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CENTRAL FUNCTIONS OF CORPORATE CONTROLLING SYSTEMS WITHIN CSR TERMS

CENTRALNE FUNKCJE SYSTEMÓW CONTROLLINGU W ODNIESIENIU DO SPOŁECZNEJ ODPOWIEDZIALNOŚCI PRZEDSIĘBIORSTW

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Summary: The paper presents three controlling instruments related to CSR and discusses the implementation of those instruments into CSR. The first section deals with the activity-based costing and process-oriented controlling. It shows the differences between these two approaches and stresses their contribution to identification of the non-value creating activities and waste reduction. The second section elaborates on the requirements of modern product costing systems giving a more detailed view about product life cycle costing in the CSR context. The third section focus on target costing where target costs are determined by different market approaches and thus being much more flexible to customer needs and expectations. Finally, the paper introduces a concept of green controlling as a part of CSR.

Keywords: activity-based costing, CSR, life-cycle costing, process-oriented controlling, target costing.

Streszczenie: Artykuł prezentuje trzy instrumenty controllingu związane ze społeczną odpowiedzialnością (CSR) i omawia ich implementację w ramach polityki CSR przedsiębiorstwa. W pierwszej części przedstawiono rachunek kosztów działań oraz controlling zorientowany na procesy. Wskazano różnice między tymi dwoma podejściami oraz podkreślono ich rolę w identyfikowaniu czynności, które nie tworzą wartości oraz służą ograniczeniu strat. W drugiej części artykułu omówiono wymagania stawiane wobec współczesnych systemów rachunku kosztów produkcji, zwracając uwagę na rachunek kosztów w cyklu życia i jego związek z CSR. Trzecia część opracowania omawia rachunek kosztów docelowych, w którym koszty docelowe ustala się w sposób zrównoważony, stosując odmienne podejście rynkowe oraz zachowując wysoki stopień elastyczności i dostosowania do potrzeb klientów. W artykule opisano również koncepcję tzw. zielonego controllingu, będącego częścią polityki CSR przedsiębiorstwa.

Słowa kluczowe: rachunek kosztów działań, CSR, rachunek cyklu życia produktu, controlling zorientowany procesowo, rachunek kosztów docelowych.

What gets measured gets done.

Robert Kaplan

1. Introduction: The link between controlling and corporate social responsibility

The topic is based on the corporate function of controlling to prepare and rationalize decisions of managers. The scope of application will be discussed distinguishing between the controlling of variable costs, capacity costs, profits and return figures. The conceptional architecture culminates in a value-based controlling concept that focuses on the social aspects that can be portrayed as value drivers. In this respect the concept is a means to establish the corporate social responsibility approach into modern controlling systems. Punch line: The generation of corporate value necessarily implies sustaining and empowering employees on all decision levels. This is substantially facilitated by the disputed controlling approach.

2. Activity-based costing and process-oriented controlling

2.1. Development of activity-based costing in general

In the past decades value creation has changed, forcing a change in planning, management and control activities – each of them generating fixed overheads. But the cost influential factor is not the level of employment as which is having product variants/variation in products followed by product and process complexity [Horváth et al. 2015, p. 243]. As a result of an increase in automation all other direct attributable costs were declining [Fischer et al. 2012, p. 240]. As production overhead were completely allocated to production wages the information value of the product cost dropped also [Joos-Sachse 2014, p. 351; Friedl et al. 2017, p. 434]. Since the standard costing methods failed, the activity-based costing method has been developed [Coenenberg et al. 2012, p. 156]. This new system allocates overhead not on a production wage basis, but rather on the activity-based tasks. Typical characteristic for this approach is the focus on the production overheads and the product cost allocation [Horváth et al. 2015, p. 235].

2.2. Main objective of activity-based costing

To understand the main objective of the activity-based costing approach, it is necessary first of all to understand the concept of the optimal cost accounting system – a system which minimizes error costs and cost of collection. It is true, that ordinary cost accounting systems are causing less costs of collection but are more inaccurate in estimating product costs. So, it is natural that the determinants for an optimal cost

accounting system are cost of collection, error costs and variety in products. The reasoning why ABC is more favourable than other systems lies within the continuous change in those determinants [Männel 1992, p. 370].

Because of the high cost of collection, it is uneconomical to do data acquisition just for product calculation, even more when the needed data is already within business range. Based on this topic, cost of collection includes not just the implementation of raw and/or detailed information into the cost accounting system, it means also the estimated cost of production. So, for the fact of technological progress, costs for information and informational distribution and implementation decreased, giving more detailed information about make-ready processes and their costs as a result. Another benefit of the technological progress is the use of modern and efficient computers, making cost calculations easier [Männel 1992, p. 370].

The second determinant was the rising error cost, occurring because of bad decision making. Incorrect budget planning, misinterpretation of product calculations and contribution margins or investment decisions based on wrong figures are all influencing factors biasing decision making, causing those error costs. Specific reasons for this happening can be the tougher competition on the market, due to more creativity in product distribution or specialized products – enabling a better cost allocation and cost determination. More generally reasons behind the rise in costs are the change in overhead structure. Owing to this fact, ordinary cost accounting systems are blurring the correlation between products and overheads because of their reference values. Contrasting this development, the activity-based costing method clearly reveals this connection and enhances the overhead management [Männel 1992, p. 371].

2.3. Implementation of activity-based costing

The implementation process of activity-based costing is done within four steps. In the beginning it is necessary to summarize all essential actions to activities. It can be achieved by analysing and documenting the steps/tasks required for the production and sales of a certain product [Schunter, Zirkler 2012, p. 33]. This step contributes by lowering the costs of collection and costs of settlement and with that lowering complexity within the cost accounting system. However, this only applies if not every single task/step is defined as an activity, as otherwise complexity rises. The main goal of the summarizing process is to create activity dictionaries or catalogues [Zirkler 2002, p. 195]. These are capable of giving a proper definition and detailed information about every single activity [Fisher et al. 2012, p. 241]. Then, those activities are bundled regarding their significance and affiliation to so-called activity centres. Based on their area of activity a cost allocation regarding on either full costs or just overhead takes place [Zirkler 2002, p. 196]. Due to that, it is shown that the American activity-based costing method does not know about German cost centre overlapping on main processes [Schunter, Zirkler 2012, p. 34].

After the procedure it is crucial to determine the use of resources spent on each activity by allocation of the identified activities' costs and capacity [Fisher et al. 2012, p. 241; Männel 1992, p. 381]. To do so it is essential to select resource cost-driver for each activity. The objective of these cost-drivers is to bring the general-ledger-system and the implemented activities together. This effect enlightens the blurring caused by normal cost accounting systems, allowing identification of each single activity, the costs it caused and the nature of use. Furthermore, it is now possible to classify each activity based on cost hierarchies, allowing a differentiated point of view regarding the variability of costs [Schunter, Zirkler 2012, p. 34].

To obtain cost allocation not only the prior activities are necessary. It is important to identify the company's products, services and customers as they represent the result of every business activity [Fisher et al. 2012, p. 241]. After this process these cost-objects are matched to the single business activity, revealing if the whole procedure was beneficiary or not [Schunter, Zirkler 2012, p. 36].

The last step of the ABC implementation process is to combine the cost-objects with the activity costs by using activity cost-drivers [Männel 1992, p. 382]. These are quantitative parameters like machine runtimes or number of make-ready process [Männel 1992, p. 382]. Based on this procedure it is possible to obtain a successful activity-based costing process.

2.4. Development of process-oriented controlling in general

While the activity-based costing has been developed in the USA major changes regarding the value-added structure occurred in Germany. It is attributable to technological progress and computerization as it makes production more flexible. This led to a production enhancement as new production lines were cost-effective in procurement. However, the enlargements in product variety and production flexibility come up at a cost. The asset utilization and the flow of material needed to be adjusted to the faster cycle times. To synchronize production with other processes and to solve this problem, just-in-time-systems have been developed. Because of this happening, there have been changes in the cost-structure as more and more overhead was being generated, while labour costs were plummeting [Friedl et al. 2017, p. 434]. For this reason, overhead rates were rising absurdly to the amount of several hundred percent [Coenenberg et al. 2012, p. 160].

So, as changes in cost structure already result in misleading interpretation of the current cost situation, even higher overhead rates cause inappropriate allocation of overheads. Another point is that products assembled via new production technologies get less overhead allocated in contrast to products which were assembled on conventional machinery or production lines as they get a very high overhead allocation. This development blurs the cost and profit accounting, as supposed loss-making production lines were actually profitable and vice versa [Coenenberg et al.

2012, p. 161]. Due to the fact, that the current cost accounting systems were not adequate to manage this problem [Wöhe, Döring 2010, p. 1010], a new approach was inevitable [Coenenberg et al. 2012, p. 157].

2.5. Main objective of process-oriented controlling

Generally, it can be held down that the process-oriented calculation wants to improve product calculation, as well as the planning and control activities of overhead. To be more precise, process-oriented controlling pursues a creation of cost transparency, as better insight on a company's processes allows an overview on its job structures, overheads and the current cost situation [Friedl et al. 2017, p. 442].

The implementation of planned volumes and process cost-unit rates improves planning and control activities for overhead generating sectors. A common consequence is that it also improves the allocation of cost responsibility within the company [Muschol 2016, p. 303; Coenenberg et al. 2012, p. 161].

Process-oriented calculation leads to a better product calculation as it is recognizing the utilization of the indirect areas through the cost unit within the allocation process. Because of this, there is a better basis and flow of information leading to an improvement in decision making, e.g. product development, product pricing or price differentiation [Friedl et al. 2017, p. 442].

Another point is that the determination of process costs makes possible comparing costs according to a decision between producing in-house or producing externally, ultimately leading to an outsourcing of different processes like logistics to a known logistics service provider [Friedl et al. 2017, p. 442].

2.6. Implementation of process-oriented controlling

The implementation process of the process-oriented calculation may be subsumed into four steps. It is necessary to define the sector and main target of the project which will be undertaken in the first place. In that matter, department activities need to be identified which are directly involved in the project work. Noteworthy is that activities within the process-oriented calculation are always high in use and of repetitive nature, as they are not complex [Macha 2011, p. 159]. They are also representing the smallest calculation unit, which is no longer divisible, however their use of resource can still be identified [Friedl et al. 2017, p. 443]. To gain detailed information about each task/activity interviews or interrogations with employees or cost centre managers are done, each of them constituting which tasks they are involved in and giving information about the perceived costs and time consumed. The main idea behind this procedure is to filter the volume and time required for each activity aggregating them to sub-processes [Coenenberg et al. 2012, p. 164]. Figure 1 shows the process regarding cost centre activities and their aggregation to sub-processes and to main-processes in the end.

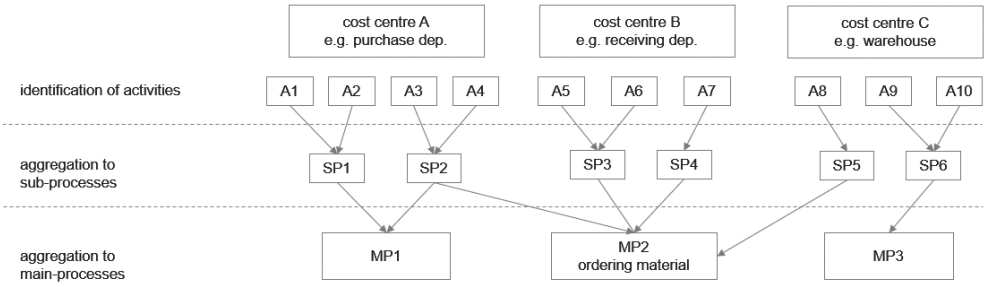

Figure 1. Process hierarchies

Source: own presentation based on [Horváth et al. 2015; Joos-Sachse 2014].

Within the sub-processes it can be differentiated between activity-quantity induced costs and activity-quantity neutral costs [Dahmen 2014, p. 106]. The quantity induced costs are always dependent on the cost centres working volume, meaning that generated overhead may be allocated through defined cost-drivers, whereas the neutral costs without any points of reference cannot be allocated as there is no chance of defining adequate cost-drivers [Dahmen 2014, p. 238]. Here it is remarkable that cost-drivers are not only the responsible benchmark for cost occurring and cost control but also for the correct cost allocation on each cost unit [Joos-Sachse 2014, p. 356].

It is necessary to allocate the occurred costs from each cost centre to each sub-process before aggregating the sub-processes to main-processes. This is achieved by dividing the occurred costs with quantitative scale methods like partial output rates

Table 1. Calculation of sub-process cost rate

No.	Sub-process	Cat.	Time-key (man-years)	Sub-process costs	Yardstick (number of…)	Yardstick volume	Sub-process cost rate (aqi)	Contribution rate (aqn)	Sub-process cost rate (total)
1	Individual ordering	aqi	1	8.000,00 €	orders	50	160,00 €	47,06 €	207,06 €
2	Master data maintenance	aqi	0,5	15.000,00 €	suppliers	30	500,00 €	147,06 €	647,06 €
3	Production support	aqi	2	45.000,00 €	product variety	40	1125,00 €	330,88 €	1455,88 €
4	Department management	aqn	1	20.000,00 €					
			4,5	88.000,00 €					

Source: own presentation based on [Horváth et al. 2015, p. 238].

or by time-keys like man-years – here yardstick volume. After that, the activity-quantity neutral costs are allocated by the ratio of themselves and the remaining costs multiplied with each aqi-rate [Horváth et al., 2015, p. 238]. Finally the partial aqi-rates and contribution rates (aqn) were totalled to get to the final sub-process cost rate, as shown in the table below. If further aggregation is not possible at this stage, the sub-process cost rates (total) illustrate the main-process cost rate. With the allocation of the aqn-costs in such a manner, the process-oriented calculation mimes the full-cost accounting system [Friedl et al. 2017, p. 446].

The last step contains the aggregation of the sub-processes to cost centre-overlapping main-processes, which are a combination of related sub-processes of different cost centres [Dahmen 2014, p. 108]. Consequently the information gathered by this procedure improves strategic and operational business performance as it enables a better use of the product-mix as well. In this process different effects may occur like the allocation effect, complexity effect and the degression effect [Coenenberg et al. 2012, p. 174].

2.7. Differences between activity-based costing and process-oriented controlling

After showing the operationalization of process-oriented controlling it is time to discuss the differences between both methods. Activity-based costing cannot be a synonym for process-oriented calculation even just because their different reasons for implementation. As ABC was introduced to be more activity driven throughout the production process, it is clear that the calculation purpose is paramount [Zirkler 2002, p. 193]. Quite in contrast to this German process-oriented calculation can be understood as a activity-based calculation clearly focussed on overhead management, as for problems regarding the German accounting system [Zirkler 2002, p. 193].

Based on this, it is getting clear that the process concept is paramount, whereas the ABC sets its priority mainly on single activities [Baltzer, Zirkler 2012, p. 13], which results in generalizing cost centres of the same type [Zirkler 2002, p. 193]. This is based on German differentiated cost centre structures, where processes are overlapping different cost centres [Baltzer, Zirkler 2012, p. 14]. Furthermore, the process-oriented calculation recognizes activity quantity induced costs and activity quantity neutral costs which do not exist within the ABC [Baltzer, Zirkler 2012, p. 14].

The last difference of ABC and the process-oriented calculation lies within the area of application. As activity-based costing may be applied for overhead settlement in the direct production area [Becker, Ulrich (eds.) 2016, p. 578] and in the indirect areas of contribution tasks, the process-oriented calculation has its focus solely on the indirect area. This is because of the implementation of modern cost calculation

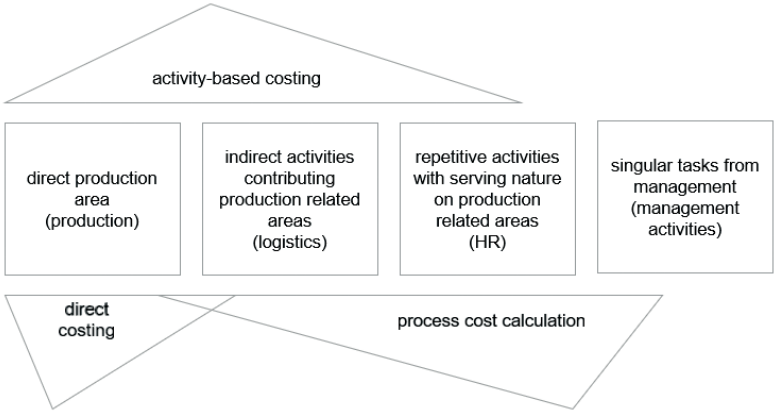

Figure 2. Applied areas of different costing mechanism

Source: [Baltzer, Zirkler 2012, p. 13].

systems like direct costing or accounting of hourly rates for machines in Germany throughout the twentieth century [Baltzer, Zirkler 2012, p. 12]. Figure 2 subsumes the prior differences between the mentioned calculation methods.

2.8. Interim conclusion

Activity-based costing is based on the principle of attributable utilization. The analysis of processes helps to identify and eliminate waste and scrap in the internal value chain as non-value adding processes. Activity-based costing reinforces optimal resource consumption. Major processes cover several cost centers – typical examples are: continuous handling of a customer order, continuous handling of a production order and ongoing servicing of key account customers. Those processes need to be repetitive [Muschol, Zirkler 2009, p. 260]. Activity-based costing is an aid in cutting down capacity by consequently monitoring the cost driver specific and therefore cost center spanning cost rates [Coenenberg et al. 2012, p. 173].

3. Requirements on modern product costing systems and respective solutions

3.1. General perspective and approximation

Cost calculation has proven to be very dynamic and flexible when it comes to a need for adaptation. When there was the paradigm shift regarding the change from a provider-oriented market to a demand-oriented market, cost calculation developed the process-oriented calculation, activity-based costing and the target costing approach [Männel 1992, p. 180]. However, time has shown that ordinary standard

costing is no panaceum; neither workshop production manages series production. Therefore, it is crucial to understand and consider interdependencies, organizational structure as well as informational technology of cost accounting systems. This can only be achieved by continuous research in the areas of impact analysis of the influencing factors and the situational research paradigm, both offering options of further development of the cost accounting theory. An ultimate result of this will be a significant rise in cost calculations efficiency and its organization [Männel 1992, p. 181].

Another point is that the process of automation and mechanization has led to a relative increase of capacity costs. Therefore, the value adding consumption and the proper resource allocation turn out to be a very crucial aspect of cost management. There are three basic types of fixed costs which are capacity costs: period fixed costs, lot size fixed costs as well as life cycle fixed costs (preproduction costs and follow-up costs). The capacity consumption is evaluated by means of performance measurement and activity-based costing. The cost management system has to focus on a flexibility strategy concerning the fixed expenses. Capacity disposition accounting presents the fixed obligations of capacity costs in respect of time and causation.

3.2. Approximation based on lifecycle-costing

Activity-based product costing is an aid to a refined calculation. Calculations should be initiated before serial production – premature product costing in the phases of development and construction is an important tool to influence costs from the time of origination. Product costing has to be simultaneously communicated to engineers and controllers to secure efficient cost management. It is a contribution to a lean controlling concept to base product costing on standard costs. A coherent accounting system should be based on the concept of the general ledger which avoids accounting with imputed expenses as it is commonly used in a dual accounting system.

Nowadays management is confronted with product lifecycles gaining even more momentum, based on technological progress [Männel 1994, p. 110]. The result: products are replaced even faster (irrespective of whether complex or simple) and preliminary costs are representing a much higher proportion on the total costs – meaning higher proactive investments for the company [Joos-Sachse 2014, p. 296]. The solution was the implementation of lifecycle-oriented controlling – adapting the product cost and accounting system as well as its earnings statement through every phase of the products' lifecycle [Männel 1992, p. 703].

The term "lifecycle costing" was invented in the mid-sixties as a method of cost management to monitor large investment projects. Its goal is to optimize the total costs of a certain project or product right from start of product development until its disposal [Fisher et al. 2012, p. 276]. Anyhow the term costing is not accurate enough in this case, because it is a total overview of a whole lifecycle, enabling the ability to

fade the periodization of costs. Based on this fact cash inflow and outflow are more accurate termini in this case [Coenenberg et al. 2012, p. 600].

Preliminary costs as well as follow-up costs are being assigned to the period of their occurrence. By doing this it can appear that overhead components were allocated to products which did not cause these costs, resulting in biased period results [Joos-Sachse 2014, p. 297]. Due to the rise of preliminary and follow-up costs the number of biased or misleading period results has increased in the same manner. To eliminate this occurrence, cost categories regarding these costs were implemented [Männel 1992, p. 111]. This led to the realization that only differentiating between capacity costs and performance costs do not reflect ordinary cost behavior. Moreover, it can be stated that both costs are part of performance costs with investment cost character [Männel 1994, p. 110]. For this reason a periodical cost and profit accounting is crucial [Joos-Sachse 2014, p. 299].

Figures 3 and 4 show a whole product life cycle with its costs and revenue occurrence. However, it gives no information about the amortization time or contribution margin for each period [Männel 1994, p. 111].

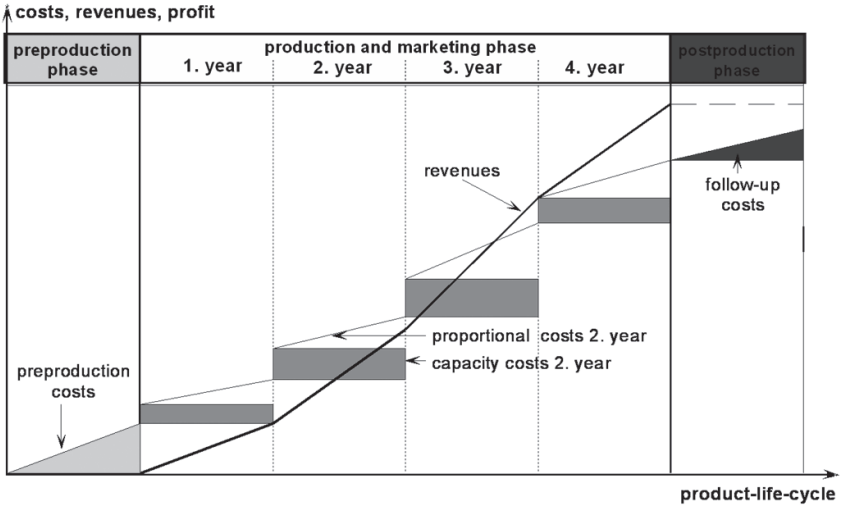

Figure 3. Life cycle costing (1)

Source: [Muschol, Zirkler 2009, p. 228; Männel 2006, p. 43].

Figure 4 shows the contribution margin development for each period after the deduction of the periodical fixed costs.

Figure 5 shows the general lifecycle costing system regarding the occurrence of costs and the cost definition in each phase [Becker, Holzmann 2016, p. 113]. In the preparatory phase the main idea is being developed. Based on this, further planning, market research and production preparations [Wöhe, Döring 2010, p. 1015] were made to set everything good to go for production launch [Joos-Sachse 2014, p. 84].

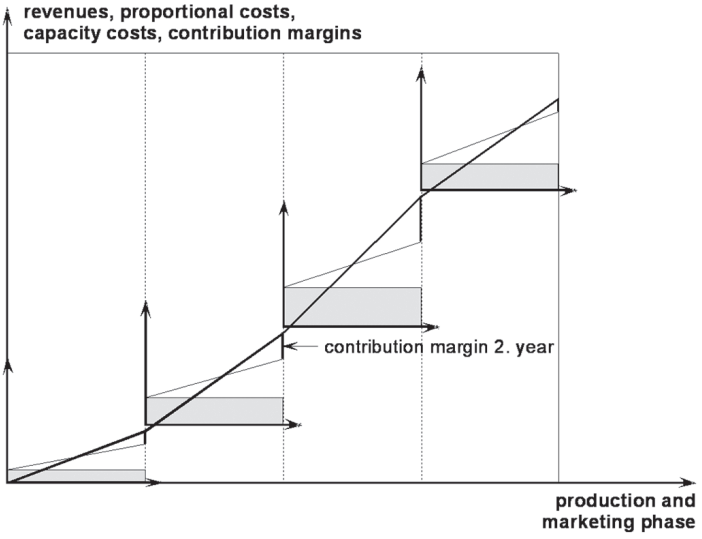

Figure 4. Life cycle costing (2)

Source: [Muschol, Zirkler 2009, p. 228; Männel 2006, p. 43].

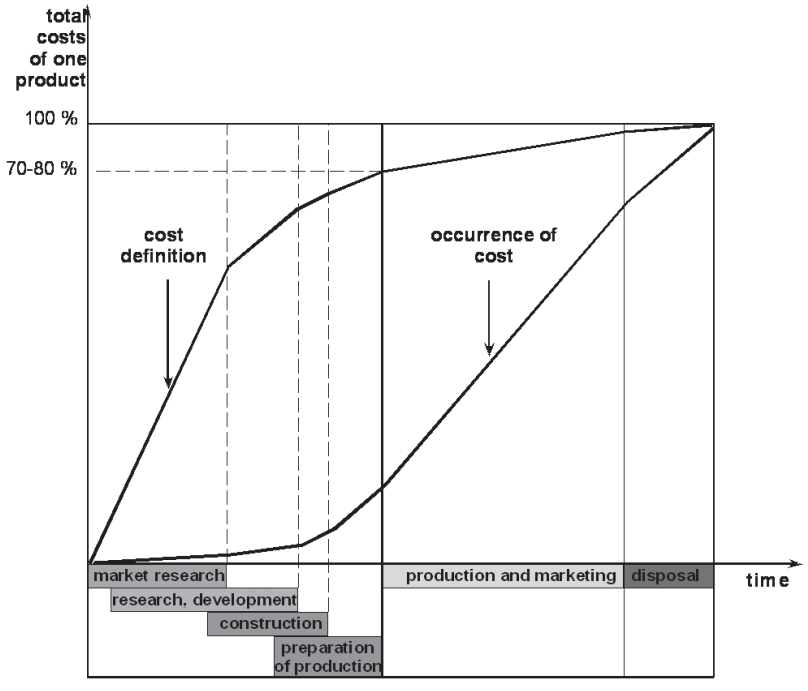

Figure 5. Early product costing (1)

Source: [Muschol, Zirkler 2009, p. 428; Männel 1994, p. 137].

Right at this stage (before launching the production) 70–80% of the costs are defined and already known [Colsman 2016, p. 84].

The market implementation phase starts with product launch and ends with the decision of withdrawing it. During the market phase products go through the following life cycle: introduction > growth > maturity > decline [Fischer et al. 2012, p. 277]. This cycle was enlarged by the preparatory and disposal phase as part of the integrated product lifecycle [Horváth et al. 2015, p. 225]. However, if it is known which phase is current, it is possible to make conclusions about the future sales performance and success potential [Fischer 2012, p. 277].

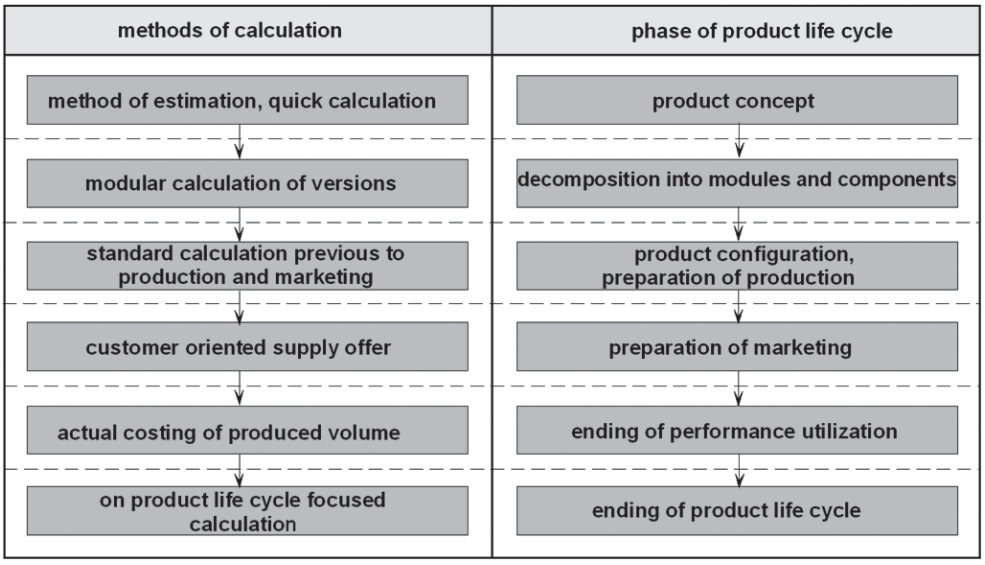

Figure 6. Early product costing (2)

Source: own study based on [Männel 1992, p. 703–713; Fischer et al. 2012, p. 277].

In the disposal phase the main subject is the question about the recycle-ability of the products as well as the disposal logistics [Becker, Ulrich (eds.) 2016, p. 335; Muschol 2016, p. 75]. A crucial point in this phase is the ecological responsibility of a company regarding the correct disposal of the goods. But it is not only the ecological aspect, on behalf of the economical point of view the company may even gain some revenue for the recycled material [Joose-Sachse 2014, p. 296], which may blur the presentation of the products revenue gained through its lifecycle [Fischer et al. 2012, p. 335].

4. Target costing[1]

4.1. Different dimensions of target costing

To recognize target costs in a product-life-cycle a multi-dimensional coordination is required by deducing characteristics from modern cost accounting. These dimensions may be split up into the temporal and functional dimension [Muschol 2016, p. 392].

Table 2. Dimensions of target costing

Temporal dimension	Functional dimension
Planning, management and control activities: • pre-cost process (iterative planning) • during the cost process (iterative planning, billing, analysis and control) • post-cost process (billing and analysis)	Coordination of cost incurring processes through: • development of technology • JIT stock • human resources policy / remuneration • supplier pools / supplier selection • quality management • construction

Source: own presentation based on [Muschol 2016, p. 392].

The temporal dimension is responsible for the planning, management and control activities pre, during and post the cost process. During the process it does the iterative planning, analysis and management tasks [Muschol 2016, p. 392]. The post process includes the billing and analysis procedure. In Table 2 the different dimensions of target costing are shown.

4.2. Target costing procedure

The target costing procedure may be divided into four logical parts, all of them following a certain planning system regarding the production of a new product [Horváth et al. 2015, p. 230]. These are as follows:

(1) determination of the main target costs regarding the future product;

(2) target costs splitting due to their functional proportion of the product;

(3) determining the degree of cost achievement via the target cost index and advanced target cost index [Vahs, Schäfer-Kunz 2015; p. 612; Coenenberg et al. 2012, p. 558; Fischer et al. 2012, pp. 264–268; Küpper et al. 2013, pp. 306–309];

(4) continuous variance-analyses [Horváth et al. 2015, p. 230; Friedl et al. 2017, p. 479].

The first phase of the target costing process is determining the target costs on the main product level. The basis for the target cost determination is the market itself. The

[1] For further information see: [Zirkler, Muschol 2009, pp. 262–306; Horváth et al. 2015, pp. 228–234; Reichmann et al. 2017, pp. 203–216; Fischer et al. 2012, pp. 262–275; Coenenberg et al. 2012, pp. 555–585].

more the product costs are derived by the market, the more successful the undertaking will be [Horváth et al. 2015, p. 230] as unit sales may be forecasted throughout this procedure [Coenenberg et al. 2012, p. 558]. Possible entry points for a proper target cost derivation on behalf of the market is given in 11.3. Concepts of Target Costing. Within this procedure it is also crucial to ascertain the different functions of the product and the feasible realisation of each product component throughout a conjoint analysis [Joos-Sachse 2014, p. 310]. The key assumption is that the partial weights of each product component is assigned with analogue proportions of the target costs [Vahs, Schäfer-Kunz 2015, p. 612]. So, the optimal use of resources is given when they equal the product value relation [Horváth et al. 2015, p. 230; Macha 2011, p. 263].

After gathering the required information from the market, it is necessary to operationalize the target costing management for a single product via target cost splitting [Dahmen 2014, p. 140]. This process breaks the entire product target costs into functional costs, component costs and parts costs [Friedl et al. 2017, p. 483]. The functional costs contain costs for the general function of a product and its performance function. To determine the functional costs, it is common to use conjoint-analyses as an instrument of market research. Therewith it is possible to determine characteristic values of already existing products and executing a pre-selection of innovative characteristic values. Furthermore, it is possible to run a selection of relevant characteristics of new products, as well as measuring their contribution [Horváth et al. 2015, p. 230]. The reasoning behind this procedure is to obtain a service bundle which meets functional requirements demanded by the customer. These functions are leading to the customers' satisfaction of needs, wherefore the functions were transmitted into components and company processes [Fisher et al. 2012, p. 266]. The transmission process can be distinguished between the component method and the functional method. While the component method assumes that a component fulfils only one function – neglecting the customers' demands, the functional method addresses completely on the customer needs by defining a product as a combination of functions which are implemented by technical components and services. Within the function-component-matrix the matching process between the components and functions is performed [Fisher et al. 2012, p. 266; Küpper et al. 2013, p. 306; Horváth et al. 2015, p. 230]. After this procedure all specific product components are equipped with direct cost characterized target costs [Fischer et al. 2012, pp. 264–267]. Figure 7 shows the explained process of cost splitting.

To determine the degree of cost achievement the third part of target costing management introduces the target costing index. This index calculates the ratio between the percental contribution partial weight of a component and its percental cost component. So, in case that the resource input for a component equals the customer use, the target cost index result must be one. It can be postulated that a cost index smaller one describes a condition, in which the product is to complex, and the costs must be reduced, in vice versa [Fischer et al. 2012, pp. 264–268; Küpper et al. 2013, p. 306; Friedl et al., 2017, p. 493; Coenenberg et al. 2012, p. 472]. The target costing

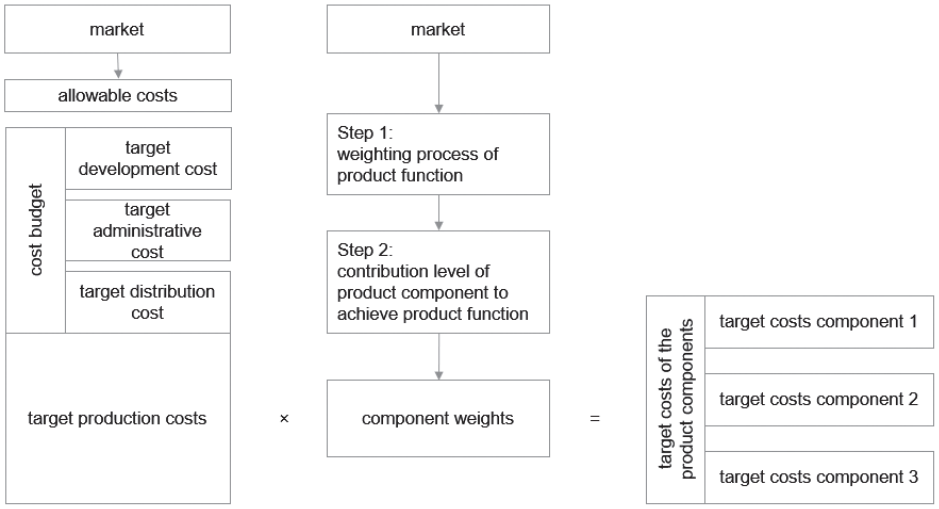

Figure 7. Cost splitting process

Source: own presentation based on [Friedl et al. 2017, p. 483].

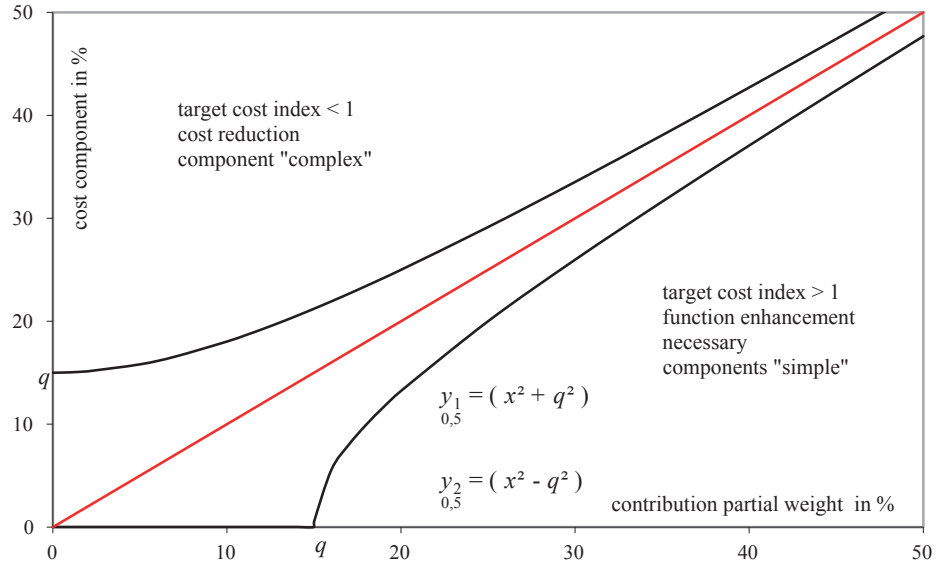

Figure 8. Target cost control diagram

Source: own presentation.

control diagram visualizes all components or rather their target cost indexes. While the *x*-coordinate represents the components contribution partial weight, the ordinate

shows the cost component. The angle bisector characterizes the ideal state of a cost index which equals one [Coenenberg et al. 2012, p. 491]. To determine the upper corridor of this function the term y_1 is taken, while giving q represents the sensitivity of the function. Ceteris paribus is the procedure for the lower corridor [Macha 2011, p. 267; Küpper et al. 2013, p. 308; Horváth et al. 2015, p. 234; Fisher et al. 2012, p. 268; Coenenberg et al. 2012, p. 572]. The smaller the defined number for q is, the more sensitive the function will be and the harder it will be to hit the corridor.

5. Integration of the concepts into a corporate social responsibility controlling

5.1. CSR-controlling via process-oriented calculation

In this academic work an overview of the process-oriented controlling was given. It has shown that even the time-consuming split up procedure of the different tasks and their allocation of costs are still worthy, as they recognize more than just the level of employment. This helps with identifying and monitoring costs related due to higher complexity. By this procedure only the process-oriented costs are recognized, as the cost-centre related costs are not. Because of that, cost-accounting is more flexible to changes regarding social, economic and ecological processes. When process-oriented controlling is enlarged by marginal costing for short-term decision making, it can execute sustainable cost management [Colsman 2016, p. 76]. Keeping in mind the side effect of process-oriented controlling (allocation, degression, complexity), it distributes vast amounts of aggregated information for decision making purposes. Pointing on the allocation effect, the process-oriented calculation is more accurate than the overhead calculation in case of equal purchase prices, as the overhead allocation is closer to reality [Colsman 2016, p. 77].

5.2. CSR-controlling via lifecycle costing

The earlier mentioned diversification of ecological products can be achieved via sustainable lifecycle management, as a product does not only have economical, ecological and social effects in the production phase but rather through all parts of its lifecycle. Thus, it can be divided into two lifecycle dimensions regarding the temporal and sectional dimension [Colsman 2016, p. 86]. The temporal dimension covers the whole lifecycle from the development phase right until the disposal phase. The sectional dimension goes one step further by attending the extraction of raw material until the recycling phase of the product [Colsman 2016, p. 86]. Both meaning a total different understanding about cost occurrence as different cost-types may occur across different accounting periods. However, this cost may occur either in the company itself in the form of preparation costs/launching costs or outside of company – meaning customer related like cost of purchase and disposal costs. The

third possibility is the cost occurrence on corporation level like costs for remedying environmental damages. So, if a company can optimize its production line, lowering the energy usage of the outcoming product by 50% it is not only saving the customers future power usage, it also shortens the use of resources needed in production – complying social responsibility terms [Colsman 2016, p. 86].

5.3. Green controlling as a factor of CSR

Sustainable management means considering ecological, economic or social needs. Controlling as a distribution unit of aggregated data and information fulfils this new management approach through adjusting company processes towards sustainable production [Günther, Steinke (eds.) 2016, p. 58]. The reason behind is that sustainable production opens new sales opportunities while reducing production and process costs [Horváth et al. 2015, p. 416]. Adjusting processes and tasks towards sustainability does not mean neglecting traditional profit orientation; it is more of a long-term value orientation according to the going concern principle, based on constant innovation and social responsibility [Colsman 2016, p. 48]. So, the purchase department picks the supplier which complies with company quality standards at a reasonable price. According to this orientation, the suppliers are becoming business partners no longer substitutional factors. Key figures in the logistics department are not only speed, security and price-oriented but rather enlarged by the question of environmental compatibility of each action taken. Company production focuses on new techniques to reduce overhead while being sustainable. Finally research and development (R&D) needs to develop new products which are augmenting customer needs while being environmentally friendly [Colsman 2016, p. 48]. So, the main tasks of controlling or more likely green controlling regarding the company's products are [Horváth et al. 2015, p. 417]:

- analysing the relevance,
- identifying risks and chances,
- continuous monitoring process,
- integration in planning and decision-making processes.

Controlling can use different tools to achieve these objectives. These tools are differentiated by three categories. The first category recognizes classic tools that are identified controlling instruments with high ecological aspects or high ecological potential like life-cycle costing, process-oriented calculation or target costing [Horváth et al. 2015, p. 417]. The second category is kind of an opportunity cost approach in which action alternatives are being evaluated and either executed or devolved to third parties [Horváth et al. 2015, p. 417]. The last category (so-called extended green controlling) refers to special controlling instruments like water footprint, carbon footprint or cumulated energy expenditure.

Based on the previous classification the following tools are mentioned regarding the green controlling [Horváth et al. 2015, p. 417].

- environmental check list,
- ecologic sustainable capital budgeting,
- material flow calculation,
- life-cycle assessment,
- environmental audit,
- sustainability-oriented risk management.

This approach can be enlarged by sustainability controlling via the sustainable balanced score card (SBSC). The five areas of this controlling instrument is enlarged by recognizing environmental, ecological and social perspectives [Colsman 2016, p. 66].

While the financial perspective refers to costs, revenues out of realized chances and ecological actions taken and their imminent financial effect, the market perspective focuses on customer relationship, customer loyalty, market prices and social actions with direct impact on sales volumes. The process perspective illuminates sustainable and ecological effects on the purchase market coming out of company's value-creation and innovation process [Colsman 2016, p. 67]. Within the learning perspective the company's know-how development, staff motivation and role as an appealing employer is represented. The last perspective, the out-market perspective analyses social and ecological actions taken by the company and its effectiveness on its reputation and social standing [Günther, Steinke (eds.) 2016, p. 66].

For each perspective there is an extra indicator, supporting the cooperation between different company departments. In business practice the benefit of green controlling and corporate social responsibility is still critically questioned even though individual interest exists [Günther, Steinke (eds.) 2016, p. 66].

5.4. Interim conclusion

Sustainable revenue controlling focuses on the realization of higher prices through better consumer acceptance. Better consumer acceptance can be achieved by producing sustainable products. Due to social and ecological awareness those products have to meet social and ecological needs. Therefore, an increased consumer acceptance leads to higher consumer benefits and hence a higher price level [Colsman 2016, p. 84]. The social and ecological benefits of the products must be communicated to the markets. In a socially and ecologically oriented society proportional costs can be reduced by a sustainable resource consumption approach. This means e.g. to apply for subsidies which are granted for using ecological materials. It can be further implemented by avoiding anti-social and non-ecological materials as those are often penalized with social and ecological fines. A sustainable controlling of fixed expenses can be achieved by using social and ecological fixed resources. Those resources are often encouraged by the state authorities (subsidies). Especially ecological resources usually have a longer life cycle and therefore lower periodical costs [Becker, Ulrich (eds.) 2016, p. 335]. The sustainable controlling of asset management can be divided into the controlling of non-current assets and current assets. Maximal

consumption of non-current assets is crucial. Current assets can be decreased by reducing scrap and waste which in turn leads to ecological benefits. A sustainable financial management can be implemented by borrowing from banks with social behavior. Income taxes may be minimized by using social and ecological tax saving programs. Risk management may serve financial management by a diversification of ecological products.

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Part 5

Management accounting and control in the Academia