Improving the Company's IQ: How to Use Intelligence as a Paradigm for Designing Business Processes

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- how to use intelligence as a paradigm for designing business processes

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ABSTRACT
In their struggle for operational excellence, global companies face challenges in finding a common denominator to streamline and align operations across the divisions and supply chains. They face a dilemma of allowing local flexibility to adjust to the varying market requirements versus central coordination needed to achieve business synergies. We approach this problem by suggesting a design framework based on the paradigm of intelligence.

The framework outlines four interrelated perspectives: build, execute, learn and innovate. We argue that when combined, these perspectives can enable effective business processes and help establish an efficient IT engagement model. We apply the framework to a case company, which leads to a set of design principles.

Methodologically the article is based on the design science research paradigm, embedded in systems thinking. It is based on a theoretical discussion across several streams of research including psychology, pedagogy, artificial intelligence, learning models and business process management.

Keywords
BPM, intelligence, intelligent processes, process design

INTRODUCTION
The impact of Information Technologies on business transformation has been widely discussed both, by researchers and practitioners. Starting with optimization and efficiency gains, through process redesign, the interest has now switched to IT-enabled strategizing. This aspect is especially important in multinational companies, which after years of developing local solutions often find themselves having a large number of legacy systems with a low degree of interconnectedness. This hinders coordination and is in a strong opposition to the need for streamlining operations stretching across increasingly global and complex value streams.

An approach developed to overcome this issue is Business Process Management (BPM). It is often perceived as bridge-building between business and IT (Al-Mashari, 2006). Nevertheless companies find themselves struggling to use this approach design-wise. In other words they lack process design principles to translating the corporate visions and strategies into business processes and the platform for executing the processes. Such principles are necessary to help them streamline the corporate and locally-enabled business process design and execution.

In this paper we propose a unified design framework that serves this purpose. We justify the framework by investigating the case of BPM in a Denmark-based multinational company. The goal is to assist the company in reshaping its approach to BPM. The purpose of the design framework is to serve as guiding principles to be used for re-thinking the company’s IT-engagement model. (Ross, Weill and Robertson, 2006)

We use the concept of intelligence as analogy and inspiration to develop the design framework for what we call intelligent business processes. As opposed to process intelligence, which focuses on deriving and leveraging process event-enabled data for decision-making, we take a broader approach. In addition to multi-level process-execution we discuss the design principles shaping a corporate process landscape.

To fulfill this objective we first analyze and frame the concept of intelligence – both from the social sciences’ and systems’ point view. By doing so, we catalyze a set of properties which have contributed to the success of living and artificial intelligent entities. We then use them as constructs to outline the model consisting of four interrelated perspectives on intelligent process design. Each of the perspectives is illustrated by a real life business case. Finally, we justify the framework by applying it to the focal company to come up with a set of design guidelines formulating an intelligent business process strategy.
These design guidelines can be seen as propositions to be validated in the future during the implementation of BPM in the focal case company. The key concern and contribution of this study is the design framework. The context of the study is an action research program in the focal company, but the methodology applied has been based in the design science research paradigm (Järvinen, 2007).

**THE NOTION OF INTELLIGENCE**

The notion of intelligence has received a lot of attention from researchers in the fields of biology, psychology, computer science, theology, astronomy and philosophy. Recently it has also been used in the various fields of business and management literature in contexts such as intelligent manufacturing, intelligent negotiations, intelligent management systems or intelligent supply chains. There is however a high level of ambiguity as to what intelligence relates to in these particular cases because it is often treated as axiomatic.

In contemporary everyday English language it is possible to identify at least three meanings of the concept. Intelligence can pertain to information concerning an enemy or an area, especially in military and political contexts. Sometimes it is also referred to as the organization collecting such information. Finally, intelligence can mean a set of properties of mind of humans and other beings (Collective, 2008). This latter meaning defines our understanding of the word in this article. This set of properties is outlined to include learning from experience, adapting to new situations, understanding and handling of abstract concepts and using knowledge to manipulate one’s environment. (Collective, 2008)

The notion of knowledge is central to much of the research devoted to intelligence. For example (Lohman, 1993) indicates that any entity, in order to be able to be called intelligent, must possess the ability to acquire knowledge which in turn requires that it is capable of acquiring inputs from the environment. This link does not have to be permanent, nonetheless it is not possible to talk of an intelligent being if it is fully contained within itself.

Input reception is however not sufficient to be called knowledge acquisition, due to the differences between the notions of inputs as data (raw, no meaning associated) and knowledge (processed, meaningful). (Hinton, 2006) Within intelligence, the inputs are put in a context, filtered for usefulness and reflected upon (Ackoff, 1989).

This issue is addressed by (Perkins, Jay and Tishman, 1993) who argue that accumulated knowledge and experience in different areas serve as a reference for the collected inputs. Similarly (Flynn, 2007) in what he calls a pre-theory concept of intelligence states that knowledge, information and memory are important factors when looking at intelligence of individuals.

The reflective or processing component is also well recognized in research on intelligence. (Flynn, 2007) writes about speed of information processing. (Sternberg, 1988, 1997) defines three main intelligence sub-theories, with componential intelligence being one of them. He coins this term to describe the ability to process information effectively, which includes meta cognitive, executive, performance, and knowledge-acquisition components that help to steer cognitive processes. If this is viewed from a functional angle, the concept of reflective intelligence means tackling problems, learning, and approaching intellectually challenging tasks. (Gardner, 1993; Perkins, 1995; Sternberg, 1988)

Other research highlights the interactive properties of intelligence, including interactions with the environment. Acquiring inputs from the environment should be supplemented by the ability to take an active role in interacting with it. This means that an intelligent entity produces outputs, which according to (Binet and Simon, 1905; Drever, 1952; Sternberg, 1988, 1997), take the form of shaping the environment depending on its needs or on adapting itself to it.

Many authors suggest novelty as an important property of intelligence. It can manifest through the ability to deal with novel situations or thinking in novel ways (Sternberg, 1988, 1997), to provide on-the-spot solutions to problems never encountered before (Flynn, 2007) and the capacity to meet novel situations, or to learn to do so, by new adaptive responses (Drever, 1952). Novelty means that an intelligent being not only solves a limited number of problems which can be foreseen or pre-programmed, but is able to process the knowledge at a higher level of abstraction in order to find more general patterns and thus address a problem which it never encountered before. This way it can not only modify its modus operandi but also the pre-assumptions and goals that lay foundations for it.

Many scholars build a direct link between intelligence and learning (Neisser et al, 1996, Gottfredson, 1997, Colvin in Sternberg, 2000, Drever, 1952, Poole et al., 1998, Vossin Goertzel et al, 2005). This relationship can be attributed to the understanding of intelligence through linking its properties to form a process. Capturing inputs can be viewed as a starting point of the process. Bits of data are acquired by the sensors in order to be stored for further reference. Once a sufficient amount of information has been accumulated, it can be processed in order to choose the apt course of action. It is then executed via the self-adaptation mechanisms or through interacting with the environment. This view is similar to the experiential learning concept, such as proposed by (Kolb, 1984) and (Juch, 1983).
For that reason we believe that an entity is intelligent if it possesses the capabilities to accumulate experiences absorbed from interacting with the environment and leverage them through learning loops in order to develop a course of action which maximizes its chances of success. This action can take place through interacting with the environment or adaptive self-redesigning.

**Intelligence as a system**

Based on the above considerations it is possible to derive a set of components, properties and relationships to present a systems view of intelligence. This is somewhat similar to the Artificial Intelligence (AI) approach, however the distinguishing factor is that it focuses on the area of organizational sciences rather than engineering, especially robotics, software creation etc. For comparison with the AI research, references primarily to (Albus, 1991) and (Albus and Rippey, 1994) are made.

Intelligent entities can be viewed as consisting of intelligent and non-intelligent sub-systems. The former is where the intelligence is localized and the latter where it is sustained (e.g. through executing decisions, providing resources). The system possesses the ability to gather inputs, which come both, from the environment, as well as from the system itself. (Albus, 1991) calls this the sensory component.

The inputs are later stored, and through their accumulation *experience* emerges. In (Albus, 1991) terms it is facilitated by the so called world model component. According to the same author intelligence of a system is positively correlated with the amount and quality of information stored (Albus et al., 1994).

Another key component of intelligence is the *reflective function*. This means that a system is intelligent when it does not put up a reaction to the received inputs, but also includes a decision-making activity (*sense-decide-react* rather than *sense-react*) (Albus et al., 1994; Berg-Cross, 2002; Meystel, 2001). Data is put in *context* and through complex *processing* meanings are derived from it. The complexity means that *patterns* and *relationships* can be identified at a high abstraction level, allowing tackling problems never encountered before and/or developing *novel solutions*.

These solutions can be used both, to *interact* with the environment or *adapt* to it. In other words, the system decides the best strategy in a given situation, which can be proactively affecting the surroundings (reshape) or conforming/adapting. In the latter case the solution is applied to the system itself to reorganize its way of operating. This view is supported by (Meystel, 2001), who in their suggested intelligence design include a process of recording the encountered experiences and deriving from them a new set of rules determining how the intelligent system acts under new circumstances.

An intelligent system however considers the results of its actions in its further operation. Therefore it tracks the impact of the decisions on the environment and itself. The *feedback loops* through which the system *learns* from its previous actions are an important factor for intelligent performance. The quicker the loops are, the more real-time the learning, processing and readjustments become and thus the more intelligent the system is.

Summarizing the above considerations, an intelligent system is one which is capable of maximizing the chances of successful outcome of its actions. It is agile as it constantly reviews and redefines its goals and the ways of achieving them in response to the developments in the environment. In order to respond promptly to both, events and trends it requires visibility over both. It is triggered by real-time event recording and storing as well as access to an aggregated experience base. This combination allows making decisions to tackle problems encountered for the first time. Since an intelligent system is constantly exposed to the stimuli, it functions by means of feedback loops to continuously adapt and leverage its previous experiences.

It is apparent that there is a certain misfit between the general intelligence concept in psychological and AI research. The latter focuses on real-time functioning of an intelligent system and actions it takes to fulfill an objective. There are however very few if any explicit considerations about redefining the premises based on which the action is carried out. This is in contrast to the psychological intelligence research which emphasizes novelty as means of redefining the principles and goals for the actions, leading to the overall success of the entity. We claim that this meta-level thinking is an important feature of the intelligence paradigm and cannot be omitted.

**DEVELOPING THE DESIGN FRAMEWORK**

With the above criteria in mind we now set out to apply the concept of intelligence to business processes. We use them to outline four perspectives of the business process design framework, as well as for detailed discussions of each of them.

Design of new processes is a complex task. It triggers business transformation and change has always been a challenge for organizations. However, intelligence requires incorporating change into the organizational paradigm through constant redefining and adapting of the business. We argue that the existing processes and IT infrastructure can support and not hurdle...
the intelligent dynamism if they are built in the right manner. Building infrastructure as a pre-requisite for intelligence is therefore the first design framework perspective.

In the earlier sections we argue that intelligence is action-oriented. An intelligent entity is able to act in a way which maximizes its chances of success in a given setting. This does not necessarily mean that the action leads to success in a particular situation, but that based on the available information the chances of a desired outcome are highest.

The outcome-orientation is similar in nature to business processes. (Davenport, 1993) defines processes as orderings of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs. He calls this a structure for action. This definition does not consider the decide part as in the sense-decide-react triplet. When that element is added to a business process, we refer to this situation as intelligent execution. It constitutes the second perspective of the intelligent process design framework.

The goal structure of intelligent entities is multi-leveled: in order to fulfill a strategic objective it has to complete several sub-objectives, which in turn can be decomposed even further. Similarly, corporate processes are analyzed on various organizational levels – spanning from strategic processes, outlining corporate business models, to workflows of particular departments or even members of the organization. A challenge lies in aligning the process structure. Ideally, the sum total of the low-level process outcomes is the desired outcome of the strategic process.

Therefore if process execution contains the elements necessary for describing it as intelligent, on a meta-level it is a react without the sense and decide parts. Meta-level sensing enhances the company’s experience base allowing it to decide which executive capabilities to develop. The intrinsic dynamics of an intelligent system pose the requirement of quick and apt learning of capabilities driven by the changes in the environment.

In the general discussion we argue that intelligent entities are able to deal with novel situations and come up with novel solutions. They do this by thinking in abstract ways and applying patterns from known situations to the ones they currently face. Companies also have to both, deal with new situations and come up with new solutions in order to stay in the market. Some authors claim that their success depends on its ability to out-innovate the competitors (Hammer, 2003).

In the common way of creating solutions – whether they are products, services or processes – requirement specification needs to be in place before development can begin. Such approach has two weaknesses: the growing complexity of business prolongs the time of development, while at the same time the changes in the environment accelerate. This creates the possibility that solutions are already outdated at the time of the release. Our claim is that intelligence can be used to overcome these weaknesses by incrementally aligning the innovation pace with requirements of the environment. This lays foundations for the fourth perspective of the design framework.

These four interrelated perspectives, build, execute, learn and innovate presented in the figure below, constitute our framework for intelligent processes. Each of them will now be discussed in detail.
Build infrastructure

The first perspective we propose in intelligence thinking is the build perspective. It encompasses a set of design prerogatives for enabling intelligent processes creation.

One of the most important ones is adaptability. Constant learning and innovation require agility to cope and adapt to the changing environment. Organizationally, business processes are a set of routines which require certain competences from people and a proper set-up of IT systems. Establishing new processes inevitably leads to political resistance and requires training programs or complex system roll-out projects. This inflexibility poses a challenge to the intelligence driven dynamics.

On the other hand, full flexibility enabled by delegating decisions to anyone with a need to adapt would lead to corporate anarchy and decay. No business can run without coordination mechanisms. Hence, a key question arises of how to draw a line between what should be built to change and what should be built to last.

In their book Ross et al. (2006) propose a concept of foundation for execution. They argue that a company should define its core processes, standardize them and create a supporting IT infrastructure. At the same time, an operating model representing a vision of how the company will operate in the future should be a managerial focal point.

Toyota works in a similar way. The organizational learning principle of “The Toyota Way” states that when a problem has been successfully identified and fixed, the solution should be standardized. By doing this the company can reap the benefits while focusing on exploring new improvement areas (Liker, 2004).

Unable to foresee the future and prepare for it in advance companies should redefine the role of strategy. Instead of using it to plan, segment and target markets, they should turn it into a tool to constantly reshape and readapt the organizational goals. Haechel (1999) argues that strategy be used for an adaptive business design enforcing a sense and respond loop rather than a particular way of acting.

Dell, a leading PC-manufacturer is an example of a company who did not sustain the competitive advantage its innovativeness once earned it. When it redesigned its business model in the 1990s, enabling end-consumers to configure online the PC they wanted, it became a number one player for years to come (Dell, 1998). However, the company failed to recognize the long-term developments in its surroundings. Customers began to see computers as commodities; they did not want to spend time researching the parameters to configure the products themselves. Dell’s reliance on its business model prevented the company from incrementally adapting to the changes. Eventually, Dell lost its market leader position. After all the company has rethought its approach and developed alternative sales channels, however if its business model had emphasized change and adaptation, it is possible that the necessary steps would have been taken earlier.
### Execute processes

Process execution is the short-term, real-time perspective in the intelligent process design framework. It is the actual action, with a direct business output to the organization. In order for this action to be intelligent, several requirements have to be met:

- **A source of inputs.** The more high-quality inputs, the more intelligent the action.
- **Input accumulation.** The ability to discover patterns enables intelligent decision-making.
- **Processing.** The actual decision-making.
- **A channel for outputs.** The possibility to take action which depends on the inputs.
- **Feedback loop.** Tracking the results of the actions.

The feedback is a crucial element for intelligent process execution. An intelligent process can only maximize its rate of success if it minimizes execution errors. Thanks to the analysis of its actions it is able to see what has had a positive or negative output and react accordingly. The inputs reinforce the knowledge base, facilitating the creation of the process’ output, materialized through action.

This model is similar to several other cycle-based models, such as the “Observe-Orient-Decide-Act” (OODA) loop (Boyd, 1987) and the situational awareness model (Endsley, 1995). The former is a model developed by an American military strategist J. Boyd, to facilitate adaptive decision-making in combat operation processes and the latter is a general model enabling the understanding of the environment in order to project the developments in the near future. Both models emphasize attaining the full picture of the current situation in order to maximize the outputs of the decision process. Boyd’s OODA loop also distinguishes between the inputs depending on the previous actions and those independent of them. Both models include a feedback mechanism to analyze the unfolding events and adapt.

The nature of the feedback loop is similar to the previously mentioned experiential learning models by (Kolb, 1984) and (Juch, 1983), which emphasize leveraging on experiences in order to derive knowledge. Execution is therefore a learning process, which based on experience is able to take action to maximize the expected outcome. The learning is however of a different type than the learning perspective of the intelligent process framework. Using Argyris and Schön’s classification, execution is a single-loop learning process where actions are modified according to the difference between expected and obtained outcomes, whereas in double-loop learning the values, assumptions and policies that led to the actions are being questioned (Argyris and Schön, 1978).

In this context, an interesting concept is proposed by (Castellanos, Sacca and Weijters, 2006). They argue that by working with process event data in a proper way the information base for decision-making can be considerably enhanced. They specify a number of potential applications of business process intelligence (BPI), which, among others, include exception handling, prediction and dynamic optimization. Their claim is that through prompt and real-time process event data analysis, business processes can predict the near future, handle unforeseen developments or modify their sequence of action based on the unfolding events.

A good example of how execution is realized in practice is the Spanish apparel company called Zara. It is one of the most successful companies of its kind in spite of using processes which are far from industry standard and at first sight seem counter-productive. (Ferdows, Lewis and Machuca, 2004)

Zara has full visibility over the shelves, goods in transport and sales in particular shops by using the widely-available barcode and point-of-sale technologies. In order to complement the data with tacit knowledge, each store manager has been supplied with a handheld device to be able to communicate with the headquarters. This way the company has developed an information base for prompt decision making.

At the same time, by locating the manufacturing in Europe, frequent use of air-freight, and placing design and manufacturing in physical proximity, Zara has been able to reduce lead-times and thus the design-produce-supply cycle.

This has enabled the company to manufacture in small batches and high varieties. Each design is tried by customers, then through quick feedback-loops the information is transmitted to the headquarters. There it is processed so that the company knows which features sell and which do not. This information is used almost instantly to create new designs based on customer preferences. The outcome of the design process is therefore dependent on the constant influx of data from the stores and discovery of market patterns. (Ferdows et al., 2004)
Learn capabilities

As we mention earlier, the execution perspective of intelligence incorporates learning. A process increases its chances of success through accumulation of experiences which enable appropriate actions. These actions are based on the well-defined output and constraints of the processes, attributed during the construction stage.

Nevertheless, taking the meta-level intelligence perspective, these static outputs and constraints of processes hinder adaptiveness on the organizational level. In other words, a process might be executed in an intelligent way but its output might no longer be valuable or relevant in an evolved context. For that reason a learning perspective on a meta-level is necessary, to constantly rethink and redesign the premises based on which the processes are executed.

The difference between the execution-oriented single-loop learning and the strategy-oriented double-loop learning is that the latter is much more trend and pattern-oriented, whereas the former is event based. Reacting to events only can lead to missing out important long-term developments and thus failing to recognize the root cause of the faced challenges. (Senge, 2006) calls this “fixation on events”.

The learning perspective on intelligence can therefore be compared to a ladder, where a company only knows the current step and the direction in which it is heading. The next step depends on leveraging the capabilities acquired on the previous one and on the developments which took place in the environment.

An example of an intelligent learning is the Toyota case and its long-term development of production system. Pushed by post-WW2 resource and technology scarcity and facing the market economy reality the company had to develop a business philosophy which would be appropriate to these conditions. Some authors claim that the Buddhist thinking was a cultural catalyst directing Toyota towards continuous business process improvements. (Snabe, Rosenberg, Møller and Scavillo, 2009)

Based on the principles of long-term thinking and finding root-causes of problems, the company developed a philosophy known as the “Toyota way”. It includes concepts such as hansei – continuous reflection to review and rethink the processes and kaizen – continuous improvements. Together they trigger a learning process which has no end – reaching an organizational development goal opens up the possibility to identify new directions of improvement. (Hino, 2006)

Innovate and evolve

Zara, used to illustrate intelligent process execution, is also a good example of the innovation perspective on intelligent processes. Using the concept of (Amabile, 1996) it is creative by being able to generate many new ideas (designs) and innovative by facilitating their successful market introductions.

The size and diversity of a company increase the number of innovative ideas it generates, but create a hostile ground for them to grow. Endless approvals, estimates, plans and organizational levels to seek acceptance at can let the steam out of many initiatives. To keep pace with the rapidly changing requirements companies must be able to generate ideas and bring them to life, circumventing the traditional planning and development cycle.

The ability of intelligent beings to abstract, derive patterns and apply them in other situations greatly expands the experience base they can use to solve a given problem. In organizations the way to circumvent the planning and development cycle to enhance the experience base is thoughtful experimentation. The case of Zara illustrates experimental innovation with products, but this pattern also applies to services, processes and business models. Experimentation allows seeing what works and what does not instead of trying to predict that.

To be able to utilize the intelligence-based approach and utilize experiences companies must be willing to commit to ideas based on only limited screening. In order to mitigate the risk associated with it the ideas ought to be local and scalable so that the implementation is driven by experiences as they are gathered. Ideally, these experiences come from enabling users and customers to contribute to the development of the product or service by means of a feedback-loop. This involvement is often viewed as the most important and most beneficial source of innovation (von Hippel, 1988).

The two key methods of intelligent innovation are therefore experimentation and continuous response. In simple terms, these methods can be laid out in the following way: try it, learn from it and then scale it up, modify it or shut it down. This requires uninterrupted contact to the source of evolving requirements and proper, adaptive response.

An example of intelligent innovation is Google Labs, an idea incubator of Google Inc. The company constantly develops new functionalities for the Internet users to complement its search service. For that purpose it has developed a set of methods to facilitate the process.

One of them is the creation of an organizational environment which fosters creativity. Google realizes that through its HR strategy. The company hires people who are passionate about a particular area and allows them to spend 20% of their time
developing ideas which they believe might benefit the company. The creativity is leveraged by a high degree of independence, as one Google manager is claimed to have as many as 160 direct reports. (Hamel, 2006)

The ideas which seem to be most promising are then transformed into projects on the Google Labs website. At this stage the initial draft versions of Google’s services are made available to the users. The company is then able to analyze the usage patterns, collect feedback and based on this – develop the project further. Sometimes a long time passes before a project has evolved sufficiently to receive the status of a Google Labs graduate and become a part of the company’s regular service offering (Hamel, 2006). This adaptive, incremental innovation, driven by the users’ suggestions and reactions to them, is the essence of the innovation perspective of the framework.

INSIGHTS FROM REAL WORLD APPLICATION

In the beginning of this article we set on a journey to propose an intelligence-inspired approach to business process design. The underlying goal was to come up with a set of principles which can assist managers of a specific company to redefine their BPM approach. We enclosed those principles in four interrelated perspectives: build infrastructure, execute processes, learn capabilities and finally innovate and evolve.

We now justify this framework by utilizing it to come up with a set of recommendations. These recommendations are an instantiation of the framework applied to the case company and therefore are not general. Nevertheless, they fulfill the goal of illustrating the usefulness of the framework and the nature of inputs to the company it is capable of providing.

Our recommendations start at the strategy level. As intelligence is action-oriented, we believe that the company needs to commit itself to changing its corporate culture from functional thinking to a process approach. This is a pre-requisite for enabling business agility and following the market trends. Today the company’s primary strategic focus is the ways of doing business in particular markets. We recommend that it shifts towards intensifying the overall effort to sense changes in the environment and facilitate business-enabled adaptation.

Strategic sensing means updating the corporate goals to adjust to the changing environment. This requires rethinking the managerial culture in the company. The technocratic approach focusing on short-term KPI’s, daily performance metrics and business operations handling should give way to identification of opportunities and potential areas of development.

For that purpose the company might want to rework its standard project approach model. In order for change to be continuous and aligned with requirements, approvals and red tape have to be reduced. Instead of trying to get everything right the first time, the focus should be put on designing for scalability and changeability. This approach is risky in a way that some of the launched ideas can fail, but the failure is local, and therefore less costly than a full-scale project that ended up wrong.

We suggest that this approach be first applied to the product development process. It should focus on constant improvements to the existing product portfolio, rather than scrutinized, resource- and time-consuming process of idea verification and approvals, only potentially leading to the launch of a product development project.

The IT organization is the second area where this approach can be beneficial. Instead of having one right way of doing things it should focus on enabling business. The current focus on conformity assurance and standardization though imposing processes should give way to creating a platform which business can use to execute and adapt its own processes. The role of infrastructure should be to create visibility for intelligent processes execution.

In order to create a true platform for execution, the business has to be detached from the discussion of what is and what is not compatible with the bulky ERP system. We recommend a two-step IT solution deployment approach. For experimentation and development, the IT organization together with the business co-develops a simple and flexible solution, regardless of the corporate infrastructural standards. When he customers and the business are satisfied with the functionalities, the IT organization migrates it into the enterprise information architecture framework. Once the process is automated and streamlined, new business ideas and initiatives can be tried and validated.

Another area in which the IT organization can rethink its role is the diffusion of innovation. Business and the customers are an important source of new ideas, but also the technological environment changes and new solutions become available all the time. Apart from focusing on events (requests from the business) the IT organization can monitor the technological developments and address business with process ideas enabled by those developments. IT innovation might also be streamlined with the suggested experimental project approach, in which members of the organization gain experience with solutions in order to be able to assess their appropriateness.

To summarize our recommendations, the three most important areas of change triggered by the intelligent process design framework in the focal company are the following:


• **Rethink the role of strategy** – strategy should be used as a driver for change and not as a plan. It should reflect the four perspectives on intelligence in order to assure completeness of the approach.

• **Reformulate the role of the IT organization** – IT should focus on leveraging business value. The IT infrastructure conformity issues should be kept away from the business and a set of competences for quick and flexible experimentation should be developed. The IT organization should scan for new technological developments in order to evaluate and diffuse them using the experimental project model.

• **Develop a new project methodology** – distribute resources away from verification, planning and approvals and allocate them to small-scale experiments with the possibility to constantly learn and grow them in the desired direction. Priority areas of application are product development and the IT organization.

**CONCLUSION**

In this paper we propose a framework for process design. We highlight four perspectives that impact the BPM approach application. We believe that these perspectives are distinct, yet have many complex interdependencies. Mapping the logic of those interdependencies, whether sequence- or scope-wise is a topic of another research project.

The logic of the framework is embedded in systems thinking. We have presented an example of a company excelling at one perspective but failing at others. Such a situation led to the deterioration of its market position. Therefore any design task in which the framework is considered should focus not on the perspectives separately but on the interplay between them.

The article is as part of an action research in the focal company. This project-based approach takes the premise of a deep involvement in the studied business environment. The intelligent process design framework will be used as a high-level evaluation schema, bringing an overall business design perspective to the locally-scoped projects.

In this sense the company can benefit from gaining momentum for change directed towards a more process-oriented thinking with a set of design guidelines in hand. Methodologically such an approach is interesting as a way of building bridges between academia and business. Theory catalyzed through design thinking has a relatively high diffusion potential through action research projects in a company.

Through applying the framework to the case company we have shown the importance of adjusting the corporate IT engagement model. The four perspectives if utilized as guidelines both for business and IT can help form a competence alignment, narrowing the gap between the two areas. We see this as an interesting topic to explore in future research.

A way this can be done is a multiple study with two cases as data sources. One of them is an implementation project based on the traditional project method, whereas the other is inspired by the intelligent process design thinking. The expected outcome of this approach is a pragmatic discussion of the effect, pitfalls and methodologies for deploying the intelligent process design in a corporate setting. At the same time, the theoretical hypotheses proposed in the framework can be tested and verified.

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