the past over-the-counter simple processes were replaced by internet-based applications resulting in closure of many branches, insurance companies and banks are now inviting their customers back to their branches, encouraging face-to-face contacts. A very recent campaign by one of the largest insurance company in Australia certainly illustrates the point, as shown by (NRMA, 2010).

Obviously in these domains, personal contacts are not possible to the same extent as in human care processes. However, armed with good understanding of their customer segments and willingness to innovate on a small scale, observe and share their insights, slowly but surely, these exemplary organizations are building a strong case for a different type of BP improvement. “Management of production processes focuses on efficiency – reducing time and cost. It is human work that delivers effectiveness, resulting in higher customer satisfaction and (for private sector companies) market leadership” (Harrison-Broninski, 2010, pg. 445).

However, the tacit nature of these innovations makes them very hard to observe and externalize. Rather than trying to capture these ideas and turn them in a deliberate methodology for BP improvement of knowledge-intensive processes in this and other domains, it is important to shift our future BPM research efforts to discover, analyze and evaluate the new challenges related to BP-related human-driven innovation, that need to be studied in the context and from a multidisciplinary perspective. Most importantly, in the case of these and other knowledge-intensive processes, design of these innovations should be left to the practitioners, as pointed out by (Bohner, 2010).

Our research has also confirmed that the previously discussed BPM concepts such as Harmon’s model and the process lifecycle need to be reexamined in the context of knowledge-intensive processes. For example, it has placed the main emphasis on the people component of the Harmon’s model, in particular process-related *human experiential knowledge*, held by process participants. This trend has been confirmed by a growing number of industry white papers and case studies such as the ones described in (Harrison-Broninski, 2008; Records, 2005; Singularity, 2010).

Furthermore, traditional BPM see people at the implementation level and being assigned to processes, making them “human-centric”, KIBPs are by nature human-driven (Harison-Broninski, 2010). These processes are based on human collaboration and innovation, making process steps impossible to fully predict, let alone model in advance. This in turn, requires us to re-think the process lifecycle and its organizational implementation.

Another important lesson learned in this project is related to the need to break down information silos to facilitate the ongoing improvement of knowledge-intensive processes and the pivotal roles of boundary-

spanning individuals in this knowledge sharing process. As confirmed by the KM field, silos are known to limit organizational learning and knowledge sharing that are of fundamental importance for knowledge-intensive BPs. For example, as shown by the recent literature, in many companies their organizational “knowledge and expertise are housed within organizational silos, and they have trouble harnessing their resources across those internal boundaries in a way that customers truly value and are willing to pay for” (Gulati, 2007, pg. 86).

Unfortunately, the problem of information silos is also present in the health care domain. “There is still a lot of silo mentality in healthcare and what is needed are pit crews with shared responsibility for the overall goal (Morse, 2010, pg. 61).

In the case organization, information silos are certainly broken down and new value created, with the help of their “boundary-spanning individual” Sue and her growing team. Very recent industry reports confirm the link between this new type of organizational roles and value creation, as follows:

“As enterprises drive towards achieving high value and improving customers’ experiences, they look to break down internal boundaries and integrate up, down and across the extended value chain. Boundary-spanning roles become pivotal towards the expression and capture of business value”(Gartner, 2006, pg. 46).

Our research shows that in addition to creation and capture of business value, this role becomes the key facilitator of knowledge processes among team members as well as with their customers, making the boundaries between the “inside” and “outside” worlds of their knowledge-intensive business more fluid. Most importantly, looking from the customer perspective, this boundary-spanning role becomes the human-face of their knowledge-intensive processes, making these BPs deeply human and more customer-owned.

## **Conclusion**

The health care providers remain under constant pressure to reduce costs while improving the quality of care. “Confronted with the trade-off between improving patient outcomes and maximizing short-term revenue many organizations routinely choose the former” (Institute of Medicine, 2001, pg. 69). This research describes an interesting case where the organization went the opposite way. After their routine processes were made efficient, they focused on their customer-facing knowledge intensive processes, and their continuous improvement. Through ongoing small-scale innovations, they created slower and more expensive, but much more effective BPs, and they continue to do so. This very much contradicts the common understanding of, and expectations associated with BP improvement efforts that were often used as cost-cutting exercises (Spanyi, 2010).

This research also confirms that the well-known BPM concepts, such as the BP trends pyramid and the process life cycle need to be reconsidered for the knowledge-intensive processes This particular finding further reinforces the previous findings by El Sawy and Josefek (2004) who argued that the new type of BP improvement methods needs to be knowledge-based rather than model-based.

However, this research is still limited to a single case. Also research findings are made in the context of an organization that is considered to be a leader in patient care in this domain and in this geographical region. Therefore, one could argue that the chosen organization is not a typical one, as other health care organizations have a long way to go, especially those still struggling with manual procedures.

Finally, in the world, where traditional BPM approaches and methodologies, inherited from manufacturing organizations, are still being applied to health-care processes, in order to make them “leaner”, faster and less expensive, the presented case organization stand out even more. Very recent reports confirm that they are not alone. “Some players have already begun reconfiguring themselves and making progress despite obstacles such as fee-for-service payment – a system that encourages the performance of procedures regardless of their impact on outcomes” (Boxmer, 2010, pg. 69).

Based on the current BPM-related developments in the other industry sectors, where process automation is no longer considered to be a sustainable competitive advantage, one could argue that the health care sector is likely follow a similar BPM maturity path in the future. However, rather than waiting for this to happen, BPM researchers and practitioners, are now in a unique position to help organizations to make

this much needed paradigm shift towards knowledge-intensive processes leading to improved care. For the reasons best expressed by one of the study participants: “We do not manufacture cars. We look after people!”

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