A Business View on Component Governance for TelCos

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Abstract: Changing conditions in current telecommunications markets created a greater need for telecommunications companies to provide a wider range of products and to produce them fast and flexible. To be successful in the Next-Generation markets for communications and content products the modern telecommunications companies are under pressure to review and optimise their business processes and organisational structures. The implementation of capable IT structures will be a key success factor to be profitable. This paper describes the market challenges of telecommunications companies and depicts three different governance methods currently applied in telecommunications companies. It also illustrates why component governance is the most appropriate approach for TelCos and which problems are emerging during the application of this approach in practice. The paper concludes with an idea for further research that addresses these challenges.

1 Motivation

About a decade ago, the business models of telecommunications companies (TelCos) have started to change dramatically. The rise of innovative technologies, like Voice over Internet Protocol (VoIP), Internet Protocol Television (IPTV) and WiMax have a huge impact on the business models, but also on the technical and IT infrastructure of TelCos [Moh07]. Therefore many TelCos are moving away from traditional network structures, with separate fixed voice and data communication services, towards "Next Generation Network"(NGN) infrastructures [Forc].

Profitability is a key focus area for telecommunications companies. To reach a higher degree of profitability telecommunications companies are considering fixed-mobile convergence. This approach is facing the challenge to seamlessly integrate the fixed and the mobile network. It is necessary to achieve interoperability between the technical infrastructure, the IT-landscape and the organisational processes of a telecommunications company [SC08]. To ensure long-term success in the telecommunication industry furthermore it is essential to consider business requirements like time-to-market (T2M) or cost-efficiency. These strategic requirements can only be fulfilled if telecommunications companies apply a flexible and agile company infrastructure.

On the one hand telecommunications markets require a big range of highly individual products. On the other hand TelCos have to sell their products in mass markets to be

profitable. To meet these requirements TelCos need to produce the products in a fast and flexible way. Furthermore it is essential to launch and establish new products as quickly as possible. Therefore it is necessary to manage all the companys processes as effectively as possible. Telecommunications companies have to ensure the interoperability of different related products, have to meet the requirements of distributed production and have to solve the problems of shared communication infrastructures [SMA08].

In addition to that it is necessary to have a flexible enterprise architecture model to be successful in future markets. The strong dependencies of products, IT systems (BSS, OSS and Embedded Systems) and the technical Infrastructure (Platform) lead to very complex business models and organizational structures within TelCos. An approach to tackle these problems - from an IT centric point of view - is component governance [RBM09]. In this paper we describe the challenges and the validity of this approach from a business and organizational point of view and conclude with a brief idea how to solve these issues.

The remainder of this paper is organized as follows. The next section briefly describes three current IT Governance approaches in telecommunication business and outlines why component governance is the most suitable approach for TelCos. In section 3 we describe and analyse the shortcomings of the component governance approach we experienced in practice with respects to the organisation. The last section concludes the paper and outlines future work.

2 Current IT Governance Approaches in TelCos

Currently, modern telecommunications companies use three different governance methods to reach a better IT business alignment. In the following section we depict the characteristics of functional governance, product governance and component governance.

2.1 Functional Governance

The functional governance method, is a more less classic approach to organize enterprises like telecommunication companies. The idea of this approach is to aggregate various activities with a high degree of similarity into functional units. Using the functional governance method TelCos have many functional units, e.g. sales and distribution (Customer Relationship Management), production (Fulfillment), operations (Operations), management of resources (Readyness), assurance, billing etc. Each service or product needs a combination of different functionalities of different units. This means each functional unit has its expertise in its particular field and it is possible to reuse and optimize its own workflows. The downside of this approach is that all products and services are highly dependent on each other. Even though especially for the telecommunication industry, frameworks like the enhanced Telecom Operations Map (eTOM [Fora]) support and implement functional governance methods. Due to the strong dependencies between a TelCo's products it is necessary to maintain a comprehensive data model. In the business field of TelCos different

approaches exist to harmonize such huge data models. One example is the Shared Data Model (SID [Forb]). It is obvious that all these activities to solve and maintain dependencies between products and services cost a lot of money and resources.

2.2 Product Governance

The product governance approach is designed to avoid dependencies between products and services. Hence it is nearly impossible to reuse any software components or workflows of different products [CW06]. The idea of product governance is a common approach in manufacturing where companies try to have a one separate production line for each product. This approach does not require a comprehensive data model. But to be successful on mass markets companies using the product governance approach need to accomplish the same activities (e.g. production, billing, operations) as companies using the functional governance approach. However the product governance method requires these activities for each product or service separately. For instance a TelCo with 3 products has 3 separate production lines and needs separate production functionalities for each production line. In a functional governance scenario for example a TelCo just needs one functional unit which provides the production functionalities to all 3 products. The product governance approach is very flexible and the cost structure is nearly ideal. In addition to that, the product governance allows a company to outsource a whole production line, because of consistent separation of the products. A product governance would be a nearly ideal IT infrastructure for a TelCo. Unfortunately, it is not possible to apply this structure in reality. The reason is that various products of a TelCo need to share some critical technical system resources (platform). For example products need to share the usage of cables in the area of network access or IP connections. As a consequence it is nearly impossible to manage the dependencies between several production lines. In addition to that there are some more challenges using this approach. For example is it extremely difficult to create a single point of communication in a product governance scenario and for cross product troubleshooting (Assurance) various production lines have to be harmonized.

2.3 Component Governance

The component governance approach tries to combine the advantages of the functional governances and product governance methods. As shown in the previous subsections, the functional governance approach is very inflexible and cost-intensive because of the dependency of products. To apply product governance in TelCos is nearly impossible for technical reasons. The key idea of this approach is that the product structure is separated into a tree structure with components. [RBM09] That means market products at the point-of-sale are composed of several reusable components.

Using the component governance approach contains the application of different components or so-called atomic products. A market product, e. g. a double-play product, will

be provided as a combination of VoIP and broadband components. Each component has its own production line and therefore needs to have all necessary functionalities. To provide a wide range of market products it is possible to reuse different components to combine new market products. The problem of the product governance approach is that some technical system resources need to be shared between products. In component governance it could occur to have the same dependencies between different market products whenever it is required to share critical system resources, but the dependencies are encapsulated within the atomic products. Another advantage of the component governance approach is that a cross-component data models is not necessary.

Component governance is a result of the combination of the 2 other methods but more important it is a realizable IT governance method for TelCos. Within the components, the structures and functionalities it is still possible to harmonize the IT of TelCos and to use current approaches e.g. eTOM [Fora], SID [Forb] or ITIL [Lim]. Hence it is possible to use standard software products, Commercial off the Shelf $COTS$ products.

Compared to functional governance, component governance applies only few rules which enforce the business alignment of the whole IT landscape of the company.

3   Component Governance in Practice

As briefly described in the previous section all these governance approaches have to deal with different conditions imposed by the real environment of a telecommunications company. All of the compared governance approaches try to align the business of a company with its IT landscape. The IT of a company should be just a means to an end. IT should be build and solely used to achieve the business goals of the specific company (cf. [RR06]). Component governance as a symbiosis of the two other approaches seems to be the most suitable approach for telecommunications companies. Nevertheless in practice component governance is still facing some challenges to make telecommunications companies as agile and flexible as necessary to be successful on future markets. Some of the key challenges are described in the following list:

- *Federation on platform level:* Even though component governance allows for the separation of different products from one another, it is still hard to implement component governance on the platform level, i.e. separating one platform related component from the other. This issue is caused by the strong dependencies between technical and infrastructural resources on the platform level. Sometimes it is inpredictable which data need to be shared, sometimes it is not allowed to share or exchange date for security reasons. These dependencies make it very complex to define clear borders between technical components. Hence federating platform related components from different providers is still a problem.

- *Incongruity:* When component governance is applied to a companies IT alone (as opposed to its organizational structure), IT and organization are not harmonized. Such a situation would lead to serious coordination problems. This inconsistency

disallows telecommunications companies to be agile and flexible enough to shorten the time-to-market phase and to apply market-products in a dynamic individual manner. Applying component governance as an add-on and installing it on top of or orthogonal to existing functional structures is thus not a viable option.

- *Activity Based Costing:* To use Activity Based Costing [KB87] as an effective cost accounting method it is crucial to have consistent processes in a company. The component governance approach helps to apply standardized end-to-end processes but the dependencies between products and the inconsistency of the structures are reasons which make it difficult to apply a activity based costing within a telecommunications company.

When applying the component governance approach in practice all these challenges have to be solved. One idea to make a company more dynamic is to apply business transaction networks, based on the component governance approach, on an organizational level. Within a business transaction network every end-to-end process is composed of various business transactions. Business transactions are clustered by different rules e.g. products, clients or resources. These clusters shall be applied on the organizational level of a company. All clusters have clearly defined and standardised interfaces. To enhance the flexibility of a company each cluster should be designed in a fractal structure [War96] and can be seen as a separate virtual company. This means outsourcing or insourcing would be less complicated as in current approaches. To verify this approach we will conduct further research in the area of different organizational governance methods.

4 Conclusion and Future Work

In this paper we primarily described three different governance approaches. We showed that component governance tries to combine the advantages of the functional and the product governance approaches. We demonstrated that component governance is the most suitable approach to be used in modern IP-centric telecommunications companies. Nevertheless even the component governance approach has to tackle some key challenges in practice.

In the future, the approach of component governance will be implemented in a major German telecommunications company. Our future work on component governance will include research on the idea to apply business transaction networks based on component governance on a organisational level of a telecommunications company. Furthermore we will investigate how to ideally cluster business transactions and what is an adequate multi-level procedure to transform the organisation of a telecommunications company into a business transaction network.

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