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## **ANALYSIS OF THE BUSINESS MODEL ELEMENTS AND THEIR RELATIONSHIPS**

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## **ANALIZA ELEMENTÓW MODELU BIZNESOWEGO I ICH ZALEŻNOŚCI**

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**Summary:** Business model that articulates the economic logic of how an organization creates and delivers value should underlie every performance measurement system and should explain how the important nonfinancial and financial variables in the performance measurement system are related to each other. Due to the lack of research in this area, the conceptual framework for analyzing elements of the business model and relations between them has been proposed. This paper explores also the concept of business model life cycle and controlling as a part of this concept. For analysis of business models this study proposes resource and process consumption accounting (RPCA) method. Its components (resources, activities, products/services, customers) are at the same time elements associated with the Osterwalder's Business Model Canvas (BMC).

**Keywords:** business model life cycle, resource and process consumption accounting.

**Streszczenie:** Model biznesowy, który odwzorowuje tworzenie i dostarczanie wartości przez organizację, powinien stanowić podstawę każdego systemu pomiaru dokonań i powinien wyjaśniać, w jaki sposób istotne zmienne niefinansowe i finansowe w systemie pomiaru dokonań są ze sobą powiązane. Ze względu na brak badań w tej dziedzinie, zaproponowano ramy koncepcyjne analizy elementów modelu biznesowego i relacji między nimi. W artykule zaprezentowano również koncepcję cyklu życia modelu biznesowego i controlling jako składową tej koncepcji. Zaproponowano zasobowo-procesowy rachunek kosztów jako metodę analizy modeli biznesowych. Jego składowe (zasoby, działania, produkty/usługi, klienci) są jednocześnie elementami związanymi z szablonem modelu biznesowego (BMC) Osterwaldera.

**Słowa kluczowe:** cykl życia modelu biznesowego, zasobowo-procesowy rachunek kosztów.

## 1. Introduction

A business model is an abstract representation of business logic [Tece 2010]. Serving as a reference framework, it supports practitioners in conceiving, designing and communicating business ideas. The academic literature provides analyses of how organizations design and innovate their business models [Zott, Amit 2010; Afuah 2014]. However, although the business models can be understood as a structured management tool, there is still no clear understanding of its roles beyond design and innovation.

This paper is structured as follows: The next section overviews the analytical consequences (mainly related to the costs) of the use of Osterwalder's Business Model Ontology and Business Model Canvas which are the formal foundation for the business models. Section 3 presents controlling as a part of business model life cycle and the management accountant's role in this process. Section 4 describes Resource and Process Consumption Accounting (RPCA) as a method for business model analysis. In this section we propose conceptual research framework for an analysis of the business model elements and their relationships. Section 5 contains final remarks.

## 2. Business model concept

Although every company adopts a business model, either explicitly or implicitly, it remains an open question what exactly is understood by business model, that is, how it should be conceptualized. At a fundamental level, scholars and practitioners agree that the business model is crucial for the success of today's organizations, especially concerning growth potential, competitive advantage, long-term performance, and as a new source of innovation.

Osterwalder provides the formal foundation for the business models in the form of the Business Model Ontology (BMO) [Osterwalder 2004]. The key concepts of this ontology map to four general areas, similar to the balanced scorecard [Kaplan, Norton 1992] and to the strategy maps [Kaplan, Norton 2004] (see Fig. 1): product (the value a company offers), customer interface (one or several segments of customers), infrastructure management (the architecture of the firm and its network of partners), and financial aspects (profitable and sustainable revenue streams).

Osterwalder described the BMO in much detail in his PhD thesis [Osterwalder 2004]. From his description, we have derived the metamodel presented in Fig. 2. It shows all key concepts included in the BMO and their relationships. These elements are decomposed into subelements. For example, a value proposition may consist of multiple offerings.

As we use Osterwalder's BMO, we adopt his definition of a business model [Osterwalder et al. 2005]: "A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of

a specific firm. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, to generate profitable and sustainable revenue streams.”

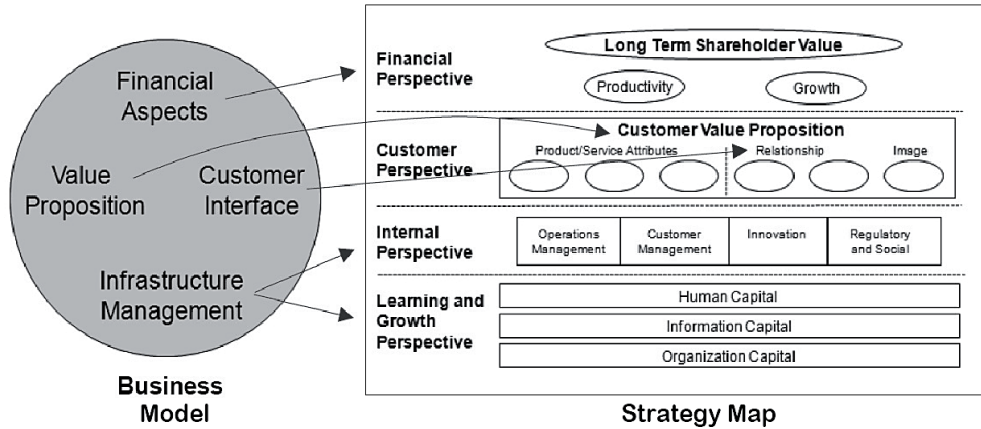


Fig. 1. Business Model and Strategy Map

Source: own elaboration.

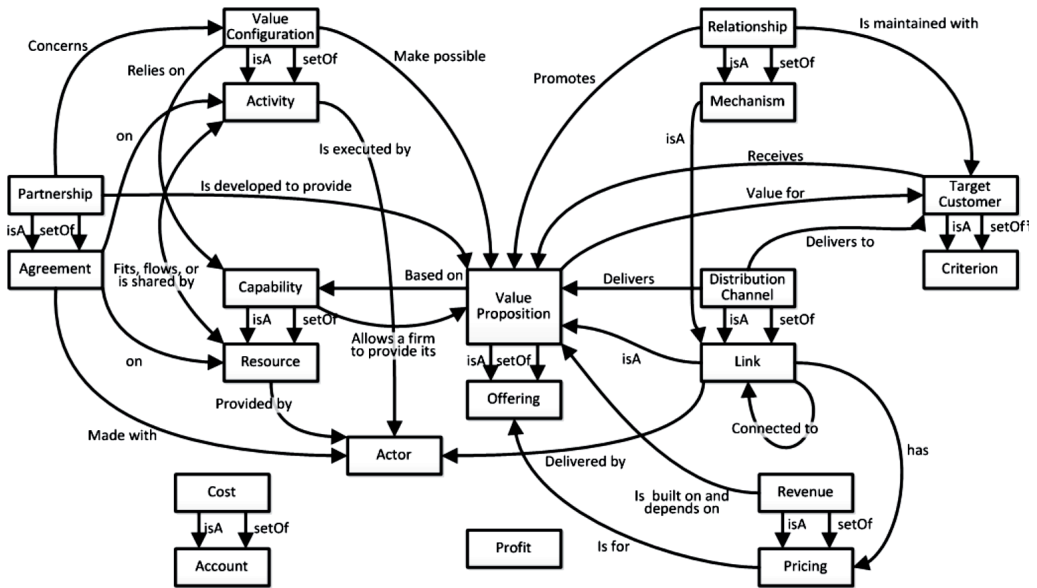


Fig. 2. Metamodel for the Business Model Ontology (BMO)

Source: own elaboration.

While the BMO consists of 20 concepts, its later versions include only nine concepts. These form the Business Model Canvas (BMC) [Osterwalder, Pigneur 2010], name which gives a clear hint on the intended use and practical relevance of BMO, namely that of a tool to design and specify business models. The main reduction of concepts comes from combining the elements with their subelements, which has significantly contributed to BMC's parsimonious character, and most probably, to its quick success. For example, from the two pairs, Value Proposition and Offering, and Capability and Resource, only Value Proposition and Resource remain. Table 1 shows the concepts of the BMC and the corresponding concepts from the BMO.

**Table 1.** Corresponding concepts

Perspective	BMO concept	BMC concept
Customer interface perspective	Target Customer	Customer Segments
	Criterion	
	Distribution Channel	Channels
	Link	
	Relationship	Customer Relationships
Mechanism		
Products/services perspective	Value Proposition	Value Proposition
	Offering	
Infrastructure perspective	Capability	Key Resources
	Resource	
	Value Configuration	Key Activities
	Activity	
	Partnership	Key Partners
	Agreement	
Actor		
Financial aspects perspective	Revenue	Revenue Streams
	Pricing	
	Cost	Cost Structure
	Account	

Source: own elaboration.

Perspectives, besides helping to group the elements into fewer components, can be interesting starting points. A business model can have its focus centered on the resources (activity perspective), the value proposition itself, the customer or even focus on the financials at the very beginning. Once the business model is already populated with elements, it can be helpful to see which element is linked to others. This identifies if an element is missing and helps in communicating the whole business model to outsiders.

We may assume that the BMC metamodel (see Fig. 3) can be derived from the BMO metamodel by considering that the relationships between BMC elements are inherited from BMO.

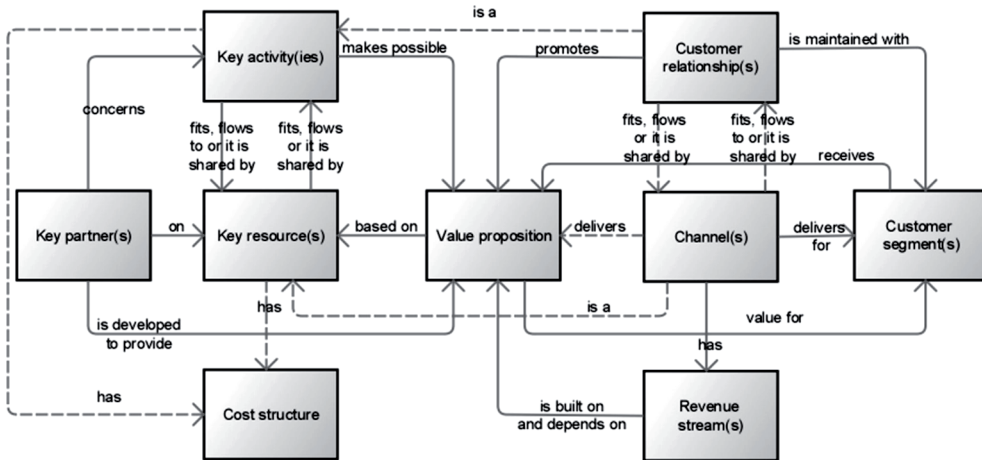


Fig. 3. Business Model Canvas (BMC) metamodel and proposed extensions

Source: own elaboration.

In the original BMC metamodel is no explicit relationship defined between the cost structure and any other elements. To compensate this, we propose the extension of the BMC metamodel with the following relationships:

- a “has” relationship from the key activities to the cost structure; key activities require the usage/consumption of resources, which generate costs,
- a “has” relationship from key resources to cost structure; we argue that key resources must be connected to costs, as the costs of all activities can be seen as resulting from the consumption/usage of resources during their execution.

Another problem (also related to costs) is that the creation and maintenance of customer relationships may also generate significant costs (e.g., through creation and distribution of marketing materials), as they can also be seen as a type of activity during which resources are used/consumed. However, no direct (or indirect) relationship in the BMO is defined between the customer relationship element and cost structure. We solve this issue by adding an “is a” relationship from customer relationship element to the key activity element. A similar situation occurs with the channels, which can be seen as resources that cost money. Take, for example, the portal application of a web shop, which is the channel through which the business is done and, hence, a key resource. The solution is to add a “is a” relationship from channels to key resources. Additionally, we may also consider extending BMC with a bidirectional “fits, flows to, or it is shared by” from the customer relationship

element to the channels element in order to make explicit the resources (i.e., channels) assigned to the customer relationships. Finally, we also miss a “delivers” relationship from channels to value proposition, since channels are also the means through which the value proposition reaches the customers.

The proposed additional relationships are shown in Fig. 3 with dashed lines and they do not belong to the original BMO metamodel definition.

Another, more fundamental issue with the BMO definition is the inclusion of capabilities in the key resources element. Osterwalder’s capability definition is that of “ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer”. On the other hand, Osterwalder defines the activity concept (which forms the core of the key activity element) as “an action a company performs to do business and achieve its goals.” As can be easily seen, not only are the two definitions semantically very much related, but also they suggest that capability (as ability of performing activities) and activity should better belong together to the same element (i.e., the key activities element) as they have the same nature: they both express behavior. Instead, the key resources element should only focus on the specification of tangible assets (e.g., plants, equipment, information systems and cash reserves), intangible assets (e.g., patents, copyrights, reputation, brands and trade secrets) and human assets (i.e., the people a firm needs in order to create value with tangible and intangible resources), i.e., on the assets an organization owns or controls. In the BMC, this problem somehow disappears, since the capability concept has been eliminated, and the only remaining elements are, simply, key activities and key resources.

### 3. Controlling as a part of business model life cycle

Recently, scholars have begun to investigate the phases of business model management beyond design, such as analysis [Pateli, Giaglis 2004; Ammar, Ouakouak 2015], implementation [Hienerth et al. 2011], and management [Chroner et al. 2015]. According to Morris et al. [2005] it is possible to envision a business model life cycle involving periods of specification, refinement, adaptation, revision, and reformulation; Cavalcante et al. [2011] distinguish between business model creation, business model extension, business model revision and business model termination. Wirtz [2011] identifies within business model life cycle the following phases: design, implementation, operation, change & evolution, and performance & controlling.

Business model that articulates the economic logic of how an organization creates and delivers value should underlie every performance measurement system and should explain how the important nonfinancial and financial variables in the performance measurement system are related to each other.

However, these models and the performance measurement systems derived from them might be based on erroneous *ex ante* hypotheses about cause-and-effect relationships. Hence, management accounting scholars argue that the analysis (and

periodic modification) of these models is crucial. For example, Ittner and Larcker [2003] argue that “if companies don’t investigate whether there is a plausible causal relationship between actions and outcomes, they condemn themselves to measuring aspects of performance that don’t matter very much.” In general, these scholars contend that this analysis can reveal whether the measures used to describe the firm’s business model are associated with each other as expected, and whether, together, these variables lead to improved performance. The verification can also help managers identify circumstances that affect the strength of the relations among the measures [Dikolli, Sedatole 2007; Campbell et al. 2015].

In looking at changes to corporate business models, management accountants could take the lead by considering a series of questions such as [CGMA 2013]:

- Are the outcomes of the current business model being measured appropriately?
- Is the value of non-traditional assets such as human and intellectual capital accurately reflected in the current model?
- Do changes in a company’s financials suggest shifts in Porter’s five forces that indicate either threats or opportunities?
- How do the financial risks of pursuing the new model compare to the risks of following the status quo?
- Do legacy accountancy practices appropriately capture potential sources of revenue for models that feature more diverse revenue streams?
- In evaluating a new business model, should cost allocation methods be revised to reflect a more complex business environment?
- Should traditional pricing models such as cost-plus be re-examined for modern business settings in which, for example, producers of value and consumers are almost indistinguishable?
- Is a new way of calculating return on investment needed?
- Should forecasting models be adjusted to most accurately capture the potential of an innovative business model?

#### **4. Resource and process consumption accounting (RPCA) method for business models analysis**

Resource and Process Consumption Accounting (RPCA) is a part of the latest global trend in research on cost accounting, the essence of which is the integration of German *Grenzplankostenrechnung* (GPK) (flexible marginal standard costing) and the cost allocation methods of activity based costing (ABC) within the framework of single resource-and-process-based costing.

Today, the integration of these two concepts of cost accounting is researched globally. Attempts to link GPK and ABC are presented in the USA under the name Resource Consumption Accounting (RCA) [Keys, van der Merwe 2002] and in Germany under the name *Prozesskonforme Grenzplankostenrechnung* [Müller 2002]. Studies on the resource-and-process-based approach to cost accounting are

also carried out in Poland, where they are presented under the name *zasobowo-procesowy rachunek kosztów* [Zieliński 2014].

Resource and process consumption accounting<sup>1</sup> (RPCA) has been defined as systematic and comprehensive management cost accounting which integrates assumptions of German *Grenzplankostenrechnung* (GPK) and Anglo-American Activity-Based Costing (ABC), processing financial and nonfinancial data, according to strictly defined rules, into management information about costs of resources and processes, as well as costs and profitability of products, services, and customers, presented in a multi-dimensional way with maintaining divisibility of cost information in terms of both actual and planned costs necessary to support short-, medium- and long-term decisions at all management tiers of the company [Zieliński 2014, p. 84].

RPCA is a combination of detailed information on resources, their costs and usage (GPK) with information on costs and effectiveness of activities and processes (ABC), made in a manner ensuring cause-and-effect allocation of costs to products, services and customers, as well as high interpretation quality of costing information.

RPCA is cost accounting that has already been successfully implemented in several dozen Polish companies of production, service and trade industries. This type of cost accounting has been implemented in large and medium, as well as small companies. Extensive application of this type of cost accounting in various industries and sizes of companies indicates its versatility and potential for use in controlling processes of many organizations.

The structure of resource and process consumption accounting presented in Figure 4 shows that this concept involves the multi-stage allocation of costs between twelve types of objects, which, are organized in four main categories: resources (resource cost centers), activities, cost objects and direct costs. These objects are connected through eleven relationships based on three main types of cost drivers: resource cost drivers (relationships no. [1], [3], [5], [9] and [10]), activity cost drivers (relationships no. [2], [4] and [6]), and cost object cost drivers (relationships no. [7], [8] and [11]). These relationships reflect the allocation of costs in RPCA, from resource cost centers and direct costs to final cost objects of products, services and customers.

The purpose of the approach to defining objects and relationships between them developed under RPCA is to provide complete, financial information at all management tiers of the company while maintaining divisibility of cost levels.<sup>2</sup> The

<sup>1</sup> The purpose of adopting the name Resource and Process Consumption Accounting (RPCA) is to distinguish this type of cost accounting from Resource Consumption Accounting (RCA), which is also an attempt to combine GPK and ABC within the framework of single cost accounting.

<sup>2</sup> The divisibility of cost levels under RPCA is based on “five basic levels of costs” and enables the separation of cost information arising from a specific management level of products and customers of the company. The basic cost levels are as follows: product level costs (costs of manufacturing products/services), product group level costs (general costs of maintaining product groups), customer level costs (costs of servicing of and selling to the customer), customer segment level costs (general cost of maintaining customer segments) and company level costs (general and administrative costs of the company) (see [Zieliński 2014, p. 166]).



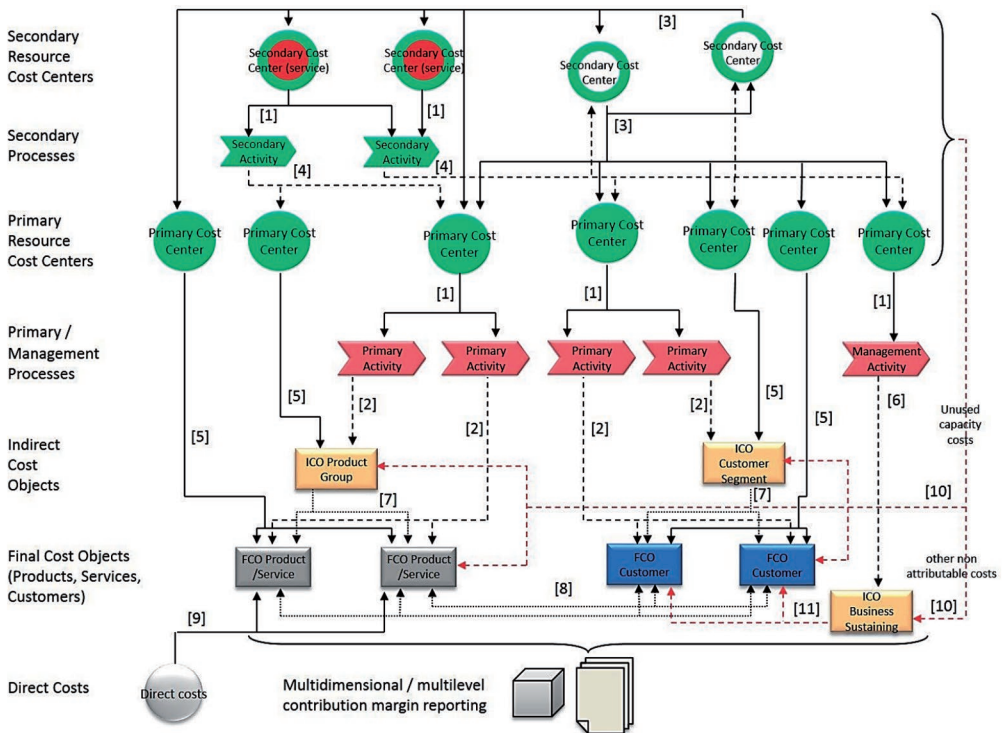


Fig. 4. Structure of resource and process consumption accounting (RPCA)

Source: own elaboration.

adopted assumptions allow one to recognize costs of a given level as relevant or irrelevant cost in terms of making a specific decision and use of RPCA in making short-, medium- and long-term decisions.

The determination of costs starts with recording cost elements (depreciation, salaries, materials, third party services, etc.) within the framework of (both primary and secondary) resource cost centers. Cost elements assigned to individual resource cost centers make up the amount of direct costs of these resources.

In the second step, the allocation of costs of secondary resources takes place with maintaining the distinction between shared resources<sup>3</sup> (relationship no. [3] in Fig. 4) and resources performing internal services<sup>4</sup> (relationships no. [1] for resources performing internal services and relationship no. [4] marked in Fig. 4). As a result of

<sup>3</sup> Shared resources are by direct consumption by other resources and their costs are allocated to other resources in a single step.

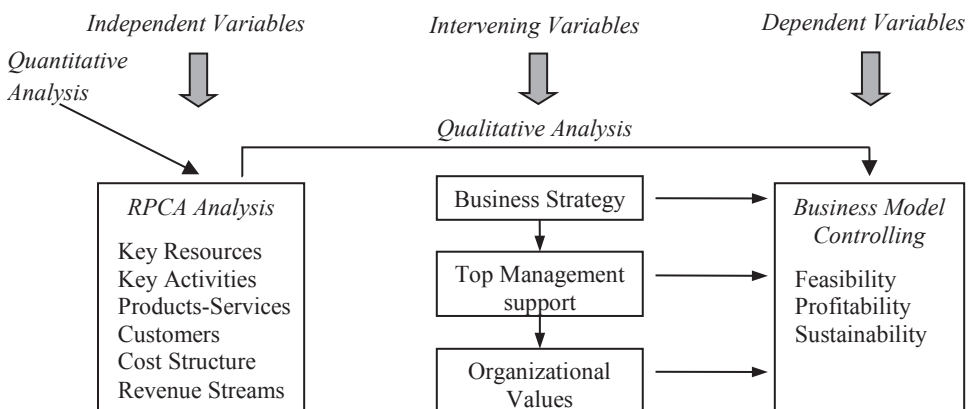
<sup>4</sup> Resources performing internal services – their costs are allocated to other resources in two stages through objects of secondary activities.

this allocation, indirect costs resulting from the use and consumption of shared resources (electricity and buildings) and performed internal services (secondary activities – repairs, preventive inspections, human resources services) are added to direct costs of primary resources. This approach enables the determination of full costs of resources and reflection of engagement of supporting (auxiliary) organizational units.

The next step is the allocation of fully burdened costs of primary resources to primary activities (relationship no. [1] for primary resources in Fig. 4). As a result, costs of activities are calculated taking into account costs of all the resources directly and indirectly involved in the activities. The presented approach to the calculation of costs of activities enables more accurate determination of costs and reflection of costs of engagement of all organizational units.

The next step is the calculation of total costs by accounting for primary activities (relationship no. [2] for primary activities in Fig. 4) and primary resources (relationship no. [5] in Fig. 4). As a result, the total cost includes costs of performed activities and primary resources (including costs of secondary resources contained therein). This approach enables more precise determination of costs of engagement of all corporate resources.

A separate calculation of costs also enables more accurate attribution of costs to specific products, services and customers. This is accomplished in RPCA through the allocation of costs to specified products (relationship no. [7] in Fig. 4) and then to buyers of these products (relationship no. [8] in Fig. 4). The level of detail of the recognition enables more attribution of costs to relevant products and product groups and, as a result, more accurate determination of their costs for the purpose of determining selling prices, and a profitability analysis of the products and customers.



**Fig. 5.** The conceptual research framework for business models analysis

Source: own elaboration.

Fig. 5 presents the conceptual research framework proposed in this study for the analysis of the business model elements and their relationships. It incorporates the independent research variables (elements connected with BMC metamodel), the dependent research variables, and a number of selected intervening variables (business strategy, top management support, organizational values) that should be taken into concern as they have an influence on the success or failure of the analysis.

Our independent research variables are mapped by elements that are components of the RPCA model, i.e.:

- the view of resources – resources and their costs are considered foundational to proper cost modeling and decision support (resource capacity management); an organization's costs and revenues are a function of the resources,
- the view of processes (allocation the resources to the activities) – it permits a better identification of the allocation processes so as to managers could have a better understanding of the outcomes of their strategic decisions,
- quantity-based modeling – by using quantitative relationships based on causality, RCPA generates more clear-cut results as a predictive model (forward-looking business model),
- cost behavior – separating the fixed costs from the variable costs helps draw attention to idle capacity and gives this information to mangers to utilize unexploited resources.

## 5. Concluding remarks

Based on a survey of 157 firms across different industries, Ittner and Larcker [2003] suggest that firms that consistently build and verify their business models have higher ROA than other firms.

Proposed research approach is a combination deductive and inductive analysis of the business model elements and their relationships: (1) the conceptual research framework is attempting to define the elements of the business models through recognizing objects of RPCA (resources, activities and cost objects i.e. products, services and customers) and relationships between them (deductive perspective). On the other hand, (2) the proposed framework is seeking to determine the influence of these relationships on the business models (inductive perspective).

Management accountants, with their holistic perspective of a company's strengths and weaknesses, may be best positioned to identify when a business model should be revisited.

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