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# FROM HOME-MADE TO STRATEGY- ENABLING BUSINESS INTELLIGENCE: THE TRANSFORMATIONAL JOURNEY OF A RETAIL ORGANISATION

Petri Hallikainen  
*The University of Sydney*

Hilkka Merisalo-Rantanen  
*Aalto University School of Economics*

Antti Syvaniemi  
*The University of Sydney*

Marjanovic Olivera  
*The University of Sydney*

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# FROM HOME-MADE TO STRATEGY-ENABLING BUSINESS INTELLIGENCE: THE TRANSFORMATIONAL JOURNEY OF A RETAIL ORGANISATION

Hallikainen, Petri, The University of Sydney, NSW 2006, Australia,  
[petri.hallikainen@sydney.edu.au](mailto:petri.hallikainen@sydney.edu.au)

Merisalo-Rantanen, Hilikka, Aalto University School of Economics, Runeberginkatu 22-24,  
00100 Helsinki, Finland, [hilikka.merisalo-rantanen@aalto.fi](mailto:hilikka.merisalo-rantanen@aalto.fi)

Syvaniemi, Antti, [antti.syvaniemi@gmail.com](mailto:antti.syvaniemi@gmail.com)

Marjanovic, Olivera, The University of Sydney, NSW 2006, Australia,  
[olivera.marjanovic@sydney.edu.au](mailto:olivera.marjanovic@sydney.edu.au)

## Abstract

*The paper examines how a retail organisation transformed from home-made Business Intelligence (BI) to a mature BI-based organisation, over a decade long period of time. We engaged in an Action Research (AR) inquiry where the transformation was explored through the first-hand experiences of one of the co-authors. Concepts from the organisational learning theory are used to analyse the organisational transformation and develop an in-depth understanding of the role of BI applications in this process. Central to the transformational process was an organisational champion and the shadow BI community that promoted BI-thinking across the organisation. As the mental models of individual organisational members transformed, through small-scale BI innovations, BI started to have a transformational impact on human work. Once the strategic importance of BI became the shared mental model in the organisation, BI became a strategic transformer, impacting the strategy as well as the strategy development process that became BI-enabled and driven.*

*Keywords: Business intelligence (BI), strategy, transformation, action research (AR)*

# 1 Introduction

Contemporary organisations are facing an ever changing and challenging competitive environment, forcing them to explore different ways to remain competitive. Very recent industry reports confirm a very strong link between an organisation's competitive position and its capabilities to use Business Intelligence/Business analytics applications. For example, in a world-wide survey of nearly 3000 executives, managers and analysts from more than 30 industries and 100 countries, Lavallo et al. (2011, p. 23) found out that "organisations that strongly agreed that the use of business information and analytics differentiate them within their industry were twice as likely to be top performers as lower performers" (p.23). Another influential report offers similar findings. "Increased competition and the recognition of the value of corporate data and information seem to have underlined the need for leveraging BI." (Luftman and Ben-Zvi, 2010, p.54). Therefore, "organisational leaders want analytics to exploit their growing data and survey computational power to get smart, and get innovative, in ways they never could before" (LaValle et al., 2011, p. 23).

Business intelligence (BI) can be defined as "an umbrella term that is commonly used to describe the technologies, applications and processes for gathering, storing, accessing, and analyzing data to help business users make better decisions."(Wixom and Watson, 2010, p.14). In the organisational context, business intelligence can be seen as "a strategic approach for systematically targeting, tracking, communicating and transforming relevant weak signs into actionable information on which strategic decision-making is based" (Rouibah and Ould-ali, 2002, p. 133). The term BI is sometimes misinterpreted to mean "business reporting' or BI technology, in order to distinguish it from more advanced applications of analytical tools often termed "Business Analytics". We adopt a broader view of BI, as recommended by Wixom and Watson (2010), and consider Business Analytics to be one type of BI applications or as Eckerson (2004) suggests one of the levels of BI tool evolutions (with BI-enabled reporting being at level 1).

In the past, organisations used to focus more on BI technology. However, this is rapidly changing. Imhoff and White (2010) suggest that one of ten mistakes to avoid when implementing BI applications is to assume that BI is just a technical solution. As technology is becoming more widespread and organisational applications of BI become more mature, organisations are turning their attention towards business related issues. "The fact is, BI technology is now at a maturity stage... Business intelligence, the management capability, needs to replace the BI technology." (Bertram, 2010, p. 12). Thus, the ultimate goal in utilizing business intelligence applications and processes is a "*BI-based organization*" (Watson, 2009; Wixom and Watson, 2010).

Furthermore, customer orientation has been considered as the key for success in the competitive marketplace (Vargo and Lusch, 2004). Therefore, complex analysis of customer-related data, integrated across functional or even organisational boundaries, becomes critical and only possible to achieve effectively with the use of BI tools. Operational BI is now bringing powerful analytical tools from the back office and designated knowledge workers to the front office turning customer facing-employees into a new type of knowledge workers (Imhoff, 2006). "Fifteen years ago, BI and enterprise systems were the domain of the technical elite. ... Now firms strive for information democracy, all levels of the organisation are using business intelligence." (Conway and Vasseur, 2010, p. 37). As many types of decision makers are now given access to powerful decision making tools and are able to turn their insights into actions, BI applications are increasingly seen as transformational (Gartner, 2009).

BI technology is now enabling organisations to trace and better understand the impact of their decisions not only horizontally across business processes, but also along various vertical information flows from the operational level all the way up to the strategy. "Senior executives want businesses run on data-driven decisions" (LaValle et al., 2011, p. 23). When various weak signals from the customers are identified and analysed, the outcomes could lead to business strategy being adjusted accordingly (Rouibah and Ould-ali, 2002). Therefore, in addition to transforming human work, enterprise-wide

applications of BI enable organisations to transform their strategies, even the process of strategy making. More precisely, the traditional top-down approach to strategy development and execution could be transformed into a more agile BI-enabled sense-and-respond approach (McNurlin and Sprague, 2009).

This paper describes a decade long transformational journey of a very complex retail organisation from its initial “home-made” BI applications into a BI-based organisation, achieved through what gradually became an enterprise-wide information management. We explore how the role of BI has evolved within this context and how this evolution has affected two transformational aspects of BI, namely its ability to transform (i) *the nature of human work* and (ii) *the organisational approach to strategy development*, as well as their mutual relationship.

We engaged in an action research (AR) inquiry, where the transformational dimension of human work was explored through the first-hand experience of one of the co-authors, who followed closely both the initiation of the organisational transformation and undertook the role of BI champion, during a period of ten years. The transformational dimension related to strategy was explored across two action learning cycles describing how strategy-mandated (i.e. prescribed) BI was gradually transformed into BI-enabled strategy co-creation.

The AR intervention is described in detail and it is reflected upon from different perspectives enabling the researchers to draw conclusions about the lessons learned and their implications for BI research and practice.

The paper is organised as follows. Section two briefly reviews the related literature on business intelligence, organisational learning and organisational transformation. The research approach is described in section three. Section four presents the action research cycles while section five discusses the results and outlines the lessons learned. Section six concludes the paper.

## 2 Related Literature

### 2.1 Business Intelligence

Bertram (2010) argues that BI - the technology - should be replaced by BI - the management capability - and puts forward the so-called 4P framework consisting of the following four components: (1) *Performance*: Setting up an enterprise-wide performance metrics framework; (2) *People*: Development of core business competencies within your business; (3) *Process*: Embedding the use of information into and around business processes; and (4) *Platform*: Creating core BI capabilities.

Previous research by (author’s reference removed) proposes to extend the above BI management capability framework with the fifth capability component – BI strategy. Thus, BI strategy needs to be fully aligned with the overall business strategy, defining goals and objectives that in turn will be used to define the Performance component of the above framework. The same research also argues that in order to achieve a high level of BI management capability, all five components (strategy, performance, people, process, and platform) need to be fully intertwined, as they continue to co-evolve.

Lavalle et al. (2011) defines three levels of analytical capability representing the three stages of analytical adoption, based on a worldwide survey of more than 3000 participants from more than 30 industries. These levels are aspirational, experienced, and transformed. The aspirational companies display “limited use of insights to guide future strategies or day-to-day operations”. The experienced companies show “growing use of insights to guide future strategies, but still limited use of insights to guide day-to-day operations”. The transformed companies show the highest level of analytical capability, especially in relation to their strategy and operations. “Almost all use insights to guide future strategies and most use insights to guide day to day operations” (LaValle et al., 2011, p.24).

While the business-related BI research is still emerging (Wixom and Watson, 2010), an increasing number of papers have recently focused on business rather than technology aspects of organisational BI implementation. Prior research on Critical Success Factors (CSF) for BI implementation and organisational adoption (e.g. Gonzales, 2009; Hawking and Sellitto, 2010; Wixom and Watson, 2001; Yeoh and Kornis, 2010) confirms the importance of business aspects. The in-depth analysis of these papers identifies several common CSFs such as executive sponsorship (or senior stewardship), the need to lead the project from the business side, full alignment with business objectives, management of organisational resistance, well-defined project scope, effective project teams, user involvement during implementation as well as various technical issues including BI architecture and user-friendly BI tools. In combination, these findings provide valuable insights for our study, as discussed later in the paper.

## **2.2 Organisational Transformation**

Organisational transformation cannot take place overnight. Organisational learning provides a useful conceptual basis for looking at the process of organisational transformation and to trace the developments over time. There are various definitions for organisational learning. We adopt the definition by Kim (1993, p. 38): “increasing an organisation’s capacity to take effective action”.

We draw from Kim (1993) to establish the link between individual and organisational learning since it is actually the individuals who learn in the organisation. Furthermore, we follow Brown and Duguid (1991) and see learning as a social construction, when individuals participate in communities of practice.

Kim (1993) presents an integrated model of organisational learning called OADI-SMM model: observe, assess, design, implement – shared mental models. The first part of the model describes the individual learning cycle in which individual “beliefs change and those changes are then codified in the individual mental models” (p. 43). An important concept for understanding how individual learning transfers to organisational learning is the concept of organisational memory that contains everything that is somehow retrievable in an organisation. In principle, memory contains both stored and active components. The active components are individual and shared mental models, which define ways of looking at the world. Once individuals improve their mental models and make them explicit, it is possible to develop new shared mental models resulting in organisational learning. Individual double loop learning changes individual mental models. Organisational double loop learning occurs when individual mental models become shared mental models, which can affect organisational action. (Kim, 1993)

Brown and Duguid (1991) see learning as a social construction. Learners participate in a community of practice and learning is about becoming an “insider”, behaving as a community member. Communities of practice are seen as significant for innovating. These emergent communities may “develop a rich, fluid, noncanonical world view to bridge the gap between their organisation’s static canonical view and the challenge of changing practice” (p. 50). However, the challenge is that non-canonical practices may be seen as deviant in the organisation. (Brown and Duguid, 1991)

Organisational transformation may be enhanced by change agents and organisational champions. In the case of planned change organisations may employ change agents who implement the objectives set by top management. Markus and Benjamin (1996) researched the change agent role of information system (IS) specialists. They identified three different models for IS specialist change agent role: traditional, facilitator and advocate model. In the traditional model the change is very much identified to the technology (IS causes the change) and the objectives for change are set by management. The facilitator model acknowledges that change is brought about by people, not technology, and the role of the change agent is to help the organisational actors through the change process. In the advocate model the change agent has a more active role influencing the behaviour of the people involved to the direction that she/he views as desirable. (Markus and Benjamin, 1996)

There is a lot of literature on organisational champions in both the innovation and IS fields. Organisational champions are different from change agents in that they have their own vision of change that they want to promote. Howell and Higgins (1990) studied the influence tactics and leadership behaviour of organisational champions. They found that “champions are informal transformational leaders” (Howell and Higgins, 1990, p. 337). They work actively to overcome any resistance to promote the cause that they believe in (Heng et al., 1999). When studying organisational champions for IT innovation, Heng et al. (1999) found that creativity was the defining characteristics of the champions and that they were ready to break organisational rules if necessary to advance their cause.

### 3 Methodology

Action research (AR) (Baskerville and Myers, 2004; Lau, 1999) was chosen as the main research approach in this study. AR was deemed by the researchers to be the most appropriate as it aims to solve current practical problems and, simultaneously, to expand scientific knowledge (Baskerville and Myers, 2004). Although there are several ways to define and conduct AR, it is typically conducted through a set of action learning cycles (Lau, 1999; Bradbury and Reason, 2003). In this research we adopted the AR cycle by Susman and Evered (1978) that is widely used to report AR studies. The AR cycle includes five phases: diagnosing, action planning, action taking, evaluating, and reflecting (specifying learning). Most importantly, in any AR project, research is highly intertwined with practice through the in-situ work of practitioners themselves, who could be researchers themselves or working closely with the researchers. Therefore, AR is conducted through active participation, rather than observation.

In this research project, the role of the AR researcher/practitioner was taken by one of the research team members. This researcher has been actively following the development of the described AR interventions of the case company. He has been working as a retail BI-expert for over a decade and is widely networked within retail industry including the case company.

His main responsibilities have included the development of the enterprise-wide information management processes, with the main objective to improve business processes through more effective data analysis and use. In addition to his domain expertise, this team member has also undertaken domain-related further studies that have enabled him to reflect on his own organisational context and directly apply the acquired scientific knowledge to his daily work. He has gradually assumed the role of the organisational BI champion (Howell and Higgins, 1990), leading organisational activities towards his vision of the future state of the BI activities - the vision that was grounded in the current scientific knowledge of the latest practices in this discipline. In addition to his deep and detailed experiential knowledge, this member of the research team has through his network had access to the abundant documentation and memos on the transformation process and the related drivers, enablers, and challenges.

Two of the other three researchers have followed the case company’s BI-initiatives since spring 2007. Although they have not been directly involved in the transformation process, they have had on-going discussions with the BI-experts, including formal interviews. The fourth researcher provided the theoretical grounding for this research and support for data analysis, seeking to help the research team to better understand the transformational journey of the organisation in the context of the current development in BI and related fields, providing an independent perspective. The following sections describe the case organisation and the main cycles conducted in this AR research.

### 4 Business Intelligence Implementation

In this section, we first briefly present the case organisation. Then we proceed to describe the two cycles of the AR intervention conducted for transforming the organisation into a BI-oriented one.

Each AR cycle phase is described through five steps: diagnosing, action planning, action taking, evaluating, and reflecting (specifying learning), as suggested by Susman and Evered (1978).

The AR intervention was carried out between 2001 and 2010. The first cycle titled “From data to information and from Independence to Contradiction” lasted five years from 2001 to 2005. It was followed by the second AR cycle titled “Advanced BI – From Contradiction to Cooperation”. It began immediately after the first cycle in 2005 and was finished in 2010.

#### **4.1 The Retail Organisation**

The case company is a European grocery retailer operating over 1000 stores. The store network consists of various store types, covering all segments from convenience stores to hypermarkets. The company follows value beyond price strategy aiming to offer best products and services for its customers. It also runs a wide customer loyalty program.

#### **4.2 AR Cycle 1 – From Data to Information and from Independence to Contradiction**

*Diagnosing.* At the start of our research in 2001, the main task of the business development unit, here information unit, was to gather and analyse sales and market data to help the business units in their decision making by providing understanding on what customers buy. Almost all organisations in the retail value chain used the same external data entity on the retail market in the case country. This data was integrated with the internal data and the technology used for data analysis was simple and easy to use. It required lots of “manual work” that, on the other hand, enabled agility. The models produced were quite advanced and widely used in business management. The information gained was rich, intelligent, holistic, and invaluable for decision making. The information unit was part of the business domain and with practically no interdependencies with the IT organisation. The BI-expert together with a process specialist, both BI-enthusiasts, developed the information management activities in a way that could be called as “end-user” development.

By 2003, the BI-expert together with the BI-oriented IT-specialist from the IT-department had realized the huge possibilities that the data available on customers and the business as a whole offered for business management. They started to plan new BI processes and explore new data mining technologies that he thought would raise information management to a new level.

In the same year, the situation changed suddenly. First, the IT department had also become convinced about the need for high quality information for winning the market competition. Some SAP applications had already been implemented in the organisation. Now the IT department decided to start a project for implementing SAP BW (Business Warehouse) application for information management to replace the “old-fashioned” Microsoft Office tools. Second, a traditional IT-policy was adopted in the organisation. The information unit's rights to access and enrich all the necessary data were limited, nor could they freely choose the tools they saw the most appropriate for their duties. Finally, the IT-specialist was promoted and left the collaboration, leaving the BI-expert alone to reach his vision of advanced BI-processes and management by information.

*Action planning.* In 2003, the IT department’s official BI-project was on-going and the BI-expert was the information unit’s representative in the project. One way to promote BI emerged through the official BI-project. There was a service provider involved in the project who also often consulted the BI-experts in the information unit unofficially. Acting as the third party in the official IT-project, he also helped to enhance BI thinking in the organisation resulting in better picture of opportunities of enhanced data and data mining technologies.

The business managers were unsatisfied with the current situation. SAP BW development was slow, the tools and reports were complicated to use, and the benefits were felt to be only modest. Change resistance in the business lines was significant and “they would not change if they don’t have to”.

Hence, SAP BW was not widely accepted and the managers used the Excel-based tools as long as they were available.

*Action taking.* In 2004 something had to be done to change the business processes more rapidly. The BI-expert studied in the university and reflected the theories on the processes and practices in the case organisation. He managed to develop a “framework for BI” for the organisation. He presented his ideas to top management to propagate the BI ideology. As the result, he got the full support of two vice-presidents in two business lines for starting a data mining pilot project in these lines independently from the IT department. A BI team, consisting of the representatives of the key business units and the information unit, was formed and it reported directly to the two vice-presidents.

SAP BW contained a data mining tool, and BI-expert worked in close cooperation with the SAP data mining product manager until he left the project after one year’s time. Soon after that, SAP quit active development of the data mining tool and the product manager left the company. The direct link to the experts of the solution provider was lost.

Hence, parallel to the IT-unit’s SAP BW-initiative, an informal shadow organisation, a community of practice was formed inside the organisation. Its objective was to improve the state of BI and to realize the vision of advanced BI-processes and management by information. The BI-expert together with some business managers started to develop pilot BI-processes to improve certain business processes or streams with data mining tools as the key enabling technology. The new processes were often developed for one key person involved in or responsible for the business stream in question. These pioneers tested and piloted the new processes. Only then were they introduced to operational and middle managers to show their advantages and effectiveness.

The pioneers often were young people coming from a university. They acted as “shakers” or change agents, who challenged the current processes and attempted to promote the change toward more efficient and effective BI-processes. The BI-expert acted as the organisational champion throughout this change. He first worked alone and then gradually was allowed to hire additional BI-specialists to the information unit.

The pilot processes were completely the responsibility of the information unit in the business domain. The IT unit was not involved in the pilot development. Thus, within the limits of their resources, the developers were quite free to ideate, innovate, and create new models for BI and management by information together with business process representatives. Some BI-processes were also integrated with external stakeholders such as suppliers.

*Evaluating.* In 2005, the first BI-processes developed in the pilot initiative were later on implemented for wider use after the business managers had accepted the change. Yet, the contradiction between technology and information returned after the implementation. In IT, BI and especially data mining based actions were still perceived as a threat for stable IT operations. The needs and demands for BI operations were not a part of the standard IT operations. Nor was there any connection between strategy and information, the ultimate goal of BI.

*Reflecting (specifying learning).* Business process change was conducted through small victories, stream by stream, navigating the change resistance in the business lines and with the IT department, where BI demands were seen as a threat for the standardized IT development and production. The pilot was the responsibility of the information unit in the business domain and out of the direct control of the IT-department. Yet, the shadow organisation had to find ways to sell the BI-processes to the business managers and to work around the IT-rules and control to accomplish their vision.

The information unit, and especially the BI-expert, were struggling to propagate their BI-vision throughout the organisation. The determination of the BI-expert together with his vision resulted in the design of a BI-framework that turned out to be one of the key drivers for the business change, as it provided a common language for a dialog among a wider and wider community. Data mining technology was the key enabler of the new BI-processes. Top management support was necessary to start the pilot initiative and to get the vital personnel and technology resources. Yet, the social network



both within and outside the organisation was of utmost importance for the realization of the vision of advanced BI-processes and management by information. External expert networks helped to find the best technologies and practices as well as the latest knowledge on BI. The internal social network with the organisational champion, sponsors, and pioneers or change agents, in turn, was essential for developing the pilot BI-processes and sustaining the confidence in the vision despite the setbacks.

### **4.3 AR Cycle 2 – Advanced BI - From Contradiction to Cooperation**

*Diagnosing.* In 2005, the organisation was renewed and the two vice-presidents were not any more in the position to sponsor the pilot initiative. This change resulted in “a step backwards” as the IT department eventually took over the control of the implemented BI-processes and also tried to control the new streams under development. Some pioneers became frustrated with the slow progress that resulted in the halt of the stream in question.

Yet, the implemented BI-business processes were effective and significantly improved the decision making, leading to a demonstrable competitive advantage. Some of these streams were taken over by the IT-department and an official project for their implementation was established. This success increased the awareness of the information unit and its expertise and, little by little, gave the unit a slightly increased degree of freedom to operate independently. At the same time, the amount of internal and external rich data continued to increase, along with organisational IT capacity for data analysis.

*Action planning.* The BI champion did not want to give up his vision now. Many business processes still needed to be transformed into BI-processes and the link between information and strategy was missing. The mind-set had to be changed from silo thinking to optimizing the whole throughout the organisation. It became clear that understanding is the key to success when competing with quality and service, instead of price only. Information must have an impact on the whole organisation and also on the business models. In addition to what customers did buy, the organisation developed its ability to know what they did not buy. The benefits of the implemented BI-processes were evident, so they could be used as references and the business people involved as messengers in promoting the change. Yet, new sponsors among the top management and new partners among operational and middle managers in the business units were a necessary prerequisite for promoting the change. Eventually the original Excel and Visual Basic based tools went out of use and there was a time when all decisions based mostly on experience, not information.

*Action taking.* The BI champion continued to actively propagate BI-thinking. He gave presentations on BI, management by information, and the framework both internally and externally, participated in conferences, and was actively involved in BI-related social networks. Finally in 2007, he managed to convince the top management of the importance of management by information and of the strategic significance of information gained from rich data. Official contacts with the top management were established and the pilot again had sponsors. The BI champion also established close contacts with two members of the executive group who acted as his mentors.

BI-processes for new business streams were continuously developed and implemented. Little by little, BI mind-set became an essential part of every operation and decision making. The contradiction between IT and BI vanished and now they support each other and work in close cooperation, striving towards the common goal of the organisation being the number one in the retail market in all fields of its operation.

*Evaluating.* In 2010, after almost ten years of development, the BI environment reached a mature stage. The information unit reached an established position at the highest level of the company hierarchy in the business domain. Thus, the information unit now has direct official contacts with the top management and actively participates in the strategy processes. It is the biggest unit of its department and still growing. The BI-champion is now a director and a member of the executive group. The unit operates throughout all the business lines, independent from them or the IT-

department. It acts as an internal consultant towards the business units and towards the IT-department in the fields of its expertise. Information experts have a licence to provoke and challenge as their ability to scan everything is generally known and acknowledged. The pilot organisation is still used when necessary to develop and show how things could be if information were used more efficiently in management and it would be linked to strategy.

*Reflecting (specifying learning).* BI must be an essential and self-evident part of each and every business function. The whole organisation from operational to strategic level must adopt the BI mindset. When information is embedded in the business processes, there is no need for separate tools for the business people. The information unit must be independent but close to both business and IT and high enough in the organisational hierarchy to have the authority needed to operate throughout the organisation. The contradiction between BI and IT should be replaced by close cooperation and acknowledging the expertise of both parties.

## 5 Discussion

This research aimed to explore how the role of BI has evolved within this context and how this evolution has affected two transformational aspects of BI, namely its ability to transform (i) the nature of human work and (ii) the organisational approach to strategy development, as well as their mutual relationship. A decade long transformational journey of a very complex retail organisation from its initial “home-made” BI applications into a BI-based organisation applying management by information was described as two AR cycles. They clearly illustrate a gradual evolution of the role of BI in the case organisation and its effects on the two transformational aspects as summarized in Table 1.

<b>Role of BI / Transformational effect on</b>	<b>Tool (AR cycle 1)</b>	<b>Innovation enabler (moving from AR cycle 1 to 2)</b>	<b>Strategic transformer (AR cycle 2)</b>
<b>Human work</b>	-BI use was mandated -No transformational effects could be observed	-Transformational effects started to emerge -Evidence: Propagation of small scale BI-innovation from the shadow community to the key influencers (middle managers)	-Strong transformational effect: wide-spread adoption of BI thinking -Evidence: BI-enabled innovations spread throughout the organisation, even without the influence of the shadow BI group
<b>Strategy</b>	-Non existent transformational effect: organisational use of BI applications had no effect on strategy	-Non-existent transformational effect: the shadow community started small-scale innovation of key business processes	-Strong transformational effect: demonstrated through design of new conceptual frameworks, BI unit’s higher organisational position and participation in strategy process

Table 1. Transformational effects along the AR phases

The role of BI has changed in three phases from a necessary but mandated tool through becoming an enabler for innovation to a strategic transformer.

### 5.1 Phase 1: BI as a tool (AR cycle 1)

Although the importance of information was acknowledged, the SAP BW project was mainly about replacing old-fashioned tools. Thus, BI was seen as a tool with no strategic importance. The use of the SAP BW tools was mandated by the IT department, but they were seen as complex and difficult to

use. Hence, there was no impact on changing the work practices. However, the seed for learning was already there, since the BI-expert and the IT-specialist were exploring the possibilities that the BI technology could provide.

## **5.2 Phase 2: BI as innovation enabler (moving from AR cycle 1 to 2)**

As the shadow community emerged and the BI enthusiasts kept looking for possibilities for improving practices through BI, they started individual unofficial development projects to experiment their ideas. These pioneers became boundary spanners who reached beyond the shadow community. They were gradually able to convince the middle managers of the key business processes about the benefits of BI through showing them the advantages and innovation potential of BI. A key factor here is the ease of use of the more mature BI applications that paved the path for their more wide-spread use. BI started to have a transformational impact on human work. Innovating through BI became a part of work practices. Thus, individual mental models were transformed (individual double loop learning) (Kim, 1993).

## **5.3 Phase 3: BI as strategic transformer (AR cycle 2)**

As the BI-expert continued to propagate the “BI thinking” throughout the organisation, he was able to convince the top management about the advantages of BI and management by information. The obvious benefits of the implemented BI solutions could be used as references. More importantly, the BI-expert communicated his framework about the strategic importance of BI throughout the organisation. Once the new mental model of the strategic importance of BI became the shared mental model in the organisation (organisational double loop learning) (Kim, 1993), the information unit received a significant position in the organisational hierarchy and a central role in the strategy development process. Now BI is seen as a strategic transformer and the strategy development process itself has been transformed.

## **5.4 Lessons learnt**

The role of the emerging shadow BI community was paramount in propagating the BI-thinking in the organisation through demonstrated outcomes. Moreover, the “first victories” for the BI-community realized through influencing other organisational members by showing them more effective BI-enabled practices. Thus, the mental models (perceptions of BI’s value) of individuals changed through convincing through action. The major breakthrough for BI took place, however, only after the top management was convinced about its usefulness. This, in turn, started to influence the approach for strategy development to better leverage organisation-wide BI-enabled innovation. This required developing conceptual frameworks and active promotion of BI throughout the organisation by the BI-expert. Moreover, the ease of use of the BI tools contributed to realizing the capabilities of BI, since end-users were easily able to experiment and demonstrate improved BI-enabled practices. Finally, as the BI shadow community focused on business process improvements, it was easy to demonstrate the business value of BI.

The lessons learnt can be summarised as follows:

1. Role of the shadow BI community was paramount in propagating BI thinking. This role was assumed through leadership rather than formal organisational positions.
2. Gradual development of shared mental models (Kim, 1993) through BI-enabled small scale innovations and sharing of outcomes was the key to disseminating BI-thinking among organisational members.
3. Easy to use BI-tools were critical, as they enabled users to innovate themselves through experiential learning (Kim, 1993).
4. Focusing on business process improvements helped to demonstrate the business value of BI.

5. Organisational double loop learning (Argyris and Schon, 1978), changing norms and influencing behaviour, required developing and using conceptual BI-frameworks that became pragmatic boundary objects (Carlile, 2004).
6. Phase 2, BI as innovation enabler, was necessary for the organisational members to become ready to accept new frameworks as pragmatic boundary objects, as defined by Carlile (2004), so that they can jointly transform their knowledge and consequently their practices.

The lessons learnt above show the complexity of organisational transformation and that it cannot happen overnight. Organisational members needed time not only to adapt to change, but also to create this change themselves through leadership and BI-enabled innovation.

## 6 Conclusions

In the present paper we have described a long evolution of a retail organisation from home-made BI to a mature BI-based organisation managed by information. The change was initialised by a BI-expert who championed the transformation process over a period of ten years. The active community of BI-enthusiasts that emerged was paramount to experimental learning and for propagating the BI-ideology throughout the organisation.

Two interesting theoretical observations can be made. First, the case organisation took a “specialized path” towards a transformed organisation by developing deep analytics expertise within a specific unit and lines of business (Kiron et al., 2011). Second, a mature BI-based organisation facilitates the interaction between BI and organisational strategy, which can be considered an additional management capability (Bertram, 2010).

Practitioners should find the role of the shadow BI-community in the transformation process interesting. Often these types of communities-of-practice may be found as “deviant” by the organisation. Yet, it is important to realise the creative power that these communities may have. Harnessing this creativity could be a key competitive advantage for modern organisations. The shadow type unofficial organisation has an important role for pushing the change especially in the companies where the organisational culture does not fully support BI - based management and change.

There are some limitations to this study. First, the results may not be widely generalised since we examined only one case organisation. However, the issues considered, such as the importance of top management support and developing and using pragmatic boundary objects, are likely to be relevant in other cases of transformed organisations as defined by Lavallo et al. (2011). Second, our study was conducted in the European setting and it would be interesting to see whether different results could be reached in different settings, for example, in Asia. Finally, in the future the role that the BI-unit plays in organisational decision making could be investigated in more detail. The innovative capability of the BI-community would be another interesting avenue for future research.

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