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# KEY BUSINESS ARTIFACTS: A METHODOLOGY FOR THE STRATEGIC MODEL WITHIN THE MDBT (MODEL DRIVEN BUSINESS TRANSFORMATION) FRAMEWORK

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# KEY BUSINESS ARTIFACTS: A METHODOLOGY FOR THE STRATEGIC MODEL WITHIN THE MDBT (MODEL DRIVEN BUSINESS TRANSFORMATION) FRAMEWORK

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## Abstract

*The present research in progress paper presents the description and formalization of a new strategic analysis methodology that allows a vision of the whole business of a company as a set of interacting Business Artifacts that operate upon firm resources. The concept of Business Artifact (BA) already introduced and used for business process modeling within the Model Driven Business Transformation (MDBT) framework is the basic element of our methodology. The theoretical foundations of the work are provided by the Resource Based View (RBV) of the firm theory (Barney, 1991).*

*Considering that, by definition, each Business Artifact has a data model, in which all the resources it needs and uses during its lifecycle are specified, we want to identify which Business Artifacts are strategically relevant for a company and prioritize them according to the Sustained Competitive Advantage they could be able to provide. These key BAs should then be the target of any IT-dependent strategic initiative, that should include actions aimed at improving or transforming these BAs in order to achieve, maintain and exploit the company competitive advantage.*

*Keywords: Resource Base Theory, Artifact-Centric Operational Modelling, Strategic analysis, IT-enabled business transformation.*

# 1 INTRODUCTION

The Artifact-Centric Operational Modelling (ACOM) is a methodology – developed within a framework named Model Driven Business Transformation (MDBT) (Bhattacharya et Al., 2005; Bhattacharya et Al., 2007) – that supports IT-enabled business transformations (Liu et Al., 2009). ACOM specifies the modelling of a business process with an information-centric approach that allows generating quasi-automatically the software solution supporting the modelled business process (Bhattacharya et Al., 2007; Liu et Al., 2007).

The MDBT framework has been specifically designed to help organizations in achieving a flexible structure in order to quickly respond to environmental and market changes and to pursue, through ACOM, continuous improvement within internal and external processes. Contrary to the traditional, activity-centric, approach to process modelling, ACOM enables time and money savings by rapidly providing a business analyst with a prototype representing the process and simulating its functioning (Kumaran et Al., 2008), thus allowing her customer to start thinking about how to transform and improve that process. The ACOM approach proved to be suitable and successful in addressing specific business objectives related to a process re-design or to an IT platform implementation (Chao et Al., 2009), and in general, it is particularly suitable if a company already knows which processes it needs to transform. Problems arise, instead, when the company doesn't know exactly what its transformational objectives are before linking them to IT solutions: the Artifact-centric approach assumes that a company is able to identify which Business Artifacts make up its business and which ones should be transformed in order to fulfil strategic aims.

Such an assumption is far from being realistic. In fact large part of the IS literature about IT/IS strategic alignment deals just with the complexity of the task of expressing the strategic objectives in terms compliant with the design of the information system (Henderson et al. 1997, Avison et al. 2004, Wonseok et al. 2007). ACOM moreover, covers just the operational layer within the MDBT framework (as shown in Figure 2) but lacks of an identification and prioritization of the Business Artifacts and thus, of the processes which make up a company's business. The present research aims at complementing the ACOM approach by adding a "strategic layer". This layer, that actually is already existent in the MDBT framework but not formalized, consists of a methodology, complementary to ACOM, which drives the analysis of the business strategy and the identification of the strategic priorities by using the same central concept of ACOM, i.e. the Business Artifact, but extending its scope to include the role of a Business Artifact within the business strategy.

The theoretical background to support this development of the model is provided by the Resource Based Theory (Barney 1991) that allows identifying which Business Artifacts (BAs) enable the achievement of a sustainable competitive advantage to the company. This research in progress paper is organized as follows: chapter 2 presents a description of the MDBT framework and of the concept of Business Artifact and of its characteristics, chapter 3 is about the Resource Based View of the firm, focusing on the definition of a *resource* and its impact on achieving a sustainable competitive advantage, chapter 4 will describe the association between Business Artifacts and sustained competitive advantage, chapter 5 will present and describe the proposed strategic analysis methodology more in detail, and chapter 6 will present our conclusions and the future work required to complete the study.

## 2 THEORETICAL BACKGROUND ABOUT MDBT AND BUSINESS ARTIFACTS

The Business Artifact-centric approach, different from traditional business modelling methods, which often consider process modelling and data modelling separately, takes a unified approach by representing business processes as interacting business artifacts. Each business artifact is characterized by a self-contained information model and a streamlined lifecycle model. The lifecycle model consists of a collection of business activities that act on the business artifact progressing towards the

operational goal as manifested by the business artifact. The information model includes information needed in executing the activities. For example, in account opening, the data entity *Arrangement* is likely to be identified as a business artifact. Its lifecycle model describes business activities such as *Identifying Customers*, *Proposing Arrangement*, *Accepting Arrangement*, and *Activating Arrangement* etc. Each of these activities brings a significant milestone in the lifecycle of *Arrangement*. The information model of this business artifact contains data attributes of *Arrangement*, such as *Customer ID* and arrangement conditions, as well as other data artifacts, e.g., *Proposal* and *Offer* that are created or modified in the context of arrangements. Traditionally, the information model of a business artifact is primarily a placeholder for business records that are either necessary inputs to business activities in its lifecycle or the results produced by the activities. In this research, we extend the information model of a business artifact to include representations for tangible or intangible resources, and capabilities that are required for executing activities. These are also required inputs to business activities, but often ignored in most process modelling approaches.

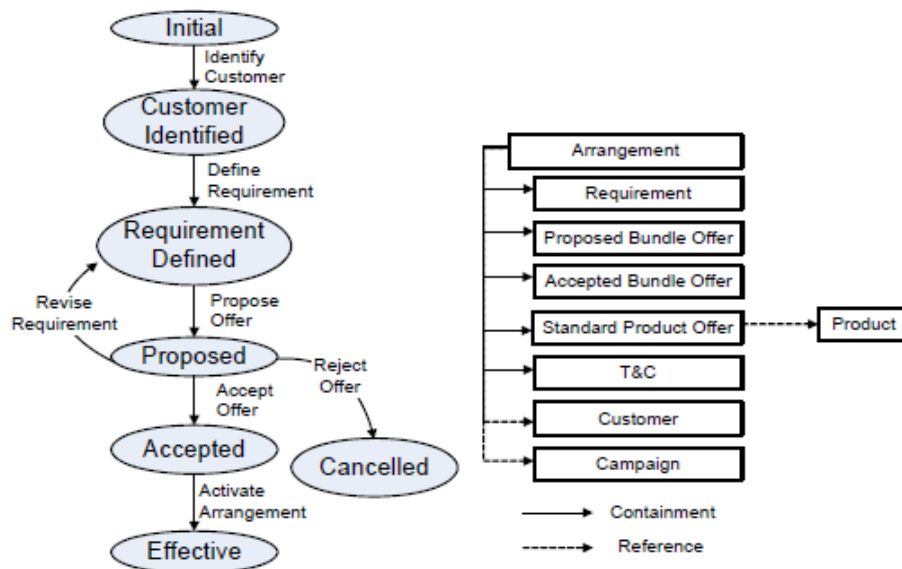


Figure 1. Behaviour model and data model of a Business Artifact

Model-Driven Business Transformation (MDBT) is a methodology and also a tool set for transforming business strategies into IT implementation in order to achieve the alignment between business and IT, as shown in Figure 1. MDBT contains a series of transformations. The first transformation extracts operational objectives from a strategy model and then defines business entities to manifest the operational objectives. Accordingly, an operation model is created as interactive business entities. For instance, a pharmaceutical company with a strategic alliance defined a business strategy where the objective is to “Develop transparent cost drivers”, and initiatives are set to “create a new development plan process” (Kaplan et al. 2010). In this sample business strategy, the initiatives define an operational goal that further indicates that development plan may qualify as a business artifact to start with. The second transformation in MDBT builds a composition model from the operation model. In the composition model, more application design details can be added, for example, automation of business activities as service operations, visibility to business artifact information model per role and per business activity etc. MDBT provides a tool to make this transformation semi-automatic. The last transformation generates IT applications that are also called implementation models from the composition model.

Clearly, in MDBT methodology, the starting point is a well-defined business strategy model from which business artifacts can be easily identified. However, often business strategies do not lend themselves to business artifacts identification.

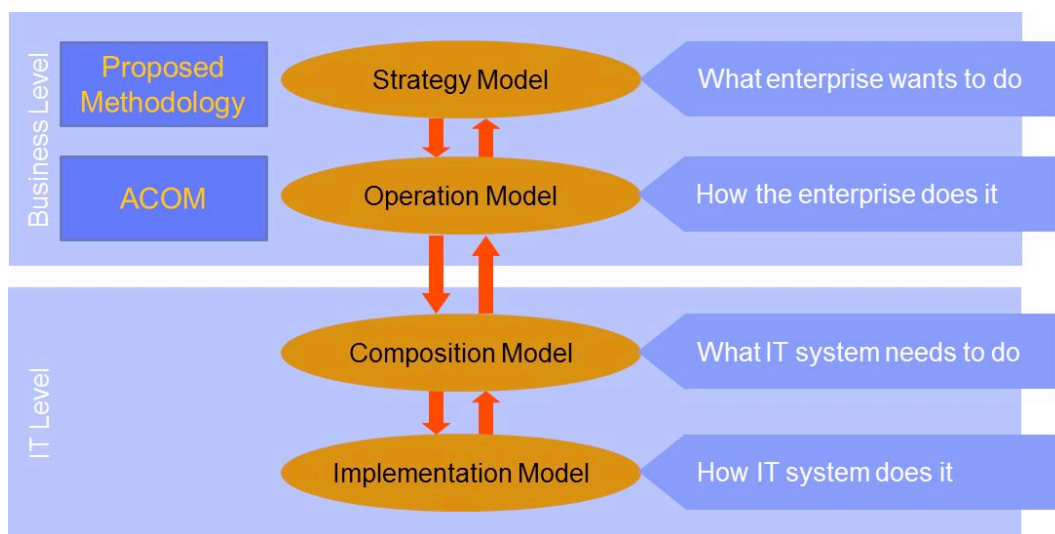


Figure 2. The Model Driven Business Transformation Framework

### 3 THEORETICAL BACKGROUND ABOUT STRATEGIC ANALYSIS METHODOLOGIES (RBV)

Coherently with the aim of proposing a new strategic analysis methodology that is suitable to be integrated with the Artifact-centric approach to process modelling, we performed a large literature review and analysis of representative strategic analysis models and methods (such as Porter’s five forces, Six Sigma, Component Business Model and others) in order to verify their compliancy with our research aims. None of the reviewed strategic analysis approaches resulted compliant with the concept of Business Artifacts, in the sense that an application of any of them would have required an additional effort in order to come to the identification of Business Artifacts (*reference omitted for review*). Thus, we thought to design a new strategic analysis methodology. To pursue this goal we preferred to start from a general theory and derive a methodology from that theory rather than design a methodology from scratch. After an overview of the main theories used in IS research, dealing with strategy, we recognized some similarities between the concept of *resource* used within this Resource Based View of the Firm Theory and the *resources* used by BAs and contained in its data model.

The Resource Based View of the firm theory (RBV or RBT) proposed by Barney in 1991 has the objective to understand how a company can achieve a Sustained Competitive Advantage (SCA) by implementing strategies that exploit internal strengths, through responding to environmental opportunities, while neutralizing internal threats and avoiding internal weaknesses (Barney, 1991). According to Barney, SCA can be achieved through *firm resources*. Ironically, the definition of firm resources is the main controversial issue of the RBT. A detailed literature review led us to the conclusion that neither Barney nor other scholars later have been able to agree to a common vision about the concept of *resource*.

According to Barney’s 1991 definition, *firm resources* “include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of or implement strategies that improve its efficiency and effectiveness”, and traditionally, according to Porter (1981) “resources are strengths that firms can use to conceive of and implement their strategies”. After these two definitions, several scholars distinguished between resources and capabilities, for example, according to Grant (1991) resources are:

- Tangible resources, that include the financial capital and the physical assets of the firm such as plant, equipment, and stocks of raw materials.
- Intangible resources, that encompass assets such as reputation, brand image, and product quality, while

- Personnel-based resources, that include technical know-how and other knowledge assets including dimensions such as organizational culture, employee training, loyalty, etc.

While capabilities refer to an organization's ability to assemble, integrate, and deploy valued resources, usually, in combination or co-presence (Schendel, 1994; Russo, 1997). And thus, Sustained Competitive Advantage is created by integrating resources to create organizational capabilities.

Considering resources from Barney's perspective, they can be divided in some subsets and only a particular kind of resources is able to provide SCA. A resource that have the potential to provide SCA must be:

- Valuable, when they enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness.
- Rare, when they're not possessed by a large number of competing or potentially competing firms.
- Imperfectly imitable, if the firms which don't possess these resources cannot obtain them.
- Not substitutable, if there are no strategically equivalent resources that are themselves not rare or imitable.

At a superficial analysis, Barney's definition of firm resource may appear coherent with the aim of the present work, because it's the one more adherent to the concept of resource contained in the data model of the Business Artifacts. In fact, in the data model of a Business Artifact, one may find the specification of physical assets that are consumed by tasks or role players who execute tasks, as well as competences, skills and knowledge (that fall under the definition of capability) required for the lifecycle of that Artifact. On the other hand, one must consider that Business Artifacts *use* resources as they are processed (by activities), but at the same time (according to Barney's definition) Business Artifacts *are* firm resources, because they encapsulate business processes that can implement strategies to improve efficiency and effectiveness (Barney 1991). Moreover there can be other firm resources, such as the management team or physical location that may not be used by Business Artifacts.

## 4 THE SOURCES OF THE SUSTAINED COMPETITIVE ADVANTAGE

As discussed above, the definition of firm resource is broad and inherently ambiguous as it can be applied to different "entities" related to a company and encompasses many and diverse concepts. Thus, before investigating into the link between Business Artifacts and SCA, it is suggestable to get back to the roots of RBC and focus on what SCA is and which are the sources of the SCA. According to Barney (1991) a firm is said to have a *Sustained Competitive Advantage* when it's implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy. Notably, there is much more agreement about the definition of the SCA rather than resource and, apart for some discussions about the sustainability and duration of the competitive advantage (Wade and Hulland, 2004), the definition reported here is widely accepted among different authors and clear enough in order not to generate misunderstandings. A few, credited scholars propose a different definition: according to them SCA occurs when competitors face significant challenges in acquiring, developing and using the resources underlying the value creating strategy (Mata et Al. 1995, Ross et Al. 1996). By referring to resource to define SCA, they end up undermining the explanatory power of the definition that almost has a structure of a tautology.

On the basis of the general definition of SCA it is now possible to investigate which are the sources of SCA and what is the relation between Business Artifacts and SCA. According to Barney, this relation is clear: SCA is achieved through the conception and implementation of strategies employing firm resources. To avoid the ambiguity introduced by the term resource, we find useful to keep as a reference Barney's foundational paper (1991) and highlight the properties of the "entities" he mentioned as basis of the SCA. From this standpoint it is reasonable to claim that SCA can be provided by entities that are valuable, rare, imperfectly imitable and without strategically equivalent substitutes. By matching these properties with the definition of Business Artifact we can conclude that

these “entities” (that Barney names firm resource) may correspond to: (1) a Business Artifact, (2) a particular characteristic of the Business Artifact that makes the BA in the condition of providing SCA, (3) or other factors not directly related to any Business Artifact.

The first situation is possible, but from an *a priori* perspective should not be very common in real industrial contexts: in order to directly link SCA to a single Business Artifact it's necessary that for some reason that specific Business Artifact is at the same time valuable, rare, imperfectly imitable and without strategically equivalent substitutes. We assume more likely the second situation, where a certain Business Artifact is owned by all the competing companies, but a specific characteristic contained either in its lifecycle or informational model makes it able to provide the SCA to a company. This latter case should be more common. For example, within the services industry, very often the same information is available to all the companies, but what makes the difference is the way it is processed. Thus, back to our specific case, the behaviour model of this information or a part of the data model of the Business Artifact itself is responsible for providing the SCA. Eventually the SCA can be obtained from situations that cannot be directly connected to a specific Business Artifact (situation 3). This is the case of what Barney calls “*historical conditions*” and “*social complexity*”. For example, in case SCA is obtained thanks to a particular location of the production facility, there is no evident connection between the SCA and any Business Artifact, unless we force the facility to be an Artifact, but this operation would not be correct, as a Business Artifact by definition is an information entity which encapsulates a process and captures a process goal.

## 5 DESCRIPTION OF THE METHODOLOGY

We can now apply the outcomes of the discussion presented above to define a methodology integrating the ACOM at the strategic layer of the MDBT.

The first step of this methodology is the identification of the sources of Sustained Competitive Advantage for the company. This task should be performed by executives or strategy consultants and without the abstraction of the term firm resources. Rather, the analysis should focus on the “entities” determining the SCA (assuming there is a SCA).

The second phase aims at relating the sources of the SCA and the Business Artifacts. In this phase all the BAs that are to some extent responsible for a SCA should be identified (phase 2.1). Subsequently the analyst should build the behaviour model of these Business Artifacts and draw their data model, in order to give full characterization to each Business Artifact and eventually identify the relationships between the Business Artifacts (phase 2.2). Noteworthy, the output of the second phase is a partial picture of the business, as we identified just those BAs influencing the creation of SCA. At this strategic level it is not necessary to complete this picture identifying all the BAs involved in the business of a company.

In the third phase the identified BAs should be prioritized. This task requires to evaluate the potential Sustained Competitive Advantage that could be achieved and identify the potential barriers that the company can put to the imitation of competitive advantage. This stage is directly connected with the definition and conception of the strategy, as the key BAs are those that – among the others – contribute more largely to achieve a SCA, and thus to fulfil the company strategy. Once the key BAs are identified, their lifecycle should be modelled and prototyped in order to evaluate IT dependent strategic initiatives involving the key BAs. In particular, order to exploit and/or put solid barriers to the sustained competitive advantage they provide to the company (activities that, of course, are carried out following the ACOM approach).

The monitoring stage is the last phase, in feedback, of the methodology. The key Business Artifacts should be characterized with Key Performance Indicators, and a monitoring system should be put in place to provide executives with an updated picture of the strategic impact of their initiatives. This latter stage of the methodology has not been defined yet, even though we already performed a literature review on the topic (*reference omitted for review*), we've not been able to find any methodology perfectly suitable with the ACOM approach, but can hypothesize an application of some measurement techniques such as Balanced Scorecard, that however still need further work.

## 6 CONCLUSIONS AND FUTURE WORK

In this paper we presented our preliminary research. We evidenced that the ACOM methodology – with all the benefits it can give to a company's business and to its processes – cannot be applied *per se* and that in order for companies to achieve flexibility and continuous improvement, through the application of the MDBT framework, the development of a strategic analysis methodology is required. We therefore identified a gap in the MDBT framework and came to the identification of a theoretical framework, based on the SCA, coherent with the Business Artifacts and thus with ACOM. Hence we identified a path that led us to the formulation of a methodology; the first proposal of the methodology is eventually described within the paper.

The future work in our research will be firstly directed to a further definition and refining of the proposed methodology, thus we will perform the following activities:

- Further review on the RBV theory and on the related concept of dynamic capabilities, in order to develop a more accurate definition of the relationship between Business Artifacts and Sustained Competitive Advantage.
- Theoretical investigation about which kind of IT-dependent strategic initiatives can be performed to get a sustained competitive advantage through the Business Artifacts. A challenging issue would be related to the identification of some practical guidelines on how to design or redesign the key Business Artifacts in order to maximize the sustained competitive advantage they can provide to the company.
- Characterization of the performance measurement system for the Business Artifacts, according to the Balanced Scorecard approach or to other methodologies or techniques.
- Application and test of the methodology in a real company case study.

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