

**Supporting the agile enterprise
in a networked knowledge economy**

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Supporting the agile enterprise in a networked knowledge economy

Abstract

The shift from transformation activities to interactions represents a broad shift in the nature of economic activity. Enterprises looking to succeed in today's rapid-paced new economy must be agile, innovative and rapidly responsive to changes in their business environment.

The number of employees doing interactive and cognitive work is increasing rapidly. Supporting knowledge workers becomes of vital importance for the ability of enterprises to survive in a networked knowledge economy. By regarding knowledge as a production factor and by supporting knowledge workers, enterprises can achieve great breakthroughs in quality, productivity and impact. The emphasis in this vision is placed on "being able to use knowledge" instead of "having knowledge".

Traditional capabilities and enablers are not sufficient to meet the challenges of an enterprise environment that is shifting from push driven to pull driven. It requires inter alia an agile infrastructure. To support the business transformation there is need for Enterprise architecture that deals not only with technical capabilities, but also with information and knowledge, organizational and process capabilities. Knowledge 'architecture' is the most forgotten discipline within enterprise architecture. Today we model and design everything (data, processes, organizations etc.) but not knowledge. To combat the shrinking half-life of knowledge, organizations are forced to develop new methods of establishing and managing knowledge processes, authentic sources and their owners. This transformation should be embedded in a Business agility program. An enterprise agility value center acts as the nucleus for the business driven action.

Introduction

This is an overview article that explores means to enhance the business agility of enterprises that operate in a networked knowledge economy.

In the first part we explore several facets of the networked knowledge economy. The second part deals with the notion that knowledge should be treated as a primary production factor. It argues that supporting knowledge workers by making knowledge usable and productive helps enterprises to cope the ever accelerating pace of change. The third part presents enablers that support enterprises to achieve in their transformation. Part 4 describes how to organize this transformation.

Part 1: The networked knowledge economy

We are living in a knowledge economy. Labor, capita or base materials are no longer the main means of production, but the application of knowledge is.

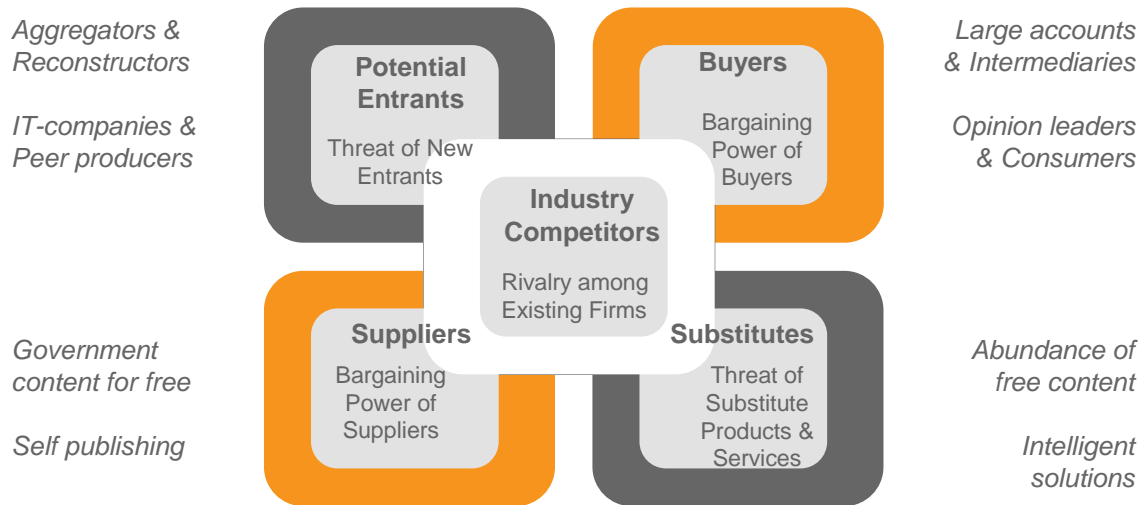
Whereas the economy one hundred years ago was primarily driven by transformational activities, turning raw product into finished product, the highest-value activities in the modern world are complex interactions between people and systems.. This shift from transformation activities to interactions represents a broad shift in the nature of economic activity. Economic success and most productivity gains in the future are going to be in interactions.

Knowledge, imagination (creativity) and the ability to execute are becoming key differentiators between success and failure, between the forehead of the knowledge economy and the laggards.

Enterprises looking to succeed in today's rapid-paced new economy must be agile, innovative and responsive to changes in their business environment. These changes can be competitive, market, regulatory and more and more customer attitude-driven.

Globalization, powered by a continuously expanding and accelerating information and communication technology, has become a fact of life for every enterprise. There is no scarcity of potential partners, competitors, suppliers or customers. They can be located in every discipline in every corner of the world. In many cases there are not only new players, but also the roles of established players change in the networked economy.

In this phase of the information age we are riding the inclining wave of *distributed intelligence* (Norman Poiré)¹. New and flexible forms of networking are required to 'capitalize' this intelligence. Value chains (a connected series of organizations, resources and knowledge streams involved in the creation and delivery of value to end customers)² will be redefined. This gives rise to new and different ways of specialization and collaboration. Therefore a strategic rethought of core competences is required.



Increasing competitive environment of the publishing sector

Enterprises are beginning to realize that *sources of strategic advantage* shift during times of rapid change. Strategic advantage becomes less focused on ownership of distinctive stocks of knowledge. Increasingly, as Hagel and Brown argue in greater depth in “The Only Sustainable Edge”³, advantage resides in the institutional capacity to get better faster – it is not just about the pace of capability building but the relative pace and the ability to accelerate this pace over time. This in turn depends upon privileged access to the most promising flows of knowledge and rapid integration of knowledge acquired from these flows.

In the knowledge economy there is no scarcity of information. There is a *scarcity in time* to process information. This impacts enterprises and enterprise chains as well as their customers equally. The abundance of stimuli and the shortage of time lead also to an intensifying *fight for attention*.

Products, services and market parties that are perceived as delivering *intuitive value* will become the top brands of the information age. They will attract the largest market share.

Pull models are emerging everywhere: from customer aggregation and publishing to supply chain management. As customers gain access to a greater number of options and more information about those options, they become more demanding on resource providers, requiring resources to be made available on their terms, when and where they want them, rather than when and where it is convenient for the resource providers to deliver them.

At the extreme, customers are demanding and receiving tools to create their own products and services, bypassing entire tiers of product and service vendors⁴. Sometimes this is referred to as being a form of *democratization*. Examples of this trend can be found in e.g. case based medicine networks and the open access movement.

These forms of *Peer production* enjoy very special economics. It is a new kind of scale economy which enables massively distributed and ultra-specialized micro-production.

Peer production affects the economics of value chains by migrating industry profitability from the center of the chain towards both edges⁵.

An agile enterprise understands the impact of the *shift from push to pull* that is going on and acts accordingly. Traditional push models are top down oriented and highly procedure driven. They are designed for stable environments and have a hard time to complying with evolving and ever changing trends and participants in a highly networked knowledge economy. Pull models cannot cope with the heterogeneity in participants, activities, rules, systems, structure, syntax and semantics of this environment. At maximum some form of suboptimal interoperability will be reached.

Part 2: Supporting the knowledge worker

Supporting knowledge workers becomes of vital importance for the ability of enterprises to survive in a networked knowledge economy. In the past western enterprises could realize *productivity gains* by automating routine based activities. Meanwhile the majority of these activities has been automated. Other routine based activities are disappearing by the already mentioned trend from push to pull (e.g. growth of self-service concepts). Increasing productivity by automating routine based jobs is coming to an end.

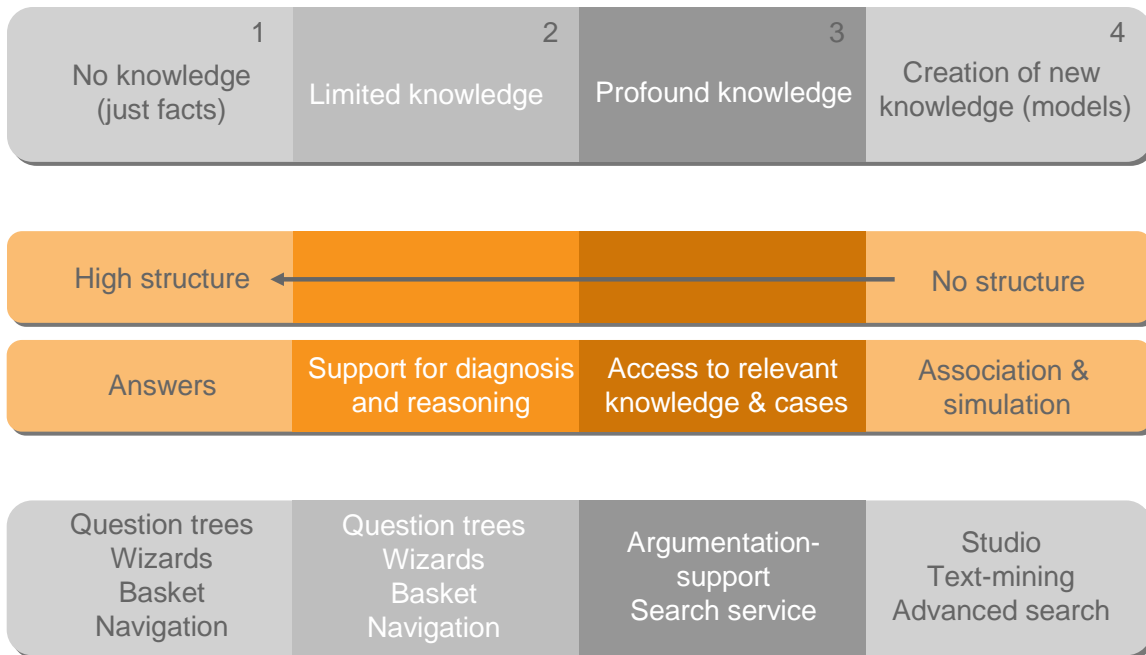
Knowledge as a production factor

Since 1997, extensive McKinsey research on jobs in many industries has revealed that globalization, specialization, and new technologies are making *interactions* far more pervasive in developed economies. Currently, jobs that involve participating in interactions rather than extracting raw materials or making finished goods account for more than 80 percent of all employment in the United States. And jobs involving the most complex type of interactions— those requiring employees to analyze information, grapple with ambiguity, and solve problems—make up the *fastest-growing segment*. Salaries reflect the value that companies place on these jobs, which pay 55 and 75 percent more, respectively, than those of employees who undertake routine transactions and transformations⁶.

Only a small part of the knowledge workers produces new knowledge (on universities or in research). A much larger group of well educated specialists applies abstract knowledge within their practices (e.g. doctors, lawyers and teachers). The largest and vastly increasing group of knowledge workers does not work with such abstract knowledge at all, but applies practical knowledge in their daily jobs.

Therefore the biggest challenge of the knowledge economy had become the creation of value by effectively using knowledge in processes, products and services.

We define knowledge in this context as the *'ability for effective action'*. In this sense knowledge in it self has no value; it is an ability that gets only value when it is used.



Knowledge work types and support types

The ‘ability for effective action’ needs to be seen as a primary production factor in our view. The demand for knowledge workers and the high cost of employing them are a clear call to arms. Enterprises need to make this part of the workforce more productive, just as they have already raised the productivity of transactional and manufacturing labor. Unproductive knowledge employees will be an increasingly costly disadvantage.

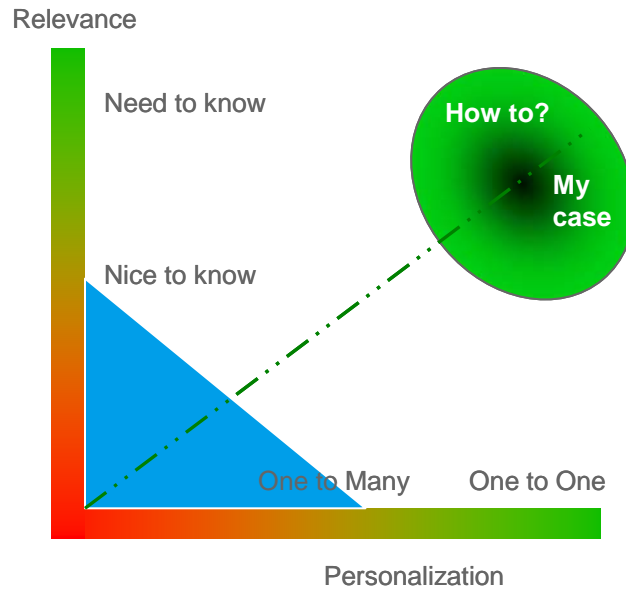
Making knowledge usable and productive

The *next wave of productivity improvement* will therefore be based on improving the efficiency and effectiveness of non-routine based cognitive and interactive tasks. By treating *knowledge as a production factor* and by supporting knowledge workers, enterprises can achieve great breakthroughs in quality, productivity and impact.

In order to *make knowledge usable and productive*, the focus is bound to come on demand driven and context sensitive knowledge supply. This requires in turn identifying the relevant knowledge and organizing its development and provisioning process.

Relevance is becoming a competitive advantage in a pull driven environment. “Relevance pulled response rates three times higher than just personalization”, according to Rab Govil, president of the Print On-Demand Initiative⁷.

Relevance turns information into knowledge. Customers want to get access to true relevant resources; to use information within the context of what they are doing. They want to have access to the right information, but only when they need it. And they need to be assured that the access is guaranteed, easy, fast and reliable, according to Susan Feldman (IDC)⁸. It is probably not needed to emphasize that the same also applies to enterprise (chain) employees



Relevance combined with true personalization yields the best result

One of the most persuasive factors to manage the production factor in a continuous way is the shrinking half-life of knowledge. The “*half-life of knowledge*” is the time span from when knowledge is gained to when it becomes obsolete. Half of what is known today was not known 10 years ago. The amount of knowledge in the world has doubled in the past 10 years and is doubling every 18 months according to the American Society of Training and Documentation (ASTD)⁹. What was relevant yesterday is today obsolete. Agile enterprises cannot afford neglecting the consequences of constant change in the production factor knowledge. Since knowledge is constantly changing the knowledge process has to be organized and managed, authentic sources have to be created and owners for these have to be appointed.

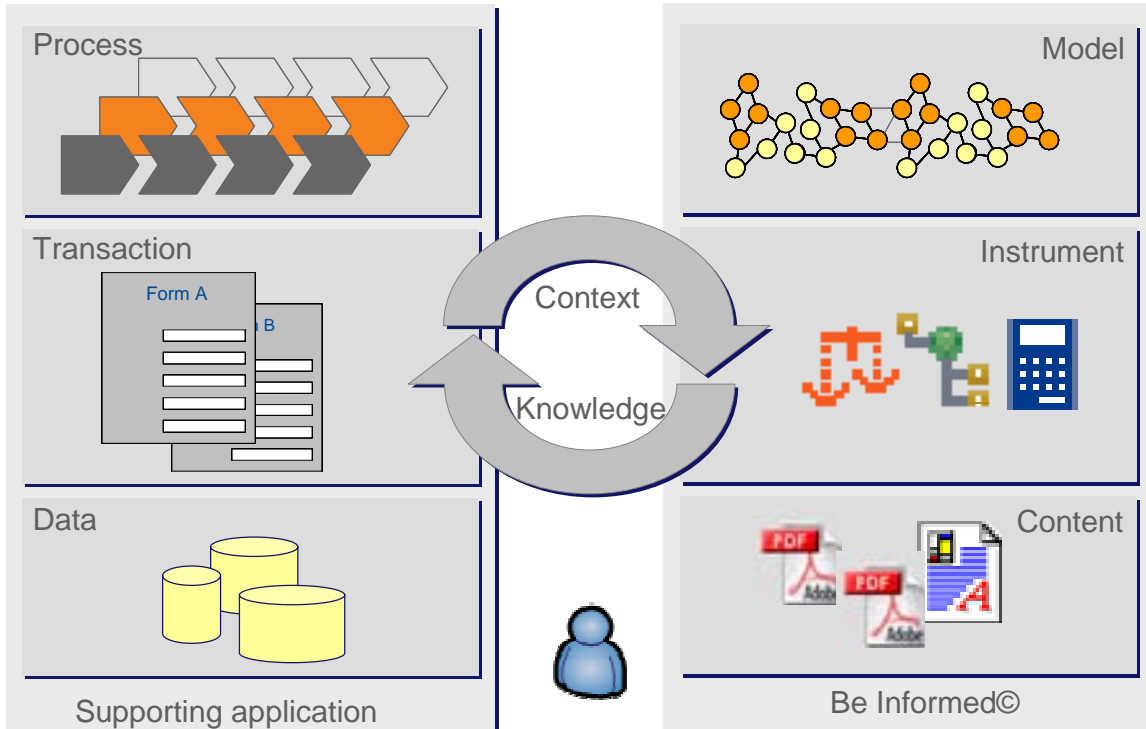
We make a distinction between four ways and types of *applications to make knowledge usable and productive*:

1. *Improving the interaction with customers*: self-service applications for complex situations, products and services as well as interaction support for e.g. call-centers become possible by making complex rules usable by “laypeople”.
2. *Supporting knowledge-intensive processes*: less experienced and less highly qualified employees are able to perform knowledge-intensive tasks and apply knowledge if they are presented with the right knowledge, on time and tailor-made within the context of the process.
3. *Managing authentic sources of knowledge and rules*: by structuring and managing knowledge centrally by means of knowledge models it becomes possible to keep authentic sources and the knowledge derived from them up-to-date.
4. *Facilitating innovation in products and processes*: by separating knowledge and process and then integrating both in an application, it becomes possible to change knowledge and process separately (“a new manager means new processes; a new government means new rules”).

The emphasis in this vision is placed on “*being able to use knowledge*” instead of “*having knowledge*”.

Knowledge as a service

For “*being able to use knowledge*” the knowledge should be offered to the user as a *service*. This is in line with both Web 2.0 and SOA technologies which re-conceive software as services. A knowledge service supports not only the day to day process; but also accelerates learning and capability building and establishes effective performance feedback loops.



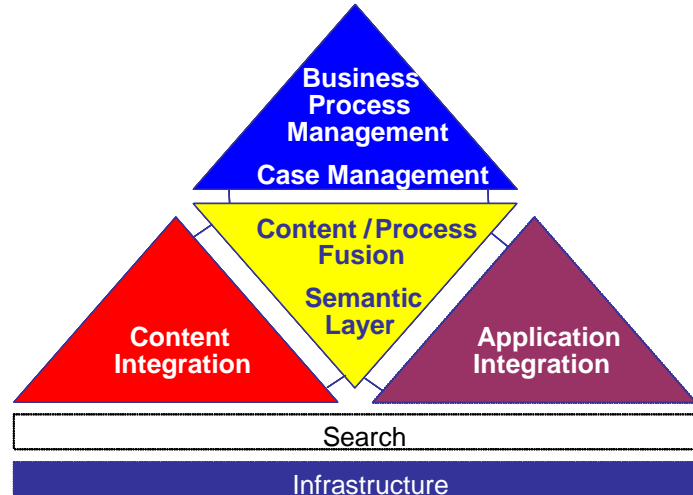
Be Informed© : Context - Knowledge interaction

By offering knowledge as a service in the enterprises’ primary process without forcing the user to go and search for it, he gets used to a form of intuitive empowerment that helps him to achieve the corporate and personal goals. This will foster a positive attitude towards giving feedback and will gradually enhance the demand driven approach.

A knowledge service will also power the fusion between content and process. By placing a semantic layer over the available sources that adds meaning and structure you get a grip on knowledge. We call this *knowledge modeling*.

By taking the activities that employees and customers perform as the starting point and from that determining the knowledge requirement, knowledge can be directly linked to the process and made context-specific. For example, if employees have to decide whether a permit may be issued, they can find a clear answer by means of a question tree based on the regulations. Or, if a customer selects a product, they can be given the best advice by

means of a product comparison tool that makes use of that customer's specific characteristics.



Content & Process Fusion

Part 3: Agility enablers

Agility is often defined as the ability of a business enterprise to run profitably in a rapidly changing fragmenting global market environment by producing quality, high-performance, and customer targeted goods and services.

An agile business is able to change its systems rapidly, allowing it to get new products and services to the market fast. Ideally, an agile business can ensure that strategic business changes impact operations directly and quickly while eliminating time and accuracy lag between the business and IT.

What we see in practice however is that information systems often are the last thing to adapt to change. Change is ultimately delayed and impaired by an *infrastructure* that lags behind and by processes 'that are embedded in reinforced concrete'. Business transformation becomes then a cumbersome process.

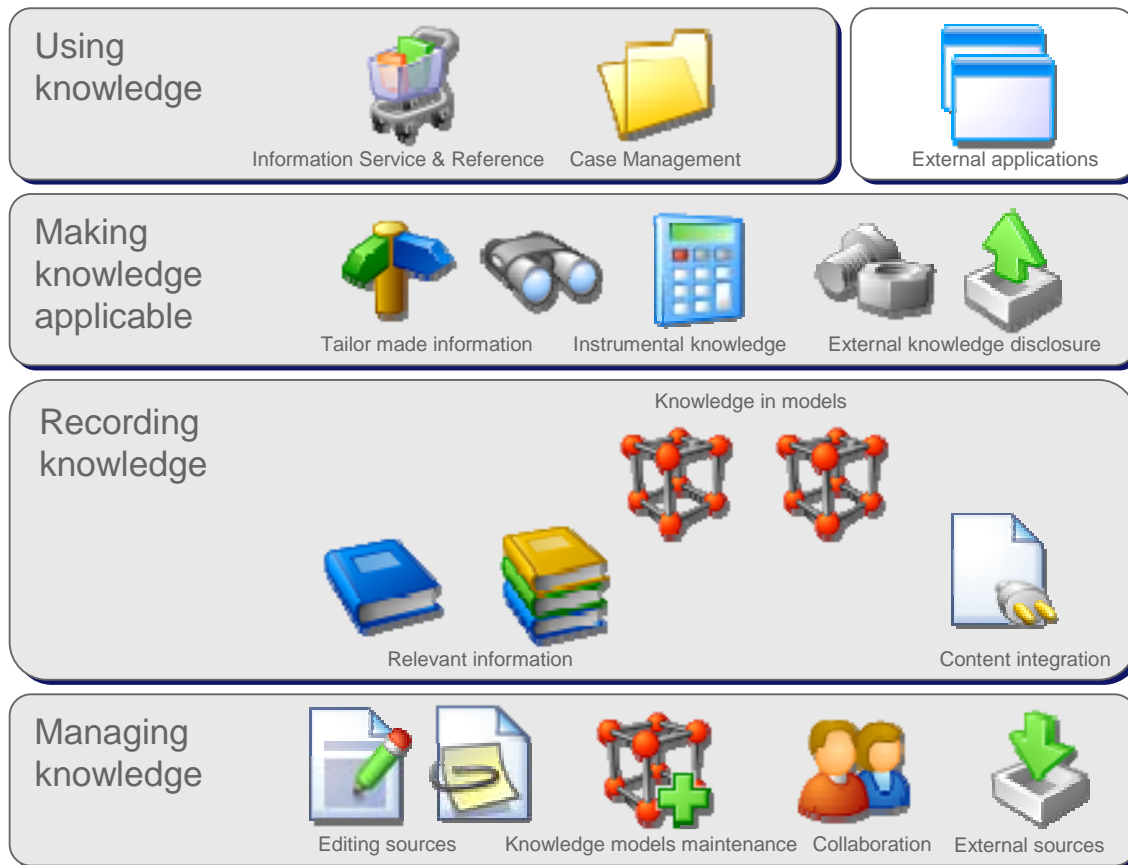
Is it therefore that we see a trend to enterprise architecture as the Holy Grail to overcome the chasm between the leaden enterprise infrastructure and the new market demands?

Enterprise architecture

Enterprise architecture however has to cope with situations in which fragmentation and incoherence is the natural state. Maybe that is one of the reasons why enterprise architecture in the past has often restricted its activities to the technology domain and more specific to the infrastructure and application domain. This isolated approach was bound to fail. It has led to a situation in which the word '*enterprisey*' is used with a negative connotation for 'sophisticated software architecture which is claimed to be good enough (robust, flexible, etc.) for use in enterprise applications, but in fact is merely excessively complex and baroque'¹⁰.

Excellent companies on the contrary, are able to apply technology in a way that establishes integration and cohesion between the technology and the context in which it has to operate. They not only orchestrate the technology environment but also the whole enterprise environment.

Enterprise architecture in our view surpasses the boundaries of the strict technology angle. It deals not only with technical capabilities, but also with organizational and process capabilities and last but not least with information and knowledge capabilities. One could even argue that *knowledge 'architecture'* is the most forgotten discipline within enterprise architecture. Today we model and design everything (data, processes, organizations etc.) but not knowledge.



Knowledge modeling in context

The main *responsibility* of enterprise architecture is to conceive and guard the concepts, principles, high level designs and guidelines, along which the enterprise can deal with processes, systems and information in an integrated and coherent way within its own environmental context.

Like the backbone in the human body this architecture provides the framework, muscles, nerves and the isolation and connection layers that enable the body to move and adapt smoothly to every situation. To paraphrase José Ortega y Gasset¹¹, architecture helps to

prevent that the enterprise becomes a ‘Compania invertebrada’ (company without backbone).

The focus is on architecture that works *between enterprises* rather than architecture that works within an enterprise. It starts from the outside and moves back into the enterprise. This contrasts with the traditional approach; however it is a crucial viewpoint in a pull driven environment.

Enterprise architecture acts not only as an enabler, but also as a *signpost* for disruptive fractions in the equilibrium between business requirements and enterprise capabilities. This can work two-ways: signposting suboptimal use of capabilities at the one hand and shortcomings in the capabilities at the other hand.

This relates directly to the *information orientation* of the enterprise. Donald Marchand¹² refers to maturity levels for the aspects:

- Information behavior and values,
- Information management practices
- Information technology practices.

Upgrading e.g. the technology to a higher level while other aspects, like structuring information, lag behind will not work, as many enterprises have found out meanwhile.

Information technology

Information technology is becoming an even more important enabler of strategic differentiation, rather than diminishing in strategic importance. Success in the next five to ten years will require a deep understanding of the power of interactive capacity in both the own industry and the economy at large and of how technology can help to lever that power..

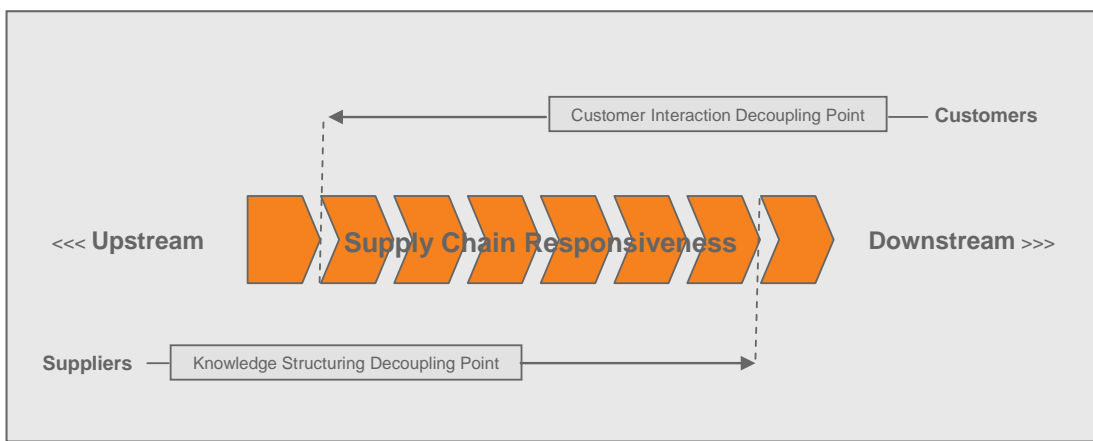
In the past, IT may actually have been a barrier to more agile and collaborative business architectures as executives made a Faustian bargain: seeking large operating expense reduction at the expense of more flexibility and collaboration with other enterprises¹³. Today’s *investments in technology* target network services, rich media, mobility and knowledge technologies. This investment cycle will dwarf the previous ones in size and scope; it will be three to five times larger than the dot-com investment boom that followed the invention of the World Wide Web¹⁴.

The focus will be on *pull based technology* since under conditions of growing abundance of resources, push models become untenable. Pull platforms tend to be much more modular in design. Modules are created to help to make resources and activities more accessible in flexible ways since the core assumption of pull platforms is that the needs of participants cannot be well anticipated in advance. Pull platforms are designed from the outset to handle exceptions, while push programs treat exceptions as indications of failure.

Pull programs enable the enterprise to push the *Customer Interaction Decoupling Point* further upstream in the supply chain, thereby dramatically increasing the customer

responsiveness. The Customer Interaction Decoupling Point refers to the furthest point upstream to which information on real final demand for products and services can penetrate the supply chain. If this point lies further downstream and even outside the enterprises' borders, then the client has to make on his own the match between demand and supply. The higher upstream this point lies the better the client can communicate his functional demand with the enterprise. The enterprise is able to convert this demand in products and services.

In contrast, the *Knowledge Structuring Decoupling Point* needs to be as far downstream as possible. The Knowledge Structuring Decoupling Point refers to the furthest point downstream to which knowledge products/services can be modularized or versionized and still remain adaptable to customer specifications.



Responsiveness of Knowledge supply chains

The responsiveness of supply chains increases the further decoupling points can be extended apart¹⁵. By using the methods of knowledge modeling and authentic sources the distance between these two decoupling points will be the greatest without damaging the integration capability of the enterprise.

This enables the shift from push to pull, from product to process and even solution selling on a large scale.

New generations of IT are coming together to support new management techniques:

- *Semantic technologies* represent meanings separately from data, content, or program code, using the open standards for the semantic web.
- *Service oriented architectures* provide more flexible access to distributed application and database resources.
- *Virtualization architectures* provide more flexible access to distributed computing, storage and networking resources.
- *Interaction tools* including mobile access devices and social software help to connect people together any time and anywhere in much richer collaboration environments.

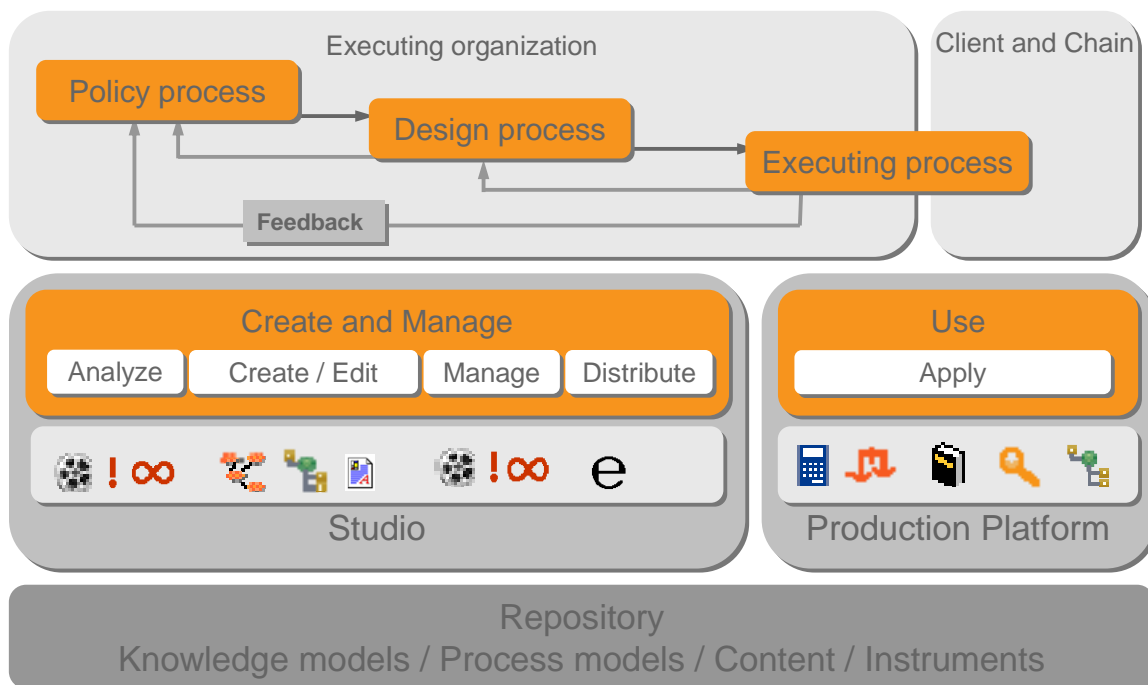
Be Informed

For supporting knowledge intensive and sensitive activities as described in this article *tools and methodologies* are needed to disclose, manage and model knowledge like the ones used in Be Informed (www.beinformed.nl).

Be Informed is developed by Be Value (www.be-value.nl). The vision that knowledge is a production factor and so should be treated as such was at the heart of the development of an approach, technology and tools that go further than simply managing knowledge.

Within Be Informed, in addition to structuring knowledge in semantic models, the knowledge is offered actively in the process and in a form that can be used by means of a series of instruments.

By making use of the context in which the knowledge is to be used, it can be disclosed in a tailor-made form. This makes knowledge truly usable. The concept of authentic sources gives an insight into who is responsible for knowledge in an organization, and makes it possible to implement changes transparently and quickly.



Be Informed© : Supporting knowledge based BPM

Be Informed enables also the *decoupling of knowledge and process*. And exactly this is a crucial requirement for agility in and between enterprises. After all, why should one put enormous efforts in changing processes and/or applications if only the knowledge is changing? This way processes become more robust while the enterprise is better equipped to adjust to e.g. regulatory and organizational change.

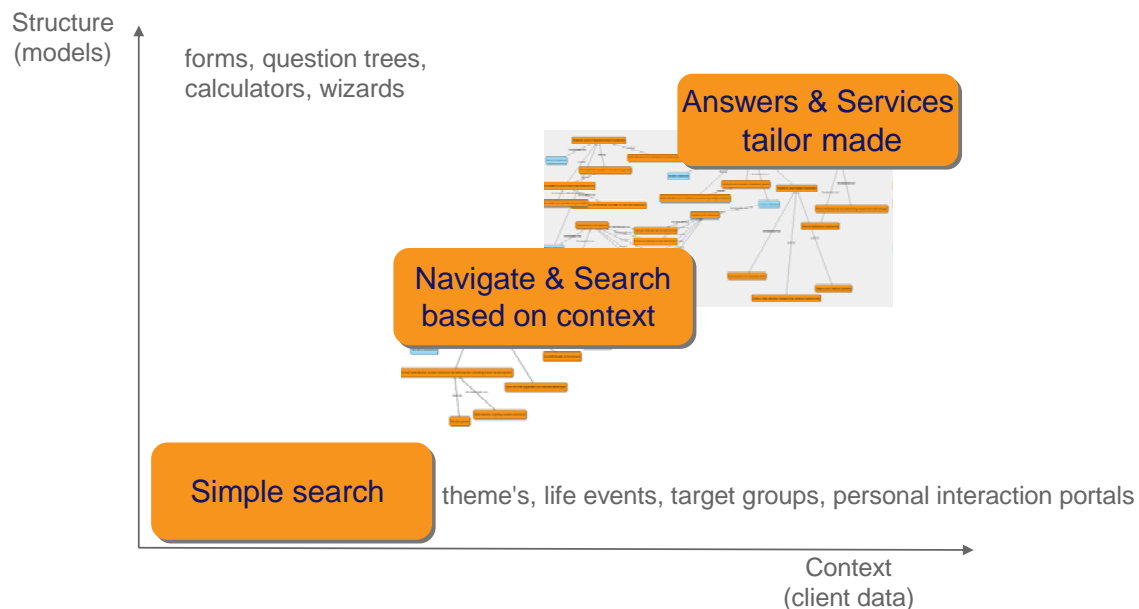
The result is obvious: lower costs, better manageability, more satisfied customers and a flexible organization.

Part 4: Agility program

As we have argued, enterprises need to transform in order to survive in the networked knowledge economy. The question arises “How to achieve this transformation?”

In a complex and dynamic environment it makes no sense to jump in the waters without a *Business agility program* that keeps the enterprise in mind and that is driven by business initiatives. Such a program will run for several years and needs to evolve with the environmental changes.

The program needs to be deployed in an incremental and pragmatic way. It should focus on capability building and performance improvement where it counts and where it is feasible. The grow path can differ per enterprise and sector.



Grow path towards tailor made Government services and answers

The impact of such programs will be huge in time; however it will also allow achieving quick wins in a short time span by selecting the appropriate improvement points that can be tackled right away.

Priorities for supporting knowledge intensive and sensitive activities could be e.g.:

- Reducing complexity in processes
 - By using lean reusable reference processes.
 - By separating knowledge from processes.
 - By putting the variation points (the locations at which variation can occur) outside the processes.
- Reducing complexity in knowledge production
 - By treating knowledge as a production asset.

- By making the process more robust and able to adjust to regulatory and organizational change.
- By putting ‘smartness’ into the data instead of into the applications.
- By embedding instruments into the process.
- Enhancing transparency and prioritization in knowledge production
 - By switching from a supply driven to a demand driven approach.
 - By establishing authentic sources.
 - By adding meaning to information sources.
- Reducing costs
 - By eliminating redundancy in processes and jobs
 - By providing ‘just in time’ information.
 - By enabling stakeholder specific self service.
 - By reusability of the development solutions for other knowledge critical processes.
- Implementing transparency and compliance
 - By logging and reporting who takes which decisions based on what as an integrated part of the knowledge worker support process.

Of course, the Business agility program roadmap has to be adjustable based upon newly emerging business priorities and new enabling technologies.

Agility Value Centre

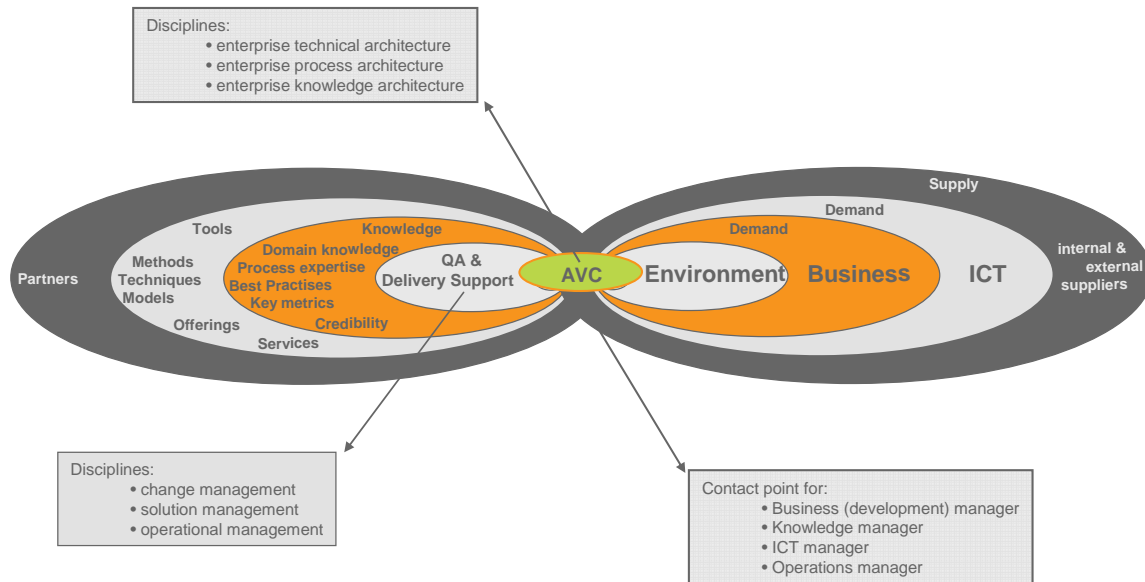
Since the agility program is driven by business initiatives, the business needs to have a counterpart or nucleus within the enterprise that will help to materialize the agility program. This counterpart is, like the business itself, *accountable* for its contribution to the business agility.

Let’s call this nucleus the *Agility Value Centre*. The Agility Value Centre consists in my view of a multidisciplinary team, in which disciplines like technology architecture (infrastructure, systems and applications), process architecture and knowledge architecture are represented.

The *responsibility* of the Agility Value Centre is the high level enterprise architecture as described in a previous paragraph.

Since their main reason for existence is ‘to provide value to the enterprise, their *natural partners* are enterprise managers like the New Business Manager, Domain Business Managers, Chief Technology Office, Chief Knowledge and Information Officer and probably also the Chief Compliance Officer and the Operations Manager(s).

In order to realize the full program potential, the Agility Value Centre’s *multidisciplinary* team is supported by an inner circle of specific disciplines, like change management, solution management and operational management. Their responsibility is to assure that the specific action plans will be embedded within the enterprise or within the enterprise chain.



Be Value's Delivery Model for an Agility Value Center

The Agility Value Centre can be supported by external parties who support its transformation process. Such parties should also understand the importance of supporting knowledge workers in a networked knowledge economy.

Benefits

This approach provides benefits in four basic categories: reducing integration expense, increasing asset reuse, increasing business agility, and reduction of business risk. These four core benefits actually offer return at many different levels and parts of the enterprise.

Conclusion

The sources of strategic advantage shift during times of rapid change in the networked knowledge economy.

The next wave of productivity improvement must be based on improving the efficiency and effectiveness of non-routine based cognitive and interactive tasks.

By treating knowledge as a production factor and by supporting knowledge workers, enterprises can achieve great breakthroughs in quality, productivity and impact.

Enterprise architecture can help to create the infrastructure that is needed to support the required business agility. An agility program and support need to be setup to put this vision into reality.

About the author

Thei Geurts is a Principal Publishing Consultant of Be Value (www.be-value.nl), a company specialised in supporting knowledge workers and agile enterprises.

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