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Innovative Business Process Design

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By Richard Veryard

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Independent Guidance *for* Service Architecture and Engineering

Best Practice Report: Innovative Business Process Design

Going beyond basic process modeling for enhanced customer experience

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We explore examples of how complexity can be managed and show how to give the organization more power to operate effectively in a complex demand environment.

Introduction

As transaction-oriented IT becomes increasingly commoditized and virtualized, any competitive advantage from IT must come from its support for business innovation and organizational intelligence. In this article, we shall explore how business improvement in today's world demands innovative business process design.

Strategic Advantage and Differentiation

There are two important differentiation questions for any organization with critical relationship with external stakeholders (such as customers): how do They differentiate Us, and how do We differentiate Them.

Firstly how do They differentiate Us. In other words what differences in our products and services or organization are (a) going to be noticed by external stakeholders such as customers and (b) going to affect the behaviour and attitudes of these stakeholders.

Sophisticated marketing organizations pay a lot of attention to this kind of thing. Does it make a difference if we put this in a blue envelope? Does it make a difference if we have a female voice here? Sometimes you have to experiment with differences that don't matter, in order to have a refined view of what differences do matter. So intelligence involves an important feedback loop through Decisions and Learning.

Secondly, how do We differentiate Them. What are the strong signals in the environment that we must respond to, and what are the weak signals we might respond to? An organization that responded to every weak signal would be impossibly unstable, so most organizations have operational processes that respond to strong signals, and

some form of business intelligence that scans the environment for weak signals and identifies a subset of these signals demanding some kind of response.

Differentiation and Context

The CBDI Forum identified Differentiated Services as a key pattern of advanced SOA as long ago as 2002. We have looked at a number of dimensions of differentiation, including identity, presence and context, and discussed how businesses in such sectors as retail have created value for themselves and their customers by progressive differentiation.

An enterprise may differentiate its customers (and their behavior and intentions) according to a number of factors, with greater or lesser granularity.

- Zero variation. No differentiation between customers. One size fits all.
- Fixed segmentation. The enterprise identifies a number of (fixed) market segments, and assigns each customer to the appropriate segment.
- Dynamic deconstruction. Differentiation based on the detailed actions and inferred intentions and context of customers.

Each degree of differentiation increases the range and scope of supported behaviors, and therefore affects the overall complexity of the process[1]. Under the right conditions, increased differentiation may produce better outcomes for the enterprise and its customers. Under the wrong conditions, differentiation merely adds complication, increases cost and risk, and may produce worse outcomes.

From a business process design point of view, we are searching for different contexts. Understanding the range of contexts is critical for business agility – because each new context introduces some degree of variation (differentiation) that adds value to the process for that context[2].

Business Intelligence and Differentiation

With business intelligence, we have the opportunity to select the most relevant forms of differentiation, based on statistical analysis of characteristic features. In many situations, what the business really wants is to use the past to predict the future. We only want to differentiate customers based on their past buying patterns if this provides a good predictor of their future buying patterns.

When I lived in Central London, I sometimes used to visit a hairdresser on the King's Road in Chelsea, The King's Road is full of hairdressers, and the staff would stand in the street handing out leaflets to likely customers. When I was walking towards my hairdresser, I would walk past several of these touts, but I wouldn't be recognized as a potential customer because I didn't have a smart haircut. After my hair was cut, I would be given loads of leaflets because I then fitted their preconception of what a customer looked like – but of course I didn't then need a second haircut. This is the kind of stupidity trap that many backward looking sales operations fall into – trying to sell lawnmowers to people that already have lawnmowers.

Business intelligence helps us find alternative differentiators. What are the characteristic features of someone who needs a haircut, or might buy a lawnmower? We can then differentiate the services based not on a fixed set of differentiators, but on a current (and periodically updated) set of differentiators, and we constantly review the

predictive power of these differentiators. (This means that the underlying business type model now needs to be constructed at the meta level, with DIFFERENTIATOR and CHARACTERISTIC FEATURE as business types.)

Retail Example – Amazon

In our articles about business modelling, we have described the progressive differentiation that can be observed in certain industries. For example, over the past decade or so, retailers have progressively increased their ability to differentiate customers according to buying history and other contextual information.

The introduction of the loyalty card represented a radical strategic shift for the large retail chains. Stores now had a formal basis for recognizing a customer as the same again. They can identify customers, and collect and analyze data about the behavior of specific customers. And they can use this analysis to differentiate the response to different customers. For example, different customers may receive different special offers.

Obviously if the retailer can identify the customer as she enters the store, then this differentiation can be done as the customer browses, rather than only when the customer comes to pay. This is relatively easy to implement with online shopping (for example through the use of cookies); and there are various mechanisms (smartphone, face-recognition software, RFID) that might achieve the same result in a physical store if the obvious privacy concerns can be allayed.

For example, if there are RFID chips on the goods and RFID scanners on the shelves and in the shopping trolley, then the customer can be presented with information based on the stuff that is already in the shopping basket. This capability is very easy to implement for online shopping, and this stimulates retailers to build an equivalent capability for physical shopping.

The service we get from supermarkets is fairly simple, so perhaps there isn't much scope for variation. But each customer may get a different set of special offers, and this can be generated dynamically, according to the contents of the shopping basket or the path through the store. A customer with a known taste for raw eggs, or a history of returning stale products, may get a warning that a selected product is close to expiry.

Amazon is of course well-known for its pioneering work in providing targeted information and deals based on a customer's browsing and buying history, and creating new forms of associative information which may be reflected back to the customer. But even Amazon could possibly go further in differentiating all aspects of the supply chain, in order to maximize value for the customer and for itself. For example, we recently heard a complaint from an Amazon customer about the delivery process that required the customer to pick-up the parcel after failure to deliver, for an item that was actually small enough to slip through the letter-box. In this particular instance, in other words, Amazon seems to have failed to have built sufficient differentiation into its delivery process. (Perhaps we have higher expectations of companies like Amazon: the appalling lack of differentiation we experience from most other service companies is quite scandalous.[3])

Library Example

Some business people think of differentiation purely in terms of targeted advertising. But it is also important to think of ways that an organization can serve its customers better (not just target them better) through an awareness of their context. This is intrinsic differentiation - in other words, differentiation that is relevant to the service in hand.

Let us consider libraries. A few years ago, my son did a school project on a mathematician of his choice. He chose Florence Nightingale (the inventor of the pie chart). If he had gone into a library for help, would he have been offered a scholarly history of the Crimean War or an academic thesis about mortality statistics and their graphical representation? Maybe that depends whether he talks to a human librarian or uses the computer.

Can a computerized system offer anything approaching the sensitivity and common sense that we still expect from a human librarian? At one extreme, there are standardized search systems, which will give you exactly the same answer whether you are a schoolchild or a BBC researcher or an LSE postgraduate. At the other extreme, there may be inflexible classification systems, which assume that a child is only interested in reading books that are designated suitable for that age group.

One of the most important aspects of context is how the service fits into what the consumer (the customer, the library reader) is trying to do. *Do I have an essay or article or thesis to write, and when is it due? Am I reading Nietzsche because I am learning German, or because I am learning existentialism (or both)? Am I reading Bede because I am studying history or historians (or both)? Does it make sense to read Locke without also reading Hume? What stage of my learning have I reached? Do I need an edition with glossary, with scholarly notes, with English translation facing? What is my preferred style of learning, my preferred style of researching a topic?* Surely questions like these are relevant to improving the service offered by a library to a particular reader?

Ultimately, context-awareness takes us down a path of embracing user diversity. Not just user semantics, but user pragmatics. How much of the reader's context can the library possibly deal with, and what other service providers might the library collaborate with? There are some seriously complex models here.

Context-awareness introduces some significant challenges to many organizations - introducing modes of complexity that they have never dealt with before - but with the potential reward of offering massive improvements to the experienced quality of service.

Coordination and Intelligence

Effective differentiation is a function of the intelligence embedded within the customer management capability. The greater the “quantity” of intelligence, the greater the capacity to differentiate effectively. See Box below.

Success Factors of Effective Differentiation

- Focus on the most relevant differentiators.
- Sufficient range of responses to differentiators.
- Coordination between variety of perceived differentiation and variety of response.

- Feedback loops to improve relevance and accuracy of differentiation.
- Feedback loops to refine responses.
- Progressive elimination of unnecessary or irrelevant complication, along with exploration of new opportunities.

Retail Example – Supermarkets

Many organizations are increasingly facing multi-sided markets, and the need to create indirect value as well as direct value. They must differentiate and innovate in a number of different process areas simultaneously. The critical capability here is the coordination between these process areas. Let's explore this using a retail example.

Let's start by dividing a retail operation into a number of discrete capability areas, each focusing on a discrete domain of interest. Each capability area can then be managed semi-autonomously.

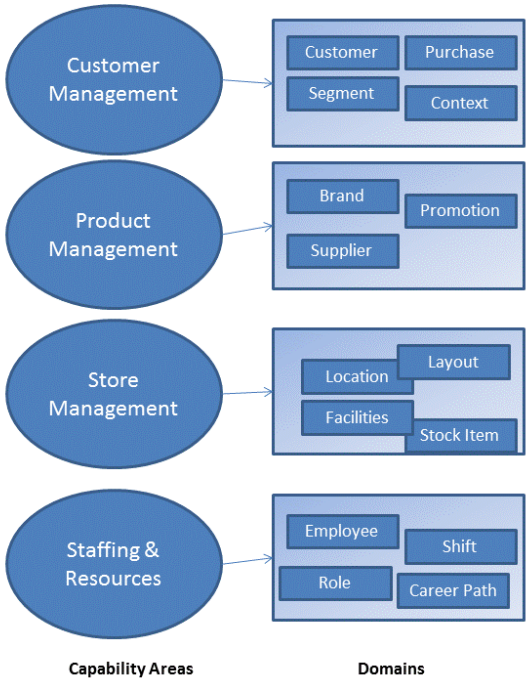

Figure 1 – Example Capability Areas in Retail Operations

(We may compare alternative ways of decomposing the retail operation according to the independence of each chunk, and how much coordination is required. Any given decomposition leaves some cross-cutting concerns. Many architects skip this step, and base their models uncritically on the most obvious decomposition, without exploring alternatives.)

Within each capability area, we have a potential trade-off between the economics of scale and the economics of scope. For example, simple economics of scale within product management suggest stocking large quantities of a very small number of products from a small number of suppliers to obtain maximum discounts and minimum transport costs. However, this conflicts with the need within product management to offer a broad range of products (economics of scope).

There are also trade-offs between capability areas. For example, a simplistic approach to the economics of scale within product management will conflict with a simplistic

approach to the economics of scale within store management. In practice, it is impossible to optimize all these economic factors simultaneously. So we need a coordination mechanism that allows for a reasonable accommodation between these semi-autonomous areas, illustrated in Figure 2, as well as a sense of the economic and organizational cost of this coordination.

For example, suppose a supply-side manager negotiates a deal with a key supplier, which specifies a favourable display position for that supplier's products. This deal may then inhibit our ability to vary the display arrangements, even if this variation could improve the customer experience and increase total spending. Most importantly, if we fail to experiment regularly with alternative display arrangements, we won't have enough data to calculate the true value of a given display arrangement, and therefore to estimate whether a given supply-side deal carries an unacceptable opportunity cost (in terms of lost sales for other products).

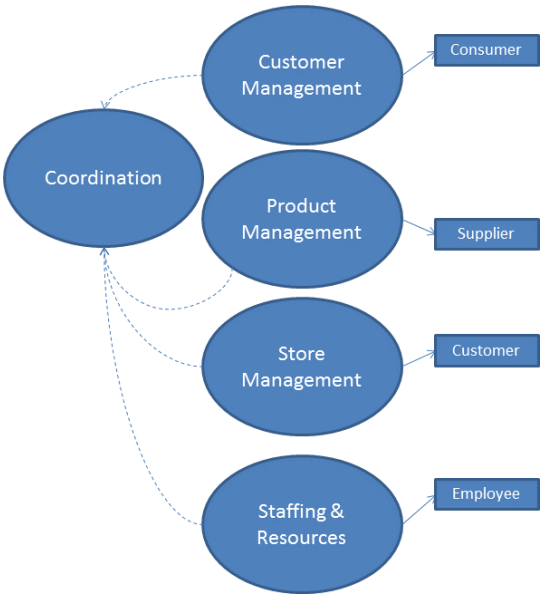

Figure 2 – Coordinating Semi Autonomous Capability Areas

Design Questions

- What are the events and information flows that help to join up the retail operation as a whole?
- Where is the strategic knowledge of the enterprise located, and how is it continuously developed and effectively used?
- What are the mechanisms to support innovation and organizational learning?

There are many different pathways for joining-up the business. Think for example how a supermarket manages a single product – a jar of organic baby food. This product has many different associations, each of which has some coordination and integration implications as shown in the Table below.

Coordination with other jars (pasta sauce)	Often supplied by the same manufacturers. Similar patterns of shelf life and shelf management. Similar handling requirements.

Coordination with other baby goods	Bought by the same customers.
Coordination with other organic produce	Bought by the same customer demographic.

Table 1 – Example Product Associations Requiring Coordination

How are these different associations managed? The traditional approach is to regard one of these associations as primary, and to construct processes and hierarchical organization structures around the primary association – for example, product line management. Some organizations complicate this approach by attempting various forms of matrix management, but this is typically an unsatisfactory compromise that still fails to deal with all the associations and pathways properly. Furthermore, when these associations are hard-coded into the organization structure, even tactical change in product management necessitates major organizational change – and there are some organizations that undergo this kind of reorganization alarmingly frequently.

An adaptable enterprise needs to have a more dynamic way of managing a broad range of these associations and pathways. Each of these pathways may be associated with a different capability area, and mobilizes a different kind of intelligence.

Systems, Services and Technology

There are several technologies that help to support the intelligent real-time enterprise, including business intelligence, complex event processing, business process management, knowledge management and enterprise social networking ("Enterprise 2.0"). Within the enterprise, these technologies are typically at different stages of adoption and maturity, and there are interesting developments within each area. The key question for us here is how these technologies and tools can be combined to solve more interesting and complex business problems.

In our work on service-oriented business intelligence, we have talked about closed-loop business intelligence – management feedback loops that operate at real-time or near-real-time. We are already seeing an interesting convergence between business intelligence and complex event processing.

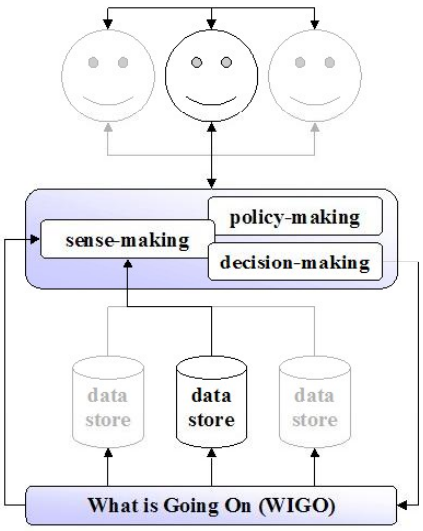

Figure 3 – Closed Loop Business Intelligence Model

Much of the experience with Complex Event Processing (CEP) tools has been in tracking real-time operations. For example, telecommunications companies such as Vodafone can use complex event processing to monitor and control service disruptions. This is a critical business concern for these companies, as service disruptions have a strong influence on customer satisfaction and churn. CEP is also used for autodetecting various kinds of process anomalies, from manufacturing defects to fraud.

When coordinating between different business processes, each process may operate on a completely different tempo. With customer complaints, for example, replying to the customer is either instant or within hours/days (and a product recall for safety reasons would probably operate on a similar tempo), whereas the feedback loop into product design probably takes weeks or months - in other words, a much slower tempo.

Business Process Management itself has several nested feedback loops, each operating at a different tempo.

- A modeling and discovery tempo, in which the essential and variable elements of the process are worked out. Oftentimes, full discovery of a complex process involves a degree of trial and error.
- An optimization and fine-tuning tempo, using business intelligence and analytics and simulation tools to refine decisions and actions, and improve business outcomes.
- An execution tempo, which applies (and possibly customizes) the process to specific cases.

The events detected by CEP can then be passed into the BPM arena, where they are used to trigger various workflows and manual processes. This is one of the ways in which CEP and BPM can be integrated.

Social software and Enterprise 2.0 can also operate at different tempi - from a rapid and goal-directed navigation of the social network within the organization to a free-ranging and unplanned exploration of business opportunities and threats. Social networking platforms (such as TIBCO's new product tibbr®[4]) can be organized around topics, allowing and encouraging people to develop and share clusters of ideas and knowledge and experience.

The organization of Enterprise 2.0 around topics appears to provide one possible way of linking with CEP and BPM. A particularly difficult or puzzling event (for example, a recurrent manufacturing problem) can become a topic for open discussion (involving many different kinds of knowledge), leading to a coordinated response. The discussion is then distilled into a resource for solving similar problems in future.

A critical success factor for organizational intelligence is "contextually relevant information", and this provides a common theme across all of these technologies. It helps to think about the different tempi here. In the short term, what counts as "contextually relevant" is predetermined, enabling critical business processes and automatic controls to be operated efficiently and effectively. In the longer term, we expect a range of feedback loops capable of extending and refining what counts as "contextually relevant".

- On the one hand, weak signals can be detected and incorporated into routine business processes. Wide-ranging discussion via Enterprise 2.0 can help identify such weak signals.

- On the other hand, statistical analysis of decisions can determine how much of the available information is actually being used. Where a particular item of information appears to have no influence on business decisions, its contextual relevance might need to be reassessed.

Social Media (Systems of Engagement)

Recent work in the Content Management domain distinguishes between Systems of Record (focused on transactions) and Systems of Engagement (focused on interactions). In a recent white paper Systems of Engagement and The Future of Enterprise IT : A Sea Change in Enterprise IT (AIIM 2011), Geoffrey Moore identifies this as a major shift of emphasis in IT. According to Moore, this shift is necessary because most organizations are dependent upon suppliers or distributors or partners to deliver their fundamental value proposition to their customers.

(Of course, these challenges aren't just for commercial organizations. Public sector organizations are under just as much pressure to deliver value, even if this pressure is transmitted politically rather than commercially.)

They also raise key architectural issues, especially in managing the join between formal systems and informal systems. For example, enterprise social media can be organized around business topics. The particularly difficult or puzzling example event mentioned above (the recurrent manufacturing problem) is a good example of this. The discussion around the topic leading to the coordinated response may be distilled into a resource for solving similar problems in future. A business topic can be modeled as a social object[5]- efficient and effective integration between transaction systems (Systems of Record) and intelligence systems (including Systems of Engagement) requires a simple and flexible model of such social objects, and a clear understanding of the identification and granularity of these objects.

Conclusion and Key Actions

In this article, we have explored how complexity is (can be) managed in a real business. The agenda here is not to eliminate complexity but to respect and leverage it – giving the organization more power to operate effectively in a complex demanding environment. For improving organizational intelligence, there are several key actions for architects, as shown in Table 2 below.

Aspect	Purpose	Artefact
Granularity	Enabling the organization to identify more precisely and respond more flexibly and appropriately to a finer level of detail and differentiation.	Business Concept Model Business Type Model
Sense and Respond	Defining the set of events that the business processes can respond to.	Event Model Business Process Model
Feedback Loops	Building a closed improvement and learning loop into each business process.	Business Process Model
Coordination	Establishing coordination and intelligence capabilities between multiple strategic processes.	Business Capability Model
Platform	Establishing a joined-up platform (including business intelligence, business process management, knowledge management and social networking) to enable managers across the organization to collaborate and innovate effectively.	Technology Architecture

Table 2 – Key Actions for Architects

References

Some of the ideas presented in this article have been mentioned in previous articles.

- Business Flexibility (CBDI Journal, June 2002)
- Web Services to improve Business Intelligence (CBDI Journal, June 2003)
- Service-Based Business – Insurance 2 (CBDI Journal, December 2004)
- Service-Oriented Business Intelligence (CBDI Journal, October 2005)
- Business Modeling for SOA (CBDI Journal, January 2006)
- Towards the Agile Business Process (CBDI Journal, July 2007)
- Web 2.0 and Enterprise Architecture (CBDI Journal, November 2007)
- Event-Driven Service Architecture (CBDI Journal, February 2008)

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[1] Process complexity informally measures the difficulty of describing and executing a process. See for example Howard, Rolland and Qusaibaty, Process Complexity, INFOS 2004. http://www.cs.rmit.edu.au/~jah/cats09/papers/cats2009_submission_41.pdf

[2] The ability of a system to respond appropriately and flexibly to the variety in the demand environment is known as **requisite variety**. The greater the complexity and turbulence of the environment, the greater the value of this variety. The challenge for the enterprise is to manage this variety efficiently, and to focus on those variables that have the greatest potential contribution to business value.

[3] See my review of the Support Economy, CBDI Journal July 2004. Also available at http://rvsoapbox.blogspot.com/2005/01/support-economy.htm

[4] Tibbr® http://www.tibbr.com/

[5] The concept of social object was introduced by Jyri Engeström, and has been developed by JP Rangaswami and others.

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