Public Version

Masterthesis ANWB

UNIVERSITY OF TWENTE.

To what extent is the current cost allocation system at the ANWB an effective and efficient tool for strategic and operational management purposes and how to improve it?

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Preface

Date: 31 October 2013

Dear Reader,

This report is the public version of my master thesis to graduate for my study Business Administration – Financial Management at the University of Twente and is performed at the ANWB in The Hague. This public version concerns the management summary, the introduction to the research, and the literature review or the original thesis. The rest is not included due to a confidentiality agreement with the ANWB. This thesis concerns the improvement of the current cost allocation system used at the ANWB in order to let it contribute more effective and efficient to strategic and operational management purposes. In my five month during internship I have seen many aspects of a large organization like the ANWB. I have learned a lot by performing this research and about the daily operations and organizational culture of the ANWB. These insights will have benefits in my starting career. I think my research results are very satisfying. New cost drivers, a separation of specific and generic costs in the allocation system, and ten guidelines to use the cost allocation tool make it in my opinion a better tool. For that I thank the people I have interviewed and my colleagues at Group Control who challenged my findings now and then. The latter I also thank for the great ambiance on the department and the fun talks. I enjoyed it sincerely!

Special thanks go to my ANWB supervisors Thijs van Tuyll and Marcel Buytendijk. First, for giving me the opportunity to graduate in an interesting organization like the ANWB and second, for the great support during my whole research. With Thijs I had challenging talks that made me think twice about what I thought about my findings and how to tackle them. These talks significantly contributed to the quality of this report. He also thought me that the solution of a problem is not always the solution itself but could be as well the process to it. Besides he thought to structure thoughts and stories by making processed drawings and therefor you should always have a stack of blank papers near you. Marcel always knew several extra applications of my findings and he saw that almost all problems of the ANWB were linked. Unfortunately my research was demarcated and I could not solve all the problems. So I guess there is still room for some other graduators for him to supervise in the near future!

Special thanks to Henk Kroon, my supervisor at the University of Twente. I had great joy in our meetings discussing my subjects and many beside my subject. After each meeting I always had the feeling that I was well on track but that there was still more than enough to do. Henk gave me clear and simple insight in some hard to understand subjects. The solution for a problem does not always need to be groundbreaking; it has to be as simple and practical possible given the circumstances. Our meetings had an informal character and that is just the way I like to communicate. I also thank Peter Schuur, Martijn van Nistelrooy, and Jaap Tanis for reviewing this master thesis and giving me helpful feedback at the end of my graduation period. It contributed to this report as it is now. At last I would like to thank my parents for giving me the opportunity to study. It has taken six and a half beautiful years being a student for me to come this far and I really appreciate the way you let me fill in my student's life.

I hope you enjoy reading my master thesis, I enjoyed conducting it!

Kind Regards,

Timo Tanis

Management Summary

This is the management summary for the master thesis conducted at the ANWB. The research question that forms the center of this thesis is:

"To what extent is the current cost allocation system at the ANWB an effective and efficient tool for strategic and operational management purposes and how to improve it?"

Four essential topics are recognized in this question. First, the subject of research is the cost allocation system currently used at the ANWB. This cost allocation system is called the Under- & Overcoverage-tool (U&O-tool from now). Second, it is the question if this system meets all strategic and operational goals (is it effective)? Third, how much effort is needed to achieve those management goals (is it efficient)? And fourth, it these management goals are not all achieved, how should the allocation system be improved? These questions are in line with the sub-questions to answer the central question. The approach to answer them is fourfold. First, a literature review is performed to determine the strategic and operational management purposes of cost allocation. Second, The technical aspects of the U&O-tool are tested with the theory. Third, a potential performance gap between actual use for management purposes and preferred use of the U&O-tool is determined by conducting over 20 semi-structured interviews. Fourth, based on this performance gap a process for improvement was set with the stakeholders and followed. These individual talks and a workshop helped to improve and test the U&O-tool. At the end the central research question is answered and some recommendations are placed.

The management summary is more extensive than usual and this has several reasons. First, this thesis is technically written which makes it harder to understand for non-financials. Since the target group is everyone with a higher educational degree, an extensive introduction is beneficial. Second, this thesis contains some detailed descriptions on how things work or should work at the ANWB. Therefore reading this longer management summary in a more conventional language makes it easier to follow the 'storyline' in this thesis. The structure of this summary is supported with examples, tables, and figures which are part of this thesis.

Introduction

The ANWB exists about 130 years, developed a divisional organizational structure, and is active in several different businesses. The divisional management layers do not all correspond with the business unit. Since each business line or unit utilizes the same centralized supporting and overhead departments like Projects & ICT (P&I), HRM, Finance, or Purchase Management (PM) it is a challenging task to accurately allocate those overhead costs for supplied internal services. The business lines of the ANWB are Assistance, Insurance, Media, Retail, Travel, and the Association. In general costs of overhead departments are allocated to determine an accurate product return of each business line (for strategic purposes) and to determine an accurate departmental result, both cost centers and profit centers at the ANWB (for operational purposes). Through this thesis and this summary a running example is used. The HRM department is chosen since this

Running Example HRM – Profit & Loss Statement (fictive figures)

Actual 2012 (x€1000)	
Own costs	300
Cost received	100
Total costs	*400*
Direct revenues	-10
Costs allocated	-430
Total income	*-440*
Net result	**-40**

The total costs allocated to other departments plus direct revenues exceed HRM's own costs and received costs allocated by other supporting departments. Thus HRM has a positive result after cost allocations.

Figure 1: Running Example HRM - Profit & Loss Statement

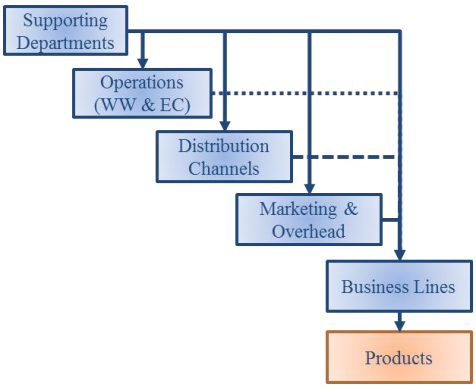
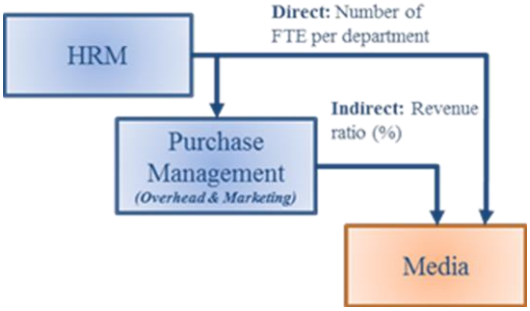


Figure 2: A Simplified Example of ANWB's Step-Down Allocation Method

is the most striking example. An example of how a departmental result is determined is showed in figure 1. HRM has own costs – like personnel costs – and receives costs – from other supporting departments that have supplied HRM with some services like laptops, workplaces, or legal advice. These costs have to be earned back by HRM to tell how HRM performs. Therefore they allocated their costs via an allocation base to internal customers – other departments – and these allocations are a revenue for HRM. In figure 1 HRM has a so-called over-coverage of costs, the revenues exceed the costs. In principle each department should have at least a slightly positive results. The accuracy of HRM's net result depends on two factors. First, the accuracy of the costs they receive from others and second, the accuracy of the costs they allocate by themselves.

Figure 2 shows the simplified allocation method used at the ANWB. Departments are placed on a predetermined sequence on the steps. Within the supporting departments each department like P&I and HRM are also places in a fixed sequence. The allocated costs follow the arrows downwards, so cost allocation the other way around is prohibited. In figure 3 an example of a cost allocation is shown. In this figure HRM can allocate its costs to Purchase Management (PM) – which is an overhead department (see figure 2, fourth row) – but PM cannot allocate costs to HRM although PM provides services for HRM. In theory this method is called step-down allocation and it is one of three possible methods. Managers and controllers of some departments feel they cannot manage upon some of these allocations and ultimately not on the net result of their department. In theory the upper departments should be inexpensive and the lower departments should be more expensive. Nevertheless, they argue that the allocation method is not right and that all supporting and overhead departments are in principle too expensive. It has been expressed often that managers cannot manage upon the net result after allocations of their department.



Media receives direct cost of HRM based on the number of FTE active at Media. HRM has determined a Price (P) per FTE and Media 'takes' the Quantity (Q). Media receives indirect costs of HRM via Purchase Management based on the relative amount of revenue Media makes.

Figure 3: Running Example HRM - Direct and Indirect Allocations

All costs are assigned via an allocations base which have two forms: a cost driver or an Equi-Proportional Mark-up (EPMU). By a cost driver the total amount of costs to allocate is determined by a Price (P) per unit times a Quantity (Q) of units supplied. By an EPMU the amount is determined by a percentage (ratio) of the total. Figure 3 shows another simplified running example HRM of how their costs are allocated to the business lines. The number of FTE is a cost driver and the revenue ratio is an EPMU. One FTE (full-time equivalent) represents 38 working hours per week excluding holidays and the revenue ratio is the relative amount of revenue a business line makes. All costs are eventually assigned to the business lines, either direct or indirect. Following the example in figure 3 Media receives direct costs of HRM based on the number of FTE in their department. Media receives indirect costs from HRM via the department Purchase Management (PM). The latter allocation is based on the

EPMU of PM and is based on the height of revenue Media makes. This means that HRM first allocates costs to PM, and that PM allocates a part of these costs to Media on their turn. Some managers and controllers place doubts by the cost drivers (like the one of HRM) or EMPU's (like the revenue ratio) used in the U&O-tool. They argue whether these allocation bases represent the true activities of those departments. For example, they challenge if the number of FTE a department has corresponds to the amount of work HRM has to do. A department with 40 part-timers (±20 hours per week) receives the same costs as a department with 20 full-timers (±38 hours per week). Next, they challenge if the amount of revenue a business line makes corresponds with the amount of services they take. Hence, it is questionable if the net result after allocations of their department or product returns yields the reality. Management upon these costs is seen as difficult and therefore sometimes not done. Another argument expressed was that many do not understand how the costs are allocated, how the method works, and why costs are allocated as they are. So the U&O-tool is seen as a black box. Together these potential deficits place the question whether the U&O-tool contributes sufficient to management purposes.

Theory

In the literature review the importance of an accurate cost allocation system was expressed. Cost allocation systems are an important part of a more comprehensive control process, which on its turn is part of the whole management accounting system. So if the U&O-tool at the ANWB faces problems it could affect management on different levels. These levels, demarcated to cost allocation, are defined as three main strategic and four main operational management categories (see table 1). As the previous sentence suggests each category is a bundle of statements about management possibilities from various authors. Strategic management is management on corporate level and corporate wide activities on the long term (with a horizon of >2 year). Operational management is management on departmental level and activities on short term (daily – 1 year). Tactical has been rejected In the semi-structured interviews it was checked whether the U&O-tool is used for these categories and what the reasons are for it not to achieve them. This IST-situation is compared to the preferred SOLL-situation. When the U&O-tool complies with all strategic and operational management purposes it is seen as effective. If those purposes are complied with minimal effort, it is seen as efficient.

Strategic management:	Operational management:
1. Cost reduction, efficiency, and profit optimization	*1. Information and transparency*
2. Competitive performance and strategy	*2. Decision making and behavior*
3. Market share, segmentation, and product mix	*3. Performance and efficiency*
	4. Influenceability and communication
Sources: Bouwens & Abernethy (2000), Simons (1991), Dent (1990), Kaplan (1984), Barret & Konsynski (1982), Langfield & Smith (1997)	

Table 1; Theoretical Strategic and Operational Management Purposes for Cost Allocation

Regarding the allocation method the theory subscribes to use step-down allocation costing for large organizations like the ANWB. This method is accurate, prevents excessive use of services, and has low costs of (management) errors. The other two methods, direct allocation and reciprocal allocation, have other issues. Direct allocation is too inaccurate, has no limits on use, and has high costs of errors. Reciprocal allocation is very accurate, but has very high costs of use due to complexity. Step-down allocation takes place closest to the cost-accuracy trade-off in the case of the ANWB (see figure 4). As can be seen in figure 2, step-down allocation follows

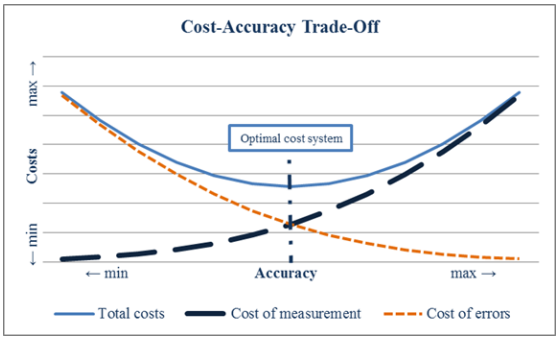


Figure 4: The Cost-Accuracy Trade-Off

a fixed sequence of departments. The order of departments influences the accuracy of allocations significantly. Two rules to determine the right sequence are stated by theory of which the first is leading: *1) the relative size of service/cost allocation to each other;* and *2) the absolute size of the service/cost allocation to each other*. At the ANWB a partly applied Activity-Based Costing (ABC) system is used. On this concept the cost drivers or EPMU's are based. Six criteria to check or develop the allocation bases used are set by theory: *1) Allocations should be cause-and-effect based; 2) Costs should be allocated to departments that benefit from the services supplied; 3) Allocations should be for a fair price; 4) The balance between costs/effort and advantages should be right; 5) Allocations should be consequently based on Actual or Budgeted activities; 6) When these criteria cannot be applied, costs should be allocated to those who can bear them.* The sequence of departments in the U&O-tool and if the allocation bases meet the upper criteria is checked.

Findings – Performance Gap

Regarding the sequence of departments some remarks are made. The first remark is about the place of the Boards. It is not correct when the first rule – about relative costs – is followed. The Boards should be placed on top then. Absolutely seen the Boards receive €xxxK less from Business Services (BS), HRM, and P&I. But they allocated €xxxK to BS and P&I. In the end the effect is not very large, but the insights are more accurate. The other remark is about the place of many overhead departments. These departments also provide services for supporting departments so in principle these should be seen as and placed by the supporting department. Costs of overhead departments are allocated based on relative revenue of a department so no suggestions about their place can be made yet due to the fact that supporting departments do not make any real revenue. Regarding the cost drivers or EPMU's used question rise with several departments. Some allocation bases do not meet the first five criteria stated in theory. Figure 3 (see page v) displayed the running example of HRM and showed that the number of FTE is probably not entirely related to the amount of work HRM does for one department. Similar issues were raised with the allocation bases of supporting departments Accounts Payables (AP), Accounts Receivables (AR), and overhead departments Legal Affairs (LA), Purchase Management (PM), Customer Intelligence (CI), and Customer Strategy & Innovation (CS&I). After conducting the semi-structured interviews these allocation based were improved by having individual talks and a workshop.

Strategic Categories	Current Use (IST)	Preferred Use (SOLL)
Cost reduction, efficiency, and profit optimization		
Competitive performance and strategy		
Market share. Segmentation, and product mix		

Table 2: Performance Gap on Strategic Management

Operational Categories	Current Use (IST)	Preferred Use (SOLL)
Information and transparency		
Decision making and behavior		
Performance and efficiency		
Influenceability and communication		

Table 3: Performance Gap on Operational Management

The semi-structured interviews pointed out for which strategic and operational management purposes the U&O-tool is preferred to use (SOLL situation) and is actually used (see table 2 and table 3). Qualitative statements of each category were somewhat quantified by a pie-chart (see the right two columns of table 2 and 3) by the author to create a visual impression of the differences. These charts should not be interpreted as hard values, but they give an as objective and accurate possible indication of the performance gap. The

dark orange piece represent the proportional use, the light orange piece the proportional non-use. For strategic management purposes the U&O-tool is used less for the first and third category (see table 2). Several reasons were found for this gap. Currently the U&O-tool is used for the cost reduction plan, but due to some costs which cannot be influenced by managers the tool is not adequate for achieving efficiencies and profit optimization. Besides, product returns calculated by the tool are not seen as accurate and therefore not used market strategies. The lack of use for efficiencies and profit optimization are enforced by the insular culture that prevails in the ANWB. Each departmental manager thinks first of his own department and second on behalf of the whole ANWB. Dialogues between stakeholders of different departments are rather one sided about decreasing costs the receive and not about mutual efficiencies. Additionally some stakeholders told they do not understand how the results of the U&O-tool are calculated and see the tool as a black box. That fact enforces the insular culture again, it is like a vicious circle. For operational purposes the U&O-tool is less used for the second and fourth category (see table 3). This gap is explained by some cost drivers or EPMU's that do not reflect the departments actual activities like HRM, AP, AR, and the overhead departments. Stakeholder mention it is not always clear how costs occur, how the user can influence them, and manage upon them. Another argument is about generic overhead costs that are non-operational. These costs make the operational result after allocations unclear and unusable for decision making and management, according to some stakeholders. Insular culture impedes communication between managers or controllers from different departments having the same effects on mutual efficiencies as stated earlier. Concluding the U&O-tool is not used for what it could do.

Improvements

In order to solve the issues stated in the previous section four steps are taken: *1) The inadequate allocation bases of supporting departments have to be replaced with one or more that meet the criteria; 2) Indirect and direct overhead costs should be separated and for the specific overhead costs new allocation bases should be used; 3) The sequence of supporting departments – including the specific overheads – should be altered according to the two rules;* and *4) Guidelines for 'how to interpret and use the allocated costs by the U&O-tool' should be written to stimulate dialogues and change behavior between stakeholders.* For the first two points a process was followed based on either individual talks or a workshop. The end results are shown in table 4. The workshop of HRM provided several new cost

	Departments	Sub-unit	Cost driver / EPMU
Supporting Departments	HRM Support	Personnel Administration	# of mutations (inflow & outflow)
		Salary Administration	# of employees
		Functional Management & ICT costs	# of employees
	HRM Services	Training Administration	# of employees
		ANWB Select	# of mutations (only inflow)
	HRM Advice		Distribution of FTE Advisors to responsibility area
	HRM Labor Affairs		# of employees
	Accounts Payables		# of Assistance Invoices
			# of biased Assistance Invoices
			# of Standard Invoices
			# of biased Standard Invoices
	Accounts Receivables Collections		# of Collections
			# of Complaints Small/Large Account
			# of Complaints Key Account
Overhead Departments	Legal Affairs		# of legal files
	Purchase Management		% of spend
	Customer Strategy & Innovation		Distribution of FTE to responsibility area
	Customer Intelligence		Distribution of FTE to responsibility area

Table 4: New Cost Drivers of Supporting and Overhead Departments

drivers which are better related to their activities. The individual talks with Accounts Payables resulted in more specific cost drivers. Four overhead departments were marked as specific and these will be seen as supporting departments from now on. Of each of those departments one new cost driver or EPMU is suggested. All these new cost drivers or EPMU's meet the first five criteria of allocations bases. Besides, they are chosen such that minimal extra effort is needed to deliver the input for these allocation bases. Therefore they form genuine preconditions for an allocation system that should be an effective and efficient tool for management purposes. Regarding the new sequence of supporting some alterations have to be made. Following the first rule – the relative size of cost allocations – the new sequence should be as follows: Legal Affairs, Purchase Management, the Boards, Business Services, P&I, HRM, Finance, and Customer Intelligence. The second rule – absolute size of cost allocations – does not suggest anything different. To enhance the understandability of the U&O-tool for all stakeholders the 'ten commandments of U&O' are provided. Summarizing these ten guidelines tell the 25 stakeholders how they should use the U&O-tool for management. It tells that one only hold responsibility over specific costs and services which are of primary need. These specific costs are expressed in a Price (P) times a Quantity (Q). The supplier should achieve an acceptable price for an acceptable quality and the user should minimize the quantity while remaining qualitative operations. Suppliers and users should have dialogues about both the P and the Q to improve mutual efficiencies since the U&O-tool allows that. Generic costs exist due to decisions of the Executive Board and are of secondary need. They are allocated to the Executive Director and eventually on products which can bear them (revenue ratio). Management of business lines holds no responsibility, but just accountability over these costs.

Effects New Cost Drivers of HRM (fictive figures)

	Current B'14 (x1000)	New B'14 (x1000)	Effect
Emergency Center	€ 30,00	€ 51,00	€ -21,00
Wegenwacht	€ 89,00	€ 65,00	€ 24,00
Assistance Buma	€ 28,00	€ 34,00	€ -6,00
Assistance Coma	€ 105,00	€ 102,00	€ 3,00

The effects of the new cost drivers of HRM are mostly expressed in change of allocations to the Emergency Center and Wegenwacht (seasonality effects and part-time employees). Due to the indirect allocations of the Emergency Center and Wegenwacht to the Business Lines, Assistance B2C benefits most from the new drivers of HRM

Figure 5: Running Example HRM - The Major Effects of the New Cost Drivers

Effects

HRM and AP delivered data to test what the effects on the business lines like Media are. Figure 5 shows an example of the effects of HRM on the Emergency Center and the Wegenwacht (the Operations, see figure 3) and ultimately on the business line Assistance. In sum, with the new drivers of AP the effects on individual business lines vary from approximately €xxxK to €xxxK per business line. The new allocation bases of the former overhead departments – LA, PM, and CI – had bigger effects on the business lines. Assistance Business to Consumer (B2C) and Insurance ANWB benefit from the new allocations at the expense of the Association and Media. The effects vary from €xxxK to over €xxxK per individual business line. The supporting and overhead costs are allocated again in a different and more accurate way to other departments. Besides, these financial effects the behavioral changes that could be achieved have to be mentioned. The preconditions to achieve both strategic and operational management purposes are set. The biggest arguments about lack of influence on costs and insight in the cost allocations are tackled. The supplied guidelines are hoped to breach the insular culture at the ANWB and stimulate dialogue about mutual efficiencies for the ANWB's whole sake. Additionally the new allocation bases make errors or wrong administration visible and bring it into account (see drivers AP and LA, table 4). So eventually the allocations become more accurate over time. All suggested improvements could be achieved with limited extra effort. Hence the efficiency of the tool remains the same and sufficient.

Conclusion

The objective of this masterthesis was to answer the central research question:

"*To what extent is the current cost allocation system at the ANWB an effective and efficient tool for strategic and operational management purposes and how to improve it?"*

The answer of the central research question is as follows: *The U&O-tool is currently not used for all strategic and operational management purposes, hence it is limited effective. Nevertheless for the purposes it is used, it does not need much effort, hence it is efficient. To make the U&O-tool effective and remain its efficiency my suggested improvements should be applied.* Concluding I recommend applying the new cost drivers and EPMU's, use the new sequence of supporting departments, and use the ten commandments of U&O. This way the preconditions for the cost allocation system to be an effective and efficient tool for strategic and operational management purposes are met. In essence the provided ten commandments should stimulate the right dialogues and change behavior within the ANWB. Taking the resistance to organizational change into perspective it could take longer for the improvements to be fully exploited. For the stakeholders to get used to the new cost allocations I recommend to use the test sheets for every department, which I developed in Excel, side to side to the current allocation method next year in 2014. This way teething problems can be found and solved before potential damage of errors are caused. After one year of testing the new cost drivers should be definitively be used during (the budgeting period of) 2015. For more specified recommendations I refer you to chapter 8 of this master thesis.

Abbreviations

Abbreviation		English Definition	Dutch Translation
ACS	-	Accounting Control System	
A&I	-	Assistance and Insurance	Hulpverlening en Verzekering
AP	-	Accounts Payables	Crediteuren
AR	-	Accounts Receivables	Debiteuren
B2B	-	Business to Business	Zakelijke Markt
B2C	-	Business to Consumer	Consumenten Markt
BL	-	Business Lines	
BS	-	Business Services	
CI	-	Customer Intelligence	Klantkennis
CS&I	-	Customer Strategy & Innovation	Klantstrategie & Innovatie
DC	-	Distribution Channels	Distributie Kanalen
EC	-	Emergency Center	Alarmcentrale
EPMU	-	Equi-Proportional Mark-Up	
FA	-	Financial Affairs	Financiële Zaken
GAR	-	Group Accounting & Reporting	
GC	-	Group Control	
HRM	-	Human Resource Management	
LA	-	Legal Affairs	Bedrijfsjuridische Zaken
MAS	-	Management Accounting System	
MBO	-	Management by Objectives	
MCC	-	Management Competence Center	
M&M	-	Members and Marketing	Leden & Marketing
M&R	-	Management & Releases	Beheer & Releases
M&S	-	Marketing and Sales	
OA	-	Operations Assistance	Operaties Hulpverlening
O&M	-	Overhead and Marketing	
OOPS	-	Out of Pocket Costs	
P&I	-	Projects and ICT	
P&L	-	Profit and Loss Statement	
PM	-	Purchase Management	Inkoopmanagement
SD	-	Supporting Department	Ondersteunende Diensten
SP	-	Special Products	
U&O-tool	-	Under- and Over-coverage tool	Onder en Overdekking Model
WW	-	Wegenwacht (Road Assistance)	

Table of Contents of Confidential Version

1. Introduction

This master thesis contains a research performed at the ANWB in The Hague, The Netherlands, at the department Group Control. It gives insight in a financial and strategic issue related to this department. First, the ANWB is introduced (§1.1). Second, the department where this research takes place is discussed (§1.2). Third, the problem statement is properly explained (§1.3). Fourth the research is demarcated (§1.4). Fifth the objectives for the end of this master thesis are determined (§1.5). And sixth, the central research question and its sub-questions are described (§1.6).

1.1. About the ANWB

The ANWB was founded in 1883 as an association for cyclists and also developed through the years as an Association for hikers, drivers, horse riders, bikers, boaters, campers, and travelers. This makes that the ANWB evolved significantly in 130 years to a very divers organization. They still derive their raison d'être of the familiar and well-known Wegenwacht (WW) who provide road assistance to its customers.

Currently the ANWB is active in six different main businesses: *insurance, assistance, travel, media, retail, and the association.* Therefore the ANWB has developed a complex business and financial structure. Four strategic themes are strived for in ANWB´s latest vision for middle-long term 'Ambition 20/20': sustainable mobility, traffic safety, nearby recreation, safety net for on the road. Ultimately a triple-win should be achieved: a win for society, a win for their members, and finally a win for the ANWB. In 2012 a net revenue of over one billion euros was achieved, but a net loss after tax of 12.5 million euros. In sum an average of 4173 FTE are spread over the various business lines of the ANWB like Wegenwacht, insurance, medial, travel, retail and the Association. The ANWB has approximately 4 million members in the Netherlands and 70 retail stores of which over 20 are reshaped according to the new store formula. Due to the net loss of 2012 and the unabated high skepticism in the Dutch economy ANWB decided to force a 15% cost reduction throughout the whole organization. This influences daily operations, strategic decisions for the upcoming periods, and the importance of this report.

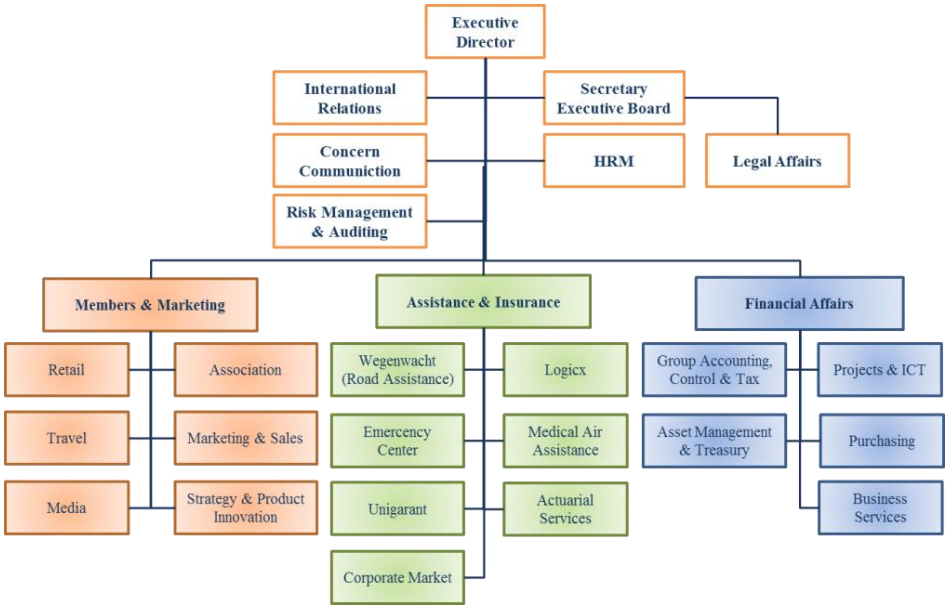


Figure 6: Organizational chart of ANWB

Figure 6 shows that the ANWB has a divisional structure. Of each division – that is of Member & Marketing (M&M), Assistance & Insurance (A&I), and Financial Affairs (FA) – a director takes seat in the executive board along with the executive director. Figure 7 on the next page shows the five

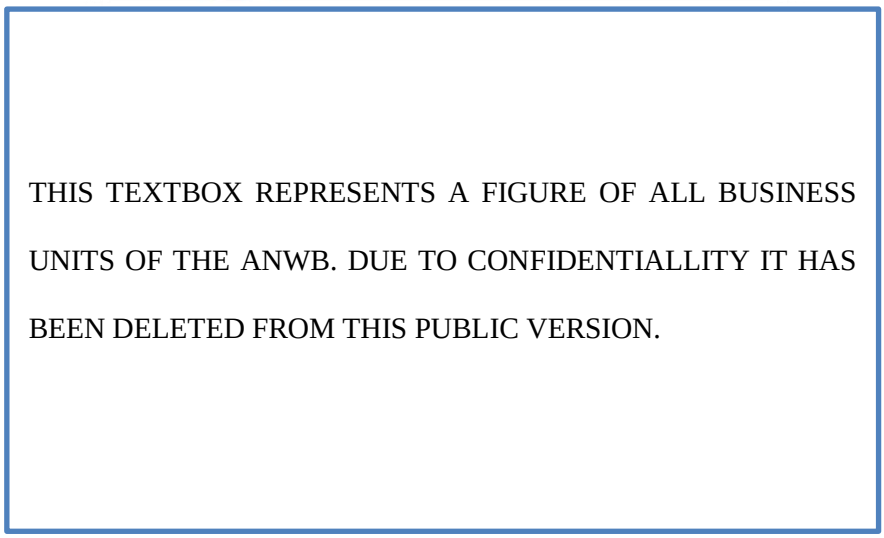


Figure 7: Business Units of the ANWB

business units of the ANWB – these are Supporting Departments (SD), Distribution Channels (DC), Overhead & Marketing (O&M), and Business Lines (BL).

Top management has responsibility over several departments out of different business units. Each business line makes use of the same centralized supporting and overhead departments. So allocating costs and determining financial performance within a responsibility area is challenging. Financial flows are complicated by the fact that the ANWB is split up in a few fiscal entities.

1.2. About Group Control

This graduation internship is performed in the department Group Control (GC) which is a supporting department under the responsibility area of Financial Affairs (FA). Combined with Group Accounting and Reporting (GAR) it is one of the five SDs – the other ones are Business Services (BS), Projects and ICT (P&I), Human Resource Management (HRM), and the Boards. GAR concerns reporting financial data for official Annual Reports and administrate all accounts payables and receivables. GC uses this data together with other operational data to analyze and control current business and to make forecasts of the future. So their main activities concern management (cost) accounting – that is control all financial flows of the ANWB and report it in a way that strategic decisions and operational management can be made upon. In practice one manager, two controllers, and two business analysts of GC reports direct to the board of directors, the other business controllers report to the department's management team and the director of GAR & GC.

GC's purpose is to provide accurate management (cost) accounting information and analyses. For doing this source systems like Oracle Financials are used. In this case Oracle is used for bookkeeping and Cognos is a management information system used for reporting data clearly out of a data warehouse in between source systems and Cognos. Monthly and annual performance reports of departments are manually imported into PowerPoint files and adapted. One important part of their reporting concerns the allocation of costs – or the control of costs – through the organization. Organizations like to know how many services and costs are internally allocated between departments to determine all kinds of performances. Allocating costs has several purposes, and organizations use different methods, models, tools and systems for doing that. Also the ANWB allocates costs to internal departments and products. A tool to calculate these cost allocations is used and it is called the 'under and over coverage tool' – the U&O-tool in short. This tool is a set of nine linked Excel files allocating

cost from over 20 departments to 80 products. One of the controllers of GC – who is also one of the two internal supervisors of this internship, Marcel Buytendijk – is the one maintaining and operating this tool in addition to his group controller activities. Investigating the use of the U&O-tool, determining its imperfections, and recommend practical and directly applicable improvements in an academic way is the purpose of this graduation internship at the ANWB. In the next section the problem analysis about the U&O-tool is provided.

1.3. Problem Analysis

Allocating costs within organizations in general has several purposes – determining the performance of cost centers or determining an accurate cost price of a product. Many departments – but especially the supporting departments – deliver services to other departments. Via a cost allocation system they can account the receiving or purchasing departments for these services. An organization would like to know how many costs are incurred to have one or more products on the market and if it is feasible to keep these products on the market. These two examples show the necessity of having a cost allocation system in use. Organizations have three levels of control: strategic (long term, >2 years), tactical (medium term, 1-2 years), and operational (short-term, daily-1 year). The same goes in essence for cost allocation systems and its management purposes. The cost allocations system's design, in terms of method and allocation bases used, is influenced by the purposes for which it is used. Each design has its pros and cons; the challenge is to balance these with the requirements. Besides, controlling costs is an important part of the overall management accounting.

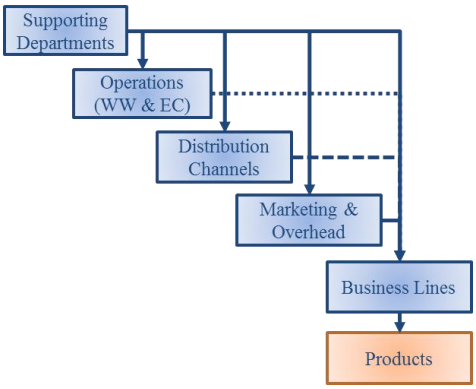


Figure 8: Simplified Example of ANWB's Cost Allocation Method

The ANWB also uses a cost allocation system, called the U&O-tool (see figure 8). The current system was developed five years ago as a result from a reorganization called 'Drive8'. The vertical organizational structure has been changed to more integration in vertical and horizontal management. Where the previous model just gave insight in product returns, the U&O-tool allows calculating departmental returns. Business economic principles provide the basis for this U&O-tool, that is the concept of step-down cost allocation. This different view changed together with the model the three years after to how it is now. It has resulted in some new efficiencies and deficiencies. The deficiencies led to some expressed complaints and rumors within the ANWB. Four examples are given to demonstrate the problems the ANWB faces regarding the U&O-tool.

1. Some managers believe the cost allocations from HRM do not represent the amount of activities HRM performs for them. They state that they receive in general too much costs from another department, shortly they feel that the cost allocation is inaccurate.

Running Example HRM – Current Cost Allocation Issue (fictive figures)

Cost Allocations from HRM (A'12)

	# FTE	# Employees	Current Allocated Costs (x€1000)
P&I Overhead	32	35	142
Contact Center	50	70	188

HRM costs are allocated based on number of FTE per department. One FTE accounts for approximately 38 hours per week excluding holidays. HRM performs their activities more per employee (individual). Taking the upper table into perspective HRM has probable twice as much work for the Contact Center with many part-timers, but allocates just 25% more based on the FTEs. Does the number of FTE correspond with the activities HRM has to do?

Figure 9: Running Example HRM - Issue Current Cost Allocation

Figure 9 shows a running example of HRM's cost allocation and explains this perceived issue. Since HRM is the most striking example, this department is used throughout this thesis to support the findings or improvements.

2. Some departmental managers or controllers state they do not entirely understand which services are provided for the amount of allocated costs via the U&O-tool. Either the way how costs are assigned or which costs are assigned is sometimes unclear. They place questions by the accuracy, transparency, and fairness of the costs allocated by the U&O-tool.
3. Example 2 has influence on the way departmental results are interpreted by managers and controllers. Figure 10 show a new running example of a profit and loss statement (P&L) HRM. Each month a P&L per department is calculated. Costs allocated from one department to another serve as revenue for the service supplying department and as a cost for the service receiving department. Management is reviewed by the results – whether the allocated costs are enough to cover their own departmental costs plus costs received. In fact some of these stakeholders stated that the departmental result after cost allocations is that inaccurate or unclear that is not used for management. Strange since this result shows how well a department performs.
4. This last example has to do with the overhead costs of the ANWB. The ANWB Insurance department receives costs from overhead departments via the U&O-tool. It is a substantial amount of costs since overhead costs are allocated based on the relative amount of revenue a business line like ANWB Insurance makes (±17% of total revenues). Their management complained about these costs since ANWB insurance cooperates with Unigarant insurance as a single entity. ANWB Insurance makes only use of the overhead services of Unigarant, not those of the holding ANWB. So how come that ANWB Insurance receives all these costs while they do not receive services?

Running Example HRM – Profit & Loss Statement (fictive figures)

Actual 2012 (x€1000)	
Own costs	300
Cost received	100
Total costs	*400*
Direct revenues	-10
Costs allocated	-430
Total income	*-440*
Net result	**-40**

The total costs allocated to other departments plus direct revenues exceed HRM's own costs and received costs allocated by other supporting departments. Thus HRM has a positive result after cost allocations.

Figure 10: Running Example HRM - Profit & Loss Statement, Source ANWB

These complaints from within the organization, together with the importance of accurate and fair cost allocation, made Group Control manager and this internship assignment issuer Thijs van Tuyll think if the U&O-tool used at the moment truly leads to an accurate reflection of reality. It might be possible that some departments are unjustified charged or not charged with costs which affects their P&L. Strategic and operational management decisions are made upon these accounts. So, inaccurate cost allocations have (negative) influence on strategic and operational management. Together with Marcel Buytendijk he started to question whether the U&O-tool is effective in contributing to strategic and operational management purposes of cost allocation. They ask to reflect on two situations. First, the intended use of the U&O-tool (what are these management purposes?) which is the SOLL situation. And second, the actual performance of the tool (which management purposes are achieved?) which is the IST situation. Besides, since one model is more comprehensive, more expensive, or time consuming than another, they question whether the U&O-tool is an efficient tool to

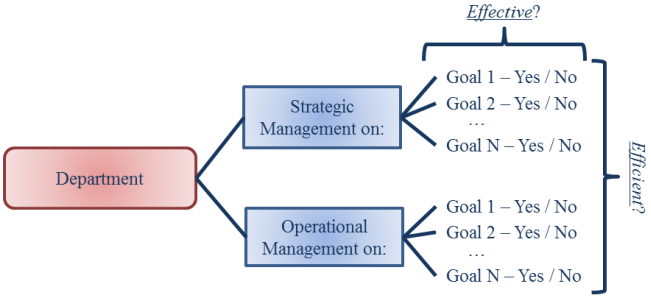


Figure 11: Effectiveness and Efficiency on Strategic and Operational Management

reach those intended strategic and operational management purposes. In figure 11 a schematic summary of this problem statement is presented. The five essentials in this report will be the U&O-tool, strategic management, operational management, effectiveness, and efficiency.

The ANWB supervisors would like to receive solutions which they can directly apply. They have asked to manage the process for implementing suggested improvements besides delivering recommendations and improvements.

1.4. Demarcation

To keep this research manageable and focused it is important to demarcate the field of interest. The U&O-tool determines the P&L of each department, other financial statements like cash flows or balance sheets are disregarded. Both technical (how the tool works) and behavioral (how the tool affects people) are subject of investigation. The U&O-tool is applied for all supporting departments and operating divisions. To find the essential problem, the use of the U&O-tool in all departments is investigated. Its use is demarcated to strategic and operational management purposes and whether these are achieved or not. Tactical management is felt to be out of scope for this research for some reasons. First, it is unclear what the medium term use of the U&O-tool is. Second, at the ANWB management sees tactical as half operational oriented and half strategic oriented. So for simplicity only operational and strategic terminology is used. Third, the author and his supervisors like to focus on the monthly use of the U&O-tool and long term management using the U&O-tool. Additionally, it is investigated if the strategic and operational objectives of the U&O-tool are achieved in an efficient manner. Summarizing, the ANWB-wide application for strategic and operational purposes of the U&O-tool together with its direct stakeholders – the controllers and (financial managers) – are concerned.

1.5. Objectives

These objectives are defined together with my supervisors of the ANWB. At the end of my graduation internship they should be achieved.

1. Determine the preconditions of a cost allocation system to contribute to strategic and operational management successful by studying the literature.
2. Define how each stakeholder wants to use the U&O-tool for their strategic and operational goals
3. Describe the effectiveness of the U&O-tool to reach ANWB's strategic and operational goals
4. Determine the efficiency of the U&O-tool to reach its purpose
5. Design an improved U&O-tool which is in line with strategic and operational whishes
6. Test if the improved U&O-tool is a more effective and efficient tool for both strategic and operational purposes
7. Enhance my knowledge of management accounting, control systems, and especially cost allocations due to the literature study and practical experience gained in the five months during internship

The expected redesign of the U&O-tool can be in the cost allocation method used, other than or adaption of the current step-down method, or in the basis of costing, like activities. These new models could be tested with actual data from the ANWB.

1.6. Research Question

We question if all the people coping with the input or the output of the cost allocation system intrinsically (are able to) understand what they could do and what they should do with the results from

the U&O-tool. Simultaneously we question if technically seen the data process in the U&O-tool is the best way of allocating costs and allow people to perform adequate management. Therefore the central research question of this report is:

To what extent is the current cost allocation system at the ANWB an effective and efficient tool for strategic and operational management purposes and how to improve it?

In this research question the part '*cost allocation system at the ANWB'* concerns the U&O-tool used. The part '*effective'* means what purposes the U&O-tool has and whether these are achieved yes or no. The part '*efficient'* means how much effort, time, or costs is needed to achieve these goals. *'Strategic and operational management purposes'* concern the goals which the U&O-tool should achieve on these two organizational levels. The last part '*how to improve it'* has to do with the technical – how it works – and behavioral – how it affects people – enhancements for the U&O-tool needed to come from the current to the desired situation. To answer the central research question some sub-questions are formulated focusing on each of the stated parts in the research question.

1.6.1. Sub-questions

The following sub-questions allow to give an appropriate answer to the central research question and to meet the stated objectives. They are formulated in such a way that there are two theoretical questions (1&2), one SOLL question (3), one IST questions (4), and one improvement question (5).

1. *What are the theoretical requirements of a cost allocation system to effectively and efficiently contribute to strategic and operational management?*

This sub-question provides a better understanding of how cost allocation systems can or should be used for strategic and operational management. The purposes of cost allocation systems and how its performance relates to put effort become clear. It allows us to interpret the current situation at the ANWB better and it gives guidelines to achieve improvements. As the question suggests it concerns a literature study which is performed in the next chapter.

2. *What are the theoretical technical shortcomings of the U&O-tool regarding its use for strategic and operational management purposes?*

This sub-question answers potential theoretical technical shortcomings. It concerns the design of the U&O-tool. These points can be used for further investigation in the semi-structured interviews.

3. *How should the U&O-tool be contributing to strategic and operational management purposes at the ANWB in terms of effectiveness and efficiency?*

This sub-question describes the intended purposes of the U&O-tool and a preferred situation. It is compared with the next sub-question to find the performance gap of the tool. These discrepancies show room for both technical and behavioral improvements. This sub-question is answered by performing interviews with all relevant stakeholders.

4. *Is the U&O-tool currently an effective and efficient tool for strategic and operational management purposes?*

This sub-question answers whether the U&O-tool is capable in contributing to the desired strategic and operational management objectives at the moment. An overview of which purposes are achieved and which are not is provided. Besides, it is interesting if the desired purposes (if reached) of the

U&O-tool are reached in an efficient way. It might be possible that it costs too much effort – perhaps due to complexity – to reach the intended results. Also for this sub-question the relevant stakeholders are interviewed.

5. *How to redesign (the usage of) the U&O-tool to allow it to contribute effective and efficient to the intended and unexploited strategic and operational management purposes?*

The final sub-question is a conclusive question and suggests an improved redesign of the U&O-tool. It uses all knowledge gained in the previous sub-questions to redesign the U&O-tool. Criteria and support are given by literature and room for improvement by the performance gap. Extra interviews and a workshop yield the practical and technical improvements of the U&O-tool. At the end these changes are tested and validated. Here recommendations of improvements to let the U&O-tool achieve its intended and unexploited purposes.

At the start of each upcoming chapter an introduction is provided in which is described how the chapter contributes in answering one (or more) of the sub-questions. At the end of the chapter a short reflection is given to the answer of the sub-question. In the methodology chapter the choice of research method is made and extra attention is paid on how to perform this research and achieve the preferred results.

2. Methodology

In this chapter the research methodology is described. First the research design is chosen and an explanation is provided of why this design is appropriate for this particular research. The second part elaborates on how, what sort, why, and from who the data is collected followed by an explanation of how the data and findings are analyzed and interpreted to form a founded opinion about the problem statement. The methodology is chosen such that by conducting it answers for all the sub-questions for paragraph 1.6.1. are obtained.

2.1. Research Design

Several types of studies can be performed when investigating an organization. Here is chosen for a single case study since it concerns just one case (that of the ANWB), it takes place in a real life context, and the data obtained from these cases are often analyzed in a qualitative manner (Dul & Hak, 2008). A case study research is advocated for when the topic is broad and complex, when there is not a lot of theory available, and when the context of the topic is very important (Dul & Hak, 2008). Indeed the context of the ANWB case is very important; its financial and organizational structure which is developed throughout several decades and consists of very diverse businesses makes it complex and very difficult to copy-paste another proven cost allocation method from another company. Enough literature on the concept of cost allocation methods is written, but the literature remains very conceptual and not easy to implement in a complex practical situation.

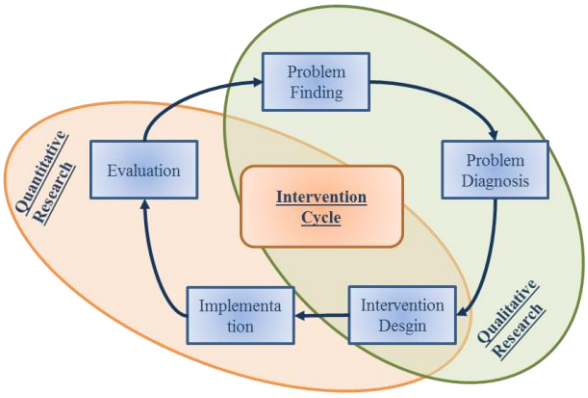


Figure 12: The Intervention Cycle for Solving a Practical Problem, Adapted from Dul & Hak (2008)

To be more precise there is chosen for a descriptive practice-oriented research, because it is about tackling a practical problem with the focus on describing the current and preferred situation of the U&O-tool put in practice and propose improvements for the U&O-tool. The aim is not to develop or test hypotheses, so other types of research like hypothesis-testing research falls off (Dul & Hak, 2008). For solving practical problems Dul & Hak (2008) developed the intervention cycle (see figure 12). It is adapted somewhat to indicate that this research is in particular a qualitative research (*problem finding, problem diagnosis, and intervention design stage)* and has some quantitative aspects in measuring the improvements of financial performance (*intervention design, implementation, and evaluation).* This intervention cycle is further used as the handhold for this research. In chapter 4 the actual problem or performance gap is found and analyzed. In chapter 5 a process for intervention and improvement is designed and first implemented. In chapter 6 the new financial effects or results are analyzed and recommendations for adaptions or not are made. But first, in chapter 3 the literature is reviewed to give insight in the concept of cost allocation and helps to diagnose and understand the current situation and provide requirements or rules for actual improvements. Since theory is used to understand and develop the practice it is a deductive research (Babbie, 2007).

In case studies it is conventional to conduct interviews with stakeholders for data collection. Semi-structured interviews are conducted with open-end questions to allow the participants to be comfortable, speak free, and increase the change of receiving data which was not thought of yet. Semi-structured interviews are also advocated for when the researcher is not (yet) an expert on the subject

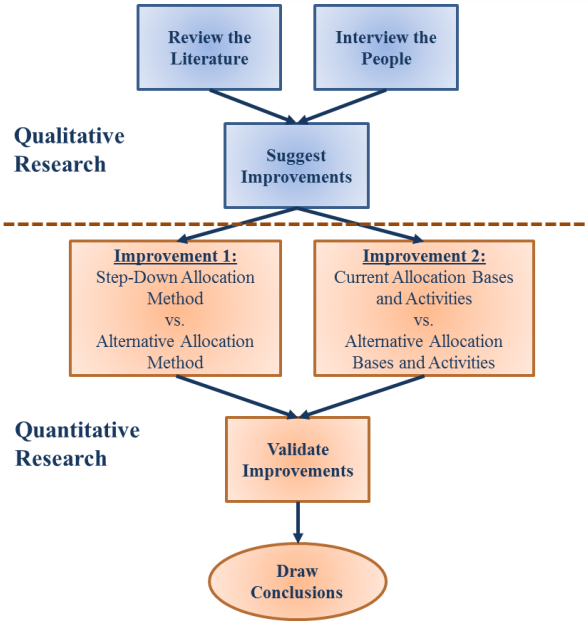


Figure 13: The Research Design

(Babbie, 2007). These interviews are conducted to determine the IST and SOLL situation in terms of why the U&O-tool is used, how it is intended to be used, and how it is used now. The interview design is chosen to be semi-structured with open-end questions to allow the participant to be comfortable and speak free (Babbie, 2007). To keep the interview structured, precise, and accurate the interviewer has to intercept when necessary and keep focused on the essentials, so the interview should not take longer than one hour. Although this can be tough, it still remains possible to achieve high internal, construct, and face validity (Babbie, 2007). This is due to a lack of bias like ambiguous temporal precedence, maturation, attrition, regression, and testing (Shadisch, Cook, & Campbell, 2002). In Appendix B the interviewees and interview questions are placed. When conducting interviews some ethics have to be taken into account like voluntary participation, anonymity, and confidentiality. Although in this case complete anonymity and confidentiality is not possible for a proper research, the information given by the interviewees is kept as much as possible between the interviewer, the interviewee, and the supervisors. Of course each interviewee has to participate voluntary and all necessary actions are taken not to harm the participant's daily work, integrity, or feelings. Also it is nice to debrief the participant after the research is conducted, so a promise for feedback will be made (Babbie, 2007).

One remark that has to be made is that there exists a robustness and generalizability issue, which is low external validity. Case studies consist often of a small sample size and are very case specific. But since this research is not aimed to build new theories which can be generalized to other companies it should not lead to any problems. By simplifying the redesign-models of the U&O-tool and using the widest extent of financial data the internal validity and statistical conclusion validity is attempted to be increased in power. The same argument for external validity counts.

Improvements for the U&O-tool follow from the gap between the IST and SOLL described by the conducted interviews. The literature delivers preconditions for redesigning the U&O-tool and at the same time gives a good understanding about what is done and why it is done. What kind of data is tried to gain is explained in the next paragraph. Other improvements are expected since it is not sure whether this suggested alternative improvement is the only one. There just exists a feeling about that now. Actual improvements are validated by showing them to the stakeholders and comparing financial performance with historical figures. Afterwards conclusions of these findings are drawn.

2.2. Data Collection and Analysis

The interviews are conducted to describe the current and the preferred situation in a detailed way, a so-called IST/SOLL analysis. The literature review which is elaborated upon in the next chapter is used to better understand the IST/SOLL situation and to state rules and conditions for redesigning the model. To be more precise a very important part of the IST/SOLL analysis is performing a stakeholder analysis. These findings are expected to be a handhold for redesigning the U&O-tool. Therefore the interviews concern a particular set of subjects.

First of all the units of analysis are the U&O-tool and all people relating to the U&O-tool (the stakeholders). These people or stakeholders are the controllers and the managers/directors of each department and will be subject to interviews. The controllers provide input and maintenance of the U&O-tool and report it output in a specified way to the management, where the management has particular demands of which information should be reported and how management is applied based in these reports. Since each controller and manager operates in a different setting the interviews are adapted for each situation. One part is focused on the input for this tool like costs, allocation methods, cost drivers, allocation bases, workload, and prices of services. A second part is focused on how the tool is used for strategic and operational management and if it contributes in an efficient and effective manner to management. A third part concerns different improvements from each stakeholder's perspective to the U&O-tool and its usage. Combined for the stakeholder analysis this leads to insight in the requirements, goals, or demands for the U&O-tool in the short term and in the long term as well for transfer prices. In essence these interviews (see Appendix B) are constructed in a way that the *why, how* and *what* is clear at the end and sub-questions two until five can be answered. The answers of the participants are noted on paper and are elaborated in Appendix C. The IST situation is summarized in a narrative way per department and is placed in Appendix C-1, for the SOLL situation just the improvement and comment are pointed out in Appendix C-2, and the stakeholder analysis is put in a table for oversight categorized in an IST and a SOLL situation per department concerning strategic management purposes, operational management purposes, and transfer pricing. Essentially the stakeholder analysis is the basis for improving and redesigning the U&O-tool.

In chapter 4. Finding the Performance Gap the U&O-tool is first described and then tested by theory. In the third paragraph the SOLL situation is expressed and in the fourth the IST situation is described. These are written such that the reader is spared all the details. The details can be read in the appendices so that this chapter only needs to cover the common theme. After analyzing these findings together with the literature the improvements for the U&O-tool are first theoretically formulated and then formulated in explicit practical improvements. As mentioned improvements in allocation methods, cost drivers, allocation bases etc. are expected and lead to a redesign of the U&O-tool. In chapter 5. Suggested Improvements the first improvements are suggested and the process for redesigning the U&O-tool is expressed and implemented. In chapter 6. Analysis of Improvements the results of the improvements from the previous chapter are tested, analyzed, validated by the affected stakeholders, and perhaps adapted. Conclusions and Recommendations form the final two chapters of this thesis.

3. Literature Review

In this chapter an extensive review of relevant literature is presented which should answer the first sub-question:

1. *What are the theoretical requirements of a cost allocation system to effectively and efficiently contribute to strategic and operational management?*

The U&O-tool has to do with all subjects in this question and to understand how the tool works, how it should be working, and how to redesign it when the relevant literature is reviewed.

The literature should provide a better interpretation of the practice and provide guidelines for improving the model. Many sources of literature like text books, readers, and accredited journals are used for the review. Searching for literature is done in three search engines: *Google Scholar*, *Scopus*, and *Jstor*. To find relevant articles in the large pile of journals some selection criteria are used. First, the key search words were: *'cost control (systems)', 'management accounting (systems)', 'operational management', 'strategic management', 'cost allocation (method)', 'direct/step-down/reciprocal allocation', '(time-driven) activity-based costing', 'transfer pricing', 'organizational change',* combinations of these terms and some derivatives. Then the relevant accredited journals are selected, examples are '*The Accounting Review', 'Accounting, Organizations and Society,' 'Journal of Accounting Research', 'Harvard Business Review'* etcetera. Of those remaining the ones are chosen that have many citations (>50) and after quick-reading these articles the final selection is made. The content of the literature is chosen such that the place of a cost allocation system (§3.3) in the control process (§3.2) and overall management accounting system (§3.1) can be interpreted. Besides, the link between cost allocation and strategic and operational management purposes are identified since these provide an actual basis for ANWB's performance (§3.3). Then a more detailed description of cost allocation methods, cost pricing, and transfer pricing with pros and cons for management purposed is provided to test the actual cost allocation system and provide a handhold for improvements (§3.5). Finally since some improvements and actual implementations are expected attention is paid to organizational change (§3.6). The first sub-question is answered in the concluding sections of this chapter (§3.7).

3.1. Management Accounting

Every organization applies some form of management accounting. Management accounting focuses on individual departments. Its goal is to provide financial information to managers to help them make better decisions, control, forecast, and increase operating effectiveness and efficiency. This is in contrast with financial accounting which is focused on providing financial information to external parties like annual reporting (Drury, 2008). Eventually management accounting is done for proper decision-making. Zimmerman (2006) splits the process of decision-making into four steps: *initiation*, *ratification*, *implementation*, and *monitoring* where initiation and implementation belong to decision management and ratification and monitoring belong to decision control. Initiation and ratification is more on a strategic level and the implementation and monitoring is more on an operational level. This method of splitting the decision-making process resolves agency problems since management accounting procedures are used as a means by top management to communicate their goals and strategies to the company which can be subject to agency theory implications (Zimmerman, 2006). Drury (2008) also splits up decision-making into two processes: planning and control (see figure 14). Both concepts indicate that if one step in the decision-making process is not done properly it affects either the planning process or the control process. At the ANWB the U&O-tool is used through the

whole process, so an error in the U&O-tool could have negative effects on the whole decision-making process. Therefore it is very important that management accounting systems accurately display the real business.

Management accounting systems (MAS) are systems to facilitate and control the diverse activities of a company by forecasting annual operations, providing flexible budgets to compare actual results with the forecasted results, compare division's goals with top management financial goals, and allow allocating management compensation and resources among divisions (Kaplan, 1984). A lot of these features are also facilitated by the U&O-tool. According to Kaplan (1984) the demand for management accounting systems took off when vertically integrated, multi-activity companies became apparent in the early 1900s. The basic principles did not change except for MAS to become more quantitative models of planning and control. Due to the global downturn in the economy, financial officers and managers try to find out how to improve and maintain MAS effectiveness to enhance financial performance (Zoni, Dossi, & Morelli, 2012). This is what is tried to be achieved with the U&O-tool. For the U&O-tool to become more effective or useful it is necessary to know some basic determinants for the design of a MAS or cost control system like the U&O-tool.

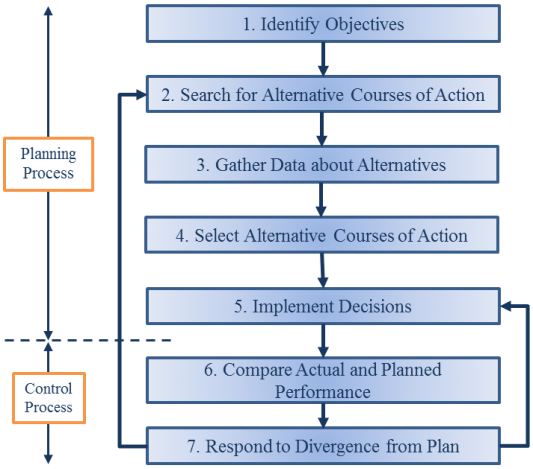


Figure 14: The Decision-Making Process, Source: Drury (2008)

Chenhall & Morris (1986) state that the perceived usefulness by managers of MAS design in terms of broad scope *(focus, quantification, and time horizon*), timeliness (*frequency and speed of reporting*), aggregation (*time period, functional area, and analytical or decision models*), and integration (*intra-sub-unit interaction and targets for activities and their interrelationship*) of information could be determined by uncertainty in their operating environment, organizational interdependence *(extent of exchanges)*, and organizational structure *(level of decentralization)*. Chenhall & Morris (1986) found significant evidence for relation between uncertainty and perceived usefulness (p.u.) of a broad scope ($r = 0.35$, $p < 0.01$), interdependence and p.u. of a broad scope ($r = 0.33$, $p < 0.01$), uncertainty and p.u. of timeliness ($r = 0.39$, $p < 0.01$), decentralization and p.u. of aggregation ($r = 0.37$, $p < 0.01$), interdependence and p.u. of aggregation ($r = 0.32$, $p < 0.01$), decentralization and p.u. of integration ($r = 0.27$, $p < 0.05$), and interdependence and p.u. of integration ($r = 0.36$, $p < 0.01$). One point of criticism on these findings is whether the perceived usefulness by managers is still the same in 2013 since this research was conducted in 1986. A remark the authors themselves made was that the data was gathered at one point in time, gathered by a questionnaire, which could influence consistency of the results.

Concluding, proper management accounting is essential for successful business with the main objective of making the best decisions on both strategic and operational level. One error in the process could frustrate the whole decision-making. Therefore it is necessary that MAS supporting management accounting are well designed. So when the U&O-tool is reviewed or even redesigned to be more useful or effective, organizational factors as stated by Chenhall & Morris (1986) should be taken into account.

3.2. The Control Process

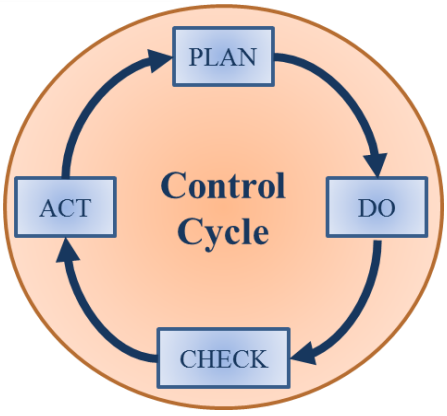


Figure 15: The PDCA-cycle, Source: (Deming, 1950)

As became clear the control process is an essential part of the decision-making process in management accounting. Since this research takes place at the Group Control department and together with the fact that the U&O-tool is a control tool it is nice to describe how a basic control process is designed. The first control cycle was designed by Deming (1950) and is known as the PDCA-cycle or Deming-cycle (see figure 15). It provides a simple schematic overview of a cycle of a planning process (e.g. a budgeting period), doing the activities (first month of operations), checking performance (monthly reporting period), acting upon possible performance gaps, and then the cycle goes over again. This is a very simplistic view of reality but it might be helpful to find in which stage the problem arises regarding the current U&O-tool. Both the strategic and operational aims of the tool should be able to be evaluated by such a control cycle. Robins & Coulter (2005) state a more extensive control cycle which is concerned with managerial decision making. It shows different steps in comparing actual with budgeted performance and is typically applied during annual budgeting period or monthly reporting period. Inadequate application may lead to wrong decision making. According to Boddy (2008) in a control system like managers can compare:

- Current and past performance;
- Performance of units within their organization;
- Performance of their organization relative to others;
- Performance in relation to some minimum, or ideal, standard.

Comparison as above is often performed as feedback control. It is the common form since it is simple and takes place after an activity has taken place. A big disadvantage is that actions are taken only to prevent recurrence (Boddy, 2008). Another downside is when one step in the control cycle is not appropriately performed it has huge influence on the quality of the next steps taken. When a control system is not used to check performance, actions taken after decision making can be wrong. The control cycle touches the concept of Management by Objectives (MBO) which acts as a system of objective agreements between staff and management and measures progression to objectives each period. MBO could lead to transparency of the U&O-tool increasing accuracy and reduce costs by errors. One general downside of control is, while some may welcome it, when performance is measured accurate and comprehensive others fear that their performance is visible to supervisors or coworkers (Boddy, 2008). Additionally Boddy (2008) argues that in not-for-profit organizations the choice of measure in the control process if often contentious. Many stakeholders in organizations favor different measures and these people may disagree or be uncertain about which activities contribute in particular to performance.

3.3. Responsibility Accounting

Some attention has already been paid to departmental performance and management compensation. It all has to do with responsibility. Responsibility accounting is seen as the recognition of the departments of an organization as responsibility centers (Zimmerman, 2006). Each department has responsibility and decision rights over its own cost control and operating performance which is evaluated by a responsibility accounting system (Drury, 2008). Managers could be rewarded based on

those evaluations. There are three types of responsibility centers: investment center, cost center, and profit center. At the ANWB there can be identified two of them. All supporting departments like ICT, HRM, Finance, overhead departments, marketing departments, and distribution centers act as cost centers. *Cost centers* are responsibility centers which are only accounted for costs that are under their control. Managers have decision rights about labor, materials and supplies (the input mix), managers are evaluated on the efficiency in which they transform inputs into outputs (minimize costs for output, maximize output given fixed budget), and this method is used when the manager can measure its output, can observe the quality of its output, and has knowledge about the optima input mix (Zimmerman, 2006). *Profit centers* are responsibility centers which are accounted for both revenues and costs. Managers have decision rights about product mix, input mix, and selling prices while they are evaluated on actual profits and actual profits compared to the budget. These centers are used when the manager has the knowledge of the best price/quantity and the knowledge of the best product mix (Zimmerman, 2006). Although not all decisions right lie at the manager of a business line at the ANWB, they are responsible for proper implementation. All business lines or Marketing Competence Centers (MCC's) obtain revenue from end-customers through end products and thus act as profit centers.

With both these centers, but especially profit centers, there exists a constant debate between managers of departments of how to price the transfer of goods or services between the departments and how to allocate corporate overhead costs to each department. Issues like these also occur at the ANWB and both have influence on how to distribute decision rights and how to measure performance. A MAS like the U&O-tool, which covers both types of responsibility centers with its cost allocation, should be designed such that responsibilities over costs can be taken and demanded by top-management for both types of stakeholders. Besides, each type of responsibility center has different strategic or operational requirements to a cost allocation system.

3.4. Cost Control

Cost control is together with cost allocation the base of cost accounting. Cost control has to do with generating information about organizational costs such that these can be managed. Management on strategic and operational level is of interest in this research. This means that cost control takes place on a higher level and has not to do with how (technical) but with why (organizational/behavioral) costs are allocated trough an organization. In this section the strategic and operations purposes and applications are discussed. In the next section the actual technics of cost allocation are elaborated.

3.4.1. Strategic Purposes of Cost Allocation

A purpose of allocating cost through an organization is to determine a cost price of a product and make decisions upon product returns. Another purpose is to determine the profitability or performance of a responsibility center. According to Horngren, Datar, and Rajan (2012) the four most important purposes of cost allocation are:

1. Provide information for economic decisions such as business analysis, cost recovery, and making it easier;
2. Provide motivation and incentives for managers and other employees;
3. Provide data for external measurement like competitive strategy performance, product-mix, or benchmarking;
4. Provide cost justification like a fair price or the right amounts for internal reimbursements.

As has been mentioned in the introduction strategic and operational management purposes of cost allocation systems are subject of interest. First, strategy is discussed and later operational management. Ansoff (1965) states that strategy concerns the interaction with external problems, rather than internal, like product-mix choices and which markets to exploit.

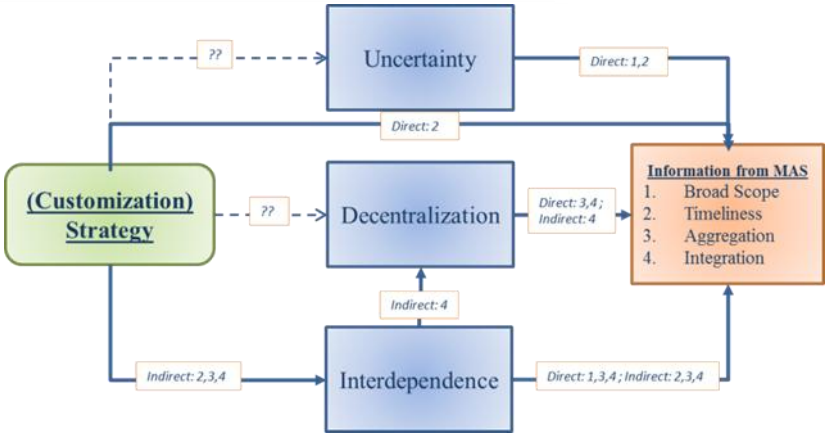


Figure 16: Summary of MAS Design Theory, Adapted from Chenhall & Morris (1986) and Bouwens & Abernethy (2000)

Ackoff adds that strategy is long-term and top-down implemented. Many organizational strategies are derived from the generic strategies of Porter (1980) or Miles & Snow (1978). Simons (1987) found that corporate strategy influences the purpose of and the design of accounting control systems and thus costs allocation tools. Bouwens & Abernethy (2000) hypothesized that strategy has direct positive influence on information needed from accounting systems in terms of broad scope, timeliness, aggregation, and integration or has indirect positive influence via three organizational characteristics of uncertainty, decentralization, and interdependence of departments. The relations are shown in figure 16 – the solid arrows represent significant and supported relations and the dashed arrows are insignificant (Bouwens & Abernethy, 2000). Although critique was expressed about the internal validity – relations could be the other way around or other factors could be of influence – these results can be generalized to the ANWB and is useful due to the source of data; production and sales managers from different industries. These findings should be taken into account when determining which kind of information about the three major categories with strategic purposes of cost allocation is requested by the ANWB.

In table 5 (see next page) several statements of different authors are presented about strategic purposes of cost allocation and for what strategic management purposes the ANWB should use the U&O-tool. In the left column three main strategic categories are identified based on the same sources which are also shown in figure 17. These three strategic categories will be leading further in this research. Whether the U&O-tool contributes in an effective and efficient way to these categories is investigated. A comment has to be placed by the fact that some statements in table 5 better reflect overall management accounting purposes but are also applicable for cost allocation.

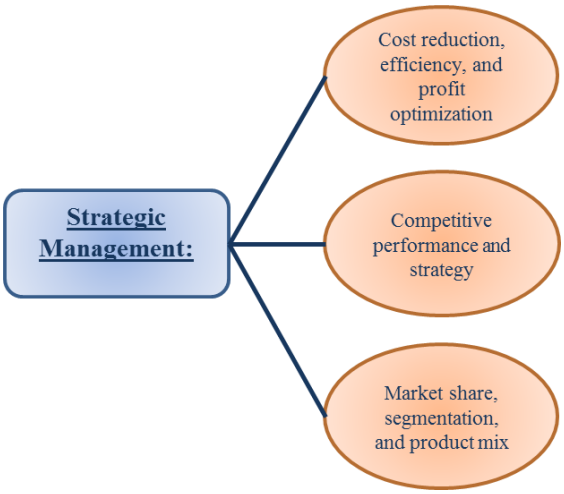


Figure 17: Strategic Management Purposes

Theoretical Strategic Management by Cost Allocation	
	What <u>should</u> the ANWB do considering the literature?
Cost reduction, efficiency, and profit optimization	Efficiency and ongoing cost monitoring (Langfield-Smith, 1997)
	Balance potential synergies (Dent, 1990)
	Market development, cost reduction programs, personnel development, profit margins (Govindarajan & Gupta, 1985)
	Shape managers' activities and relationships (Langfield-Smith, 1997)
Competitive performance and strategy	Guide overall company strategy (Kaplan, 1984)
	Provide handhold to check how company strategy (cost leader, cost differentiation, focus or analyzer, defender, prospector) performs (Bouwens & Abernethy, 2000)
	Help to evaluate competitive strategy (Dent, 1990)
	How resources are focused to convert competences into competitive advantage (Langfield-Smith, 1997)
	How each business-unit competes within its own industry (Langfield-Smith, 1997)
Market share, segmentation, and product mix	Alignment with environment (Dent, 1990)
	Product / Market strategy: attain competitive edge, maintain market leadership or share, and enter a new product / market (Barret & Konsynski, 1982)
	Which type of business the company should be in (Langfield-Smith, 1997)
	Provide accurate product costs for good competitive strategy (Cooper & Kaplan, 1988)
	Mix of business in the corporate portfolio and allocation of resources within that portfolio (Dent, 1990)

Table 5: Theoretical Strategic Management by Cost Allocation

3.4.2. Operational Purposes of Cost Allocation

Operational management or decisions are short-term – daily, weekly, or monthly (Ackoff, 1974). It concerns the performance of specific divisions or departments and should support overall strategy (Boddy, 2008). As the operational management suggests it always is about managing the

Theoretical Operational Management by Cost Allocation	
	What <u>should</u> the ANWB do considering the literature?
Information and transparency	Consist information about the activities of other departments (Bouwens & Abernethy, 2000)
	Reduce information gap between departments (Bouwens & Abernethy, 2000)
	Provide information about the type and volume of the services produced as well as information about the costs, revenues, and prices associated with the output (Bouwens & Abernethy, 2000)
	Provide information about functional area, time-period, or through decision models (Chenhall & Morris, 1986)
	Information generated is an important and recurring agenda addressed by the highest level op management (Simons, 1991)
Decision making and behavior	Facilitate decision-making and coordination between functional departments (Bouwens & Abernethy, 2000)
	Provide information to asses operating efficiencies, to aid pricing decisions, and to control and motivate worker performance (Kaplan, 1984)
	Influence attitudes and behavior (Langfield-Smith, 1997)
Performance and efficiency	Motivate and evaluate departmental performance to guide overall firm strategy (Kaplan, 1984)
	Cost reduction (Barret & Konsynski, 1982)
	Productivity improvements (Barret & Konsynski, 1982)
	Right cost – accuracy trade-off (Drury, 2008)
	How each business-unit competes within its own industry (Langfield-Smith, 1997)
Influenceability and communication	Interactive tool to regularly and personally let management involve in daily business (Simons, 1991)
	The process demands frequent and regular attention from operation managers at all levels of the organization (Simons, 1991)
	Data are interpreted and discussed in face-to-face meetings of superiors, subordinates, and peers (Simons, 1991)
	The process relies on the continual challenge and debate of underlying data, assumptions, and action plans (Simons, 1991)

Table 6: Theoretical Operational Management by Cost Allocation

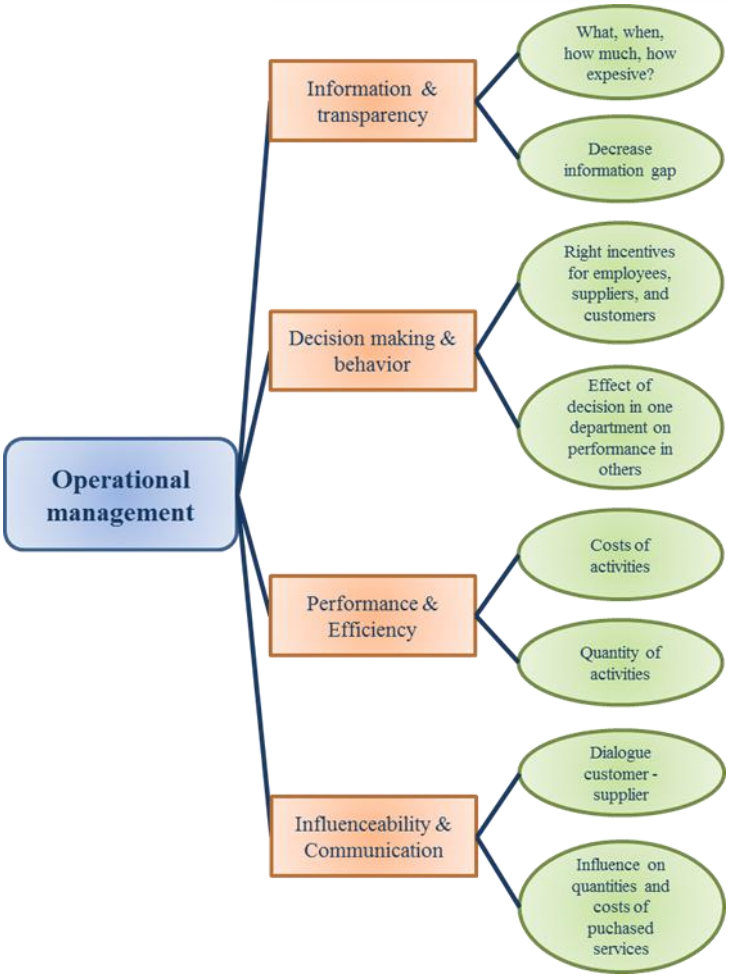


Figure 18: Operational Management Purposes

organization's operations, its business. Also for operational management by cost allocation statements of several authors are presented (see table 6). All statements are categorized into four main categories in the left column.

The same argument goes again that some statements may be better examples for management accounting but still they are clear examples of how cost allocation systems could be contributing to operational management purposes. In figure 18 the four main operational categories are presented again together with some explicit examples for the usefulness of a cost allocation system like the U&O-tool. Out of the interviews will appear that examples correspond with what the ANWB would like. Again these four categories are leading in this research and the degree to which the ANWB intends and uses the U&O-tool effectively and efficiently for these operational objectives.

Concluding on strategic and operational management purposes – Horngren, Datar & Rajan (2012) identified four purposes of cost allocation. Each purpose seems to have a strategic and operational aspect in it. Further reviewing the literature teaches that for strategic management three categories can be identified and for operational management four categories. The goal is to find out how the U&O-tool performs regarding these categories and suggest improvements to close the gap. The influence of corporate strategy and organizational characteristics on information requirements out of the cost allocation system as proposed by Bouwens & Abernethy (2000) should be taken into account when suggesting improvements.

3.5. Cost Allocation

Cost allocation is an important practice in accounting as became clear in the previous section. It supports the management team to make the right strategic and operational decisions. It is seen as the assignment and reassignment of costs to one or more cost objects, especially the allocation of corporate-level costs to various decentralized profit or cost centers (Rajan, 1992). This section concerns the technical aspects (the how) of cost allocation. This means the focus is on the type of costs to be allocated, the method needed for allocations, allocation bases to allocate costs, and criteria for costing. Pros and cons for each type are also presented.

3.5.1. Type of costs

Costs are divided into two categories – direct costs and indirect costs. With direct costs the costs are instantly traceable to a cost object. In the case of indirect costs – such as overhead costs – the costs are

assigned on allocation bases and to do this traditional costing systems or activity-based costing systems are used (Drury, 2008). Every company has service departments like ICT, HRM, Finance etcetera for which it is not easy to allocate costs straight to a product. But to determine the cost price of the final product, the costs of the service departments must also be allocated to operating divisions, which in turn allocate their costs to a product (Zimmerman, 2006). For supplying departments allocated costs are a revenue and for receiving departments a cost. Financial manager like to control these 'revenues' or costs. For indirect costs that seems to be difficult sometimes. Overhead costs are the best example of these problematic costs. Horngren, Datar & Rajan (2012) separate overhead costs into generic overhead and specific overhead. At the ANWB the supporting departments are seen as specific overhead costs and the overhead departments as generic overhead costs. Specific overhead costs are traceable to the departments which consume the resources; of generic costs business is generic in such a way that tracing costs to the department that uses the resources is practically impossible and making cost control very difficult. Keeping these managers responsible for costs they cannot influence seems unfair. Some of the complaints heard within the ANWB are about these costs. Allocating overhead costs is not easy and faces many issues. In the next paragraph the three main methods of cost allocation are elaborated: direct allocation, step-down allocation, and reciprocal allocation.

3.5.2. Allocation Methods

In the majority of organizations costs are allocated using one of three possible allocation methods: direct, step-down, or reciprocal (Zimmerman, 2006). Each method has its pros and cons regarding the accuracy of allocating costs and the effort needed for doing that. It will become clear that the choice of method has evident effect on accounting information obtained out of the system. So the method used in an organization has to be in accordance with its strategic and operational objectives and demands. For convenience the three allocation methods are compared in table 7 based on the findings of

Type	Method	Advantages	Disadvantages
Direct allocation	Supporting departments directly allocate costs to operating divisions and not to each other (see figure 19)	- Very simple and inexpensive to use	- Low accuracy due to arbitrary allocation and unallocated costs - High costs of errors - A supporting department might overuse the services of another supporting department since no monetary incentive to limit the use exists.
Step-down allocation	Supporting departments allocate costs to all remaining supporting departments and operating divisions. The second supporting department allocates all its own cost including the share being allocating, and so on until a product. Cost allocation to departments on a higher step is not possible (see figure 19)	- Overcomes partly the excessive use of other services - More accurate for control and decision making due to more cause-and-effect cost allocation and more allocated costs - Less costs of errors	- Departments lower in the steps face more costs - More departments could choose to buy services externally due to high fixed costs (death spiral) - Sequence of supporting departments could be arbitrary - More expensive to use
Reciprocal allocation	Al interactions between supporting departments are recognized. Supporting departments can mutually allocate costs and can allocate costs to operating divisions (see figure 19)	- Most accurate way of allocating costs - All costs are cause-and-effect so good control and decisions are possible - Fairest method - Few costs of errors	- Opportunity cost transfer prices are comprised by fixed costs - Calculation and allocations are very complex - High costs of use due to complexity and effort

Table 7: Comparison of Allocation Methods, Adapted from Zimmerman (2006)

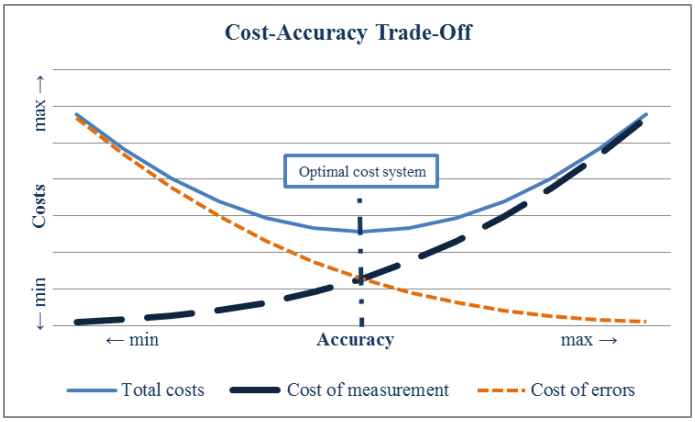


Figure 20: The Cost-Accuracy Trade-Off, Source: (Zimmerman, 2006)

Zimmerman (2006). Schematic overviews of the three methods are presented in figure 19.

Direct costing is advocated for when the organization is small and has a simple structure. Overuse of services can be prevented by non-financial measures. Since the ANWB is a big organization and has a complex structure this method is not recommended. Costs of errors, bad decisions, and inaccuracies will be too high. Step-down costing solves many of the problems from direct costing (Zimmerman, 2006). Horngren, Datar & Rajan (2012) suggest that the best order for supporting can be determined by the proportional and amount of services one department performs for another. When purchasing services externally is allowed an organization should beware of the death spiral, prices of internal services keep rising sky high due to less internal customers. Since departments are obligated to purchase internally at the ANWB step-down allocation costing could be a good method with acceptable accuracy and costs of use and errors. In fact the ANWB uses this method. Reciprocal costing is the best method when costs are not a subject and when an organization has the expertise to develop and maintain such a system (Zimmerman, 2006). But these boundaries disappear, because computing power increases to perform repeated iterations or solve linear equations. More and more organizations apply it nowadays (Horngren, Datar, & Rajan, 2012). Zimmerman (2006) argues that one of the reasons the reciprocal method is not often used is that the primary objective of cost allocations not decision-making. Some doubts can be placed at the latter argument, because always decisions about cost cutting or so are made with cost allocation at the basis. Nevertheless, reciprocal costing is perhaps interesting for the ANWB.

Eventually when it comes to choosing one of the three methods it is all about how much accuracy is acceptable at what price to pay. Table 7 shows it is inevitable that when one wants to increase cost allocation accuracy to make better decisions and incur less costs of error the system becomes much more complex and expensive to operate. In literature this is known as the cost-accuracy trade off

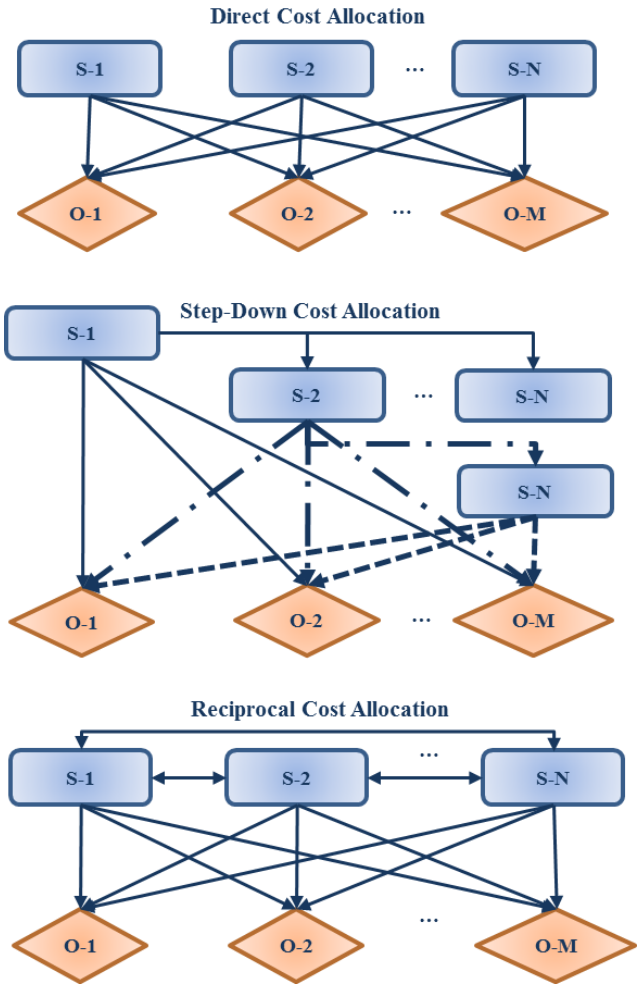


Figure 19: Schematic Overview of the Four Allocation Methods. S = Supporting Department, O = Operational Division. Source: Zimmerman (2006)

(Zimmerman, 2006). An example is shown in figure 20, the optimal cost system lies where the cost of measurement (use) crosses the cost of errors. It is difficult to precisely assign an allocation method to a place in figure 20 but direct costing occupies the left part, step-down costing the center part, and reciprocal the right part. It is expected that there exists some overlap between the methods in the figure. Concluding step-down costing is preferable in most situations. When the supporting departments remain limited it could be as accurate as reciprocal costing. The question is where is the ANWB on the line with their current U&O-tool (according to step-down allocation principles)?

3.5.3. Allocation-Based Costing

Now there is a general idea of how costs can be allocated through an organization. An important choice in designing a cost allocation system is which allocation bases should be used. One can see the method of allocation as the 'car' and the allocation base as the 'engine'. In this section the choice of allocation base is discussed.

Absorption Costing

Drury (2008) states that allocation bases are significant determinants of the costs or the drivers of the costs and he calls them cause-and-effect allocations. He also argues that when an allocation base is not a major determinant of the costs it is called an arbitrary allocation. One method described extensively in literature is absorption costing. It is a direct way to allocate manufacturing costs to the various products produced, so the product absorbs the costs. Although this method evolved in the manufacturing industry it also has been applied in the service sector. Zimmerman (2006) states that nonmanufacturing accounting systems are even easier since they do not have to cope with work-in-progress and finished goods. Though he argues that is for nonmanufacturing firm more difficult to define the 'product' to which the costs should be allocated. Nevertheless, the concept remains quite the same. All costs – fixed and variable – are seen as variable which has several advantages: it does not understate the importance of fixed costs and it avoids the possibility of fictitious losses, especially for organizations where fixed and variable costs are difficult to separate (Drury, 2008) (Zimmerman, 2006). Many organizations use an overhead rate. This price for a job or a process is determined by accumulation of all indirect costs into an overhead account and the allocation is done by an overhead allocation base. A lot of firms use a prospective – or predetermined – overhead rate which is set at the beginning of the year. Using prospective rates leads inevitably to under- or overabsorbed overhead costs due to a difference in actual and budgeted quantity of the allocation base (Zimmerman, 2006). An organization can apply a single plant-wide overhead rate and multiple overhead rates based on overhead categories (Zimmerman, 2006). The ANWB uses multiple overhead rates, the supporting departments (BS, P&I, HRM, Boards, GAR, and GC) have their separate overhead rates and allocation bases and the other overhead departments are bundled using a single overhead rate (based on revenue ratio). Often step-down allocation is used in combination with multiple overhead rates, as is the case at the ANWB. Multiple rates are more accurate than plant-wide but require more administration.

Activity-Based Costing

A problem with standard absorption costing is that it may lead to inaccurate product costs. This happens when the cost allocation system does not use allocation bases that represent the cost-and-effect relations. Theory provides an alternative to traditional absorption costing – activity-based costing (ABC) (Zimmerman, 2006). ABC is allocating costs based on the activities that cause or drive the costs for producing a product or service. Activities are repetitive tasks performed by an activity center in the organization. Activity centers are cost centers like discussed in paragraph 3.3. Overhead costs are first allocated to activity cost centers based on resource cost drivers, second the costs from the activity cost centers are allocated on object (products, services, customers). Cost drivers are

financial and nonfinancial measures that accurately reflect the factors that cause an overhead activity's cost to vary and show how products consume the resources in the activity cost centers (Zimmerman, 2006). Examples of typical cost drivers are the number of setups, number of machine hours, number of errors, or the number of invoices processed. This principle is comparable to the process at the ANWB – supporting departments allocate their costs via a mix of proportional rates and costs drivers to other activity centers like the operation assistance, distribution channels, other overheads and the business lines. These centers on their turn allocate their costs on product level to a cost-object by several proportional rates and cost drivers. Horngren, Datar & Rajan (2012) strongly recommend that when allocating common costs – like those of the supporting or overhead departments of the ANWB – it should be done consistently. So using proportional rates and cost drivers at the same time for equivalent departments is not advocated for. In essence, if one wants to (re)design a successful ABC system, following these four steps is necessary (Drury, 2008):

1. Identify the main activities that take place in a department;
2. assign costs to cost pools/centers for each activity;
3. determine for each activity the cost driver;
4. assign the costs of activity to the 'products' according to the product's demands for activities.

ABC gives managers the information needed during the budgeting process manage the resources needed to perform the expected activities (Cooper & Kaplan, 1999). Besides, it provides information about the current performance of activities on which accurate decision making and control is possible. Kaplan & Cooper (1998) state that ABC is ideal for service companies, because the majority of costs made in service organizations are indirect. Another reason why ABC could be beneficial is that many organizations (or its departments) do not have the incentive to improve profitability or efficiency since all costs are absorbed by increasing its price of services to its customers (Drury, 2008). ABC allows managers to focus on the factors that drive the costs instead of other irrelevant factors (Zimmerman, 2006). Not using ABC correct could lead to wrong incentives as can happen within the ANWB. When one supporting department faces under coverage, it could just raise its prices for services. As service companies implement better cost systems, the measurement of service quality and service level is also improved (Kaplan & Anderson, 2007). For the ANWB this means that supplying and consuming departments can make better agreements upon quantities and qualities of internal services. The general benefits of ABC are that it generates more accurate product cost data, which is beneficial for decision-making and control and could lead to lower costs. However, having too much cost drivers could lead to lower benefits due to more administration costs and less effective monitoring of managers by the increased discretion of them (Zimmerman, 2006). Other problems regarding ABC are described by Kaplan & Anderson (2007):

- The data used for the ABC can be subjective;
- the data used for the ABC is expensive to store, process, and report;
- most ABC models are local and enterprise wide profitability opportunities are not provided;
- an ABC model is difficult to update/change due to its complexity;
- and in theory it can be incorrect when unused capacity is ignored.

So indeed there are some pitfalls with ABC. The latter issue about unused capacity is worth attention since reducing waste or increasing quality is only possible when there is insight in capacity exploitation. ABC's design structurally overestimates the costs of performing an activity since people do not account for unused productivity/capacity, what makes it hard to manage efficiency of the supplying department. When consumers think that they have to pay too much for the taken services

when ABC is applied, they are right. This issue is overcome by the concept of time-driven ABC, where activities are expressed by minutes or hours spent instead of percentage of total time (Kaplan & Anderson, 2007). Time-driven ABC is addressed to in the next part of this chapter.

Time-Driven Activity-Based Costing

This part addresses to the concept of time-driven activity-based costing (TDABC) since it solves some of the problems of traditional ABC. TDABC skips defining all sorts of activities and therefore costs less, is less time-consuming, and less subjective. TDABC just needs two parameters: cost of capacity supplied (total departmental costs) and practical capacity of resources supplied (total departmental time). Dividing these two yields the capacity cost rate in euros per time unit. The cost driver is the units of time used for performing an activity, do that times the capacity cost rate and the total number of supplied activities and there is the total amount of costs which needs to be assigned to the customer (Kaplan & Anderson, 2007). When the supplying department performs its processes faster than budgeted or supplies fewer services than budgeted, unused capacity can be calculated. This allows management on efficiency. Another positive side-effect of TDABC is that it contributes to the concept of Lean Six Sigma. By defining processes in such a way it can identify waste reduction opportunities and improve customer value (Kaplan & Anderson, 2007).

Although Kaplan & Anderson (2007) state several clear advantages on conventional ABC – easier and faster; integrates well with ERP data; provides visibility in efficiency and (un)used capacity, better way to forecast; maintenance is easy and inexpensive; and it can be used in complex companies in many industries – I still remain with some doubts of its applicability. That is TDABC states nothing about how to deal with assigning material costs and still the relevant activities within the process have to be defined. Kaplan & Anderson (2007) indicate that to apply TDABC special software is required. Buying and setting up this software package could prove to be an expensive and time consuming process which is not beneficial in the first place. Another problem for TDABC is that it is only applicable for specifically defined processes with clear tasks. Otherwise there are still costs which have to be allocated in an arbitrarily or inaccurate way.

Concluding when applying ABC, it has to be done consistent with costs drivers which represent the main cause-and-effect relation. To prevent loss of control and decision-making and high administrative costs, the number of cost-drivers per activity center should be limited. When a department performs fixed and repetitive processes, TBABC could be a simpler and more efficient way of allocation. Since the ANWB has applied an (incomplete) ABC system, a change to TDABC could be very expensive and difficult.

3.5.4. Criteria's for Cost Allocation

Horngren, Datar & Rajan (2012) state that when costs are allocated through an organization it has to done according to some criteria. Six criteria are given by Horngren, Datar & Rajan (2012) together with a technical suggestion and example of an allocation base.

1. Costs should be allocated as possible according to *cause-and-effect*. The user of services supplied by another department should pay. Costs in the indirect cost pool should be allocated via cost drivers;
2. Costs should be allocated to the departments that *benefit* from the services supplied by another department. For example advertisement costs should be allocated to profit centers based on a percentage of revenue;

3. Costs allocated should be of a *fair price*. One might ask what a fair price is. In the case of internal transfer of services, a price that benefits both equally;
4. The balance between *costs or effort and benefits* needed and achieved of performing cost allocation should be right. This is very difficult to quantify and is thus a difficult criteria.
5. Cost should be *consistently* allocated based on actual or budgeted usage.

When it is not possible to allocate costs based on the upper five criteria:

6. Costs should be allocated to departments who are *able to bear* the costs. Expensive general projects should be allocated on percentage of revenue – that is an Equi-Proportional Mark-Up (EPMU) – of the profit center

Falling back on generic and specific overhead costs the criteria suggest that generic overhead costs could be allocated based on an Equi-Proportional Mark-Up (EPMU) like a percentage of revenue. But Horngren, Datar & Rajan (2012) do not recommend this type of cost allocation since it does not always relate to the consumption of resources. Not allocating these costs but indeed accounting for it is one possibility. Specific overhead costs should be allocated based on a cost driver like the number of machine hours. The authors strongly recommend whatever way one chooses to allocate costs, do it consistent through the system. Together with these criteria's Horngren, Datar & Rajan (2012) suggest to ask some legitimate questions when allocating costs: What costs should we allocate? What allocation base should we use? How many cost pools do we want? How homogeneous should these cost pools be?

3.5.5. Transfer Pricing

One problem that can occur is called the death spiral. Large amounts of fixed costs of service departments are allocated to operating divisions and these divisions can choose buy the services internal or external (Zimmerman, 2006). When a supporting department charges higher costs than an external company, inside user might switch to the external company leaving less inside customers to charge the fixed costs. The remaining inside customers face higher charges resulting in more to leave until the charges are that high that no one will take the internal service no more. Therefore determining the right price for internal services is very important, this price is called a transfer price or sometimes an allocation rate (Drury, 2008) (Horngren, Datar, & Rajan, 2012). In literature there are four types of transfer pricing discussed: market-based, variable- or marginal-based, full-cost, and negotiated transfer pricing (Zimmerman, 2006). In table 8 (see next page) the definition of each and the pros and cons of each type is displayed.

Resume each method has its pros and cons. In an organization like the ANWB – which has no real external market for its internal services and have huge indirect variable and fixed costs – using another method than full-cost could lead to structural losses within the organization. Market-based is difficult, variable-based discards the huge fixed costs of the ANWB, and negotiated transfer pricing could lead to unwanted disputes and interference in each other's business. A solution to variable-based pricing is a two-part transfer pricing system where the fixed costs are assigned as a fixed lump sum based on the percentage of capacity used by the consuming department. This method holds the center of variable costing and full costing and has as the advantage that it stimulates planning, coordination, and communication between departments (Drury, 2008). Van der Meer-Kooistra (1994) who performed research on transfer pricing in large Dutch organizations found that full cost pricing is used usually when there is low information asymmetry, low uncertainty, internal transactions are obligatory, and

the transfer price is predetermined and prescribed. At the ANWB this seems to be the case, so full cost transfer pricing or two-part transfer pricing is advocated for.

	Definition	Advantages	Disadvantages
Market-based	Based on publicly listed prices for an identical product or service. It is the same price as the competition.	Could provide an incentive for efficient production and cost reduction when services can be bought externally. Could be used for evaluating subunit performance and preserve autonomy	When an organization is more likely to produce internally, this method does not accurately reflect the opportunity costs of internal production.
Variable-based	Based on all variable costs incurred for producing one unit.	Preferable when there is no external market or when large synergies make the market price an inaccurate measure. Motivates management when based on budgeted costs.	Does not concern fixed costs; these could be charged by a fixed fee. This method results in less accuracy and unreliable long-term planning. So it is difficult to evaluate subunits performance and it does not entirely preserve subunit autonomy.
Full-cost	It is the sum of all costs in the long run per unit.	Leads to higher firm value, avoids wasteful disputes, governs all costs, it is easy and inexpensive to implement. It motivates management when based on budgeted costs.	Supplying department may overstate their opportunity costs leading to too high transfer prices. When full costs differ substantially from opportunity costs the forgone profits increase. Same cons about subunit performance and autonomy as with variable-based.
Negotiated	Based on the negotiation between supplying and receiving departments.	Both parties try to reach maximum profit for both.	Dispute about true opportunity costs and external transfer price. When only the price is discussed and not quantity of service, it will not lead to maximized firm value. Other down-sides are time-intensive, risk of conflict, and departmental performance is subject to negotiator's skills.

Table 8: Four Types of Transfer Pricing, Based on Sources: Zimmerman (2006) and Horngren et al. (2012)

3.5.6. Budget versus Actual

It is clearer now which transfer price or allocation rate could be used in what for situation. But still there exists questions about whether one should use budgeted or actual rates and whether one should use budgeted usage or actual usage. These choices affect the degree of influenceability and manageability of costs being allocated. This section concerns these choices. Horngren, Datar & Rajan (2012) distinct two types of allocation: single-rate and dual-rate. The differences are presented in table 9.

At the ANWB it is difficult to split fixed and variable costs of all supporting departments. For some the variable part is difficult and for others the fixed part is difficult. Therefore the ANWB applies a mix of single-rate and dual-rate allocation. Horngren, Datar & Rajan (2012) advocated for consistency

	Single-rate allocation	Dual-rate allocation
Method	Makes no distinction between fixed and variable costs	Separates costs into a fixed cost-pool and a variable cost-pool.
Calculations of allocation	Costs = 'actual use' * 'budgeted price'	Fixed costs: 'budgeted use' * 'budgeted price'. Variable costs: 'actual use' * 'budgeted price'
Advantages	Easy and cheap. It gives user some operational control over the allocations they bear.	Signals to divisional managers how fixed and variable costs behave. Lead to good decisions that benefit total organization and division.
Disadvantages	May lead to managers to outsource which could lead to organizational inefficiencies.	When it is difficult to separate fixed costs and variable costs this method is not recommended

Table 9: Single-Rate versus Dual-Rate Allocation, Based on Horngren et al. (2012)

	Budgeted usage	Actual usage
Advantages	Allocating fixed costs helps user with short- and long-term planning. Under or overestimation can be controlled by 'stick' or 'carrot' reward.	When dual-rate allocation is used actual usage for direct costs is appropriate. Variations in the actual usage for one division do not affect the other. Combining actual usage with budgeted rates provides users with advanced knowledge of rates and control over the costs.
Disadvantages	Could lead to underestimation of results in divisions bearing a lower percentage of fixed costs. Active control on usage of user is not possible.	Could lead to excessive high costs, including costs of unused capacity, when rates are based on expected usage. Besides, with practical capacity – allocating fixed costs based on actual usage – induces conflict between user and supplier. Also users do not know charges until end of period.

Table 10: Budgeted Usage versus Actual Usage, Based on Horngren et al. (2012)

in such choices, but dual-rate allocation should be applied to where it is easy to do.

The choice of between budgeted rates and actual rates is in essence easy to make. Horngren, Datar & Rajan (2012) imply that budgeted rates help to motivate supplying managers to improve efficiency. Supporting departments – not the users – bear the risk of unfavorable variances. Supplying managers view budgeted rates adversely if they are unfavorable due to variances outside of their control. These costs – which cannot be influenced – should be identified and relieve managers from responsibility. Actual rates impose uncertainty for bot users and suppliers and the users are kept unaware of their departmental results until the end of the budgeting period. The ANWB uses budgeted rates through the whole system – one thing the ANWB should be aware of is the responsibility and influenceability issue. What remains is the question whether to use budgeted usage or actual usage when allocating costs. Horngren et al. (2012) state several advantages and disadvantages for each way (see table 10):

Practical capacity (see table 10) includes just fixed and variable costs that are used by the operating department. Unused resources (for common good) are normally highlighted but not allocated to the divisions (Horngren, Datar, & Rajan, 2012). The ANWB seems to apply both budgeted use and actual use when allocating costs of different departments. Allocation on actual usage is preferable when the disadvantages are taken into account. Resources for the common good – which are difficult to link with a user – are still allocated to divisions at the ANWB with some complaints as a result.

3.6. Change in Organizations

In the literature many concepts about how to allocate costs and how to use information about cost allocation for strategic and operational management purposes have been discussed. Already some suggestions about changes or improvements have been mentioned in the literature review and it seems inevitable that as a result of this research some definitive recommendations of change are made. Therefore it is necessary to review literate about change in organizations.

The success of implementing a new model or a regular change depends not only on financial expectancy but perhaps even more on human behavior and the willingness to adapt. Figure 22 shows a model of the change process in which the awareness of the need for change starts in the left side by perceiving a performance gap – the driving forces – and resistance occurs at the right side when change is implemented since the need for change is subjective, thus different for each stakeholder, and could threaten their values, interests etcetera – the restraining forces (Boddy, 2008). Besides, people, also technology, business processes

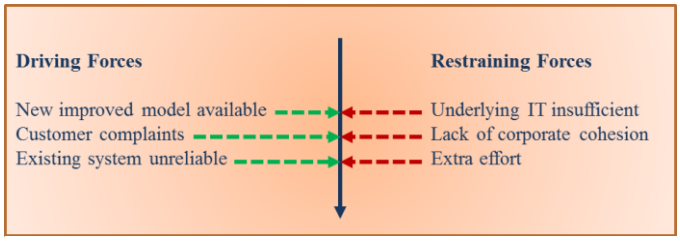


Figure 21: Example of Driving and Restraining Forces, Source: Boddy (2008)

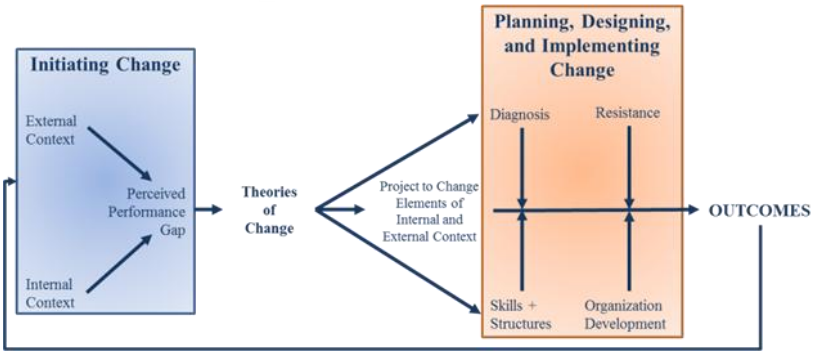


Figure 22: A Model of the Change Process, Source: Boddy (2008)

(how thing just go), financial resources, structure, culture, and power are a source of resistance for change (see figure 21). To overcome these points is essential for a full and successful application of change. To overcome peoples resistance the expectancy theory argues that motivation for change depends on the person's belief if the effort (E) needed will lead to good performance (P) and that good performance (P) will result in an outcome (O) the person perceives as valuable (V) (Vroom, 1964). Vroom (1964) states the force exerted (F) for change is determined by the following equation: F = (E → P) x (P → O) x V. Zoni, Dossi & Morelli (2012) argue that a lot of success can be achieved when the change is applied evolutionary – it follows the company's changing life cycle – and should be led by a key individual.

Concluding when this research suggests improvements for the U&O-tool the expectancy theory has to be taken into account to increase the driving forces and decrease to restraining forces. Also one or more key individuals should be involved in the change process.

3.7. Concluding on the Theory

Now the literature is reviewed it should be possible to answer the first sub-question of this master thesis. It was tried to review all relevant theory regarding a costs allocation system to find which strategic and operational applications such systems can have and how it should be designed to achieve those applications. The first sub-question was:

1. *What are the theoretical requirements of a cost allocation system to effectively and efficiently contribute to strategic and operational management?*

According to literature requirements of a cost allocation system are set to meet organizational strategy, organizational structure and stakeholders' demands. Besides, the importance of a fully functioning system became apparent due to the function of a cost allocation system in the control process and thus in the total management accounting. Chenhall & Morris (1986) argued that a system should be design such that the degree in scope, timeliness, aggregation, and integration produced by the system is in accordance with the organization's or stakeholders' needs. Van der Meer-Kooistra (1994) besides states that the benefits of information, in terms of improvement of effectiveness and efficiency by better decision making, are an increasing function of the relevance of the acquired information. So the adequacy of information produced by a cost allocation system influences the efficiency and effectiveness of decisions made on both strategic and operational level.

Based on the literature three categories of strategic management purposes of cost allocation have been identified: (*1) cost reduction, efficiency, and profit optimization; (2) competitive performance and strategy; (3) market share, segmentation, and product mix*. For each category it is possible to find some practical applications, these are of interest when interviewing stakeholders. For operational management four categories were defined: *(1) Information and transparency; (2) Decision making*

and behavior; (3) Performance and efficiency; (4) Influenceability and communication. Also these categories can be split up into more operational practices which are subject of the interviews.

As stated in the literature the method for cost allocation, the types of cost to be allocated, the allocation-bases, type of transfer price and the type of rate – budgeted or actual – to be used chosen all have influence on the categories stated above. It is important to carefully figure out what the demands in terms of strategic and operational use for the U&O-tool are. Then it can be checked whether the step-down method put in place is sufficient or that perhaps reciprocal costing is better for the ANWB. Also it can be checked if the system is consistent in the use of allocation bases and total application of ABC – perhaps other costs drivers or TDABC fit better. According to literature six criteria's have been found to check for this latter statement. *Costs should be cause-and-effect; they should benefit both departments; the price should be fair; use of actual or budget usage should be consistent; effort and benefits should be balanced;* and these criteria are inappropriate *costs should be assigned to those who are able to bear them.* Eventually the ANWB would like to be on the right spot on the cost-accuracy trade-off line (see figure 20).

When changes to the U&O-tool are suggested the literature states that enough perceived usefulness of the improvements have to be achieved and while implementing the right amount of force has to be exerted. Possible restraining forces have to be eliminated where possible to achieve success. Involving one or more key individuals during the implementation phase could be very helpful.

4. Finding the Performance Gap

4.1. How the U&O-tool Works

4.2. Theoretical Shortcomings of the U&O-tool

4.2.1. Analysis of Technical Aspects

4.2.2. Concluding on Theoretical Shortcomings

4.3. Expected Performance of the U&O-tool

4.3.1. Analysis of Expected Performance

4.3.2. Concluding on Expected Performance

4.4. Actual Performance of the U&O-tool

4.4.1. Analysis of Actual Performance

4.4.2. Concluding on Actual Performance

4.5. Preliminary Conclusions

5. Suggested Improvements

5.1. Defining the Right Cost Drivers

5.2. Splitting Overhead Costs

5.3. A New Step-Down Sequence

5.4. The 10 Commandments of U&O

5.5. Concluding on Suggested Improvements

6. Analysis of Improvements

6.1. Analysis of Supporting Departments Results

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Appendix A: Departments, Cost Drivers, Prices, and Results

Appendix B: Interview Questions

Appendix B-1: Interviewees

Appendix B-2: General Questions Semi-Structured Interviews

Appendix B-3: Specific Questions per Department

Appendix B-4: Questions Overhead Departments

Appendix C: Elaboration Interviews

Appendix C-1: Findings – IST

Appendix C-2: Findings – SOLL

Appendix C-3: Comparing IST and SOLL Management Purposes of Cost Allocation

Appendix D: Slides of HRM Workshop