Tailoring the Business Modelling Method for R&D

L. O. Meertens, N. Sweet and M. E. Iacob
University of Twente, PO Box 217, Enschede, The Netherlands
{l.o.meertens, m.e.iacob}@utwente.nl

Keywords: Business modelling, modelling method, business models, research & development.

Abstract: While the benefits of innovation seem to be clear intuitively, Research and Development (R&D) organisations are struggling to show the value they add. Especially in times of crisis, the result is that they get the first budget cuts to reduce costs in the short term. This causes companies, industries, or even whole economies, to lose competitive advantage in the long run. The field of business modelling deals with the creation and capturing of value. However, it has not yet provided a method tailored to R&D previously. Building upon earlier work on business modelling, we adapt the Business Modelling Method (BMM) to the field of R&D.

1 INTRODUCTION: CREATING VALUE WITH R&D

For a company to grow, it must keep ahead of competitors whenever possible. To do this, companies must innovate, which often depends on Research and Development (R&D). Following this reasoning, investing in R&D would give competitive advantage. However, it is not that simple. A higher R&D spending does not automatically lead to more or better innovation. R&D is difficult to manage, while the success is not known in advance.

Because the direct effect is hard to measure, it is interesting to see how R&D adds value. This question remains unanswered since the beginning of research on R&D.

The field of business modelling researches the creation and capturing of value. A business model is a simplified representation of reality which tries to show how a company does business or creates value.

It is interesting to combine the fields of R&D and business modelling to expose the business model behind R&D. Translation of this interest to scientific research leads to the main research question of this paper:

> How to build a business model for a research and development organisation?

The research question combines two scientific areas, the one of business model research and the one of R&D research. R&D research is related closely to innovation research and is intertwined with various fields of expertise, such as knowledge management, marketing, production, and so on.

Business modelling is a field with many changing factors in the past two decades. The rise of information technology, the introduction of a new distribution channel 'the internet', and other new forms of communication, together with the rise of globalization, makes business model research an interesting topic (Osterwalder, Pigneur, & Tucci, 2005).

Based on Vermolen (2010), Meertens, Iacob, & Nieuwenhuis (2011) conclude that current literature provides no methodological approach for the design and specification of business models. In an attempt to make business modelling a science instead of an art, Meertens et al. (2011) propose a method that enables the development of business models in a structured and repeatable manner. They jump in one of the research gaps defined by Vermolen (2010), as 'Design', and by Pateli and Giaglis (2004), as 'Design tools'. In this paper, we further advance this method by demonstrating how it can be tailored. In this case, we tailor it for the field of R&D.

The structure of the paper is as follows. Section 2 reviews current literature on business modelling and identifies typical characteristics of research and development. Section 3 provides a design science method to tailor the BMM to R&D. By applying that method, section 4 tailors BMM based on R&D characteristics. In section 5, the first four steps of the tailored BMM are demonstrated by means of a case study. The last section consists of conclusions and provides directions for further research.

Meertens L., Sweet N. and Iacob M.
Tailoring the Business Modelling Method for RD.
DOI: 10.5220/0005885900960106
In *Proceedings of the Fifth International Symposium on Business Modeling and Software Design (BMSD 2015)*, pages 96-106
ISBN: 978-989-758-111-3

2 LITERATURE REVIEW: BUSINESS MODELLING AND R&D CHARACTERISTICS

This section is divided in two parts: business modelling and R&D characteristics. First, in the business model section (2.1), a business modelling method is chosen and presented. Then, in the R&D section (2.2), the characteristics of R&D are discussed.

2.1 Business Modelling

The term 'business model' is often used, especially in the entrepreneurial and management field, but also in other areas. The combination of these two words is used for multiple purposes with significant different meanings. This is mostly due to the fact that the term comes from different perspectives like e-business, strategy, technology, and information systems (Zott & Amit, 2010). In 2005, (Shafer, Smith, & Linder, 2005) found 12 definitions in literature with 42 different components. At the same time Osterwalder et al. (2005) received 54 different definitions from participants in the IS community. Nevertheless, no consensus concerning the definition of a business model (Pateli & Giaglis, 2004; Vermolen, 2010) from an academic perspective has been reached. In this research, the definition given by Meertens et al. (2011) is followed: "*A business model is a simplified representation that accounts for the known and inferred properties of the business or industry as a whole, which may be used to study its characteristics further...*".

Table 1: Concept matrix of selected R&D literature.

	Project management	Managing activities	Risk management	Cost management	Value	External linkages
(Ali, 1994)			●		●	
(Balachandra & Friar, 1997)	●		●			
(Brockhoff, Koch, & Pearson, 1997)	●	●	●			
(Chesbrough, 2003)						●
(Coombs, McMeekin, & Pybus, 1998)	●					
(Sherman & Olsen, 1996)			●			
(Healy, Myers, & Howe, 2002)				●		
(Kleinschmidt & Cooper, 1991)					●	
(Lev, Sarath, & Sougiannis, 2005)				●		
(Liberatore & Titus, 1983)	●			●		
(Morandi, 2011)		●				●
(Nobelius, 2004)						●
(Pinto & Covin, 1989)		●	●			

We choose this definition, as it indicates the use of a business model, not only as a design artefact, but also from a business engineering perspective.

Besides the lack of a generally accepted definition, no widely accepted methods for the design of business models exists. To the best of our knowledge, Meertens et al. (2011) propose the only method to build a business model in a generic and systematic way. Therefore, we focus on this Business Modelling Method (BMM) in this paper. Application of this method results in at least two business models. One business model reflects the 'as-is' (current) situation of the business, and the other reflects the 'to-be' (target) business model(s). This represents the potential impact on the business model after adoption of innovative technologies or more efficient business processes (Meertens et al., 2011).

The BMM describes six steps using specific methods, techniques or tools. The first four steps concern the creation of the 'as-is' business model:

1. Identify roles
2. Recognize relations
3. Specify activities
4. Quantify model

The remaining two steps concern developing the 'to-be' model:

5. Design alternatives
6. Analyse alternatives

Meertens et al. (2011) provide the BMM only as a baseline methodology, with a limited amount of concepts. The methodology has to be extended and/or tailored to specific situations. Each of the steps can de detailed further by inserting applicable techniques. The specific situation for this research is an R&D organisation, which means that the known and inferred properties of R&D are needed to tailor the method.

2.2 R&D Characteristics

To discover the known and inferred properties of R&D, we review the literature to investigate what the specific characteristics of R&D are. We follow an explicit and systematic methodology to conduct the literature review. Based on the literature review, we selected the relevant and useful papers for this research (Sweet, 2012).

By analysing the selected literature, we derive the main concepts used to describe R&D. Table 1 shows a concept matrix with the selected literature. Each of the concepts is characteristic of R&D. In the following sub-sections, we discuss each of the characteristics.

2.2.1 Project-oriented

Liberatore and Titus (1983) notice that R&D management research has an emphasis on project management, which is in line with the conclusions of Coombs, McMeekin, & Pybus (1998), and others (Balachandra & Friar, 1997; Brockhoff, Koch, & Pearson, 1997), that project management has an important role in R&D.

R&D consists of projects. Pinto and Covin (1989) state that projects usually have the following attributes:

1. a specified limited budget
2. a specified time frame or duration
3. a preordained performance goal or set of goals
4. a series of complex, interrelated activities

These attributes lead to a set of characteristics and issues, which are specific for R&D.

2.2.2 Risk Management

Pinto and Covin (1989) notice the overt risks, which are familiar to R&D projects. Ali (1994) mentions a lack or loss of project support and uncertain resource requirements. The duration of an R&D project can be very long (Brockhoff et al., 1997), especially for radical innovation (McDermott & O'Connor, 2002; Veryzer, 1998), which makes it harder and more risky to determine the allocation of resources and set reasonable goals. The same goes for project support, which is important for R&D, because R&D benefits are often only seen on the long term and success rates are often low (Pinto & Covin, 1989; Sherman & Olsen, 1996). The outcomes of R&D projects are difficult to predict (Balachandra & Friar, 1997; Brockhoff et al., 1997; Pinto & Covin, 1989), which, together with the managerial aversion of taking risk, makes risk management an important R&D characteristic.

2.2.3 Managing Activities

R&D activities are often considered as a black box, which is hard to systematically manage and control. According to Brockhoff et al. (1997), R&D activities are more often non-repetitive. Which is in line with Pinto and Covin (1989), who state that activities involved in R&D project execution are less amenable to scheduling. A project is a series of complex interrelated activities and the task uncertainty (Morandi, 2013) involving R&D processes makes it even more complex. However, because it is difficult to manage and control R&D activities, this does not mean it should be neglected. It is a common understanding that the distinguished types of innovation need to be managed differently. Incremental innovation is more structured than radical innovation, therefore the same management and control techniques cannot always be used interchangeable.

2.2.4 Value

Value is hard to determine because the success of the outcome is not known. Even if the outcome definitely leads to a patent, then the lifetime of that outcome or product is not predictable. The expected returns from incremental innovations are lower than from radical innovations (Kleinschmidt & Cooper, 1991). However, the risk associated with their development and commercialisation is lower than from radical innovations. Incremental innovations are important for the firm's overall profitability (Kleinschmidt & Cooper, 1991).

2.2.5 Cost Management

Liberatore and Titus (1983) address the existence of cost-effective techniques that can improve project management for R&D. However, costing techniques may not directly apply because of (lack of) availability of information, which is in line with earlier mentioned uncertainties. Uncertainty is why financial accounting rules treat R&D as an expense instead of the capitalisation of costs (Healy, Myers, & Howe, 2002; Lev, Sarath, & Sougiannis, 2005). Because the success of a R&D project is not known, and neither is the eventual life time of the R&D outcome, it is impossible to capitalise the R&D costs without the big risk of manipulation of earnings (Healy et al., 2002; Lev et al., 2005). The downside is that intangible assets are often undervalued.

2.2.6 External Linkages

Rothwell (1994) mentions five generations of R&D. Characteristic for the fifth generation is the emphasis on external linkages, in other words R&D as a network. The focus is on collaboration within a wider system, involving competitors, suppliers, distributors, etc.(Nobelius, 2004). This is in line with open innovation that Chesborugh (2003) proposes. He defines it as a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology.

3 METHOD: DESIGN SCIENCE APPROACH TO TAILOR THE BMM TO R&D

Tailoring the BMM to R&D is a typical example of design science. The result of this research consists of artefacts at two levels according to the levels of Gregor and Hevner (2013). We aim to contribute with a second level (adapted method: the BMM4R&D) and a first level (applied case: SBT) artefacts. We do not have the intention to contribute to the third level (grand design theory).

In the light of Gregor and Hevner (2013), we position our research in the exaptation quadrant. Exaptation in this context means that we attempt to use the previously developed Business Modelling Method (BMM) in another field: the field of Research and Development (R&D). To achieve this, we tailor the BMM for R&D by placing the right methods in the slots/steps of the BMM, according to matching with R&D characteristics.

In this paper, we attempt "to demonstrate that the extension of known design knowledge into a new field is nontrivial and interesting. The new field must present some particular challenges that were not present in the field in which the techniques have already been applied" (Gregor & Hevner, 2013, p. 347).

The BMM contains prescriptive knowledge at the second level (Nascent design theory—knowledge as operational principles/architecture (Gregor & Hevner, 2013, table 1)). Originally, it was developed as a typical example of the improvement quadrant, where a new solution was developed for a known problem.

To adapt the existing BMM, we build on methodology engineering as coined by Kumar and Welke (1992) and further developed by Brinkkemper (1996). More recently, Henderson-Sellers and Ralyté (2010) captured the state-of-the-art on (situational) methodology engineering. The methodology engineering viewpoint has two aspects: representational and procedural (Kumar & Welke, 1992). The representational aspect explains what artefacts are looked at. The artefacts are the input and deliverables of phases in the method. The procedural aspect shows how these are created and used. This includes the activities in each phase, tools or techniques, and the sequence of phases.

In this research, we focus on the procedural aspects, as the input and deliverables of each step are quite well defined and suitable for almost any specific situation where a business model has to be created. Therefore, for each step (phase) in the BMM, we reconsider the tools and techniques proposed in the original method. For each step, we investigate the literature for existing methods (tools/techniques) possible in that step. Then, we compare those to the R&D characteristics from the literature review in the previous section. Based on this comparison, and consideration of the originally proposed method, we choose a method that best fits the particular challenges of R&D. Thus, tailoring the BMM for R&D. To demonstrate that the tailored method works, we apply in two cases in an R&D organisation.

4 TAILORING THE BUSINESS MODELLING METHOD FOR R&D

In this section, the first four steps of the BMM are assessed against the R&D characteristics from section 2.2. Step 5 and 6 are based on the first four steps or use general techniques such as brainstorming. It is not needed to assess them against the R&D characteristics. Meertens et al. (2011) proposed specific methods, techniques or tools that are suitable, but they remark that other techniques may be useful and applicable as well. Therefore, based on literature reviews for every step, a possible set of suitable techniques for BMM in an R&D setting is presented.

Before the tailored BMM is presented, it is important to understand that this method is based on the assumption that a R&D organisation is considered as a portfolio of projects. This assumption is in line with literature (Balachandra & Friar, 1997; Brockhoff et al., 1997; Coombs et al., 1998; Liberatore & Titus, 1983; Pinto & Covin, 1989), but from the logic that the projects create the value as well.

4.1 Step 1: Identify Roles

One of the difficulties in '*Risk management*' is the often long time frame of R&D projects. While time passes by, the interests of stakeholders change. The stakeholder analysis (Elias, Cavana, & Jackson, 2002) focuses on the dynamics of stakeholders and their changing interests. In this way, possible risks can be foreseen and acted on.

Another focus of this stakeholder analysis is the characteristic '*External linkages*', which is implicitly a part of every stakeholder analysis. This stakeholder analysis distinguishes itself by conducting an analysis on three levels, rational, process, and transactional. This way, it gives a deeper insight in the management of relations as well as the transactions that take place. This information supports management of risks.

4.2 Step 2: Recognise Relations

The second step of the BMM aims to discover relations among the roles. It may appear that relations are already captured in the stakeholder analysis of the first step and therefore this step is redundant. However, several reasons exist why the recognition of relations is a separate step in the BMM. First of all, a stakeholder analysis often follows a hub-and-spoke pattern, as the focus is on one of the roles (Meertens et al., 2011). Meertens et al. (2011) suggest a role-relation matrix as a deliverable, as this approach forces to specify and rethink all possible relations between the roles. Secondly, they note that relations always involve some interaction between two roles. Furthermore, they assume that this interaction involves some kind of value exchange as well. This is in line with Gordijn and Akkermans (2001) who state that all roles in a business model can capture value from the business model. From this perspective, the proposed technique for this step, e3-value modelling, is a valid one. The e3-value model models the economic-value exchanges between actors (Andersson, Johannesson, & Bergholtz, 2009; Kartseva, Gordijn, & Tan, 2006). This economic-value exchange can be tangible as well as intangible (Allee, 2008; Andersson et al., 2009). The initiators, Gordijn and Akkermans (2003), present the e3-value model as being:

1. lightweight
2. a graphical, conceptual modelling approach
3. based on multiple viewpoints
4. exploits scenarios, both operational and evolutionary
5. recognising the importance of economic value creation and distribution

Properties 3 and 5 are in line with the choice of this model in this step. The multiple viewpoint approach is the missing link between the stakeholder analysis and the role-relation matrix. Furthermore, the focus on value exchange fits the property of a relation being an interaction between roles with some kind of value exchange. The remaining properties 1, 2, and 4 are useful in step 5 of the BMM. The lightweight and visual-oriented approach facilitates brainstorming and generating scenarios, which are important aspects of step 5.

Two R&D characteristics, which are relevant for this step, are '*Value*' and '*External linkages*'. The value exchange of intangible assets is an exchange that occurs often, as knowledge transfer goes hand in hand with R&D. By exposing the tangible value exchanges, as well as the intangible ones, the e3-value model is suitable for R&D from a '*Value*' perspective. This automatically shows that this model is suitable from the perspective of '*External linkages*' as well. External linkages are the relations between different roles, for example a supplier, and the exchange of for example knowledge. The strength of the e3-value model lies in business network environments and an organisation together with their external linkages can be typed as a business network.

4.3 Step 3: Specify Activities

Meertens et al. (2011) propose techniques from business process management to create the intended output. However, in contrast to the example, R&D activities are considered as a black box, which makes them hard to specify. It is possible to cluster activities in groups, but the number of techniques offered by business process management is considerable, it is necessary to look deeper into the field of business processes in R&D.

4.4 Step 4: Quantify Model

For an organisation to assign costs, several systems are available, which can be distinguished in traditional systems and more refined systems, such as Activity-Based Costing (ABC) (Drury, 2008). Process costing, job costing, and a hybrid form of these two are considered as traditional systems. Process costing allocates costs to masses of identical or similar units of a product or service, and job costing allocates costs to an individual unit, batch, or lot of a distinct product or service (Horngren et al., 2010). Not only products or services can be cost objects, also a customer, product category, period, project (R&D / reorganisation), activity or a department may qualify as a cost object. ABC refines a costing system by assigning cost to individual activities.

ABC is not a suitable technique for R&D as activities are clustered and complex. Process costing is used to cost masses of identical or similar units. One of the characteristics of R&D is its non-repetitive nature (Brockhoff et al., 1997), therefore process costing is not suitable for R&D. Job costing, on the other hand, allocates cost to an individual unit, batch, or lot of a distinct product or service. As mentioned, this research considers an R&D organisation as an organisation that is built on projects. Although project management techniques are used to create uniform structures, such as New Product Development (NPD) processes, this does not mean that process costing can be used. These kinds of structures do not cluster uniform activities but try to support the process of delivering certain outputs. Each output is unique or has its unique features and therefore job costing is a suitable technique for R&D.

5 DEMONSTRATING THE BUSINESS MODELLING METHOD: THE SE BLADES TECHNOLOGY CASE

Suzlon Energy Blades Technology (SBT) is an R&D division of Suzlon Energy Limited and is specialised in the design and development of rotor blades for wind turbines. The division is spread out over four locations: Hengelo (Netherlands), Århus (Denmark), Pune, and Baroda (India). SBT is a project-oriented organisation as most R&D organisations. Earlier, it is stated that an R&D business model is a portfolio of innovation processes. At SBT these innovation processes are reflected in new product development (NPD), design change management, and technology projects. The NPD projects 'directly' create value for the organisation, where the technology projects are feeders for NPD projects. Finally, the design change management projects are the continued development of NPD projects. The innovation process for NPD projects is already imbedded in the organisation in the form of a Stage Gate System (see section 5.3).

In this case study, we examine two NPD projects after the implementation of the stage gate system. Both projects together should give a good perspective on the innovation process of NPD's at SBT and gives us the opportunity to demonstrate the BMM4R&D.

5.1 Identify Roles

Suzlon is a multinational company with complex relations. First of all, the business unit SBT itself is internationally situated. It has to deal with various cultures and different interests within the R&D departments, and with the manufacturing in India as well.

Furthermore, the interests of the wind turbine division, overall Suzlon interests, and of course market needs and market opportunities always play a role. This reflects on current NPDs, future NPDs, current and future technology projects. In this study, the NPD is the unit of analysis, because an NPD can be seen as an example of the generic NPD process within SBT. The project teams consist of the recurring roles. Although the location of these roles may differ per project, the built up of a project team is generic. Furthermore, internal stakeholders are not taken into account, because research on roles within projects is largely available.

For the sake of clarity, stakeholders in this paper are combined and renamed. The stakeholders are addressed per stage of the NPD (see section 5.3).

Suzlon Energy GmbH (SEG) and SBT manage their organisations independently, which influences an NPD on different levels. Not only do they interact with each other, external factors as political change or economic crises can have direct influence on each project. The portfolio boards translate market needs and opportunities into product strategies. NPD and technology projects are derived from this strategy.

Table 2: Stakeholders per stage.

Stakeholder	1	2	3	4	5	6A	6B
SEG (Suzlon Energy GmbH)	●	●		●	●	●	●
SBT (Suzlon Blade Technology)	●	●	●	●	●	●	●
PB SEG (Portfolio Board SEG)	●	●	●	●	●	●	●
PB SBT (Portfolio Board SBT)		●	●				
NPD SEG (NPD on overall level)				●	●	●	●

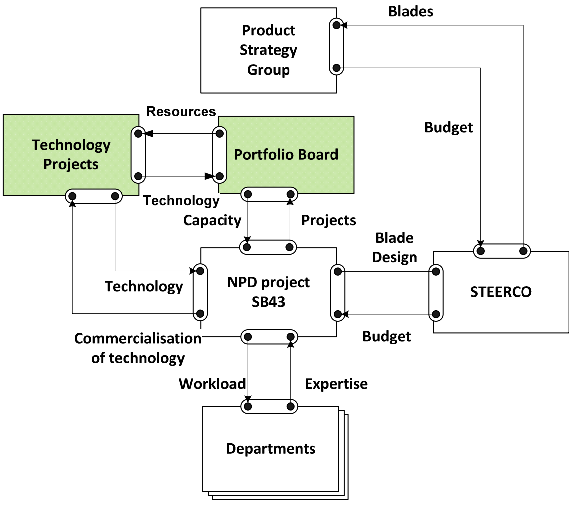

Figure 1: e3-value model of SB43 Stage 3.

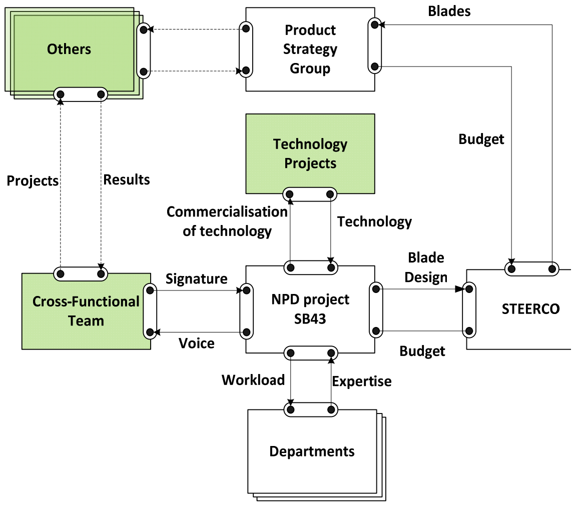

Figure 3: e3-value model of SB43 Stage 4, 5, 6.

Most of the time the influence of the portfolio board is long term, but some market changes need to be reacted on quickly. Therefore, the potential influence of such a stakeholder is always present. Finally, the NPD SEG contains representatives from the whole chain (R&D, moulding, purchasing, manufacturing, services, finance, etc.). Every decision can influence the financial cost of the other. Especially here, the tension of the various forces can be intense.

These stakeholders are returning stakeholders during every project and therefore people know by experience how to act. The play of forces of the different stakeholders' interests, culture and politics are managed by imbedded procedures and RASCIs. The influence of the stakeholders at each stage differs (see Table 2). Furthermore, an unexpected event can lead to big power impact of a stakeholder which would not have much influence during a certain stage under other circumstances. Therefore, it is important to give more insight in the relations between these stakeholders in the next paragraph.

5.2 Recognize Relations

In the first step, we mapped the stakeholders per stage and we do the same for this step, using the e3-value model per stage. When done for every stage, we get an extended view on the influence of stakeholders: not only on the power aspect but on the value aspect as well. Figure 1 shows the e3-value model of stage 3.

During the case study, an economic crisis influenced the market dramatically. Governments economised on subsidies for alternative resources such as wind energy, which directly influenced budgets. Other possible scenarios, such as radical innovation because of a breakthrough in a technology project, capacity problems in a department, or a political change can be assessed per stage using the e3-value model.

5.3 Specify Activities

An organisation needs to adapt the Stage-Gate system according to its own needs (Cooper, 2009). This

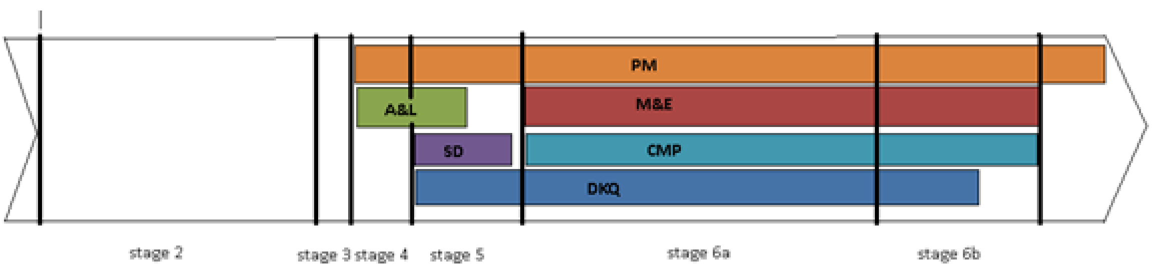

Figure 2: Departmental activity per stage.

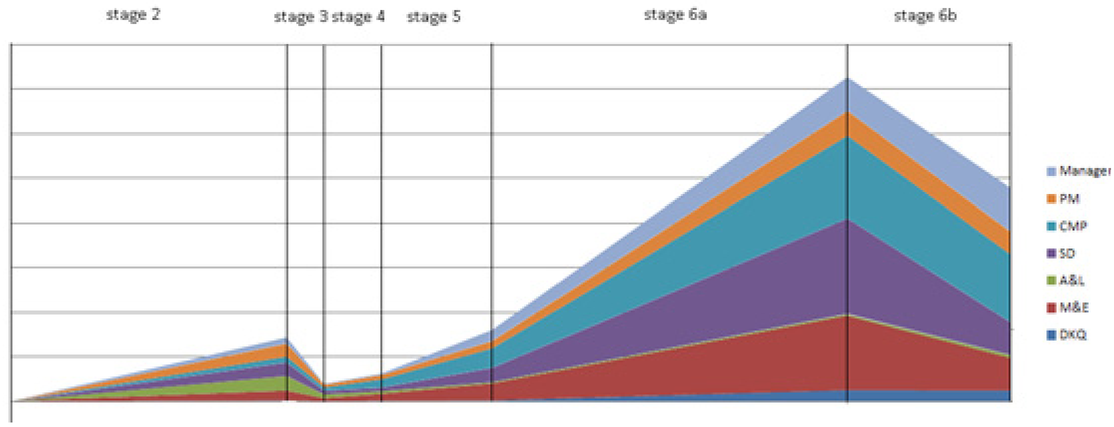

Figure 4: Hours of departments involved at each stage.

allows the method to be applicable to various kinds of R&D organisation. At SBT, all the stages are present, but stages are split up, and/or named differently, to fit with the specific situation of SBT. Although stage 1 is part of the NPD process, it is not part of an NPD project. In the best case, the activities of stage 1 are assigned to a Technology project and, if possible, an NPD project is set up at the start of stage 2.

The organisation has a structured innovation process for NPD projects, which has all the elements that the literature appoints. The projects at SBT are managed on costs, which means in this case on hours spent. At the end of each stage, there is a Go/No Go decision and a new budget is assigned/approved. To review the activities within the stages, the assigned hours and the hours spent need to be compared. Unfortunately, the setup of the budgets is not yet aligned with the hour registration, which makes comparison impossible.

An alternative comparison is possible because SBT clusters departmental activities and embeds them in their stage gate model as well. Clustering is universal over all their NPD projects and shows which departments are involved at what stage. Their involvement is based on the needed output at the end of each stage. Figure 2 gives an overview of the departmental activity.

In Figure 4, the hours per department are put against the SBT process model.

This figure shows that all the departments are already involved at stage 2 and 3, which does not match the distribution of the departmental activities in Figure 2. However, the activities of department SD should occur at stage 5, but most of them occur at stage 6A and 6B. Furthermore, the activities of department A&L are most spent at stages 2 and 3, but should occur at stage 4 and 5.

Figure 4 shows a difference between the clustering of activities at SBT and the actual clustering. This can be related to step 1 and 2. For example, the portfolio board allocates resources at

Table 3: Stage-Gate at SBT compared to Cooper (2008).

Stage	SBT Stage Gate System	Stage Gate System (Cooper, 2008)	
1	Market needs and business perspectives	1	Scoping
2	Feasibility Study	2	Business case
3	Project Planning and Commitment		
4	System Specification/Requirements	3	Development
5	Preliminary Design		
6A	Stable Design		
6B	Stable Design (incl. Prototyping)		
7	System Validation	4	Testing & Verification
8	Initial Launch	5	Launch
9	Series Launch		
10	Project Closure		

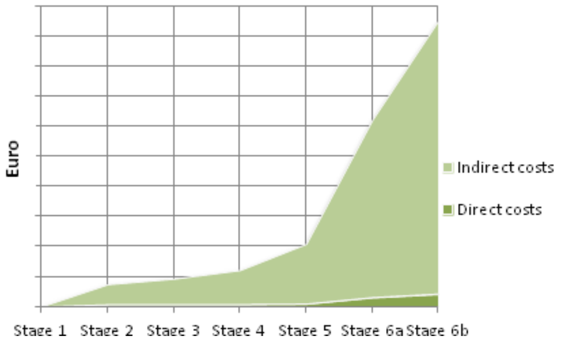

Figure 5: Direct and indirect costs at each stage.

stage 3, but taking figure x into account, the allocation already happened.

5.4 Quantify Model

A straightforward cost allocation method is used. Typical for an R&D organisation, most costs occur from labour hours. All indirect and direct costs can be summed up and allocated to a single cost pool. In Figure 5, the total cost of one of the projects is calculated by adding all the direct and indirect costs.

The figure shows that the total costs are largely build up out of indirect costs. For one of the projects this percentage is as high as 96%. It can be expected from a R&D organisation that most activities involve labour hours. The amount of hours spent, which we used in step 3 as a review of the clustering of activities, is in line with the allocation in figure X. Also, it indicates that the labour rate has a great influence on the cost of a project. Using step 1, 2 and 3, potential threats for the labour rate can be assessed.

By demonstrating the BMM4R&D, we did a quick scan of the current situation at SBT. Furthermore, at every step we showed the possibility to evaluate possible scenarios.

6 CONCLUSIONS: A BUSINESS MODELLING METHOD FOR RESEARCH AND DEVELOPMENT

In this paper, we built a business model for a research and development organisation. To achieve this, we further specified the business modelling method (BMM) (Meertens et al., 2011), to align it with characteristics of research and development (R&D). This led to the BMM4R&D: a Business Modelling Method for Research and Development organisations. The case studies for the field of R&D illustrate that it is possible to tailor the BMM to specific needs, as was originally proposed.

6.1 Academic and Business Contributions

Our main contribution is the demonstration of how the BMM can be tailored. Using the design science approach, we deliver a level 2 artefact (Gregor & Hevner, 2013), namely the BMM4R&D. It is a tailored specialisation of the BMM The approach that we used to tailor the BMM, improves the usability of it for specific fields. The approach consists of attaching applicable, field-specific methods to the available hooks (steps) in the BMM. This opens the way to tailoring the BMM to other fields as well, so it can be used in practice.

The business contribution of this paper is threefold. First, we define a set of characteristics for R&D. Second, we provide a method to create business models for R&D organisations: the BMM4R&D. Third and final, we provide two cases where a business model shows the value of R&D. These all add to the relevance of this paper.

6.2 Limitations and Further Research

As part of this design science research, we built a business model for an R&D organisation, using two projects as cases. This demonstrates the use of the BMM4R&D. To evaluate this new artefact further, it should be applied to more cases. Additional case studies could come from within the same organisation, but also from other R&D organisations, especially in other industries.

We tailored the BMM for R&D; however, we advocate that the BMM can also be tailored to other fields (Meertens et al., 2011). The originally proposed BMM has several hooks where different methods may be attached. Thus, tailoring to new fields is easy to do. Yet, finding out which methods are most suitable for a field is a harder challenge.

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