

# **Extending Business Motivation Modelling to Foster Regional Flexibility in IT Architecture Management**

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**Abstract:** Among the main challenges for standardisation of an IT architecture in a multinational company are the different environments in the countries, in particular regarding regulations and market specifics. Therefore, some subsidiaries have to implement local IT solutions that contradict standardisation efforts and lead to a heterogeneous IT architecture. Dynamic business environments require the on-going adaption and re-alignment of business and IT. This is particularly challenging in global multinational organisations that have to balance between standardisation and local solutions. This paper presents an extension of the OMG Business Motivation Model that supports strategic Business-IT alignment by making explicit the dependencies between a company's strategy and the different IT architectural realisations. The approach has been developed as a case study with a multinational company and evaluated with a transformation project in a regional organisation.

## **1. Introduction**

Technical standardisation is fundamental to strategic IT planning. A combination of technical standards is derived from the objectives defined in the IT strategy and then shaped and fine-tuned to provide the best possible backing for current and future business requirements [1]. Standardisation covers the technical infrastructure as well as the IT architecture, which is part of the enterprise architecture.

Multinational enterprises face special problems in IT standardisation. Among the main challenges for standardisation of an IT architecture in a multinational company are the different environments in the countries, in particular regarding regulations and market specifics. Therefore, some components cannot be standardized. This tends to result in either a complex IT architecture, which can hardly be managed, or an incomplete architecture definition with all the associated drawbacks.

In addition, companies have to be more agile. This agility also affects the IT architecture. However, the more complex and diverse the technology the more difficult it is to anticipate the effect of a change in one part of the IT architecture on other parts of the IT architecture.

## **2. Objectives**

In our research we deal with special requirements for managing the IT architecture in a multinational company. The research question can be phrased as follows: *How can Enterprise Architecture Management foster agility in multinational enterprises with regard to local adaptations of global IT architecture and technical standardisation?*

The main problem is to decide which components of the IT architecture should be standardized and managed company wide and which aspects can be handled by the local organisations. Also, the standardized part should have a certain flexibility, which means that changes can be implemented in short time. Making the rationale for changes explicit supports consistency of decisions.

### 3. Related Work

Enterprise architecture management claims to support business-IT alignment and agility by providing transparency and visibility of business and IT perspectives of the enterprise. The most important characteristic of an enterprise architecture is that it provides a holistic view of the enterprise [2]. It covers the business architecture and the IT architecture as well as the relations between them.

In a recent work Silviu ([3]) explored the influencing factors on the alignment of business and IT. In particular he analysed the influence of IT organisation, in particular IT outsourcing, strategic orientation, organizational culture and national culture. He found that all these factors determine the maturity of Business-IT alignment of an organisation. This is in line with the underlying objective of our study. We developed an approach taking into account these influences.

In order to take into account the influences it is important to be aware that “there may be no such thing as a ‘state’ of alignment” [4, p. 299]. Because of the dynamics of market and organisations, business-IT alignment is more a process than a state [5, 6]. This means that is important to manage this process. Making the rationale for design decisions explicit can guide this process and avoid new architecture decisions that bypass previous decisions or contradict solutions in other parts of the architecture.

If an enterprise prescribes a certain approach for its business activity, it ought to be able to say why the approach is chosen. This “why” can be modeled in a business motivation model, which is a part of the enterprise architecture. For example, in the Zachman Framework it is one of the abstractions [7, 8, 9]. A business motivation model captures the decisions about reaction to change and the rationale for making them. It thus increases clarity of and improves decision-making by learning from experience.

The OMG defined a standard for business motivation modelling [10]. This OMG BMM contains four categories of modelling objects (ends, means, influencers and assessments) and relations to business rules, business processes and organisation units, which are called placeholders. This allows to explicitly model rationale of process design, enterprise organisation and business rules. With the influencers and assessments the dependency of the enterprise architecture to Silviu’ influencing factors strategy, organisation culture and national culture (see [3]) can be made explicit.

In our research we found that an extension to the OMG BMM is necessary in order to model the influences also to the IT elements of the enterprise architecture. Thus, we added an additional placeholder for IT entities and applications together with appropriate relations to the BMM elements. Furthermore, we defined roles and responsibilities for such an alignment process in a decentralized organization.

### 4. Methodology

To derive the answer to the research question above we followed the design research methodology [11], which consists of four phases: awareness of the problem, suggestion, development, evaluation and conclusion.

(1) *Awareness of the problem:* The implementation of the Customer Service Strategy of a multinational company was used as a case study. To become aware of the problem we analysed the documentation of the company’s strategy and the IT architecture and made

interviews with the relevant stakeholders. We modelled that part of the enterprise architecture that deals with the customer service process – in Switzerland as well as in an external service centre in Indonesia. Furthermore, members of a focus group analysed a concrete transformation process.

- (2) *Suggestion*: From the analysis of the transformation process and the experiences with the enterprise architecture model we derived our solution: BMM-IT+ is an extension of the OMG business motivation modelling [10] which allows to relate business motivation to decision on IT level. We defined roles and responsibilities for such a change process in a decentralized organization.
- (3) *Development*: A metamodel for BMM-IT+ was implemented in a modelling tool.
- (4) *Evaluation*: BMM-IT+ was evaluated by remodelling the enterprise architecture using BMM-IT+ and validating it with an IT architect and the CIO of the company.

The following chapters are organised according to this research methodology explaining in detail the research steps and the solution that was developed.

## 5. Problem Analysis

To understand the problem and requirements for business and IT alignment in a multinational company we dealt with the Customer Service Strategy of Bühler Group. The company is a global market leader in the supply of flour production plants, pasta and chocolate production lines, animal feed manufacturing installations, and aluminium die casting systems. Bühler Group operates in over 140 countries. With its expertise and over 150 years of experience, Bühler again and again rolls out unique and innovative solutions for its customers.

Bühler developed in 2011 a new business strategy with focus on customer service. To implement the new strategy, fast logistics are essential. A global logistic concept with regional logistic hubs is built up. Focus areas, called “Clusters”, are defined as geographical objects to group customers in active regions. The existing organisational units are supplemented with a new *Service Center*, a centralized organization which coordinates, supports, and controls the development of the customer service business. The customer needs are served by an interaction of these entities to use as much synergy as possible while staying as local as possible.

In the case study we dealt with the customer service support in two subsidiaries: the Swiss centre and the Indonesian subsidiary. For the data collection we analysed the documentation of the company’s strategy and the IT architecture and made interviews with the relevant stakeholders. We identified three different set-ups for the IT architecture to support the customer service support:

1. The *Service Center* provides all relevant customer support services and technical expert knowledge in the area of spare and wear parts processing, maintenance and repairing. There is at least one Service Center per continent. The Service Center provides support for the smaller organization in its patch.
2. The *Service Station without integration* is the most common architecture for small Service Stations, which do not have enough business volume to invest in a Service Center solution. The Service Station without integration has the advantage of being able to easily adapt the Customer Service Business to local situations. Local solutions, however, have well-known problems. For example, a global pricing is not realizable because of missing access to the global master data maintained by the Service Center . As there is no standard set-up for this architecture, the variety of solutions is growing because more and more new Service Stations are opened to fulfil the targets of the company’s Customer Service Strategy.

3. The *Service Station with integration* is a new set-up that has recently been developed. This new set-up can provide access to the master data as well as a lower complexity than the Service Center solution, which is too complex and expensive for smaller organizations. Thus, it combines the advantages of a small organization, which is close to the customer with the efficiency gain of a networked company that has defined spare and wear parts, processes and expert knowledge in the back.

Figure 1 shows the difference between the approaches. While the Service Center has direct access to the central ERP system, the Service Stations are working with local ERP systems for which master data have to be replicated.

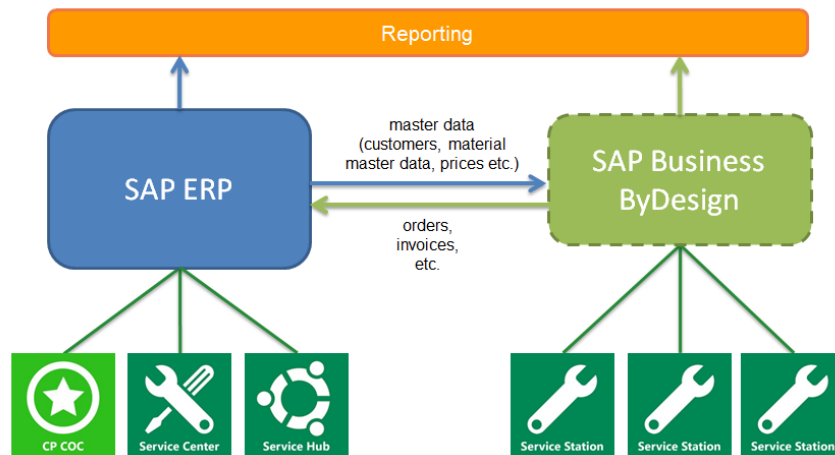


Figure 1: Sketch of the IT Architecture for Service Center and Service Stations

In the Swiss centre the customer service process is supported by a so-called Service Center. The service station in Indonesia recently finished a change from a “Service Station without integration” to a “Service Station with integration”.

The architecture model contained the process models, roles and IT applications and infrastructure for the three realisations of the customer services process:

- the process using the Service Center implemented in Switzerland,
- the Service Station without integration implemented in Indonesia before the transformation project
- the Service Station with integration, which was the result of transformation project in Indonesia

We modelled an enterprise architecture in the ArchiMate language [12]. The core process modelled was the “Spare and Wear Parts Processing” which itself consists of sub processes for Quoting, Order Processing, Delivery Process, Logistics and Invoicing. In addition the support processes for dunning, technical complaint handling and reporting were modelled. The enterprise architecture model contained the realisation of all these processes all three approaches for IT support (Service Center for Switzerland as well as Service Station with and without integration for Indonesia). Figure 2 shows a small part of the architecture.

Furthermore the enterprise architecture contained the business motivation model in which we made explicit the company’s customer service strategy by defining the influencers and assessment as well as the strategy derived from it.

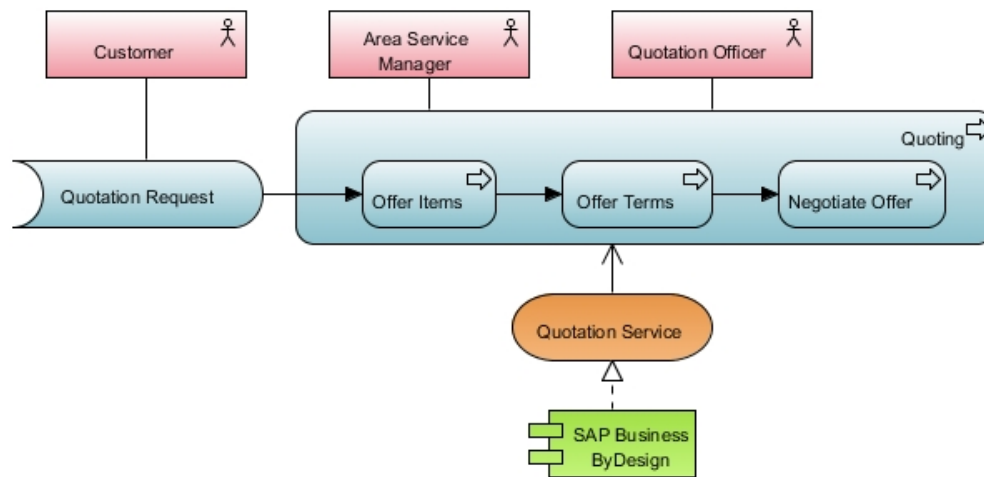


Figure 2: Part of the Architecture Model

## 6. Suggestion and Development

In a focus group the transformation process from the “Service Station without integration” to the “Service Station with integration” in Indonesia was analysed in order to find out what problems had occurred, how they were solved and how they could have been avoided. The focus group consisted of people who were involved in the transformation process. It followed from this analysis that it would have been helpful to explicitly model the rationale for design decisions in the IT architecture in an extension of a business motivation model.

The OMG Business Motivation Modelling [10] (BMM) contains four categories of modelling objects (ends, means, influencers and assessments) and relations to business rules, business processes and organisation units, which are called placeholders. Our BMM-IT+ extension of BMM allows to relate business motivation to decisions on IT level. This is achieved by adding an additional placeholder, which we called “IT Entity” (see Figure 3).

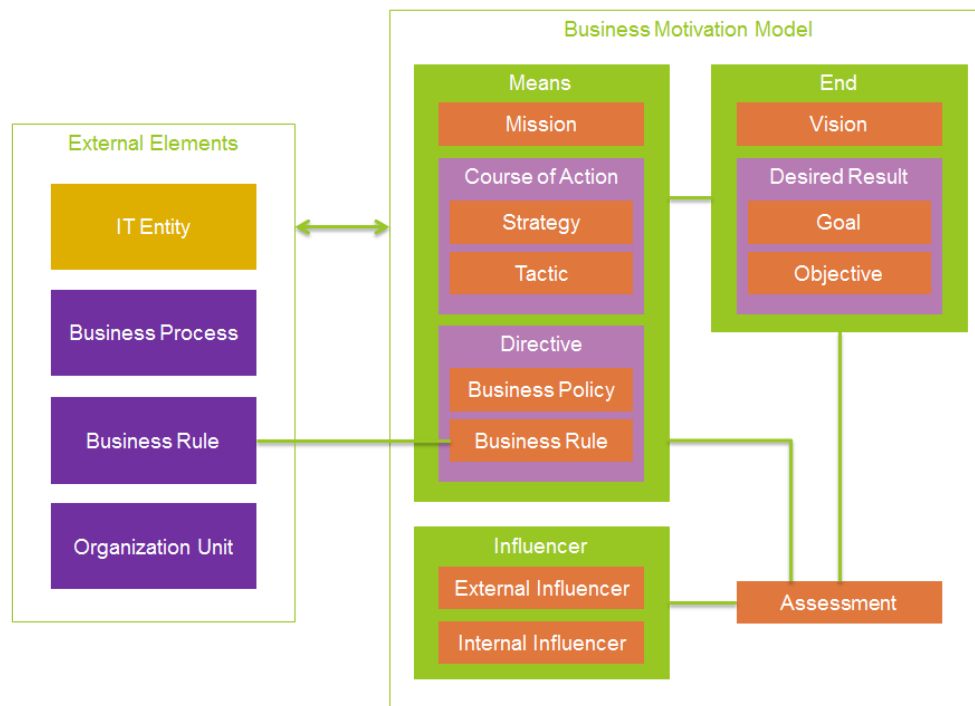


Figure 3: BMM-IT+: Extending the OMG Business Motivation Model (based on [10])

Furthermore, we defined roles and responsibilities for a transformation process in a decentralized organization. In this paper, however, we focus on the modelling aspects of the Business-IT alignment.

The IT Entity acts as the bridge between the business motivation and the application and technology layer of an enterprise architecture (see Figure 4). It can be a placeholder for one of the following elements out of the ArchiMate standard [12]:

- Application Component: a modular, deployable, and replaceable part of a software system
- Node: a computational resource upon which artefacts may be stored or deployed for execution
- Device: a hardware resource upon which artefacts may be stored or deployed for execution.
- System Software: a software environment for specific types of components and objects that are deployed on it in the form of artefacts.

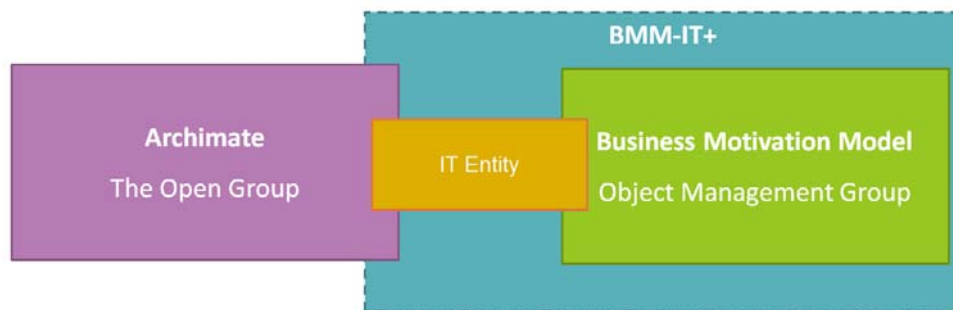


Figure 4: The IT Entity bridging business motivation and IT architecture modelling

The IT Entity can participate in the following new associations with BMM elements (see Figure 5):

- IT Entity *Enables* Course of Action
- IT Entity *Is governed by* Business Policies
- IT Entity *Is guided by* Business Rules
- IT Entity *Is evaluated by* Assessment



Figure 5: The relations of IT Entity to BMM element

The BMM-IT+ metamodel was implemented using Agilian 10.0 Enterprise Edition from Visual Paradigm

## 7. Evaluation

BMM-IT+ was evaluated by remodelling the enterprise architecture using BMM-IT+ and validating it with an IT architect and the CIO of the company.



The Motivation Model explains the pros and cons of the three set-ups as well as the influences of the stakeholders and the relationships to the means and ends. The three IT Entities are representing each an organization set-up: SAP ERP (Service Center), Local Solution (Service Station without Integration), SAP Business ByDesign (Service Station with Integration).

Figure 6 shows an excerpt of the BMM-IT+ model containing aspects of all the set-ups. On the bottom there are the influencers and their judgements as strength and opportunities. On top we see some of the tactics, which are enabled by the IT entities.

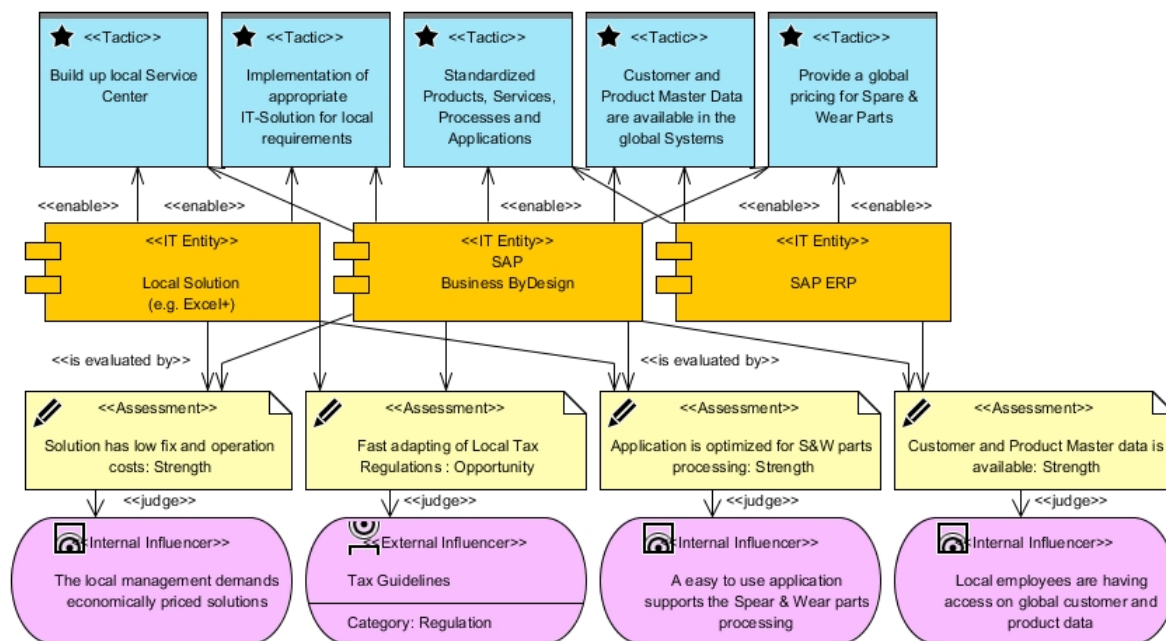


Figure 6: Part of a BMM-IT+ model with IT Entity elements and their relations

The general approach was assessed and rated as adequate by the IT architect and the CIO. The BMM-IT+ addresses some of the problems that are currently present at Bühler for example the transparency of the situation. The vision and desired results of the BMM could be directly deducted out of the company's strategy project. The modelled relationships to the IT Entity are showing clear the dependencies between the implementation of the tactics, the assessments and the influencers. This model can be used as basic concept for the further approach to find an adequate solution for the current architecture problem regarding the Service Stations at Bühler.

## 8. Business Benefits

The BMM-IT+ contributes to the Enterprise Architecture Management regarding the transparency of IT-Architecture changes that were caused by the Ends and Means of an enterprise. For solving a problem like in the case of Bühler usually different technical architecture variants are possible. How and by whom they are influenced can be shown by a BMM-IT+. This explicit modelling has several advantages: The explicit representations of the influencers and their assessment allows for an informed and decision for a preferable IT architecture.

As already argued above, because of the dynamics of market and organisations, business-IT alignment is more a process than a state. The BMM-IT+ approach supports the process by modelling the rationale for design decision of the IT architecture. If because of a business decision the architecture has to be adapted, the relations between strategy and IT architecture in the BMM-IT+ model avoid that local solutions contradict the overall strategy – or that at least exceptions are realized consciously providing for unacceptable

risks and disadvantages. The reasons for the exceptions are modelled again in the BMM-IT+. Modelling with BMM-IT+ is at the interface between business and IT, both business and IT have to be involved in the modelling. In the case of Bühler Group the new Service Center can take over the responsibility for models. Modelling itself was initiated, however, by the IT architects, because it is in their interest to achieve as much standardisation as possible and to avoid unnecessary redundancies.

## 9. Conclusions

The BMM-IT+ is an extension of the OMG Business Motivation Model specification. It allows to explicitly model the dependencies of decisions on IT level from business aspects. This extension makes it possible to deal with IT standardisation problems and agility in multinational companies, where subsidiaries must be able to deviate from global standards in order to cope with local peculiarities.

The extension of the business motivation model, however, makes sense not only for practical reasons. It is also in line with the well-known strategic alignment model of Henderson and Venkatraman [13]. The strategic alignment model contains four perspectives to align business and IT. In particular the Technology Transformation Alignment derives IT Strategy and IS Infrastructure from the Business Strategy. To model these dependencies it is necessary to have direct relation between IT entities and elements of the business motivation model.

In a further research, we develop a procedure model for business-IT alignment using BMM-IT+ that in addition to the already mentioned Technology Transformation Alignment also supports the other perspectives of the strategic alignment model of Henderson and Venkatraman [13], in particular the alignment of the Business Strategy because of new IT opportunities.

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