



HELLEDOORN

COST ALLOCATION FOR
SERVICES PROVIDED BY THE
MUNICIPALITY OF HELLEDOORN





UNIVERSITY OF TWENTE.

“What allocation model should the municipality of Hellendoorn use to allocate costs and which variables, and in which way, influence the cost price to provide services?”

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Preface

This paper is written to graduate for my master Business Administration at the University of Twente. This research is conducted for the municipality of Hellendoorn, located in Nijverdal. The result of this paper is the completion of six months during period in which I had the privilege to experience the internal processes of the municipality. This paper is also the completion of my period as a student. I look back at this period with great joy in which I learned a lot and developed myself to what I am today.

After an extensive search for an internship to conduct my master assignment, I received a quick response from the municipality of Hellendoorn about my request. I would like to thank Mr. Baars for giving me the opportunity to conduct my research at the municipality and for his support and guidance throughout this entire process. I would also like to thank Mr. Titsing for his time and patience to answer my questions during the time at the office.

I would also like to thank Drs. Vergeer for his comments and guidance during the entire process. By providing me direct and specific feedback, he helped pointing me the right direction, when I lost focus. Furthermore, I would like to thank Prof. Dr. de Groot, for providing valuable input and comments during the last six months.

Thanks to many conversations with civil servants from different departments, I was able to gather the necessary information to complete my research. I would like to thank all interviewees for their time and effort to answer all my questions. I want to thank everyone at the municipality of Hellendoorn for this great experience during the past six months.

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Abstract

This thesis is written for the University of Twente, based on a research question given by the municipality of Hellendoorn. The reason for conducting this research is that municipalities are currently under a lot of pressure. Due to the increase of media attention given to the differences between the prices of services among municipalities and the publication of those differences, the citizens are increasingly questioning the way municipalities are pricing their services. Currently, the prices to provide services are determined by adjusting previous year's prices with the current national inflation rate. Since the pricing of services does not involve a particular costing method, the municipality lacks insight in the attached costs to the activities necessary to provide services.

The research question consists of two parts. The first part concerns selecting the right cost allocation model for the municipality of Hellendoorn, while the second part concerns the practical implementation of this model for the services provided by the municipality. The research question is formulated as follows: *“What allocation model should the municipality of Hellendoorn use to allocate costs and which variables, and in which way, influence the cost price to provide services?”*

There are several costing models discussed in the literature. Five commonly used costing models are included in this research to decide what costing model is best applicable for the municipality of Hellendoorn. The objectives and complexity of the municipality of Hellendoorn are compared with the pros and cons of the costing models found in the literature. Based on the four most important criteria set for Hellendoorn to allocate costs, the Time-driven activity-based costing model would be preferred in comparison with the other allocation models. TDABC covers all key criteria and the cost of activities largely depends on the amount of time spend in the process. This means that ‘time’ is the key variable that drives costs.

To implement the TDABC model, a proper estimation of the activity time and costs are needed. Two variables need to be determined; 1) the average department cost per minute and 2) the total activity time to render the services. Instead of surveying employees on how they spend their time, managers first directly estimate the practical capacity of the resources supplied as a percentage of the theoretical capacity (Kaplan & Anderson, 2004).

An important condition is that the price set to provide services should not exceed the costs made in the process, so a break-even point should be aimed for. The price charged for services should also be in proportion to the benefits received. Besides these two conditions, the municipality should also take into account several other conditions for pricing services.

When Hellendoorn implements the TDABC method according to the steps described in this research, Hellendoorn should be able to justify and explain the prices charged for their services. For activities that are difficult to estimate, Hellendoorn could be using a clocking system to determine the activity process time. The variables in the model should also be frequently updated to make sure that the activities and costs are still applicable. Any changes in costs or activities can influence the cost price of services.

The TDABC model helps the Municipality of Hellendoorn to understand and justify the activity time and the costs incurred for each service (direct and overhead costs), which increases transparency towards the community and reduces the risk for potential penalties.

Samenvatting

Deze thesis is geschreven voor de Universiteit Twente, mede gebaseerd op een informatievraag van de gemeente Hellendoorn. Naar aanleiding van verschillende publicaties over de grote verschillen in legestarieven tussen gemeenten, groeit de vraag naar transparantie. Tegenwoordig worden de tarieven vastgesteld door het tarief te corrigeren met het jaarlijkse inflatiepercentage. Deze manier van tariefbepaling verschaft weinig inzicht in het proces en de kosten die eraan verbonden zijn.

De onderzoeksvraag bestaat uit twee delen. Het eerste gedeelte heeft betrekking op het selecteren van het geschikte allocatie model voor Hellendoorn en het tweede gedeelte heeft betrekking op het praktische gebruik hiervan. De onderzoeksvraag luidt als volgt: *‘Welk kostenallocatie model is het meest geschikt voor Hellendoorn en welke variabelen, en in welke mate, hebben invloed op de kostprijs van de dienstverlening?’*

In de literatuur worden verschillende kostenmodellen behandeld. In deze scriptie worden vijf allocatie methoden uiteengezet, welke toegepast kunnen worden op service organisaties. Onderzoek naar de voor- en nadelen van de modellen in combinatie met de criteria die van belang zijn voor gemeente Hellendoorn, is vastgesteld dat het ‘Time-Driven Activity-Based Costing (TDABC)’ model het meest geschikt is om de legestarieven te bepalen.

Het TDABC model kan gebruikt worden om de kostprijs van verschillende producten en/of diensten te bepalen. De wijze waarop een kostprijs bepaald kan worden, is in principe gelijk voor elk product en/of dienst. Ter illustratie worden voorbeelden gegeven om het model beter te begrijpen. Door middel van het volgen van enkele stappen, uitvoerig uitgelegd in dit verslag, kunnen de tarieven op een eenvoudige, overzichtelijke en transparante wijze bepaald worden.

Bij TDABC zijn slechts twee parameters van belang: 1) het tarief per eenheid van de ingezette mensen en 2) de vereiste tijd voor het uitvoeren van de activiteit. Deze aanpak is daarmee van verrassende eenvoud. Voor elke activiteit wordt nagegaan hoeveel tijd een werknemer naar verwachting gebruikt voor de uitvoering. Voor de tariefsberekening wordt uitgegaan van de productief beschikbare arbeidstijd op jaarbasis, die in de praktijk vaak niet meer is dan 80% van de nominale werktijd.

Een belangrijke voorwaarde voor het vaststellen van de legestarieven, is dat de prijs niet hoger mag zijn dan de kostprijs om de dienst te verlenen. Simpel gezegd, er mag geen winst worden gemaakt op de leges. Ook dienen de kosten in verhouding te staan tot de dienst, zoals is vastgesteld in het evenredigheidsbeginsel. Zo zijn er nog enkele andere voorwaarden waaraan het vaststellen van de legestarieven aan moet voldoen.

Om het TDABC correct en op een verantwoorde wijze te kunnen gebruiken, zullen de schattingen van de benodigde hoeveelheid tijd per activiteit redelijkerwijs bepaald dienen te worden. Indien dit niet het geval is, kan er gebruik worden gemaakt van tijdschrijven om zo toch de hoeveelheid tijd per activiteit te bepalen. Ook zullen de variabelen in het model (tijd, activiteiten, kosten, praktische capaciteit) met enige regelmaat (jaarlijks) aangepast moeten worden om zo de werkelijke kostprijs te kunnen bepalen.

Het TDABC model helpt de gemeente Hellendoorn om het proces (de activiteiten en de benodigde hoeveelheid tijd) en de daar bijbehorende kosten (directe en overheadkosten) te kunnen verantwoorden en zodoende de transparantie van de legestarieven te vergroten en de kans op eventuele financiële consequenties te verkleinen.

1. Introduction

This research is conducted for the University of Twente, regarding the allocation of costs to determine the price charged for the services rendered by the Municipality of Hellendoorn. This chapter will introduce the research topic, the organizational structure, the main activities conducted by the municipality, the research problem, and the research questions.

Public administration in the Netherlands has four tiers: central government, the provinces, municipalities and the water authorities. The provinces, municipalities, and the water authorities, are called decentralized governments (Wassenaar & Verhagen, 2006). The Netherlands consist of about 400 municipalities, located in twelve provinces.

Municipalities have their own income and they receive money from the government. The government provides the municipalities with an annual grant from the Municipalities Fund (gemeentefonds), financed by the central government's tax revenue. Their own income includes local taxes and revenues from assets or services. Municipalities use their income to provide facilities that are beneficial to the community (Municipalities and cities, n.d.).

Municipalities are authorized to make many independent decisions about which tasks to perform or how to price services. This authorization leads to different processes and prices of services provided by municipalities. Recently there is an increase in attention given to the (significant) differences between municipalities by several institutions. It appears that, for providing the same services, municipalities are asking different prices. Individuals and organizations are becoming more critical towards municipality services and the lack of transparency about pricing methods. It happens more often that municipalities have to explain and justify the price they have set. When the price is not reflecting the costs incurred in the process municipalities risk a fine. The purpose of this research is to provide a cost allocation model for the municipality of Hellendoorn that helps the municipality of Hellendoorn to determine and justify their pricing of services. The following sections will go deeper into the research question.

1.2 Organizational structure

The municipality is the tier of government closest to the people. To, for instance, request a passport, or register a new address, you have to go to a municipal office. Currently, there are about 400 municipalities in the Netherlands¹, divided in twelve provinces. The provinces Noord-Brabant (67), Zuid-Holland (67), Gelderland (56), and Noord-Holland (53) have the most municipalities. Flevoland consists of only six municipalities, while Overijssel consists of 25 municipalities.

The municipality of Hellendoorn is part of the Province Overijssel, which counts 1.137.668 citizens in 2012, located in 25 municipalities. Seventeen municipalities count less than 40.000 citizens, 5 count between 40.000 and 90.000 citizens, and Zwolle, Deventer, and Enschede count more than 90.000 citizens (inwoneraantal en oppervlakte, 2012). The municipality of Hellendoorn counts nearly 36.000 citizens, divided in five regions: Nijverdal, Hellendoorn, Haarle, Daarle, and Daarleveen, so it is a relative small municipality.

¹ Figures from Centraal Bureau voor Statistiek:
<http://www.cbs.nl/nl-NL/menu/methoden/classificaties/overzicht/gemeentelijke-indeling/2013/default.htm>

The city hall of the municipality of Hellendoorn is located in Nijverdal. The organizational structure as presented in figure 1 includes governing departments, management departments and operating departments.

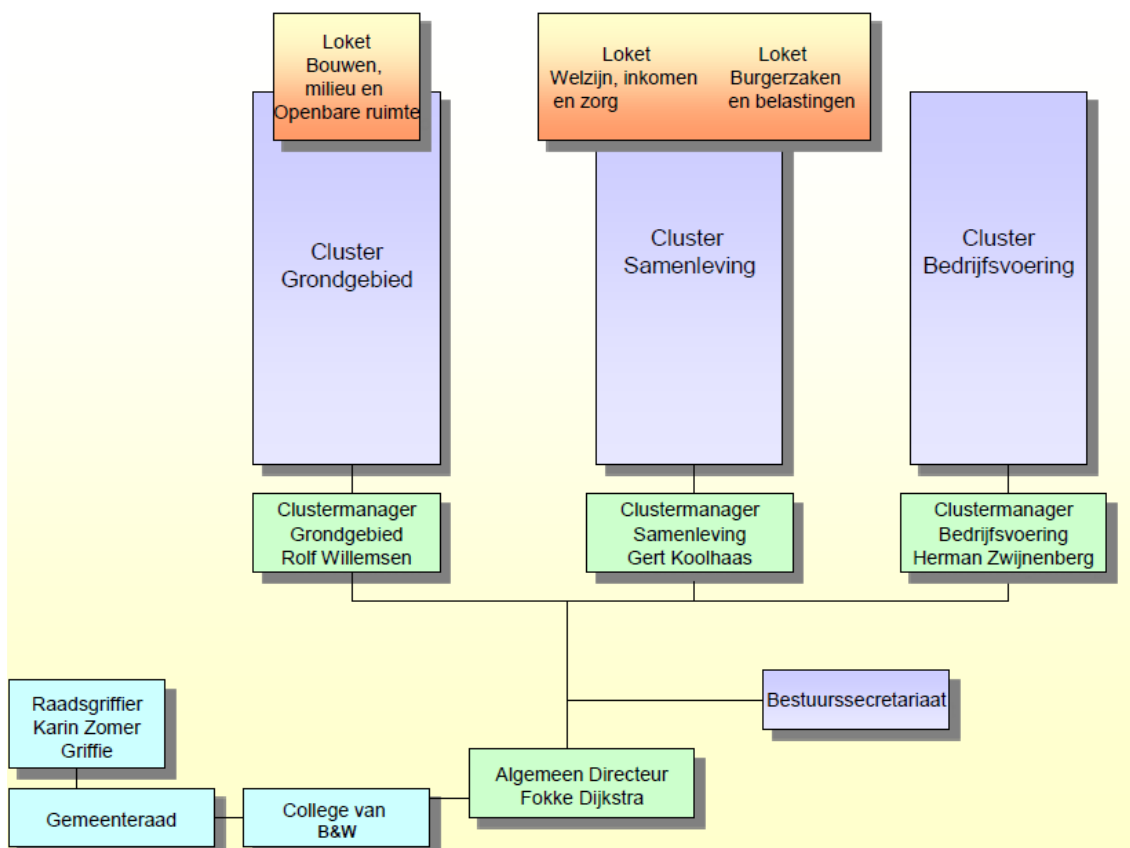


Figure 1: Organizational structure Hellendoorn

A municipal council and a municipal executive consisting of the mayor and aldermen (Municipalities and cities, n.d) run the municipality. The municipal council is the highest administrative body in a municipality. It takes important decisions, for example on municipal charges and taxes. Residents elect the council for four years. The municipal council's tasks and authorities are formulated in the Municipalities Act.

The municipal executive consists of the mayor and aldermen. It is responsible for the day-to-day running of the municipality. Its main task is to prepare decisions for the municipal council and carry them out. It also implements legislation and schemes for central government and the provincial authorities. The municipality executive is primarily responsible for the municipality's finances.

The mayor is the head of the municipality council and executive. He has a number of autonomous tasks and responsibilities. His portfolio includes public order and security. The mayor is the only non-elected member of both the council and the executive. The Queen's Commissioner puts his candidacy forward and the Crown (the monarch and ministers) appoints the mayor by Royal Decree following nomination by the Minister of the Interior and Kingdom Relations (BZK). The mayor is appointed for six years and is usually re-appointed automatically, on the advice of the municipal council.

The municipal council appoints the aldermen. They are responsible for their own portfolio but when certain powers have to be exercised, the council as a whole decides.

On the operational level, several departments divided into three clusters conduct the daily activities: Territory, Society, and Business Management. A manager who is supervising the departments leads each cluster.

Cluster Territory

Cluster Territory is responsible for e.g. construction and building related contents. In general, this cluster is responsible for decision making related to the physical environment. This cluster consists of four separate departments: (1) Supervision and Permits, (2) Public Spaces, (3) Roads, Sewers, and Traffic (RST), and (4) Public Green and Waste disposal (PGW). Besides these departments, four project leaders are responsible for the supervision of building and/or construction developments.

Cluster Society

Cluster Society is responsible for the social wellbeing and development of citizens in the municipality of Hellendoorn. In general, this cluster is responsible for decision making related to the social aspect of citizens. This cluster also consists of four separate departments: (1) Social Development, (2) Employment and Care, (3) Civil Affairs and Taxes, and (4) Sports. In contrary to cluster Territory there no project leaders.

Cluster Business Management

Cluster Business Management is responsible for controlling and monitoring the budget and cash flows of the municipality of Hellendoorn. This cluster supports the other two clusters and the governing department (the municipal council and executive) in their daily business. This cluster is also responsible for providing internal information and facilities. The departments can be distinguished into: (1) Information and Facilities (I&F), (2) Finance and Control (F&C), (3) Personal and Organization (P&O), (4) Communication, and (5) Legal Advisory.

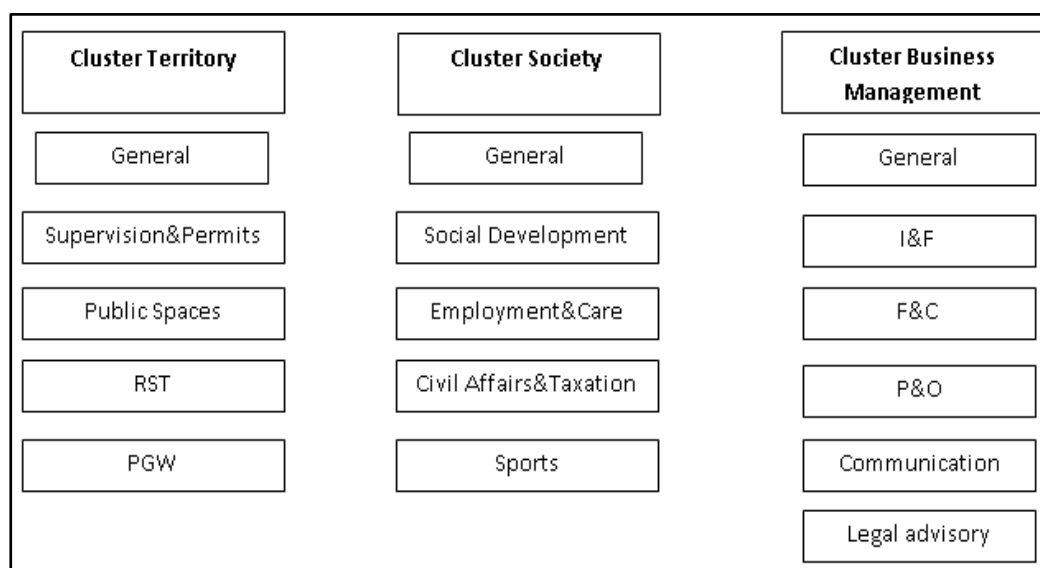


Figure 2: Organization departments per cluster

The departments within the clusters Territory and Society are involved in the primary process to provide services to citizens. Cluster Business Management has a support and controlling role regarding the departments in the other two clusters. Therefore, the departments within the clusters Territory and Society are responsible for the operational activities.

1.2 Financial structure

The tasks of municipalities consist of many different activities, which all produce costs. To be able to compensate the costs incurred to conduct activities, municipalities have several sources of income.

Municipalities largely depend on income received from the central government. The activities conducted by municipalities can produce different costs, caused by organizational specific policy decisions or by differences in physical, social-economical, or functional circumstances. The government provides the municipalities with an annual grant from the Municipalities Fund, which is financed from central government tax revenue (Wassenaar & Verhagen, 2006). This annual grant is determined by several aspects like; the number of citizens and the amount of people depending on welfare. The Municipalities Fund forms a significant part of the income received by municipalities.

Besides the Municipal Funds, municipalities can also produce their own income by raising taxes, conducting business activities, providing services and property revenues. Municipalities can produce their own income by raising taxes or by charging their services and products. Taxes are raised to pay for collective goods that have a common purpose. Municipalities are free to decide how to spend the money received from taxes. Income received by charging services or products are not obligatory and are characterized by a direct reciprocation from the municipality. Charges are primarily set to compensate the specific costs incurred to provide the service or product. Municipalities are free in pricing their own services, as long as the prices are not exceeding the costs to provide services. The next section discusses the types of services the municipality provides.

1.3 Activities

Municipalities are responsible for many different activities, primarily conducted to benefit the community. Municipalities provide a wide range of services to the citizens – both basic services like; water supply, sanitation/ sewerage, drainage, street lighting, infrastructure and waste disposal. But also other services like; parks, play grounds, crematoria, recreation centers, community halls, providing welfare and support to citizens unable to cope in the society, providing subsidies, etc (Nallathiga, 2011). In addition, providing more administrative services like; issuing driver's licenses, travelling documents, building and construction permits, child day care permits, etc.

The municipality of Hellendoorn divides all activities into thirteen different programs given in attachment A. The activities necessary to process the service requests are the activities for the services specifically requested by an individual or institution. VB Deloitte and Touche (1999) defines these services as follows:

A concrete performance executed by the municipality on behalf of an individual'. The costs incurred for providing services can be recharged if; (1) the service is requested by an individual and (2) the service' intention concerns the individual needs, rather than common needs.

The services that are of interest for this research primarily involve administrative activities. Most commonly known services are; driver's licenses, travelling documents, building and construction permit, wedding ceremonies, and issuing copies of municipal personal database records (GBA), but also processing requests regarding for; temporary rent out an accommodation, release for parking restrictions, organizing an event, opening a day care center, etc. Attachment B shows the complete list of services that have an administrative character and are applicable for charging. The services given in attachment B are involving different processes and activities, but also different departments. This means that for each product the activities and departments involved need to be determined.

These specific services need specific activities to process the request. The purpose of this research is to design a costing model that can be used to determine the costs incurred for providing the service. Important to keep in mind is that the service is requested by an individual and concerns individual needs, rather than common needs.

1.4 Pricing Services

Decentralized governments differ in many respects. Even between municipalities, quite some differences exist. Not only differ municipalities in size, location, economic and social environment. In addition, political preferences are a cause of varying views on which activities to conduct. Next to that, municipalities have to provide defined services to its citizens like passports, birth and wedding certificates, but also building permits.

Budding and Groot (1998) argue that three potential factors can explain the differences between the services cost of municipalities.

- ✓ External conditions: Municipalities with citizens living far away from each other (e.g. in the countryside), result in increasing costs to provide certain services (e.g. collecting garbage) in comparison a neighborhood with apartments.
- ✓ Production and business management: Due to different methods and processes in the daily business, the level of efficiency can differ among municipalities.
- ✓ Method of cost allocation and determination of prices: Budding and Groot (1998) point out that pricing is determined by two independent decisions.
 1. What will form the basis for determining prices?
 - Costs incurred for providing services
 - The prices of comparable municipalities
 - The capacity of citizens
 2. What will be the structure to determine prices?
 - Charging every citizen equally or different?

The primary rationale for the levy of user charges to adequate levels is to provide financial stability and effective recovery of all costs associated with a particular service (Nallathiga, 2011).

Municipalities often compare the costs incurred for providing services with the prices that surrounding or similar municipalities have set (Budding & Groot, 1998). Budding and Groot (1998) argue that municipalities compare and adjust service costs to be able to compete with surrounding municipalities.

Municipalities can recharge the costs incurred for providing services requested by citizens. The Municipal Act² prescribes that the estimated revenues from services may not exceed the estimated costs. Therefore, a costs break-even point should be aimed for.

About ten years ago, the cost price of services has been determined by measuring how long it takes to process one service request. Civil servants were asked to record the time spent on the activities in order to determine the cost price of services. Currently, the prices to provide services are determined by adjusting previous year's prices with the current national inflation rate.

The advantage of applying this method is that prices can be adjusted quickly and simple. The disadvantage is, since the organization is constantly changing (systems, processes, people, activities, costs), the lack of understanding in the actual costs incurred in the process.

² Special provisions regarding other than real estate charges (Section 3 Municipality Law): http://wetten.overheid.nl/BWBR0005416/TitelIV/HoofdstukXV/3/Artikel229/geldigheidsdatum_25-03-2013

1.5 Problem Analysis

The reason for conducting this research is that municipalities are currently under a lot of pressure. First, due to the increase of media attention given to the differences between the prices of services among municipalities and the publication of those differences, the citizens are increasingly questioning the way municipalities are pricing their services. Allers, Hoeben, Janzen, Veenstra, Geertsema, and Merkus (2013) have designed a national overview of the different costs per municipality. Results show that there are significant difference in pricing of driver's licenses between the cheapest (€ 25 euro) and the most expensive (€ 68 euro) municipality. Another example regards pricing of providing a copy of the municipal personal database (GBA). The cheapest municipality is providing this as a free service, while the most expensive municipality is charging € 17 euro for a copy.

The publication of the differences in pricing between municipalities is causing citizens and organizations to be more critical towards municipalities. In some cases, the municipality even has to appear before the court. When this happens, the municipalities must be able to justify and explain the price charged for the services. When it appears that the charged price is exceeding the actual cost price, the municipality can be given a fine. To avoid this from happening, the municipality has to explain the process involved to provide the service, and justify the costs that are included. This leads to the second problem. Since the pricing of services does not involve a particular costing method, the municipality lacks insight in the attached costs to the activities necessary to provide services.

To increase transparency in the costs to provide services, the ministry of Interior and Kingdom Relations developed, in cooperation with Deloitte and the VNG (Dutch association of municipalities), a seven step framework. This framework is developed for municipalities to determine the maximum costs to provide services. The seven-step framework described in the VNG model consists of the following steps (Deloitte BV, 2007):

- ↓ 1. Determine which services are eligible for pricing
- ↓ 2. Determine which activities are necessary to render the service
- ↓ 3. Locate the activities in annual budget report
- ↓ 4. Determine which part of the overhead costs can be allocated to the service
- ↓ 5. Determine additional costs that not specifically concern the service
- ↓ 6. Detect organizational factors that affect the pricing of services
- ↓ 7. Consider the multiple year perspective

The first step is to define the services that are eligible for pricing, followed by determining which activities are necessary to render the service. The necessary activities are important for assigning costs to the services, because different activities will result in different costs.

The third step is to detect the activities in the annual budget report. Only the costs included in the annual budget report are eligible for cost allocation.

The fourth step is to determine the cost allocation method. Selecting the right allocation method is important, because each method results in different cost prices. The VNG model mentions three possible allocation methods for pricing services: departmental costing, step-down costing, and activity-based costing. The allocation methods will be discussed more in detail in the second chapter.

Step 5 integrates scenarios that influence the allocation of costs to the service. The factors that add costs to the cost price of services need to be determined and included in the cost price.

In the sixth step, the organizational specific factors that influence or affect the pricing method needs to be determined. Examples of these factors can be internal policies regarding pricing services, cost allocation, or recent court decisions.

The last step concerns multiple year cost allocation. Projects that have a lifetime of more than one year, involves costs and revenues spread over several years. This is only the case with large projects.

Although this model is developed specifically for municipalities, research conducted by Deloitte in 2011 and 2012 shows a decrease in the times that the model is implemented. According to Deloitte (2012) the main reason for not implementing the seven-step framework, is that municipalities find it too extensive and time consuming to understand and to use. Results retrieved from conducting a questionnaire among the municipalities show that municipalities are willing to become more transparent about the activities and the costs incurred in the process, but that they have trouble to implement such a framework, because there are too many activities involved in the process.

The seven-step framework described in the VNG model (Deloitte BV, 2007) provides guidance on the requirements and conditions for pricing municipality services.

The objectives given by the municipality of Hellendoorn relate to the problems mentioned above. Hellendoorn is facing the same problems as many other municipalities, when pricing services. Hellendoorn prefers to receive: (1) an easy and clear model that is also (2) easy to maintain and adjust so that they can use this model for many years and (3) clearly shows the activities included in the process to perform the activities.

The cost allocation model should also be applicable to different services that involve different activities, since Hellendoorn provides many different services.

1.6 Research questions

Hellendoorn prefers a clear and understandable allocation model for the costs incurred to provide services that is applicable for variety products. The model should be easy to understand, to apply, and to adjust to mutations.

The main research question is formulated as follows: **“What allocation model should the municipality of Hellendoorn use to allocate costs and which variables, and in which way, influence the cost price to provide services?”**

The strategy to answer this research question is to divide the problem into several sub questions. The sub questions will be used as guidance for this research. The sub questions are:

1. What type of costs can be distinguished?
2. Which costs can be allocated to the cost price of services?
3. For which purposes are the cost allocation models designed for, and what are their pros and cons?
4. What regulations and principles are applicable for pricing municipality services?
5. Which criteria can be used to select the allocation model?
6. What are the most important criteria for the municipality of Hellendoorn to implement an allocation model?

The six sub questions above will help to determine what allocation model Hellendoorn should use to allocate costs. Before discussing all kinds of criteria for model selection, the different types of costs and the costs that can be included (or excluded) in the cost price will be given. To help select the right allocation model for Hellendoorn, a comparison of the purpose, pros and cons of each model will be made. Municipalities are restricted by many regulations, principles, and restrictions. These restrictions can affect the implementation of an allocation model. The regulations that have to be taken into account when determining the cost price of services will be discussed.

Based on the first four sub questions, the criteria to select the model will be formulated. Based on the list of criteria, the important criteria for Hellendoorn will be determined and compared with characteristics of the several allocation models found in literature.

7. Which groups of activities necessary to provide services can be distinguished?
8. Are there any other variables that add costs to the cost price?
9. How are these variables related to the cost price?

After selecting the allocation model for Hellendoorn, the variables and the relationship to the cost price needs to be determined. The formulated sub questions 7 till 9 need to be answered to structure the model for Hellendoorn

2. Literature review

2.1 Introduction

This chapter provides a literature review about the different purposes, pros, and cons of implementing several allocation models. The goal is to formulate criteria that are useful for a municipality to help selecting the right allocation model. This review is developed in such a way that it can be applied to similar organizations and for similar purposes, but at the same time provides a complete and logical guidance to answer the research questions for the municipality of Hellendoorn.

Section 2.2 starts with a brief explanation of the cost terms and the relationship to the cost price. Followed by the costs that can be included in the cost price of services are discussed, as well as the costs that should be excluded.

Section 2.3 provides a review of cost allocation models that discusses the purpose, and pros and cons. This section starts with an explanation of cost allocation and for which purposes they are used.

Section 2.4 concerns the regulations and principles that are applicable for pricing services. The regulations that are applicable for pricing services can also influence the allocation model selection. The regulations applicable for pricing services can be used as criteria to determine the allocation model.

Section 2.5 provides a list of criteria used to define the conditions retrieved from the literature. The criteria are defined, based on the requirements given in the problem analysis, the organizational structure, the legal restrictions, and the diversity of the products.

This chapter ends with section 2.6 that contains the sub questions, answered in this chapter.

2.2 Types of costs

Costs are an estimated measure of the resources consumed to provide a product or service (Lianabel, 2000). A cost object is any activity for which a separate measurement of costs is desired. In other words, if someone wants to know the cost of something, this “something” is called a cost object. Costs assigned to cost objects can be divided into two categories: direct costs and indirect costs (Drury, 2008). Knowledge of how costs and revenues will vary with different levels of activity (volume) is essential for decision-making (Drury, 2008). The terms ‘variable’ and ‘fixed’ have been traditionally used in the management accounting literature to describe how a cost reacts to change in activity (Drury, 2008). Next, the terms; direct costs, indirect costs, variable costs and fixed costs will be discussed more in detail.

2.2.1 Direct vs. indirect costs

The correct identification of direct and indirect costs affects the accuracy of cost information. Direct costs are directly related to the cost object. Indirect costs, on the other hand, must be assigned to the cost object and are therefore less precise. Stevens (n.d.) defines indirect costs as: “(a) Costs incurred for a common or joint purpose benefitted more than one cost objective, and (b) not readily assignable to the cost objectives, without allocating them to the final product.” Essentially, indirect costs are all of the remaining costs after the direct costs have been charged. Users should examine the trade-offs between information accuracy versus cost of data collection in evaluating the direct and indirect cost classification for the organization (Stevens, n.d.).

2.2.2 Fixed vs. variable costs

In classifying costs by cost behavior pattern, a relationship is established between the cost of an item (cost object) and the reaction to change in volume or usage levels. Variable costs vary in direct proportion to the volume of activity; that is, doubling the level of activity, will double the total variable costs. Consequently, total variable costs are linear and the unit variable cost is constant (Drury, 2008). Fixed costs remain constant over wide ranges of activities for a specific period.

The cost terms are used to determine the relationship of the costs to the cost price and help to distinguish the different types of costs included in the model. Next, the different types of costs that can be included in the model will be discussed, followed by a discussion over the costs that should be excluded.

2.2.3 The direct and overhead costs of municipalities

Deloitte B.V. (2007) developed a manual for municipalities in which the allocation of costs for products for which the revenues may not exceed the expenses. This manual provides types of costs that can be included in the cost price, as well as the costs that should be excluded. The next control question can determine whether the activity costs can be included in the cost price: 'Is this activity necessary for the product requested by the individual?' If the answer is yes, it is likely that the costs can be included in the cost price.

Direct costs

As mentioned in the manual developed by Deloitte B.V. (2007) the direct costs can be divided into the categories: labor costs, material costs, automation costs and accommodation costs.

Labor costs: The labor cost includes all costs for wages, including insurance, pension, and other additional expenses.

Material costs: Material cost includes all the operating costs incurred for day-today activities. This can include material costs for documents, cost of capital for transportation, equipment and other assets. In addition, the costs for training and development can be seen as material costs and can be included in the cost price.

Automation costs: The costs for specific automation costs used to provide services can be included in the cost price. This can include hardware and software programs.

Accommodation costs: The costs for accommodation are usually categorized as indirect costs. Deloitte B.V. (2007) is arguing that the accommodation costs are direct costs, since the costs for accommodation can be retrieved per department in the budget report of municipalities. Accommodation costs can include water usage, gas and electricity, workshop and construction maintenance.

Indirect costs (overhead costs)

The indirect costs can be allocated if these costs are somehow related to the specific service. The indirect costs, next called overhead costs, are related to the costs of management and support departments in favor of providing services. The overhead costs are those costs incurred for people or departments not directly related in the process to provide services. Examples of overhead departments are P&O, Finance & Control, administration, Information & Facilities, Boards of directors and legal advisory. The overhead costs are also including labor, material, automation and accommodation costs. The overhead costs need to be allocated to the operating departments based on an allocation method.

In the municipal Act is determined that costs for policy making, supervision and control, and general objection and procedures for appeal may not be allocated to the cost price. These costs are serving a common need instead of individual needs, so these costs cannot be included in the allocation of costs. Mainly the costs incurred for the governing department that is responsible for policy-making decisions may not be included in the cost price.

Next, the cost allocation models are discussed, starting with the purpose of cost allocation and the meaning for which the allocation models are used.

2.3 Cost Allocation Methods

The price set for products or services is often based on the cost price to produce or deliver the product or service. To determine the cost price, cost allocation can be used to assign the right costs to the right cost price. The literature provides several definitions of cost allocation. Drury (2008) defines cost allocation as, 'the process of assigning costs when a direct measure does not exist for the quantity of resources consumed by a particular object'. Cost allocation has also been defined as: '*the process of identifying and tracing indirect or common costs to a cost object, a product, service, activity, or segment of the organization for which a separate cost measurement is desired*' (Lianabel, 2000).

Contemporary managerial accounting is affected by the growing importance of effective overhead cost management, the cause of which lies in several factors. First and foremost, there has been a proportional increase in the overheads faced by companies, changing from around a portion of 10% in the 1950's to what it is today, potentially representing approximately 40% of a manufacturing business's total costs. Furthermore, there is the factor of increasing diversity of operations. This means that each product and every customer could differ in how they consume overhead department services within an organization. In such cases, any company's costing system should provide useful information on product and costs, as well as giving data on the relations between costs, company activities, and cost objects (Popesko, 2009, pp. 91).

2.3.1 Introduction cost allocation

Cost allocation practices can have different reasons for an organization. Management should define the purpose of the cost allocation before choosing a particular assignment method. The purpose of cost allocation may determine the complexity and the level of precision required of the allocation methodology (Lianabel, 2000). Organizations generally allocate costs for specific reasons. For example:

To make decisions regarding the allocation of resources - Costs provide an estimated measurement of the resources that the organization is using to provide a product or service. By understanding their costs, managers can make trade-off decisions to use their resources more effectively.

To provide motivation to managers and employees - Managers may use cost allocation to encourage (or discourage) specific behaviors.

To justify cost products or services - Cost allocation allows an organization to recover the direct costs of the products or services and a fair portion of the overhead costs that are necessary to manage the organization.

To measure income and assets for meeting external regulatory and legal reporting obligations – Cost allocation is usually important for publicly listed companies to meet requirements for financial reporting.

The economic costs of designing and implementing sophisticated cost-allocation systems are highly visible and most organizations work to reduce them. In contrast, the economic benefits from using a carefully designed cost-allocation system – being able to make better-informed make-or-buy decisions, pricing decisions, and cost-control decisions and so on – are difficult to measure and are frequently less visible (Bhimani, Horngren, Data, and Foster, 2008). The following are criteria for guiding cost allocation decisions (Shim and Siegel, 2009):

Benefits obtained - Costs may be allocated based on the benefits received. For example, corporate advertising can be allocated based on divisional sales. The higher the sales, the more the benefit received from the advertising. The cost of a corporate-wide advertising program can be allocated based on division revenues.

Fairness or Equity - Costs may be allocated based on fairness. “Fairness” may be in terms of input expended, resources used, and time spent. The “equity basis” is often used in government contracting to come up with mutually agreeable price.

Cause-effect Relationship - Costs may be allocated based on services provided. It is easy to formulate this relationship when dealing with direct manufacturing costs. Relationships aid in relating the cost objective to the cost incurred, for example identifying an input-output relationship. Using this criterion, managers identify the variable or variables that cause resources to be consumed. This criterion relates to the activity-based concept.

Ability to Bear - Costs may be allocated based on the cost objective’s ability to bear. An example is allocating corporate executive salaries based on divisional profitability. It assumes that a more profitable division can absorb – or bear – more costs.

The allocation base should be straightforward because complexity results in added computational costs and time that may outweigh the benefits. Clarity is necessary so that you can easily understand the allocation formulas and rationale (Shim and Siegel, 2009).

The chosen cost allocation methodology can have a significant impact on the determination of an equitable pricing structure for services (Fisher & Krumwiede, 2012). A lot of thought needs to go into selecting allocation models (Gentle, 2010). Gentle (2010) and Sunwater (2005) argue that several general criteria that need be kept in mind when selecting the right allocation model:

- ✓ **Simplicity** - Costs should be allocated using the most simple and easily understood method possible, but within the bounds of achieving the desired objectives.
- ✓ **Accountability** - The application of the cost allocation model should be sufficiently transparent that an external observer can readily trace the allocation of costs from source to destination. Sufficient documentation is important for subsequent review or audit of the methodology.
- ✓ **Reasonableness** - Costs should be allocated to user groups where it can be reasonably demonstrated that the costs would necessarily be incurred for the services to be provided (or to have the right to benefit from a service). There should be: (1) a reasonable linkage to the benefits derived, (2) a traceable cause and effect relationship, or (3) logic and reason where neither a benefit nor cause and effect relationship is clearly determinable.
- ✓ **Consistency**: Costs incurred for the similar purposes should be allocated in the same way.
- ✓ **Level of impact**: The impact on the people who use or work with this information must be known. Considerations needs to be given to the impact that various allocation methodologies have on individual schemes and across customer sectors within each scheme, mainly any significant

changes to the amount of effort needed to apply and maintain the allocation model should be taken into account.

2.3.2 Cost allocation models

This section will discuss the cost allocation models found in literature and for which purposes they are designed. In addition, the advantages and/ or disadvantages for applying certain allocation models will be given.

Before looking at cost allocation models discussed in literature, the manual 'cost allocation' developed by Deloitte B.V. (2007) on behalf of the Ministry of Interior and Kingdom Relations and in cooperation with Dutch Association of Municipalities, provide three cost allocation models. The models mentioned in the manual are:

- ✓ Departmental costing
- ✓ Step-down costing
- ✓ Activity-based costing

Since these models, except the step-down costing model, are not explained in the manual, they will be discussed by using published literature.

2.3.2.1 Departmental costing

Departmental costing refers to the method of ascertaining the cost of operating a department or cost centre. Total cost of each department is ascertained and divided by the total units produced in the department to arrive at unit cost. If one product passes through a number of departments for completion, cost of each department will be picked up and the total unit cost will be the aggregate of unit cost of the departments through which the product passes (Fisher & Krumwiede, 2012).

The most primitive form of departmental costing uses only one absorption rate to allocate the overhead costs to the products. By dividing the total overhead costs by the total direct costs, the percentage of overhead costs that is allocated to the direct costs, can be determined. This method is relatively easy to implement and to use within almost every organization (Horngren, 2005). The downside of this method is that each product is allocated the same percentage of overhead cost.

There are seven steps to follow to implement full costing on a departmental basis:

1. Allocate the specific departmental overheads to the correct department
2. Apportion the general overheads between the departments
3. Sum up each department so far to get the total for each department
4. Apportion the service department costs to product cost centers
5. Sum up the product cost centre overheads
6. Calculate an overhead absorption rate for each department
7. The units absorb the overhead costs as they pass through the product cost centers

The total direct and overhead cost needs to be determined for each department. This method results in different overhead absorption rates for each department. It completely disregards any services provided by one service department to another. This means that no portion of the overhead of a service department is reallocated to other service departments. According to Horngren (2005), departmental costing is generally an inaccurate method of service department's overhead allocation and very inaccurate when service departments receive significant help from each other. Therefore, it is only

recommended in cases where service departments do not depend much on the services of other departments.

2.3.2.2 Step-down costing

The step-down method recognizes that some departments support the activities in other service departments as well as those in production departments. A sequence of allocations is chosen, usually by starting with the service departments that renders the greatest service (as measured by costs) to the greatest number of other service departments. The last service department in the sequence is the one that renders the least service to the least number of other service departments. Once a department's costs are allocated to other departments, no subsequent service department costs are allocated back to it (Horngren, 2005). The step-down allocation method is a simplified method for allocation of internal services (Russel, Patel & Wilkinson-Riddle, 2002). The step-down costing method allows support departments to allocate costs to each other and ultimately to the operating departments. To accomplish this, the support departments are ranked. The purpose of this method is to allocate overhead costs to cost objects (activities). Step-down costing consists of four categories of cost pools: overhead cost pool, cost pool, main cost pool, and cost objects (Deloitte B.V., 2007).

The overhead cost pool concerns mainly the general costs for housing (e.g. rent, maintenance, energy, or insurance). These costs need to be allocated to the different cost pools (departments). Eventually, the costs need to be assigned to the main cost pools (teams) and finally assigned to the specific cost objects (activities).

Broadly speaking, the Step down costing method identifies the range of resources needed to run a facility, and then assigns these resources to chosen 'cost centers' on an allocation basis (e.g. floor space, occupied bed days, etc.) These costs in turn filter down until the final cost centers of interests are left. Step down costing includes seven steps needed to compute the costs, adapted from Shepard (1998):

1. Define the final product
2. Define cost centre's
3. Identify the full cost for each input
4. Assign inputs to cost centers
5. Allocate all costs to final cost centers
6. Compute total and unit costs for each final cost centre
7. Report results

The stages 1 – 5 concentrate on the estimation of costs. Here the aim of the exercise and the range of cost centers are defined, resources are identified and the step-down allocation of all their associated costs, including overheads, is assigned to final cost centers. The stage 1 – 6 concentrate on activity data and outlining the combination of this with total costs to arrive at unit costs (Shepard, 1998).

Figure 3, presented on the next page, illustrate a simple example of the step-down costing method. This example includes two steps to allocate costs to the products. This example shows the sequence of allocation, through different departments. Following this example, the allocation of costs is a one-way sequence.

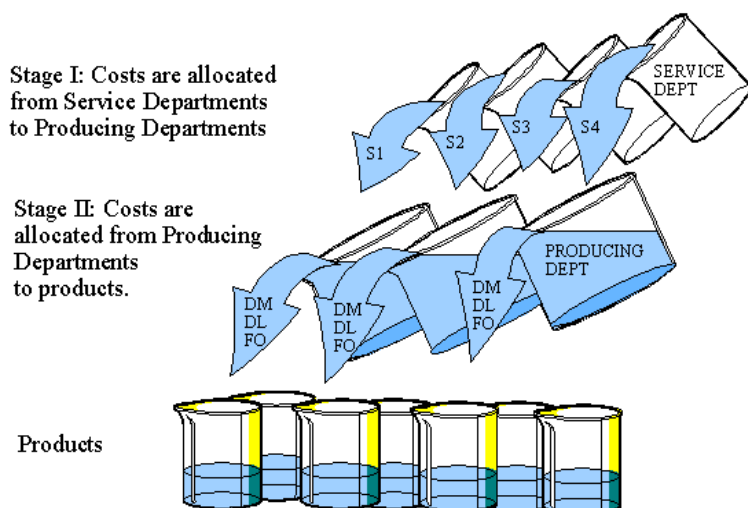


Figure 3: Simple example of step-down costing

The step-down approach is significantly better than the departmental costing method. However, the step-down approach does not take into account self-consumption, for example the facilities cost center consuming its own square footage. The true cost flows within an organization are not identified and therefore inaccuracy in the cost rates still prevails (Sedgley & Jackiw, 2001). The benefit of the step-down approach is simplicity.

The difference between the SDC method and the departmental costing method is the allocation of overhead costs to the final cost centers. Instead of calculating the overhead absorption rate for each department, only the overhead costs that can be allocated to the final cost centers of interest are used. In the SDC approach, the focus is on the cost centers instead of departments.

2.3.2.3 Activity-based costing (ABC)

Cooper and Kaplan developed the activity-based costing model (ABC model) in the eighties. Cooper and Kaplan described the ABC model as a solution to the problems occurred with the traditional costing method in the industrial industry. They first applied ABC to industries where automation was increasingly important. Most industrial organizations did not know how to deal with increasing overheads relative to the direct costs.

ABC emerged in response to competitive pressure that exposed inaccuracies in cost accounting, and was seen as a powerful profit analysis tool, due to its ability to reveal the hidden sources of profitability and embedded cost, and to serve as a catalyst for decisions to improve profitability. By the late nineties ABC was used extensively in diverse industry and government sectors (Turney, 2008). Today, ABC is the emerging foundation of performance management (Turney, 2008).

ABC has been defined as a system of accounting that focuses on a closer look at organizational activities as the fundamental cost objects, and then uses these activities as building blocks for compiling costs of other cost objects (Brown, Myring & Gard, 2013). As activities are created or changed, costs are created or changed, ABC stresses that the volume of products or services does not drive costs; the activities involved in the process drive costs (Brown et al., 2013). The costs that cannot be allocated directly to products or services are captured in overhead pools and allocated to services based on activities that have cause-effect with cost incurrence (Brown et al., 2013).

The ABC process is able to incorporate both physical measures and causal principles in the costing system (Popesco, 2009, pp. 94). The basic idea of ABC is to allocate costs to operations through the

various activities in place that can be measured by cost drivers. In other words, cost units are assigned to individual activities, e.g. planning, packaging, and shipment.

This method accurately measures the cost price to provide individual services by determining the necessary activities. It can also help to adjust and control the process of providing services by analyzing the activities. This method requires a lot of information, and is therefore relatively complex compared to departmental and step-down costing (Kaplan & Anderson, 2004). Another disadvantage of the ABC method is that it cannot be easily updated to accommodate changing circumstances.

In the manual 'cost allocation' developed by Deloitte B.V. (2007), the three above methods are mentioned briefly. And the step-down method is assumed to be the best appropriate model for allocating costs to the products. Based on two elements, complexity and accuracy, the step-down method fits between departmental costing and the ABC method. Therefore, in the 'cost allocation' manual is decided to use the step-down method as the model to apply to municipality services.

There are alternative models described in literature, in addition to the three costing models mentioned in the manual. In the next part, two alternative cost allocation models will be discussed.

2.3.3 Alternative cost allocation models

There are two alternative models frequently used in literature, which are also applicable to services organizations: *Time-driven activity-based costing* and *Total cost of ownership*.

2.3.3.1 Time-driven activity-based costing (TDABC)

The time and cost demands of designing and maintaining an ABC model on a large scale is a major barrier to widespread adoption for most organizations. Kaplan and Anderson (2007) developed TDABC to simplify the costing process by eliminating the need to interview and survey for allocating resource costs to activities before driving them down to cost objects (activities). For each group of resources, estimates of only two parameters are required: the cost per time unit of supplying resource capacity and the unit times of consumption of resources by products, services, and customers.

An important feature of TDABC are time equations, which provide the possibility to allow for variations in demand for resource capacity for each variant of a given activity time (Szychta, 2010).

Determine the cost per time unit of capacity

Instead of surveying employees on how they spend their time, managers first directly estimate the practical capacity of the resources supplied as a percentage of the theoretical capacity (Kaplan & Anderson, 2004). Kaplan and Anderson (2003) argue that measuring practical capacity of a group of resource is not a trivial issue, but neither is it an insurmountable issue. Often practical capacity is estimated as a percentage, say 80% or 85% of theoretical capacity. That is, if an employee can work 40 hours per week, practical capacity could be assumed 32 hours per week. This assumption allows for 20% of personnel time for breaks, arrival and departure, and communication and reading unrelated to actual work performance. The 85% is mainly used for calculating the practical capacity of machinery (Kaplan & Anderson, 2003). Whether or not this 80% is also applicable for civil servants remains to be uncertain. Due to unavailable literature about practical capacity for governments, it is assumed that the 80% rate is also applicable for municipalities. The total costs per minute per department can be determined by dividing the total direct and overhead costs of each department by the practical time capacity of that department.

Estimate the unit times of activities

Having determined the costs per minute of supplying resources to the business's activities, managers next determine the time it takes to carry out one unit of each kind of activity. These numbers can be obtained through interviews with employees or by direct observations. It is important to stress that the question is not about the percentage of time an employee spends on doing an activity, but how long it takes to complete one unit of that activity (e.g. the time required to process one order). Precision is not critical; rough accuracy is sufficient.

Companies can implement time equations simply, rapidly, and powerfully. Based on these experiences, Kaplan and Anderson (2004) identified the following benefits from employing the TDABC method.

- ✓ Smaller and more scalable model - TDABC is smaller, simpler, and more flexible than conventional ABC models. Process complexity causes only linear increases in model size as managers add terms to existing time equations.
- ✓ Greater accuracy - TDABC achieves greater accuracy by modeling process variation with additional terms in the process time equations. The closer linkage of time equations to actual operating, distribution, and sales activities generates greater credibility for the model and acceptance among employees about the validity of the reported data.
- ✓ Easy to design and maintain - To estimate time equations, fewer people need to be interviewed, and surveys of time allocations are eliminated. The time consumption data can be estimated or observed directly. Managers can easily update a TDABC model to reflect changes in their operating conditions. By estimating, the unit times required for each new activity identified or changes in prices or efficiency of the activity (Kaplan & Anderson, 2007).
- ✓ Ease in rollout - Most companies performs processes such as selling, order processing, purchasing, order fulfillment, order delivery, billing, and collection. Therefore, once a process equation is built at one facility, the equation can often be replicated for all other facilities across that company.
- ✓ Identification of process improvement opportunities - In building the time equation, companies often identify activity steps that are wasteful and inefficient.

The accuracy of a TDABC models arises from its ability to capture the activities from diverse operations by simply adding more terms to the time equation. Complexity in the process, cause by a particular service or order, may add terms, but is easy to incorporate (Kaplan & Anderson, 2007).

Although the advantages of applying the TDABC model are widely discussed by Kaplan and Anderson, there are also some disadvantages attached to this model. According to Fisher and Krumwiede (2012), the TDABC model is less accurate for resource costs that are not driven by time (e.g. materials). Applying the TDABC model is most effective for resource costs that can be measured by duration, instead of material costs. TDABC can be used in any industry or company with complexity in customers, products, channels, and processes and large amounts of people and capital expenditures (Kaplan & Anderson, 2007).

2.3.3.2 Total cost of ownership (TCO)

Maybe a less known costing model is the total cost of ownership (TCO) model. TCO is a purchasing tool and philosophy aimed at understanding the relevant cost of buying a particular good or service from a particular supplier. TCO is an investment model, popularized by Bill Kirwin of the Gartner Group in 1987 as a means to clearly and reasonably addressing the real costs attributed to owning and

maintaining an IT infrastructure in a business. The TCO method is a technique which can be used to make sure that all associated costs over a given time period will be considered when an organization acquires an asset. TCO does not only reflect the costs of purchase, it also includes all other costs of owning the asset (Woodside, Golfetto & Gibbert, 2008).

According to Woodside et al (2008), major uses of TCO models are:

- ❖ Understanding the customer's value function - TCO models allow suppliers to gain a better understanding of how their offering creates value for their customers.
- ❖ Documenting and demonstrating customer value - Customers need to be aware of the value that a supplier is creating for them.
- ❖ Consultative selling tool and discovery of joint profitability opportunities - A TCO model can be a powerful tool to help suppliers unveil potential problems that a customer may have. Working together, buyer and seller find ways to improve processes and to be more efficient, expanding the size of the joint profits.
- ❖ Supporting value-based pricing decisions - TCO provides an objective measure of value that can help the selling firm manage price effectively by influencing the customer's perception of their offering's value.
- ❖ Improving communication and strengthening relationships with customers - Going through a process of information sharing, communication, and collaboration, the inter-organizational ties become stronger.

TCO can be used when there is a desire for cross-functional involvement in understanding item or service cost structure. However, the main purpose of TCO is to detect the impact of a purchase on transaction costs, via negotiation, changing suppliers, and/or improving internal operations (Ellram & Sigfred, 1998).

Determining the TCO requires an extensive and costly management accounting system that captures the relevant costs of the activities by supplier and item purchased. Another disadvantage is that there is no general approach to assess costs, which makes it difficult to determine whether, and to what extent, certain cost must be allocated to an asset (Ellram & Sigfred, 1998). Woodside et al (2008) state that for accurate TCO calculations, the ABC method is required, which complicates the process and deters some organizations from using the TCO approach.

The most important advantage is the potential cost saving improvement for the company in the long-term that allows the organization to design strategies to reduce/eliminate the different cost driver rates.

2.3.4 Summary pros and cons allocation models

This section summarizes the pros and cons of the different allocation models. Table 2 shows an overview of the pros and cons of the models described in section 2.3.

Allocation model	Pros	Cons
Departmental costing	<ul style="list-style-type: none"> ❖ Relative easy to apply ❖ Quickly to apply ❖ Ideal for homogeneous products 	<ul style="list-style-type: none"> ❖ Allocates overhead costs evenly over products ❖ Not very detailed ❖ Can result in misleading information of costs
Step-down costing	<ul style="list-style-type: none"> ❖ Ideal for allocation of internal services ❖ Relative easy to apply ❖ Cost flows can be traced fairly easily 	<ul style="list-style-type: none"> ❖ Not includes self-consumption of costs ❖ Does not reflect causal relationships ❖ Can lead to inaccuracy in cost rates
ABC	<ul style="list-style-type: none"> ❖ Measures costs very accurate and in detail ❖ Costs can be easily traced ❖ Helps to adjust and control the process design ❖ Cause-effect relationship can be obtained ❖ Widely used in literature 	<ul style="list-style-type: none"> ❖ Relative complex to apply ❖ Requires a lot of information ❖ Cannot be easily updated ❖ Time consuming
TDABC	<ul style="list-style-type: none"> ❖ Less complex to apply relative to ABC ❖ Only two parameters are required: costs and time ❖ Allows variation in demand for resource capacity ❖ Fairly easy to maintain and update 	<ul style="list-style-type: none"> ❖ Less accurate for resources not driven by time ❖ Must estimate time to carry out each type of transaction
TCO	<ul style="list-style-type: none"> ❖ Enables cross-functional activities ❖ Includes all costs involved ❖ Supports pricing decisions ❖ Demonstrates customer value ❖ Long-term cost saving potential 	<ul style="list-style-type: none"> ❖ Requires extensive information ❖ Costly to implement ❖ No general approach to assess costs ❖ Requires ABC input

Table 1: Pros and Cons allocation models

For selecting the right allocation model, the pros and cons of each allocation model need to be considered. For this research is chosen to discuss the five models presented in Table 1. Other allocation models are not included, due to practical and time related arguments. The five allocation models are distinctive enough to cover a significant area in the field of cost allocation models. There are two models added in comparison with the ones mentioned in the cost allocation model developed by Deloitte B.V. (2007), which adds more strength to the selection of the right model.

2.4 Legal framework

Governments as municipalities are more restricted to law and regulations than private organizations (Rainey, Backoff & Levine, 1976). This section will discuss the legal restrictions or authorizations are applicable for municipalities regarding pricing decisions for products given in attachment B. This section starts with the generally applicable constitution in which the basic rights and regulations are set, and ends with the more specific principles of good governance.

The Constitution

The most fundamental law that captures the basic rights and regulations is the constitution. In the constitution there is little said about the services provided by municipalities. Article 124 of the constitution mentions that:

1. The powers of provinces and municipalities to regulate and administer their own internal affairs shall be delegated to their administrative organs.
2. Provincial and municipal administrative organs may be required by or pursuant to Act of Parliament to provide regulation and administration.

In other words, municipalities can decide their own policies and methods regarding their operational activities. Therefore, municipalities are independent governments that are authorized to make their own decisions. Because municipalities are independent governments according to the constitution, changes are that differences do exist between municipalities.

Municipal Act

More specific for municipalities is the Municipal Act. This act consists of many separate articles that are applicable to municipalities³. In the municipal Act, e.g. the layout and structure of the city council, the authorization of the municipality and the municipality financial structure is regulated.

The financial structure is described in articles 186 until 258. The annual report and the municipal budget are described in the first few articles. The second part concerns the administration and control of financial contents and the third part covers the municipal taxes.

The articles that are described in the last part of the financial structure, include all kinds of taxes (e.g. property taxes, tourist taxes), but also the right to charge services provided by the municipality. Municipalities can decide to set charges for; using municipality property or assets, providing specific benefits to citizens, allowing entertainment for which the municipality has to perform activities (e.g. supervision of events). For charging services, the Municipal Act prescribes e.g. that the estimated revenues from charging services may not exceed the estimated costs to provide the services (art. 229b Municipal Act).

Page 11 and 12 of the memorandum of statements for regarding 'mutation of the municipal Act for taxes'⁴, state that costs for policy making, supervision and control, and general objection and procedures for appeal may not be allocated to the cost price. In this memorandum of statements is also said that the costs calculated by municipalities for products should only include direct costs and a reasonable increase of overhead costs. Overhead costs are those costs incurred for management or support departments.

Page 12 of the memorandum of statements states, that costs incurred by external organizations costs can be added to the price set after including the direct and overhead costs.

³ Retrieved from the government homepage:
http://wetten.overheid.nl/BWBR0005416/TitelIV/HoofdstukXV/3/geldigheidsdatum_28-05-2013

⁴ Retrieved from http://resourcessgd.kb.nl/SGD/19871988/PDF/SGD_19871988_0007338.pdf
Tweede Kamer der Staten-Generaal. Vergadering 1987-1988. Wijziging van de gemeentewet op het stuk der belastingen (limitering onroerend-goedbelasting, leges en rechten).

Budget and Responsibility (BBV in Dutch)

The budget report provides an explanation of the goals set by municipalities for the following year and the resources (including financial resources) used. The budget report has five functions (Wassenaar & Verhagen, 2006):

- ❖ *Authorization function* - By approving the statements in the budget report, the municipality is allowed to make expenses.
- ❖ *Allocation function* - The municipality must decide which resources will be allocated to which purpose.
- ❖ *Control function* - The budget and yearly report are compared to determine if the budget report was composed properly.
- ❖ *Information function* - The budget report should provide a clear understanding of the financial position of the municipality. In addition, citizens should be able to retrieve information about the financial situation of the municipality.
- ❖ *Business economical function* - Based on the income and expenses estimated in the budget report, the member of the Executive Committees Colleges have to control and realized the plans set for the year.

The allocation function provides a clear restriction. Only the costs included in the budget report may be included and allocated to the service costs (Article 66, BVV)

Determining the cost price of a service or product is a business economical decision (VNG, 2010). According to the BBV, municipalities may allocate the costs based on the principles of business economics.

General Agreements Physical Environment (Wabo in Dutch)

The Wabo concerns the activities related to the physical environment. The Wabo consist of 25 individual permit requests regarding demolition, construction, housing, monuments, spacing, nature and environment (Deloitte, 2007), integrated into a single permit. The Wabo is applicable for the services listed in Title 2 of attachment B. If necessary, the specific article will be discussed in detail.

Principles of good governance

Municipalities also have some responsibilities concerning good governance. Services should be (1) timely, (2) completely, and (2) rightfully addressed to the individual requesting the service.

- ❖ *Timely*: In general, the municipality of Hellendoorn has 6 weeks to react to a permit request. For requests that are more complicated the deadline is 12 weeks. If the municipality has not given a reaction within the deadline, the permit request can be seen as fictively approved.
- ❖ *Completely*: The municipality should provide the necessary information towards the citizens. More specific, the municipality should be able to provide a detailed overview of the process followed to deliver the final product.
- ❖ *Rightfully*: The price charged for products should reflect the right costs incurred in the process. Allocating the right costs to the products is a key purpose of this research, which means that the principle 'rightfully' is an important aspect in this research.

Municipalities can set prices for services that meet the requirements of the direct benefit principle. This means that the price charged to provide a service should be in proportion to the benefits that the citizens enjoy.

2.5 Criteria selection

The literature provides several conditions that can be used to select the right allocation model. This section presents the conditions by which the right allocation model can be selected, to determine the cost price of products provided by the municipality. Gentle (2010) and Sunwater (2005) argue that managers should base their decision-making concerning allocation models on several general considerations: Simplicity, Accountability, Reasonableness, Consistency, and Impact. Each condition is defined into several criteria, which reflect the arguments given by the Municipality of Hellendoorn to allocate costs, the conditions set in the problem analysis, and the nature of the products offered by Hellendoorn.

Simplicity

Gentle (2010) states, that costs should be allocated using the most simple and easily understood method possible, but within the bounds of achieving the desired objectives. The criteria formulated to define 'simplicity' are as follows:

- a. The method to allocate costs is easy to use
- b. The method to allocate costs is easy to understand
- c. The method to allocate costs is easy to maintain
- d. The method can be easily documented

The criteria to define 'accountability' reflect the requirements set by the ministry of Interior and Kingdom Relations, in cooperation with Deloitte and the VNG (Dutch association of municipalities) as discussed in the problem analysis. The ministry of Interior and Kingdom Relations wishes that municipalities were more transparent about the pricing of services. By showing the activities to which costs are allocated, the pricing of services can be better explained and understood.

Accountability

- e. The method is sufficient transparent to show the allocation of costs from source to activities
- f. The method shows the activities to which costs are allocated
- g. An external observer can readily trace the costs and activities

Pricing services should be based on the allocation of costs to user groups where it can be reasonably demonstrated that the costs would necessarily be incurred for the services to be provided (Gentle, 2010). In pricing municipality services, costs should be based on a cause-effect relationship. The principle of good governance 'rightfully' concerns that the price charged for products should reflect the right costs incurred in the process. The criteria set to define 'reasonableness' are reflecting the cause-effect relationship. Using the criteria given by Gentle (2010) in section 2.3.1, the following criteria are defined for the municipality to allocate costs to the services.

Reasonableness

- h. The method shows a cause-effect relationship
- i. The method allocates the right costs to the right products
- j. The method shows a reasonable linkage to the benefits derived

According to Sunwater (2005), the method to allocate costs should be consistent for different kinds of costs and/ or products/ services. The administration services offered by municipalities (as driver's licenses or wedding ceremonies) differ in activities and complexity. Therefore, the allocation model for these kinds of services should be able to incorporate the allocation of costs for a variety of

products. In addition, the allocation model should also be able to be used organization-wide, because different departments are responsible for providing the services.

Consistency

- k. The method can be used for different products
- l. The method can be used organization-wide

The right allocation model for determining the cost price of services provided by the municipality depends also on the impact of the model and the characteristics of the organization. The municipality consists of several departments with different persons responsible for specific services. Therefore, it is important that the model can be implemented in a complex organization with a complexity of products. The last criterion concerns the impact of implementing the model into the organization. The implementation of the model should not significantly affect the daily operations. When employees are experiencing that, the model takes too much effort to implement they can produce resistance.

Impact

- m. The method can be used for complex organizations
- n. The method can be used for complex products
- o. The method can be implemented without significantly influencing the daily operations

The criteria above are generally applicable for selecting the right allocation model for municipality services. The importance of the criteria needs to be separately determined for the specific municipality. Based on the structure, complexity, and the requirements set by the specific municipality, the criteria applicable for the municipality can be defined. Chapter four concerns the criteria used for Hellendoorn to determine what cost allocation model should be used.

2.6 Conclusion

Section 2.2 answered the first sub question: *'What type of costs can be distinguished?'* Drury (2008) distinguishes two types of costs: Direct vs. indirect costs and fixed vs. variable costs. Direct costs can be directly related to the cost object, as indirect costs must be assigned to the cost object. Variable costs vary in direct proportion to the volume of activity, as fixed costs remain constant over wide ranges of activities for a specific period.

Section 2.2 also answered the second sub question: *'Which costs can be allocated to the cost price of services?'* According to Deloitte B.V. (2007), the direct labor, material, accommodation, and automation costs can be included to the cost price, as well as management and overhead costs. The overhead costs can be allocated to the cost price if these costs are somehow related to the services.

The municipal Act for taxes⁵, state that costs for policy-making, supervision and control, and general objection and procedures for appeal may not be allocated to the cost price. These costs are serving a common need instead of individual needs, so these costs cannot be included in the allocation of costs

Section 2.3 answered the third sub question: *'For which purposes are the cost allocation models designed for, and what are their pros and cons?'* Table 1 shows an overview of the pros and cons of the different allocation models included in this research.

⁵ Retrieved from http://ressourcessgd.kb.nl/SGD/19871988/PDF/SGD_19871988_0007338.pdf
Tweede Kamer der Staten-Generaal. Vergadering 1987-1988. Wijziging van de gemeentewet op het stuk der belastingen (limitering onroerend-goedbelasting, leges en rechten).

Section 2.4 answered the fourth sub question: *‘What regulations and principles are applicable for pricing municipality services?’* In here, the most important regulations and principles are summarized that have to be taken into account for the allocation of costs to the products. The municipal Act provides the most important conditions for the allocation of costs.

Section 2.5 answered the fifth sub question: *‘Which criteria can be used to select the allocation model?’* This list of criteria provides a general approach for selecting the right allocation model. Based on the five conditions found in literature to select the right allocation model (simplicity, accountability, reasonableness, consistency, and impact), criteria were formulated that can be applied to cost allocation by municipalities.

3 Methodology

3.1 Introduction

This chapter will discuss the methodology used to collect and analyze the data required selecting and designing a cost allocation model. First, the characteristics of the research method will be discussed. The following section concerns the case and data collection. The fourth section concerns the method to analyze the collected data. In the final section, the validity of this research will be discussed.

3.2 The Research Method

There are many different methods to conduct a research. Verschuren & Doorewaard (2007) discuss the five most relevant methods: survey, experiment, case study, theory study, and desk research. This research focuses on one specific organization, the municipality of Hellendoorn, and the results are specific for this municipality. The case study strategy fits best within this research domain.

Dul & Hak (2008) also distinguish two main types of case study: the single case study, a case study in which data from one instance is enough to achieve the research objective, and the comparative case study, a case study that requires data from two or more instances to achieve the research objective. Since only the municipality of Hellendoorn will be analyzed, the single case study methodology will be used to conduct the research. A case study is an in-depth observation of one participant, which can be a person or an organization (Pastorino & Doyle-Portillo, 2013).

The main disadvantage of the case study method is its limited applicability to other situations. It lacks generalizability; because of this, the conclusions that are drawn from case studies are limited to the topic studied (Pastorino & Doyle-Portillo, 2013). Case studies are commonly used for explorative research (Dul & Hak, 2008).

The organization at which this research is conducted is the municipality of Hellendoorn, located at Nijverdal. More specific, the services provided by the municipality of Hellendoorn will be the focus of this research. Currently the municipality of Hellendoorn is not applying a cost allocation model for pricing their services, which makes it interesting to conduct this research.

To start with, the main research question was formulated based on the problem analysis:

“What allocation model should the municipality of Hellendoorn use to allocate costs and which variables, and in which way, influence the cost price to provide services?”

Deciding what allocation model the municipality of Hellendoorn should use was based on the theoretical framework. Several sub questions were formulated:

1. What type of costs can be distinguished?
2. Which costs can be allocated to the cost price of services?
3. For which purposes are the allocation models used, and what are their pros and cons?
4. What regulations and principles are applicable for pricing municipality services?
5. Which criteria can be used to select the allocation model?
6. What are the most important criteria for the municipality of Hellendoorn to implement an allocation model?
7. Which groups of activities necessary to provide services can be distinguished?
8. Are there any other variables that add costs to the cost price?
9. How are these variables related to the cost price?

3.3 Case and Data Collection

The case study will be conducted at the municipality of Hellendoorn. Data needs to be gathered in order to answer the sub questions and finally the main research question. Information about the organization and the services was collected while participating at the financial department of the municipality of Hellendoorn, interviewing civil servants responsible for providing different services, internal databases including financial data and prior research conducted at the municipality of Hellendoorn about costs to provide services. In addition, external data was used, e.g. information about prior research conducted by Deloitte B.V. (manual cost allocation) and government legislation (BBV, Municipality Act, and Wabo).

Civil servants were interviewed to collect organization specific data. The head of finance was interviewed in order to determine the conditions for implementing the allocation model. Seven interviews were held with civil servants from different departments to collect data about the process to provide the products. The interviews were semi-structured to collect as much relevant data and in-depth information about the product, process, and activities.

Observations within the municipality were made while participating at the financial department. By attending at a workgroup in which possibilities were discussed to increase the municipality's income, a lot of background information about pricing of services and the differences compared to other municipalities. In addition, several conversations were held with people at the financial department.

The costs were retrieved from the internal financial database 'Key2Financiën'. The costs are given a number, by which the costs can be grouped. The costs can be retrieved separately, for each department, or for the entire cluster.

3.4 Analysis

The theoretical framework is designed to answer the first five sub question formulated in section 3.2. This theoretical framework provides a systematic approach to determine which allocation model the municipality of Hellendoorn should apply, taken into account the objectives, criteria, and services. The other four sub questions will be answered by analyzing the data collected from the interviews, observations, and the financial database Key2Financiën.

The data collected from the interview with the head of the financial department, was used to determine the characteristics and the most important allocation criteria for Hellendoorn. The criteria given in section 2.5 can be used to select the right allocation model for Hellendoorn. The head of finance will be asked which conditions are important for implementing the allocation model.

Data collected from the interviews held with civil servants from the operational level will be used to determine which groups of activities are necessary to provide services. The persons interviewed were selected based on the products for which they are responsible. By comparing the data collected from these interviews, the general process, the structure, and the intensity of the activities will be determined. The interviews will also be used to collect information about the time spent on the activities in the process, which will be used to be able to give practical examples.

The data collected from Key2Financiën will be analyzed based on the restrictions and prescriptions given by law and the manual cost allocation provided by Deloitte B.V. (2007). Based on the conditions about the costs that can be allocated to the products, the costs that cannot be allocated to the products will be excluded.

3.5 Validity

A potential disadvantage of a case study regarding validity is the lack of generalizability. Since case studies often include only one specific case, it will be difficult to apply these findings in other cases (Verschuren & Doorewaard, 2007). The purpose of a case study is to acquire in-depth information about a single organization. Therefore, the external validity is not that important in case studies. The internal validity is an important feature of a case study, because in-depth information can be acquired from the organization.

Newman and Benz (1998) argue that case-study methodology has potential for increased validity for several reasons. First, by using multiple data-collection techniques (e.g. interview, document study, and observation), the weaknesses of each can be counterbalanced by the strengths of the others. Second, by checking the interpretation of information with experts the validity of this case study will be increased. Third, with case studies there are generally a variety of data sources, there should be a structural relationship among these sources. All of these approaches would tend to improve understanding of the case and give in-depth descriptive information (Newman & Benz, 1998).

4 Analysis: Determining the cost allocation model for Hellendoorn

4.1 Introduction

This chapter will determine which allocation model will be used for the municipality of Hellendoorn, followed by presenting the principles of the model selected using cost allocation criteria. The selection of the appropriate model will be based on the objectives provided by the municipality, the structure of the organization and the products, and the pros and cons to implement the allocation models (see Table 1).

4.2 Cost allocation criteria

Hellendoorn prefers to receive: (1) an *easy and clear model*, that is also (2) *easy to maintain and adjust* so that this model can be used for many years, and (3) *clearly shows which activities* are included in the process *and which costs are included* to conduct the activities. The cost allocation model should also be *applicable to different services* that involve different specific activities; since there are many different services that Hellendoorn provides. These were the conditions given by Hellendoorn to implement a cost allocation model.

The purpose of cost allocation for Hellendoorn is to justify the cost of products or services. The price charged for products should not exceed the cost price to process these products. In order to relate the cost objective to the cost incurred, the allocation model should be able to show a cause-effect relationship. Another important condition to implement an allocation model is that the price charged for products should reflect the right costs incurred in the process. The price charged for products should be in proportion to the benefits that the citizens enjoy. Thus, the allocation model should also be able to allocate costs based on 'fairness', in terms of input expended, resources used, and time spent.

Next, the five conditions listed will be analyzed for Hellendoorn, mainly based on data collected from the interview with the head of the finance department. The five conditions designed for Hellendoorn will be compared with the pros and cons of the five allocation models discussed in section 2.4.

Simplicity

For Hellendoorn, it is important that the allocation model is easy to use and to maintain. The model should be easy to use, since many people working at the municipality do not have a lot of experience with cost allocation. The model should also be adjustable for changing costs or activities, so that the model can be used for many years. The more in-depth information the model requires the more complex it will be. Gentle (2010) claimed that *'costs should be allocated using the most simple and easily understood method possible, but within the bounds of achieving the desired objectives'*.

Previous efforts to implement a model to allocate costs to products were not successful, because either the method to allocate costs was unclear, or it was too time consuming to design a proper cost allocation model. This appeared to be a significant hurdle for Hellendoorn to be able to implement a proper allocation model. Hellendoorn suggests keeping the allocation model design simple, in order for it to be useful for the organization.

The most important criterion for simplicity is that the allocation model should be easy to maintain, so that the model can be used for many years. The price charged for products will be reconsidered yearly, so by adjusting the input of the model with recent developments, the cost price of products should be easy to determine.

Of course, every organization would prefer a simple model to allocate costs. If it appears that two or more allocation models can be used for Hellendoorn, the model that can be most simply implemented and maintained will be selected.

Accountability

Based on the problem analysis, the model should be transparent enough to show which costs are incurred in the process for each activity. As discussed in the problem analysis, municipalities can be required to explain how the cost price of services is determined. Due to the increasing attention given to the differences between the prices of services provided by municipalities, and the publication of those differences, citizens are increasingly questioning the way municipalities are pricing their services.

Since Hellendoorn is a service organization instead of a production company, people instead of machinery primarily do the activities. The cost price of services mostly depends on the amount of time required to provide the service. This is because labor costs are a significant part of the costs incurred in a service organization. Hellendoorn is willing to increase their transparency toward citizens to be able to explain why activities are necessary and why certain costs are allocated to the products. The allocation model should (1) be able to show the activities in the process and (2) make it easy for external observers to trace back the costs and activities. The latter criterion is important to enable Hellendoorn to quickly show and explain to external observers the process and costs involved for each product.

Reasonableness

In order to allocate only the costs specifically incurred to process a product, the model must show a decent cause-effect relationship. It must show the relationship between the activities in the process and the costs incurred for the activities. Hellendoorn is responsible for providing all kinds of services, so which specific costs for accommodation, automation, and overhead, for example, will be difficult to allocate to the specific products. Keeping in mind the complexity of the all products offered by Hellendoorn, including the product groups listed in attachment B and the sub products within each product group, the allocation model should tackle this problem by allocating the costs in a simple yet accurate way. The linkage to benefits received is not as important for Hellendoorn, since there are practically no benefits. It is not that Hellendoorn makes a profit by providing services. The only thing that is important for Hellendoorn is that the overhead costs should be allocated to the operating departments, which can be done by determining the benefits received from support or management departments.

Consistency

The process of providing services can be similar as well as quite different per individual request. The process of issuing a driver's license will be similar per request. This is a straightforward process. However, the process of administering a building permit is more complex, and can be quite different from other building permit requests. Therefore, the services of the municipality of Hellendoorn are both homogeneous and heterogeneous. This has consequences for selecting the allocation model, because differences in the process design will result in different cost prices. The allocation model should provide flexibility, so that different processes can be incorporated in the model.

In order to implement the model organization-wide, the model should provide a common method to allocate costs to the products that can be applied for different products with different activities and costs involved.

Impact

The impact of the model should be as low as possible; to make sure that the model is used by all the operating departments. The operating departments include the people who are responsible for processing the products and distributing those to the citizens. The one thing that makes the organization complex is the diversity of products and regulations applicable to them. So the model should be applicable for many different products, all include different activities. The impact of the model should be that every activity does not have to be determined, because that would be too time consuming; instead, a more general understanding of the different kinds of activities would be sufficient. To summarize, the model should be applicable for many complex products.

In order to determine which criteria are most important for selecting the allocation model, the following selection of criteria is formulated:

1. The model must show the activities and costs involved in the process.
2. The model must show a cause-effect relationship.
3. The model must be applicable for many complex products.
4. The model must be easy to maintain and to adjust.

4.3 Allocation model selection

The selection of the models is based on the criteria designed for Hellendoorn and the pros and cons of the allocation models (see Table 1). The four criteria listed at the end of section 4.2 are used to compare the allocation models. If it appears that two or more models could be used by Hellendoorn, the final selection will be based on the condition 'simplicity'. The four criteria will be discussed next.

The abbreviations used in this section stand for: DC = Departmental Costing; SDC = Step-Down Costing; ABC = Activity Based Costing; TDABC = Time-Driven Activity Based Costing; TCO = Total Cost of Ownership.

4.3.1 Criteria 1: Activities and Costs

As mentioned in the previous section, the activity costs largely depend on the amount of time needed to conduct the activities. It is therefore important that the model show what activities are needed to provide the services. First, ABC accurately measures the cost price by determining the specific activities included in the process. ABC shows in detail which activities are included in the process. The overhead costs are allocated based on the relationship to the cost pools. Some of these overhead costs are related to number of employees, amount of office space, amount of services provided, etc. ABC shows the activities and costs in a very detailed way.

Related to ABC is the TDABC method. The TDABC method is a simplified ABC approach, developed by Kaplan and Anderson. Instead of identifying each specific activity in the process, the activities can be roughly identified, because TDABC relies on estimations instead of precise calculations. The incurred costs are calculated by estimating how long it takes to complete one unit of that activity. The overhead costs are allocated based on the practical time capacity of departments, which represents the actual work time of the department. Therefore, TDABC is a more general approach to determine activities and costs in comparison to the ABC method.

TCO includes all costs involved in the process, and it is often used for product evaluation. Often included in the TCO analysis is the breakdown of products into different life-cycle phases. For each life-cycle phase, the activities and costs need to be determined. Since the activities and costs need to

be determined per life cycle, the TCO analysis will be very complex. TCO is comparable with the ABC model; it also shows the activities and costs in the process in a very detailed way.

The DC approach and the SDC approach rely more on the allocation of costs instead of determining the activities in the process. DC divides the total of each department by the total units produced in that department to arrive at unit cost. In terms of understanding which activities are necessary in the process, the DC method lacks detail. SDC identifies the range of resources needed to run a facility and then assigns these resources to chosen 'cost centers' on an allocation basis (e.g. floor space, number of employees, etc.). Because the costs are filtered down until the final cost centers of interest are left, it is easy to trace the cash flows. SDC allocates all the overhead department costs to the operating departments. Thus, SDC can lead to inaccuracy in cost rates, because the approach does not include self-consumption of costs. The SDC and the DC approaches do not consider which activities are needed to provide the services, but only show the distinction of costs centers.

Conclusion

Based on this criterion, the ABC and the TCO approach would be preferred to determine the costs and the activities involved in the process. TDABC also gives a clear understanding in the costs and activities, but relies on a more general approach. DC and SDC focus more on the costs involved than on the activities needed to provide services and are, based on this criterion, not preferred.

4.3.2 Criteria 2: Cause-effect relationship

The model must show the relationship between the activities in the process and the costs incurred for the activities. It is not sufficient to show the activities and the costs in the process; it is also important to show how those two are related. First, ABC shows exactly which activities are needed in the process, and relates those activities to the amount of hours spent, the amount of paper used, the amount of floor space used etc. ABC provides a precise calculation of the cost price of products. TCO is potentially even better in showing a cause-effect relationship, since the TCO approach includes all costs incurred in the process. TCO can, however, lead to overestimation of costs, since the price charged to provide a service should be in proportion to the benefits that citizens enjoy.

TDABC is comparable to ABC in terms of cause-effect relationship. The difference between these two models is that TDABC is less detailed. TDABC groups activities into categories and then assess the costs to those categories, whereas ABC separately assesses costs to the activities. Both methods show a cause-effect relationship between activities and the costs of those activities.

The DC model shows no cause-effect relationship between the activities and the costs of those activities. DC allocates overhead costs evenly over the products, without taken into account if those costs are incurred in the process. SDC can be placed between DC and TDABC as regards to showing a cause-effect relationship. Although costs are allocated from overhead departments to the operating departments, the amount of costs allocated to these operating departments might inaccurate. SDC allocates all overhead costs to the operating departments, which means that too many costs are allocated over the products. No actual cause-effect relationship is shown by using this approach.

Conclusion

Based on this criterion, the ABC, TDABC and the TCO approach would be preferred, followed by the SDC approach and at last the DC approach. The cause-effect relationship is important to justify the costs incurred in the process.

4.3.3 Criteria 3: Variety of complex products

The model should provide a common method to allocate costs to the products, that can be applied for a variety of products with different activities and costs involved. ABC is designed to focus on a closer look at various activities in the process that drive costs. ABC can be implemented for the most complex products, but the downside is that implementation will also require a lot of information and can be difficult to use. TDABC is perhaps a better solution to allocate costs of a variety of complex products. TDABC is less detailed, relies on only two elements (costs and time), and can be more easily designed for complex products. TDABC allows variation in demand for resource capacity, by simply adding another term in the time-equation. Of course, when products become more complex, the TDABC design will also increase in complexity.

TCO can be used for a variety of complex products, as a solid TCO model relies on ABC input. A major disadvantage of implementing a solid TCO model is that this model should be individually designed for each product. TCO is generally used to formulate investment decision, for which a variety of similar products is compared. Another disadvantage of TCO is the lack of a general approach to assess costs, which makes it very difficult to design this model for a variety of complex products, since the model design depends completely on the activities involved.

The DC approach is designed for homogeneous products, for which it is simple to allocate costs evenly over the products. In order to comply with the restriction that the price charged for products may not exceed the costs incurred in the process; the DC approach would not be preferred.

The SDC approach allocates general overhead costs to operating departments. The total costs of those operating departments need to be assigned to the products, which is simple when there are only one or two products. However, when there are many different products, also differentiated in complexity, the SDC approach provides not a clear method to allocate the costs to the specific products. Despite the fact that SDC can assign the overhead costs to the operating departments, it remains uncertain how the department costs are assigned to the products. Thus, SDC is also not preferred since there are many complex products at Hellendoorn.

Conclusion

Based on this criterion, the ABC and TDABC approach would be preferred most. The TCO is difficult to design for a variety of complex products, since TCO lacks a general approach to assess costs and requires a lot of information of each product. The DC approach is best applicable for homogeneous products, to which costs can be evenly assigned. SDC can be used to obtain the total department costs, but how to assign the costs to many complex products remains unclear.

4.3.4 Criteria 4: Easy to maintain and adjust

The price charged for products will be reconsidered yearly, so it is important that the model can be adjusted easily to keep the allocation of costs updated. ABC provides, when implemented, a very detailed allocation of costs incurred in the process. To be able to maintain the ABC model, each activity, and the method to which costs are allocated needs to be updated. This again requires a lot of time and information. The TDABC model can be easily updated to reflect changes in their operating conditions. By estimating the unit times required for each new activity identified or changes in prices or efficiency of the activity. TDABC has the ability to capture the resources demands from diverse operations by simply adding more terms to the time equations. Complexity in the process, caused by a particular service or request may add terms, but not activities, as the terms can be added to existing time equations.

Woodeside et al. (2008) state that for accurate TCO calculations, the ABC method is required, which complicates the process. To maintain and adjust the TCO model, the entire model needs to be reconsidered, since there are many variables that can be influenced or developed. Because TCO includes all associated costs over a given time period, maintaining the TCO model should include reconsidering all associated costs. This, similar to the ABC approach, requires a lot of information and time to adjust.

The SDC model is relatively easy to maintain, because the first implementation of this model already determines which percentage of the overhead costs are allocated to which department. The total costs of departments can be allocated based on those percentages. However, the disadvantage of this approach is that it does not necessarily reflect a causal relationship.

The DC approach is also easy to maintain, because the total department costs are just evenly assigned over the products. The total department costs can be directly traced from the financial database and then be apportioned over the amount of products per department.

Conclusion

Based on this criterion, the TDABC, SDC, and DC approach would be preferred. The more complex and detailed ABC and TCO approach takes a lot of information and time to be able to keep the allocation of costs updated.

4.3.4 Model selection

Table 2 shows the outcome of the comparison between the four key criteria and the pros and cons of the allocation models. If an allocation model is given a 'YES', this means that the model meets the criterion, if not the model is given an 'NO'.

1. The model must show the activities and costs involved in the process
2. The model must show a cause-effect relationship
3. The model must be applicable for a variety of complex products
4. The model must easy to maintain and to adjusted

	ABC	TDABC	TCO	SDC	DC
Criteria 1	Y	Y	Y	N	N
Criteria 2	Y	Y	Y	N	N
Criteria 3	Y	Y	N	N	N
Criteria 4	N	Y	N	Y	Y

Table 2: outcome comparison criteria and allocation models

Based on Table 2, the TDABC model would be preferred in comparison with the other allocation models. TDABC covers all key criteria, determined in advance of the model selection. Another important aspect to select the TDABC approach is the fact that the costs of products processed by Hellendoorn largely depend on labor costs. This means that 'time' is the key variable that drives costs.

Each of the models can be designed in different ways, depending on the desired level of accuracy, detail, and complexity. However, TDABC will be used for Hellendoorn to determine the cost price of products. The TDABC model design will be kept to meet the requirements set by Hellendoorn.

The second part concerns the design of the model and the variables influencing the cost price to provide services. First, the TDABC design will be presented.

4.4 TDABC Design

The results of the selection procedure show that the TDABC costing designed by Kaplan and Anderson fits best to the objectives and criteria of the municipality of Hellendoorn. This section will discuss the TDABC model more in detail. Figure 4 shows the steps necessary to implement the TDABC model. Every step in the model is discussed separately, which makes it easier to understand the principles to implement the model in practice.

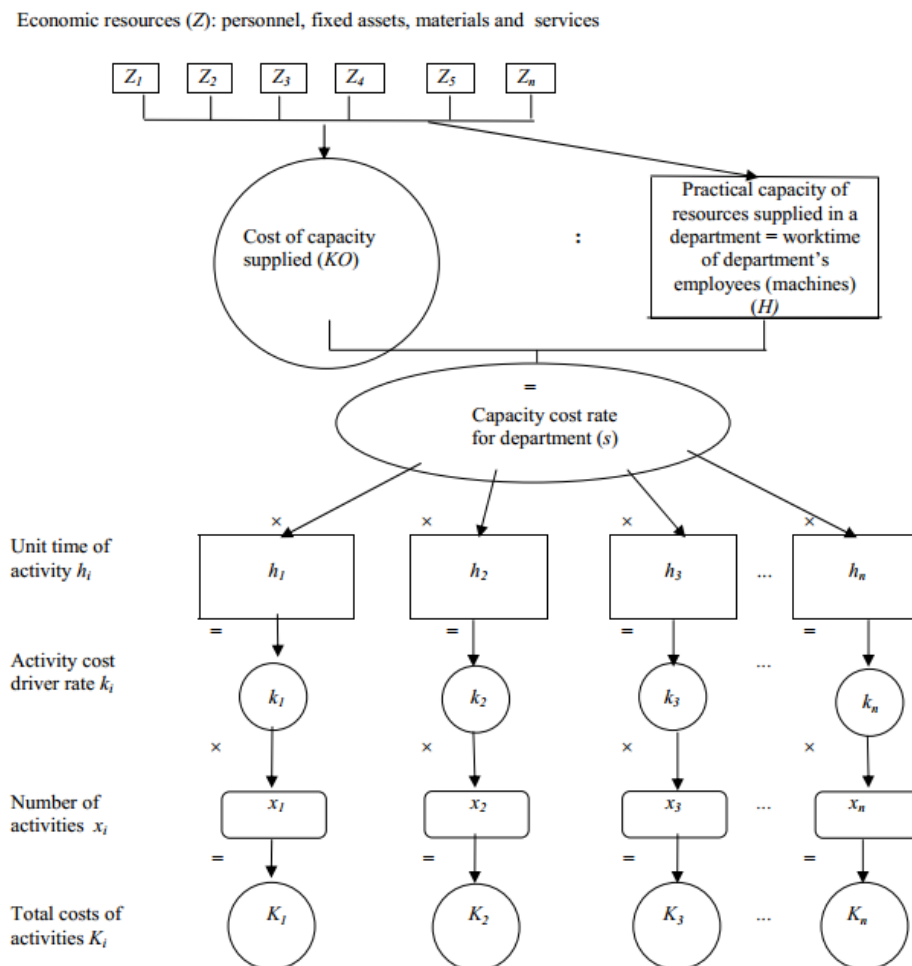


Figure 4: Activity cost calculation under TDABC (Szychta, 2008, p. 296)

Dejenga (2011) also discussed the TDABC model in detail, comparable to the model presented by Szychta (2008). Dejenga is formulates the steps as follows:

Determine the costs by particular spent resources on the one availability capacity:

1. Identification of the groups of resources, which have performed the activities (Z)

The economic resources (Z), given in section 2.2.3, need to be identified for each department that is involved in the process.

- ✓ Labor, materials, accommodation, automation, general management, overhead

2. Determination of the costs per group of resources (KO)

To determine the costs of capacity supplied (KO), the total cost of economic resources (Z) needs to be determined for each department. The overhead costs need to be allocated to the separate departments, since these are overhead costs. After calculating the practical time capacity, the overhead costs can be allocated by the practical time capacity of each department.

Department	Labor Z_1	Material Z_2	Accommodation Z_3	Automation Z_4	Overhead Z_5	Total KO
1	€	€	€	€	€	€
2	€	€	€	€	€	€
3	€	€	€	€	€	€
4	€	€	€	€	€	€
Etc	€	€	€	€	€	€

Table 3: Example step 2 TDABC

3. Calculation of the practical time capacity of each department (H)

The practical capacity of resources supplied in a department = work time of each department’s employees (H). The practical capacity of each department is 80% of the theoretical work time capacity per department, as discussed in section 2.3.3.1.

4. Calculation of costs of group of resources by dividing total costs of group of resources by their available capacity = capacity cost rate for departments (s)

Department	Total costs (KO)	Practical time cap (H)	Costs per hour (S_{hour})	Costs per minute (S_{min})
1	€	#	$(KO_1) / (H_1) = (s_1)$	$(S_{1hour}) / 60$
2	€	#	$(KO_2) / (H_2) = (s_2)$	$(S_{2hour}) / 60$
3	€	#	$(KO_3) / (H_3) = (s_3)$	$(S_{3hour}) / 60$
4	€	#	$(KO_4) / (H_4) = (s_4)$	$(S_{4hour}) / 60$
Etc.	€	#	Etc.	Etc.

Table 4: Example step 4 TDABC

The total department costs per hour can be calculated by dividing the total direct and overhead costs by the practical time capacity of each department. The average costs per minute can be calculated by dividing the costs per hour by 60, as seen in Table 4.

Estimation of time, necessary for the required variation of running activity:

5. Identification of factors, which had influence on the time period of appropriate activity (time driver), when determining the factors for every real variation of activity (h_1, h_2, \dots etc.)

The activities that are required to provide the product need to be determined. First, the standard activities need to be determined. Next, the factors that cause additional time of appropriate activities (time drivers) need to be identified. For each product, the standard activities and the additional time drivers need to be determined (see Table 5).

Activity	Standard time h_1	Time driver h_2	Time driver h_3	Time driver h_4	Time driver h_x
1	#	#	#	#	#
2	#	#	#	#	#
3	#	#	#	#	#
4	#	#	#	#	#
Etc.	#	#	#	#	#

Table 5: Example step 5 TDABC

6. Creation of time equation, which express the total time spent to per year on a particular product. The time equation includes the standard process time multiplied by the amount of products requested per year and the extra time spend on the time drivers multiplied by the number of times incurred in the process.

For example, ‘Sales order entry process time = 5 (standard time) + 15 [if new customer] + 10 [if expedited order]’. When customers are new or if orders are being expedited, these activities can be seen as time drivers. These activities are not included in the standard process time to entry sales orders.

Activity	Standard time	Estimated # of products	Time driver 1	Estimated # of times incurred	Etc.	Total time spent
1	# time (a)	# products (b)	# time (c)	Percentage of (b)	...	(a) * (b) + (c) * (d) + etc.
2	# time (a)	# products (b)	# time (c)	Percentage of (b)	...	(a) * (b) + (c) * (d) + etc.
3	# time (a)	# products (b)	# time (c)	Percentage of (b)	...	(a) * (b) + (c) * (d) + etc.
4	# time (a)	# products (b)	# time (c)	Percentage of (b)	...	(a) * (b) + (c) * (d) + etc.
Etc.	# time (a)	# products (b)	# time (c)	Percentage of (b)	...	(a) * (b) + (c) * (d) + etc.
Total						Total time spent on product x

Table 6: Example of step 6 TDABC

The estimated amount of products sold can be based on previous year’s amount of products sold, current situation in the market or other assumptions. The number of times that time drivers are included in the process, has to be estimated by people that are involved in the process. This can be expressed by estimating the number of time drivers in percentages of the total number of product requests.

7. De last step concerns the total costs of activities. The time equation shows the total amount of time spent on a specific product. When only one department is involved in the process, the total amount of time spent on a product per year can be multiplied with the costs per minute for that specific department. When several departments are involved, the activity costs have to be calculated first. This calculation gives the total costs per year per product. To determine the cost price for a single product, the total costs need to be divided by the estimated amount of product requested per year. By using this allocation method, the costs averaged over the products. This means that while the process time of each individual product request can be different, the cost price remains the same for each citizen.

Costs incurred for external organizations or institutions for a product, can be added after the cost price has been determined as discussed in step 7. This model only includes the internal variables and costs.

4.5 Conclusion

Section 4.2 answered the sixth sub question: ‘What are the most important criteria for the municipality of Hellendoorn to implement an allocation model?’ The four criteria are seen as key elements to determine which allocation model should be used by Hellendoorn. The simplest model will be used when two or more models seem to be appropriate for Hellendoorn. The four criteria for the municipality of Hellendoorn are:

1. The model must show the activities and costs involved in the process
2. The model must show a cause-effect relationship
3. The model must be applicable for a variety of complex products
4. The model must be easy to maintain and to adjust

Chapter 4 also answered the first part of the main research question: ‘*What allocation model should the municipality of Hellendoorn use to allocate costs?*’

Based on Table 2, the TDABC model would be preferred in comparison with the other allocation models. TDABC covers all key criteria, determined in advance of the model selection. Another important aspect to select the TDABC approach is the fact that the costs of products processed by Hellendoorn largely depend on labor costs. This means that ‘time’ is the key variable that drives costs.

TDABC requires seven steps to be followed. The first four steps are necessary for the estimation of costs, the following two are for the estimation of time, and in the last step, the cost price will be calculated.

1. Identification of the groups of resources, which have performed to activities
2. Estimation of the costs per group of resources
3. Estimation of the practical time capacity of each department
4. Calculation of department cost per minute

5. Identification of factors, which had influence on the time period of appropriate activity (time drivers), when determining the factors for every real variation of activity
6. Creation of time equations, which shows the total amount of time spent for each activity, for one specific product

7. Multiply the total amount of time spent per product by the department costs per minute.

5 Analysis: TDABC model for Hellendoorn

5.1 Introduction

This chapter discusses the primary and secondary collected data by using the methodology mentioned in chapter three. The TDABC model design for the municipality of Hellendoorn is based on the steps provided in chapter 4. The departments that are included in the TDABC model are the operating departments of clusters Territory and Society. The figures four and five present the hierarchy of the two clusters.

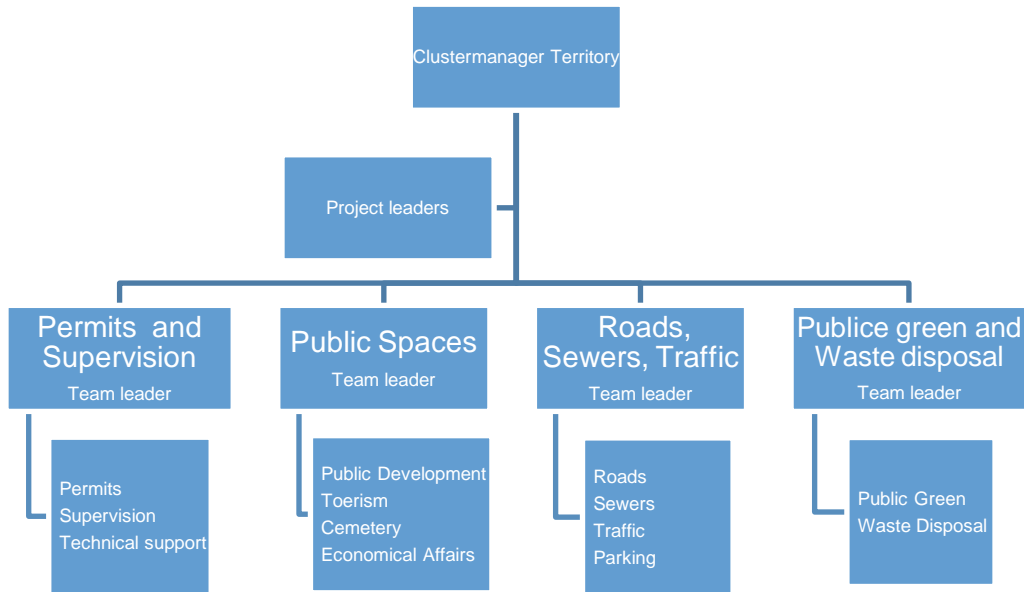


Figure 4: hierarchy cluster Territory

As seen in figure 4, the cluster Territory consists of four departments, further specified into smaller teams. Each department has its own team leader, responsible for maintaining the daily operations. Cluster Society, as seen in figure 5, is comparable to the structure of cluster Territory. Due to the many different teams per department, the departments as whole are used to determine the estimation of costs.

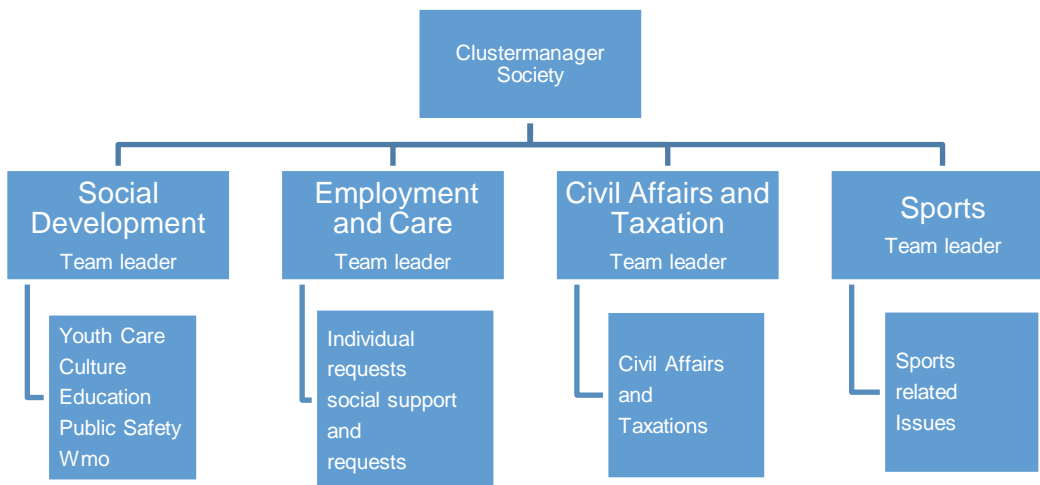


Figure 5: Hierarchy cluster Society

To meet the requirements for the allocation model set by the municipality, the TDABC model needs to be easy to use and to maintain, but still shows the cause-effect relationship of the activities and costs related to the products. In order to keep this model simple to use, the average total department costs are used to determine the costs per minute, instead of making a distinction between the several layers within each department. A second reason why this model is based on average department costs is the complexity of the products offered to citizens and the variety of people responsible for certain products. To most secure method to determine the costs per minute, is to determine the actual costs per minute for each individual person. Since the TDABC model relies on estimations, potential errors in the calculations cannot be excluded.

5.2 Determination of costs

The first four steps of the TDABC model are to identify the costs per minute for each department. The first step is to identify the groups of resources for the departments mentioned in the budget report.

5.2.1 Step 1: Identification of groups of resources

The groups of resources are those mentioned in section 2.2.3, which are labor, materials, automation, accommodation, and overhead. Specifications the groups of resources can be retrieved from the internal financial database Key2Financiën. Examples will be given from Key2Financiën, to clarify which kinds of costs are included.

Labor costs: The actual labor costs per group of resources can also be retrieved from the budget report 2013. The total costs of the departments are given in Table 5. The average labor costs per department in minutes are calculated by dividing the total labor costs per department by the practical capacity per department. The labor costs are expressed per minute, which makes it more reliable to measure the actual costs incurred provide services. In addition, the time needed to complete an activity often takes minutes rather than hours.

Material costs: The total material costs include the materials used for travel documents, equipment to administer permit requests, and other means used to provide services. The material costs include all costs for exploitation. The material costs retrieved from the financial database of the municipality of Hellendoorn are given per department. Material costs per department include e.g. costs of capital, training and educations, clothing, books and magazines, and memberships.

Automation costs: The licenses for software and hardware automation are separately mentioned in the internal financial database. The costs for automation and licenses can be retrieved per group of resource. The automation costs are also allocated based on the practical time capacity.

Accommodation costs: The accommodation costs include e.g. energy, maintenance, depreciation, and water usage. The costs for accommodation are treated as direct costs, since the accommodation costs can be allocated to the specific department.

Overhead costs: The overhead costs are those costs incurred by people or departments not directly related in the process to provide services. The costs of general management (cluster managers) and support departments. The support departments are P&O, I&F, Administration, F&C, Board of directors, Legal advisory, Business Management and Communication. The overhead costs are also divided into labor costs, accommodation costs, automation costs and material costs. The total overhead costs are retrieved from the financial database Key2Financiën. The overhead costs are allocated to the departments, based on practical time capacity.

Overhead costs incurred by the governing departments (the major, and alderman), cannot be allocated to the operating departments. This department is responsible for policy decision making, and those costs cannot be allocated to the products, as discussed on page 11 and 12 of the memorandum of statements for regarding 'mutation of the municipal Act for taxes'.

5.2.2 Step 2: Determine of total costs per group of resources

The estimation of total costs per group of resources will be given per department. Instead of estimating the total costs per group of resources, the costs per group of resources can be retrieved for each department. The cost of capacity supplied can be retrieved from Key2Financiën for each department, which helps to allocate the direct and overhead costs to the departments. The departments, also presented in figures 4 and 5, are:

- ✓ Supervision and Permits
- ✓ Public Spaces
- ✓ Roads, Sewers, and Traffic
- ✓ Public green and waste disposal

- ✓ Social development
- ✓ Employment and Care
- ✓ Civil affairs and Taxation
- ✓ Sports

The eight operating departments constitutes of different layers of people. Each cluster has its own cluster manager, who is responsible for his/her own departments. The costs incurred for the cluster manager will be allocated to the departments involved based on practical time capacity per department. As seen in figures four and five both clusters are divided into four departments, which each include several teams responsible for more specific tasks. Each department has its own team leader responsible for the daily operations of their team. For the calculation of the cost price per minute, the average cost department cost will be calculated. The total costs can be retrieved per department, instead of per team, from Key2Financien. To keep the TDABC model easy to use and maintain, and due to the large amount of products and the large amount of civil servants responsible for different kinds of products, the costs per group of resources will be given per department. This has some consequences for the calculation of costs per civil servant per department. Instead of making a distinction between people with high wages and people with lower wages, the average cost per department are calculated. Despite the possibility for errors, the average cost per department is used for the estimation of cost.

The direct costs are retrieved from Key2Financiën and are divided into labor costs, material costs, accommodation costs, and automation costs. The costs incurred for the cluster manager also need to be allocated over the operating departments. Finally, the overhead costs will be allocated to the operating departments of clusters Territory and Society. The overhead costs will be allocated in step 4, based on the practical time capacity per department. Attachment C shows the exact amount of total costs per group of resources per department.

Department	Labor costs	Material costs	Automation costs	Accommodation costs	Total direct costs
Supervision & Permits	€ 1.684.773	€ 33.977,75	€ 3.711,20	€ 194.892,76	€ 1.917.354,71
Public Space	€ 1.073.869	€ 19.924,12	€ 2.176,20	€ 114.282,66	€ 1.210.251,98
RST	€ 2.071.768	€ 53.450,30	€ 5.838,07	€ 306.585,22	€ 2.437.641,59
PGW	€ 1.908.486	€ 51.000,83	€ 5.570,53	€ 292.535,36	€ 2.257.592,72
Social Development	€ 1.226.283	€ 21.107,10	€ 14.590	€ 106.197,97	€ 1.368.178,07
Employment & Care	€ 1.600.641	€ 29.637,01	€ 20.486,18	€ 149.115,21	€ 1.799.879,40
Civil Affairs & Tax	€ 1.019.498	€ 20.812,97	€ 14.386,18	€ 104.718,07	€ 1.159.415,22
Sports	€ 1.181.928	€ 29.189,92	€ 20.177,14	€ 146.865,75	€ 1.378.160,81
Total	€ 11.767.246,00	€ 259.100,00	€ 86.935,50	€ 1.415.193,00	€ 13.528.474,50

Table 7: Calculation of direct costs per department

The four categories of direct costs given in Table 7, actually consists of many individual sort of costs. To illustrate, material costs include cost for e.g. training, education, books, magazines, and other media, clothing, paper, memberships, and other kinds of assets.

5.2.3 Step 3: Calculation of the practical time capacity of each department

The estimation of practical time capacity of each department will be calculated by using 80% of the theoretical work time of each department. The practical time capacity needs to be determined per year. Since the costs are given per year, the practical time capacity should also be calculated per year. To calculate the practical time capacity per year, several steps need to be followed:

- 1) Calculate the theoretical capacity per year.
 - a) The work time per department is given in FTE. One FTE stands for full-time equivalent, which means one full workweek expressed in hours. The formation given in amount of FTE is retrieved from the budget report 2013 and is presented in attachment D.
 - b) For the municipality of Hellendoorn one full workweek consists of **36 hours**. Multiplying the number of FTE's per specific departments by 36, the total amount of hours worked per week can be calculated.
 - c) Since the labor costs are given for the entire year, the amount of hours should also be calculated for the entire year. Normally there are 52 weeks in a year, but the actual amount of weeks that there will be worked is less. The Ministry of Finance provides calculation of the actual workdays a year. The number of available workdays a year is 261. This number needs to be reduced by the number of holidays (7), the average days off due to illness (14), and the average days on vacation (23.5).

The actual amount of workdays according to calculation of the Ministry of Finance is 216.5 days, or **43.3 weeks** (216.5/5).

- 2) The theoretical time capacity per department per year can be calculated by the following equation:

$$\text{Yearly theoretical capacity} = \#FTE * 36 \text{ hours} * 43.3 \text{ weeks}$$

- 3) The practical time capacity can be calculated by multiplying the theoretical time capacity, calculated by using the previous equation, with 0.8.

By following these steps, the practical time capacity of each department can be determined. Table 8 shows the theoretical and practical time capacity of the departments of clusters Territory and Society. The formation in FTE is retrieved from the budget report 2013. Based on the amount of FTE per department, the practical time capacity can be calculated in hours.

Department	Formation in fte	Theoretical capacity (hours)	Practical capacity (hours)
Supervision & Permits	24,83	38.705,00	30.964,00
Public Space	14,56	22.696,13	18.156,90
Roads, sewers, traffic	39,06	60.886,73	48.709,38
Public green and waste	37,27	58.096,48	46.477,18
Total	115,72	180.384,34	144.307,47
Social Development	17,94	27.964,87	22.371,90
Employment & Care	25,19	39.266,17	31.412,94
Civil Affairs & Tax	17,69	27.575,17	22.060,14
Sports	24,81	38.673,83	30.939,06
Total	86,65	133.480,04	106.784,04

Table 8: The practical time capacity per department in hours

5.2.4 Step 4: Calculation of the average costs per minute

Before calculating the average costs per minute, the overhead costs need to be allocated to the individual departments. First, the management costs will be allocated to the departments. The overhead costs incurred for support departments are given per cluster in the financial database, Key2Financiën. The total costs incurred for the general managers (cluster managers) are also retrieved from Key2Financiën. The overhead costs need to be allocated by using the practical time capacity of each department. The database shows that the management costs (labor, materials, accommodation, and automation) made by the cluster manager are:

General management Territory =	€ 481.611,00
General management Society =	€ 117.864,12

The overhead costs regarding the support departments are retrieved from the internal database of Hellendoorn, in which the overhead costs are allocated to the clusters Territory, and Society, and the Secretariat (see attachment C). The costs incurred by the Secretariat are not applicable for the products analyzed in this research, so these costs are not included in the TDABC model. The support departments are presented separately to be able to provide more insight in the costs allocated to the clusters.

Support departments	Cluster Territory	Cluster Society
P&O	€ 304.405	€ 220.548
F&C and Legal advisory	€ 499.561	€ 367.650
I&F	€ 1.150.905	€ 835.843
Administration	€ 5.172	€ 3.694
Board of Directors	€ 96.913	€ 69.550
BM and Communication	€ 626.954	€ 450.514
Total	€ 2.683.910,00	€ 1.947.799,00

Table 9: Support department costs assigned to the clusters Territory and Society

The total overhead costs need to be allocated by using the practical time capacity. The total practical capacity of cluster Territory is 144.307,47 hours and the total practical capacity of cluster Society is

106.784,04 hours (see Table 8). The total overhead costs allocated to each operating department can be calculated by:

$[\text{Overhead costs} / \text{total practical capacity cluster}] * \text{Practical capacity of department}$

By applying this equation for each department, the management and the support department costs can be allocated as seen in Table 10.

Department	General Management costs	Support department costs	Total Overhead costs
Supervision & Permits	€ 103.339,10	€ 576.529,34	€ 679.868,44
Public Space	€ 60.596,75	€ 338.069,56	€ 398.666,31
Roads, sewers, traffic	€ 162.562,44	€ 906.963,61	€ 1.069.526,05
Public green and waste	€ 155.112,70	€ 865.374,49	€ 1.020.487,19
Total	€ 481.611,00	€ 2.686.910,00	€ 3.168.547,99
Social Development	€ 24.693,24	€ 408.075,61	€ 432.768,85
Employment & Care	€ 34.672,39	€ 572.989,10	€ 607.661,49
Civil Affairs & Tax	€ 24.349,13	€ 402.388,93	€ 426.738,06
Sports	€ 34.149,35	€ 564.345,36	€ 598.494,71
Total	€ 117.864,12	€ 1.947.799,00	€ 2.065.663,11

Table 10: Allocation of overhead costs to the operating departments

The overhead costs also include the costs incurred by cluster Business Management in favor of the other two clusters. Since the practical time capacity of cluster Territory is higher than the practical time capacity of cluster Society, the amount of overhead costs allocated to cluster Territory is larger than allocated to cluster Society.

The total average department cost per minute can be calculated by using the example given in Table 4. The total cost per department is calculated by adding the direct and overhead costs.

Department	Direct costs (Table 7)	Overhead costs (Table 10)	Total department cost
Supervision & Permits	€ 1.917.354,71	€ 679.868,44	€ 2.597.223,15
Public Space	€ 1.210.251,98	€ 398.666,31	€ 1.608.918,29
Roads, sewers, traffic	€ 2.437.641,59	€ 1.069.526,05	€ 3.507.167,64
Public green and waste	€ 2.257.592,72	€ 1.020.487,19	€ 3.278.079,91
Social Development	€ 1.368.178,07	€ 432.768,85	€ 1.800.946,92
Employment & Care	€ 1.799.879,40	€ 607.661,49	€ 2.407.540,89
Civil Affairs & Tax	€ 1.159.415,22	€ 426.738,06	€ 1.586.153,28
Sports	€ 1.378.160,81	€ 598.494,71	€ 1.976.655,52
Total costs	€ 13.528.474,50	€ 5.234.211,10	€ 18.762.685,60

Table 11: Total department costs

By using the total department costs given in Table 11, the average cost per hour and per minute can be calculated as presented in Table 12.

The average costs per hour can be calculated by dividing the total costs by the practical time capacity in hours. The average cost per minute is calculated by dividing the average costs per hour by 60. The costs in the last column are the average costs per minute per civil servant divided per department. The average department cost per minute is used to calculate the cost per activity.

Department	Total costs	Practical capacity	Average cost per hour	Average cost per minute
Supervision & Permits	€ 2.597.223,15	30.964,00	€ 83,88	€ 1,40
Public Space	€ 1.608.918,29	18.156,90	€ 88,61	€ 1,48
Roads, sewers, traffic	€ 3.507.167,64	48.709,38	€ 72,00	€ 1,20
PGW	€ 3.278.079,91	46.477,18	€ 70,53	€ 1,18
Social Development	€ 1.800.946,92	22.371,90	€ 80,50	€ 1,34
Employment & Care	€ 2.407.540,89	31.412,94	€ 76,64	€ 1,28
Civil Affairs & Tax	€ 1.586.153,28	22.060,14	€ 71,90	€ 1,20
Sports	€ 1.976.655,52	30.939,06	€ 63,89	€ 1,06

Table 12: Calculation of average cost per minute

The average department cost per minute includes the average direct costs of the teams included in the cluster, costs incurred by the cluster manager and a reasonable allocation of the overhead costs, retrieved from the internal database. The activity cost depends on the department responsible for processing the activity. Because it is possible that several departments are involved in the process, different cost per minute needs to be taken into account. The next section describes the estimation of time that is the second important factor of the TDABC model.

5.3 Estimation of time

This section addresses the activities and the formulation of time drivers that drive costs to provide services, followed by the formulation of time-equations.

Before discussing the time drivers that drive costs, the general categories of activities will be formulated based on the interviews with civil servants, given in attachment E. Civil servants responsible for specific products were asked to explain the general steps used in the process. The seventh sub question was: ‘Which groups of activities necessary to provide services can be distinguished?’ Based on the data collected from the interviews, five categories of activities can be identified.

Each process starts with the intake of the request made by someone. People can make a request by mail, post, or at the front office. The most requests are made by making an appointment at the front office. Depending on the type of product request, civil servants from different departments are responsible for the intake. In some cases, Hellendoorn sends a reminder to someone, for example, when the passport or driver’s license is near expiration. The process time for requests made at the front office is recorded by GEBOS. GEBOS is a software program that records the number of products requested at the front office and the average time spend per service request.

The second activity identified in the process, is the verification of the necessary requirements of the product request. Verifying necessary documents and legal requirements, taken into account the situation, involves a significant aspect in the process. Depending on the situation and the background of the person requesting the product, the requirements can be different for the same product. To illustrate, emigrants requesting to marry in the Netherlands involves extensive research at the legal requirements.

The next activity includes processing the request. After the documents, the legal requirements and the situation are run through, the decision can be made to either process the request or if additional documentation is required, arrange another appointment. Processing the request involves collecting the necessary documents and information, informing the right people and institutions, producing the physical permit, but also performing a wedding ceremony.

The following activity concerns the transaction of the documents to the individual. The distribution of the documents can be done by mail, post or by arranging an appointment at the front office. The distribution activity is the fourth activity that is identified in the process. This activity includes the time spent for drafting a letter or mail, handing over the documents, making the payment, and providing additional information when necessary. Similar as for the intake activity, the time spent for each product distributed at the front office can be retrieved from GEBOS.

The last activity, the registration, concerns the administration after the product has been delivered. The documents need to be registered in the financial database. The documents also need to be sent to the DIV, which is responsible for documenting the files into a database that can be used provide information.

Hellendoorn offers many products that are eligible for pricing. The estimation of time necessary to process the product requests will be discussed in general, due to the variety of products offered by the municipality of Hellendoorn. The estimation of time will explained by using examples of variables retrieved in the interviews. Hellendoorn will do the estimation of time, as the people involved in the process can estimate more easily how long it takes to complete the activities necessary for the products.

5.4.1 Step 5: Identification of time drivers

This step concerns the identification of the activities that drive costs (and time). In order to determine the total amount of time spent on a particular product, the time drivers have to be determined for each product. In other words, the factors that influence the time of appropriate activity need to be identified.

The amounts of time drivers that can be included in the model are not restricted to a maximum. One advantage of the TDABC model is its ability to capture the resource demands from diverse operations by simply adding more terms to the time equation. The time drivers need to be identified, to be able to estimate the total amount of time spent on a specific product request.

Based on the interviews with civil servants responsible for processing the product requests, the factors that cost additional time are mainly: (1) incomplete/invalid/missing documents, (2) the complexity of the situation, (3) the need for additional research and/or advice, or (4) not meeting certain requirements.

The above time drivers are still very vague. To give a more specific impression about the time drivers for the products offered by Hellendoorn, each of the four time drivers will be illustrated with a practical example.

Incomplete/invalid/missing documents

In the interview about the child day care centers, the process starts with receiving the request by mail or post. The municipality is responsible for the registration in the child day care register. The conditions to start a child day care center are very strict. The interviewee mentioned that it often happens that people send in the application form in separate parts and at different times. This will lead to repeating the same activities, which can double the time necessary to process the request. The interviewee estimates that this is the case in about 50 percent of the time.

Complexity of the situation

In the interview about the dispensation of vehicles and parking, the time driver concerns the complexity of the situation. In very specific situations, the police have to be informed about the content regarding the decision. In case the decision has influence on the enforcement of the rules, the

police will be informed. Due to the complexity of the situation, this will add time to the standard process time.

The need for additional research/advice

People can request the municipality to conduct a wedding ceremony. Normally this request can be easily granted, except for foreigners requesting to marry. Foreigners requesting to marry in our country need to meet additional legal requirements. In order to control the necessary documents and the regulations extensive preliminary investigation needs to be conducted. This factor will add more time to the standard process time.

Not meeting certain requirements

Another product offered by Hellendoorn is to grant a temporary rental of an accommodation. People can decide to rent out their accommodation temporarily, when they are unable to sell it. One of the requirements to rent out the accommodations is that it must be empty. Based on the interview with the civil servant responsible for processing this type of request, 50 until 60 percent of the time the accommodation is not empty yet. When the accommodation is not yet empty, this will add another 15 minutes to the process time, because some activities have to be redone.

The above examples of time drivers are not applicable to all products. The identification of time drivers can include also other activities that drive cost and time. This has to be determined separately for each product. Table 13 shows an example of a time driver, as regards with the request to temporarily rental of an accommodation. The numbers are retrieved from the interview with Mr. Nieuwenhuijse (see attachment E 2) and are given in minutes.

Activity	Standard time	Accommodation not empty
1. Contact by Phone	5	5
2. Verifying documents	10	
Verifying ownership	5	5
Verifying salability	10	5
3. producing the actual permit	5	
4. Distributing the permit by post	5	
5. Registration to DIV and F&C	10	
Total process time	50	15

Table 13: Example of identification of time drivers

The standard process time for a request to temporarily rental of an accommodation is about 50 minutes, based on the estimates given by the interviewee. The estimates given of the time driver 'accommodation not empty' is 15 minutes in total. This means that the process time can be 65 minutes instead of 50 minutes when the accommodation is empty. This example only includes a single time driver, but it is easy to include multiple time drivers, just by adding another column.

The activity time is based on estimations given in the interview. Hellendoorn can also decide to implement a clocking system, by which people have to record their time spent per activity. This method can be used to retrieve the time spent on activities more accurate, but it also includes some significant disadvantages. Kaplan and Anderson (2004) mention a few disadvantages of activity time clocking, often used in ABC methods.

- ✓ Increase of administrative activities
- ✓ Focuses only on time spent instead on results

- ✓ Employees can fill in the amount of time spent on an activity

The TDABC model is developed to simplify the process by eliminating this extensive step. Kaplan and Anderson (2004) mention that to estimate activity time in TDABC, fewer people need to be interviewed, and surveys of time allocations are eliminated. The time consumption data can be estimated or observed directly. For Hellendoorn can be advice to estimate the amount of time spent on activities if possible. Based on experience, the time spent can be estimated by civil servants. Time clocking would only be advised if rough estimations are not possible or when it is unclear how long it takes to complete the activity.

5.4.2 Step 6: Creation of time equations

The time equations express the activities and time needed to process each activity. The time equation shows the total amount of time spent to process one kind of request. After determining the time drivers per product, the number of activities needs to be estimated and included in the equation. Hellendoorn must provide estimations about the number of product requests for the entire year, to be able to estimate the amount of expenses and income to design a budget report. Hellendoorn estimates the amount of product requests based on previous year’s product requests and the macro environmental situation.

Table 6 in section 4.4 shows a method to determine the time equation for each activity. The total standard process time illustrated in Table 13 includes all activities that are necessary each time this kind of product is requested. In addition, the time drivers have to be included to determine the total amount of time spent for the specific product.

The number of activities can be determined by estimating the number time the specific time driver is included in the process. The time equation is calculating the time amount of time spent per year. This is necessary, because Hellendoorn must determine a fixed price for their products based on estimations of the yearly product demand. The time driver costs are directly related to the product, so these costs need to be included in the activity time.

In order to illustrate the use of time equations, the request for temporarily rental of an accommodation will be used again. For the ease of use, the estimated amount of product requests is estimated 50, and based on information from the interview, around 50 percent of the time the accommodation is not empty. The total time spent on the product ‘temporarily rental of an accommodation’ is as follows:

Activity	Standard time (a) in minutes	Estimated # of products (b)	Time driver 1 Accommodation not empty (c) in minutes	Estimated # of times incurred (d)	Total time spent (a*b) + (c*d)
Intake	5	50	5	25	375
Verification	25	50	10	25	1500
Process	5	50			250
Distribution	5	50			250
Registration	10	50			500
Total					2875

Table 14: Calculation of the total amount of time spend

In Table 14, the total amounts of time spend for processing a temporarily rental of an accommodation request per year. By adding the time necessary to process each activity, including the additional time spend for the time drivers, the total amount of time necessary for providing this services is 2875 minutes. By estimating that Hellendoorn is spending 2875 minutes for providing this service, the total

costs for this service can be determined. The next section discusses the calculation of the cost price per product.

5.4 Step 7: Calculating the cost price

To calculate the cost price per product, the total amount of time calculated by using the time equation needs to be apportioned over the estimated amount of product requests per year. Important to address, is that this is only applicable when one department is involved in the process. When several departments are involved, the activity costs need to be assigned first in proportion to the time spent on the activity. The first example shows the method to calculate the cost price when only one department is involved in the process:

$$\begin{aligned} \text{Time to process one temporarily rental of an accommodation request (see Table 14)} &= \\ 2875 / 50 &= \mathbf{57.5 \text{ minutes}} \end{aligned}$$

Calculation shows that for one request for temporarily rental of an accommodation, one person spends 57.5 minutes to process this request. The next step is to determine the cost price of this product, by multiplying the amount of time spent to process one requests by the costs per minute of the involved department, the cost price per product can be calculated.

The total average costs per minute were calculated in section 5.2.4, table 12.

Supervision and Permits	€ 1.40
Public Spaces	€ 1.48
Road, Sewer, Traffic	€ 1.20
Public Green and Waste	€ 1.18
Social Development	€ 1.34
Employment and Care	€ 1.28
Civil Affairs and Taxation	€ 1.20
Sports	€ 1.06

The only department involved in the process of a temporarily rental request is department Public Spaces. The cost per minute for this department is € 1.48, so the cost price can be calculated as follows:

$$\begin{aligned} \text{Cost price to process a temporarily rental request} &= \\ 57.5 * € 1.48 &= \mathbf{€ 85.1} \end{aligned}$$

In the above situation, there is only one department involved in the process, so the costs can be assigned to this department. When there are several departments involved, the amount of time spent on activities needs to be estimated for each department involved.

This means that the process time for one product first needs to be divided among the departments, based on the time spent in the process. The time spent in the process than needs to be multiplied by the cost per minute as given above. For example, when a person from department Supervision and Permits spends ten minutes in the process, the calculation of the cost price is as follows:

$$\begin{aligned} \text{Cost price to process a temporarily rental request} &= \\ 47.5 * € 1.48 &= \mathbf{€ 70.3} \text{ (= cost incurred by Public Spaces)} \end{aligned}$$

$$10 * € 1.40 = € 14 \text{ (= cost incurred by Supervision and Permits)}$$

$$\text{Cost price} = € 70.3 + € 14 = € \mathbf{84.3}$$

The calculation of the cost price only includes the activities done by Hellendoorn. Some products also require activities done by external units. For example, passports and ID cards need to be made by the Central Government and Hellendoorn has to pay the Government for this service. Another example of an external activity is the inspection done for starting a child day care center by the Communal healthcare Institution (GGD in Dutch). These costs can be added to the cost price calculated by the TDABC model, as discussed on page 11 and 12 of the memorandum of statements for regarding 'mutation of the municipal Act for taxes'.

5.5 Conclusion

Section 5.4.1 answered the sub question: *'Are there any other variables that add costs to the cost price?'* The time drivers that can be found add more time to process the request. Based on the interviews, four types of time drivers can be identified: (1) Incomplete/invalid/missing documents, (2) complex situations, (3) the need for additional research/advice, and (4) not meeting certain requirements.

Section 5.4.2 answered the last sub question: *'How are these variables related to the cost price?'* The standard process time is the minimum amount of time necessary to process a product request. If Hellendoorn should only include the standard process time, the activities that add costs (time drivers) are not included in the cost price. To make sure the time drivers are included in the cost price, these will be apportioned over the estimated amount of product requests. Therefore, the standard process time will be increased with a portion of the time drivers.

Chapter 5 answered the second part of the main research question: *Which variables, and in which way, influence the cost price to provide services?'*

Based on the interviews with civil servants, the variables (activities) involved to process a product request were identified. Five activities were identified in the process: (1) intake, (2) verification, (3) processing, (4) distribution, (5) registration. Each of these activities can include variables that add time and costs to the cost price (time drivers).

The total amount of time spent per year for one particular product, includes the standard process time (without complications) and the time to process the time drivers (complicated requests). The price charged for the products has to be determined in advance. To make sure that all the involved costs are included in the cost price, the costs for time drivers need to be assigned over the estimated amount of product requests.

For example, the standard process time for temporarily rental of an accommodation is 50 minutes (Table 13). This means that without the time drivers, the cost for a single request is € 74 (50 minutes * € 1.48). The total extra costs for the time driver is (15 minutes * € 1.48 * 25 times this happens) € 555 per year for this product. This total amount of cost incurred for the time driver will be assigned over the 50 products requested per year. This means that € 11.1 (€ 555/50 products) should be added to the standard cost price. This gives a cost price of € 85.1 per product.

Some products also require activities done by external units. For example, passports and ID cards need to be made by the Central Government and Hellendoorn has to pay the Government for this service. Another example of an external activity is the inspection done for starting a child day care center by the Communal healthcare Institution (GGD in Dutch). These costs can be added to the cost price calculated by the TDABC model, as discussed on page 11 and 12 of the memorandum of statements for regarding ‘mutation of the municipal Act for taxes’.

6 Conclusion

This research was conducted in order to find out what model Hellendoorn should use to allocate costs for services and which variables and in which way influence the cost price for providing these services. The following two research questions were formulated:

- 1) What allocation model should the municipality of Hellendoorn use to allocate costs?
- 2) Which variables and in which way, influence the cost price to provide services?

To answer the first research question an examination of five cost allocation models was conducted in order to determine what allocation model fits best with specific characteristic of the municipality. The criteria used to select the allocation model for Hellendoorn were defined using the organizational structure, complexity of the services, legal restrictions, and the pros and cons of the allocation models.

The literature mainly discusses the implementation of allocation models for private organizations, focusing on increasing profit or reducing costs. There is not a single model preferred, for municipalities to allocate costs, in the literature. The criteria to select the right allocation model found in the literature are generally applicable.

This research shows that the allocation model, for the services provided by the municipality, should comply with four key criteria:

1. The model must show the activities and costs involved in the process
2. The model must show a cause-effect relationship
3. The model must be applicable for a variety of complex products
4. The model must be easy to maintain and to adjusted

In comparison with the pros and cons of the models can be concluded that each of the five models can be used for municipalities to allocate costs, depending on the actual model design. Prior research shows that the TDABC can overcome the difficulties that arise to implement the more complex ABC model. Although the TDABC model meets all four criteria, the method to implement the model can be done in various ways. TDABC shows the activities incurred in the process and the costs attached to these activities. This increases the transparency of the cost allocated to the services, because the costs reflect a cause-effect relationship. The model is flexible enough to incorporate many products, differentiating in complexity. The time equations can be adjusted and maintained easily by either changing the cost per minute or the process time of activities.

Answer research question 1: Based on the formulated criteria and the pros and cons of the five allocation models included in this research, TDABC is the model that Hellendoorn should use to allocate the costs incurred for providing administrative services as; driver's licenses, wedding ceremonies, passports etc.

The second research question is answered by examining the financial databases and interviewing civil servants responsible for processing the services requests. The estimation of costs is influenced by the differences in the costs incurred by departments (e.g. labor and material cost) and the differences in the practical time capacity of each department. A higher practical time capacity means that the costs incurred in the department can be apportioned over a larger amount of units.

The standard process to provide services includes five categories: Intake, verification, processing, distribution, and administration. How long it takes to process the activities included in the categories depends on the type of service request. Next to the standard process time, additional activities necessary in the process increase the activity costs. The time drivers involved in the process influence the estimation of time. There are four time drivers obtained that can cause additional time to be necessary:

- 1) Incomplete/ invalid/ missing documents
- 2) The complexity of the situation,
- 3) The need for additional research and/or advice
- 4) Not meeting certain requirements

Because Hellendoorn has to determine the price of services based on the estimated amount of services requested for the upcoming year, they have to estimate the amount of time spent to process the services requests. In order to recharge all the costs incurred for providing a particular service, the total amount of estimated amount of time spent has to be determined. The TDABC model includes the time drivers in the time equation, but simply adding another term in the equation. The additional time is assigned to the total amount of estimated service requests. This means that a portion of the additional costs incurred for the time drivers is added to the standard cost price of services.

Answer research question 2: Based on the interviews conducted with civil servants there are four categories of time drivers that influence the cost price of services. The factors that are causing additional time are mainly (1) incomplete/ invalid/ missing documents, (2) the complexity of the situation, (3) the need for additional research and/or advice, or (4) not meeting certain requirements. The time drivers influence the cost price of services by increasing the time required for activities related to each service.

The TDABC method is designed to calculate the cost price of a single product or service. For Hellendoorn to determine the cost price of every product, they have to estimate the activity time for each product. The TDABC method calculates the total amount of costs for each type of product and determines the cost price per product by dividing the costs by the estimated amount of product sold. By using this method, each citizen is charged equally.

This research shows that the TDABC method is useful for allocating costs to the services provided by the municipality of Hellendoorn. Although the TDABC model is not originally designed for municipalities, this method appears to be applicable for non-profit public organizations similar to Hellendoorn. By using the TDABC model, Hellendoorn is better able to understand the cost incurred in the process. The TDABC model also increases the transparency Hellendoorn as regards with the processes necessary to provide services. Hellendoorn reduces the risk for penalties by using this model, because they are able to justify the price charged for the services.

7 Recommendations

The current pricing method provides little understanding in the costs and activities involved in the process. Due to increasing attention given to the different prices charged for services like, driver's licenses or conducting wedding ceremonies, pressure arises for municipalities to justify the price charged for services. Without a clear and understandable justification, the municipality can even risk a penalty.

The municipality of Hellendoorn should implement the TDABC model in order to be able to justify the pricing of services and to understand which costs are involved in the process. By implementing the TDABC model, Hellendoorn can provide better explanations to citizens about their activities and the determination of prices.

To implement the TDABC model successfully, a proper estimation should be made for the time needed for the activities per group (category). Since there are many different services products for which different persons and departments are responsible, it would be recommended to implement this model organization wide. This has the advantage that the products are priced in the same way and the individual workload will be reduced. Another advantage for implementing this model organization wide is that the person responsible for particular services has a better understanding about the time and activities necessary to provide the services.

The TDABC model design is primarily designed for internal activities and costs. The costs incurred by external parties, e.g. the central government or the Communal Healthcare Institution (GGD), are fixed (travelling documents), or can be retrieved from invoices (GGD). These costs should be added after the internal cost price has been determined.

Another recommendation is to update and maintain this model frequently to make sure that the activities and costs are still applicable. Any changes in costs or activities can influence the cost price of services. When the processes are changed significantly, the currently charged prices of services can be illegitimate. Updating the model frequently, at least yearly, can also provide opportunities to raise or reduce the price in a responsible way.

The estimation of time depends on estimations about the activity process time. For activities that are difficult to estimate, Hellendoorn could be using a clocking system to determine the activity process time. Applying a clocking system would increase the complexity of implementing the TDABC model, which should only be used when rough estimations cannot be made. The activity time retrieved from the interviewee (see attachment E) can be used as basis for the estimation of time.

Average department cost per minute are calculated partially based on the assumption that the practical time capacity of civil servants is 80% of their theoretical time capacity. This assumption is used in the literature to determine the practical time capacity of personnel in general. Whether or not this also reflects the practical time capacity of the civil servants working at the municipality of Hellendoorn remains uncertain.

Hellendoorn is not obligated to recharge the cost price calculated by applying the TDABC model. This model only shows the actual costs incurred in the process. Hellendoorn should be taken into account the reasonableness of the charged price in relationship to the benefits received. When it appears that Hellendoorn should charge significantly higher prices compared to surrounding or comparable municipalities, this could negatively affect the municipality of Hellendoorn. As mentioned by Budding

and Groot (2005), pricing determinations can also be made, based on comparable municipalities. By comparing prices of comparable municipalities, Hellendoorn gets a better understanding in how they are performing and if improvements can be made. Hellendoorn can easily obtain the product that shows a significant higher cost price compared to similar municipalities.

When the TDABC model is implemented in a responsible way, by involving civil servants that are involved in the process, Hellendoorn should be able to justify and explain the prices charged for their services, which increases transparency towards the community and reduces the risk for potential penalties.

Discussion

Limitations

This single case study demarcated many theoretical viewpoints, combined with quantitative and qualitative data. The theory used to determine which cost allocation model is best applicable to determine the cost price of the included services, is mainly developed for organizations in the private sector. Although there are many cost allocation models discussed in literature, only five models were discussed in this research. By omitting other cost allocation models, this made the chosen allocation model weaker.

Many services products are applicable for charging. To make this model applicable for all those services, this model lacks in-depth information about the separate products. The proposed model provides a format, which Hellendoorn can apply to calculate the cost incurred in the process per product. A limitation of this research is that Hellendoorn itself should implement the proposed model. This research would become too extensive and would take too much time to complete.

The calculations of the department cost per minute are based on the assumption that the practical time capacity of personnel is 80 percent. This number is generally used in the literature to determine the practical time capacity of personnel. If this number also reflects the practical time capacity of civil servants, remains to be further analyzed.

The interviews conducted with civil servants were semi-structured and open. This makes it difficult to compare information gathered from the interviews, also because the activities differ per service product. Assumptions are made based on information retrieved from interviews with civil servants, which could harm the internal validity.

Single case studies are characterized by a weak external validity, because organization specific data has been collected and results are found based on the specific data. Other municipalities may have different ways to provide services and may have different costs to allocate. Although every municipality could implement the TDABC model, the results found in this research cannot be directly copied to other municipalities.

Further Research

Within the field of cost allocation models, there is little information to be found regarding a model selection for non-profit organizations and more specific for service provided by non-profit organizations. Little information can be found regarding the selection of costing models and the criteria used to determine which costing model should be implemented. The criteria used in this research are retrieved from different publications. Further research should be done to develop a more solid method to select a costing model for different purposes, in particular for public non-profit organizations like municipalities.

In order to evaluate the implementation of the TDABC model at Hellendoorn, a follow-up research can be conducted to determine if the model is successfully implemented or if adjustments are required. Follow-up research can also determine whether other municipalities can apply this model. Based on results retrieved from the evaluation, pitfalls and difficulties can be discovered, which will improve the quality of the model.

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List of used abbreviations

ABC	Activity Based Costing
BM	Business Management
F&C	Finance and Control
GEBOS	Software program that records time and number of requests at the front office
GGD	Communal healthcare Institution
I&F	Information and Facilities
PGW	Public Green and Waste disposal
P&O	Personnel and Organization
RST	Roads, Sewers, and Traffic
TCO	Total Cost of Ownership
TDABC	Time Driven Activity Based Costing
VNG	Dutch Association of Municipalities

Appendices

A. Total estimated income and expenditures 2013

Program description	Expenses (€)	Income (€)
1: Governing unit	1.019.789	0
2: Daily board, Citizen affairs and Information facilities	2.986.908	533.379
3: Regional Planning and Housing	10.513.559	7.122.637
4: Public Order and Safety	2.941.832	25.323
5: Road, Sewer and Traffic	13.324.107	8.740.605
6: Economy, Recreation and Tourism	3.917.677	3.739.350
7: Youth and Education	3.610.349	181.514
8: Sports and Culture	8.161.649	3.905.430
9: Social Support	15.619.131	7.113.752
10: Social facilities	13.907.043	10.551.746
11: Nature, Landscape and watering, Farming, Cemeteries and Public green	2.859.986	622.449
12: Waste disposal and Ecology	5.065.107	4.870.106
13: General means and Unforeseen	5.714.724	42.235.575
Total	89.641.861	89.641.866

B. Services products Hellendoorn

Behorende bij de Legesverordening 2012, vastgesteld bij raadsbesluit van 10 november 2011, nr. 11INT01517.

Titel 1 Algemene dienstverlening

Hoofdstuk 1 Burgerlijke stand

Hoofdstuk 2 Reisdocumenten

Hoofdstuk 3 Rijbewijzen

Hoofdstuk 4 Verstrekkingen uit de Gemeentelijke basisadministratie persoonsgegevens

Hoofdstuk 5 Verstrekkingen uit het Kiezersregister (gereserveerd)

Hoofdstuk 6 Verstrekkingen op grond van Wet bescherming persoonsgegevens

Hoofdstuk 7 Bestuursstukken

Hoofdstuk 8 Vastgoedinformatie

Hoofdstuk 9 Overige publiekszaken

Hoofdstuk 10 Gemeentearchief

Hoofdstuk 11 Huisvestingswet (gereserveerd)

Hoofdstuk 12 Leegstandswet

Hoofdstuk 13 Gemeentegarantie

Hoofdstuk 14 (Markt)standplaatsen

Hoofdstuk 15 Winkeltijdenwet

Hoofdstuk 16 Kansspelen

Hoofdstuk 17 Kinderopvang

Hoofdstuk 18 Telecommunicatie

Hoofdstuk 19 Verkeer en vervoer

Hoofdstuk 20 Verordening op de verblijfsrecreatie

Hoofdstuk 21 Overige vergunningen, ontheffingen en inschrijvingen

Hoofdstuk 22 Overige verstrekkingen

Hoofdstuk 23 Overige inlichtingen

Hoofdstuk 24 In deze titel niet benoemde vergunning, ontheffing of andere beschikking

Titel 2 Dienstverlening vallend onder de Wet algemene bepalingen omgevingsrecht (fysieke leefomgeving/omgevingsvergunning)

Hoofdstuk 1 Begripsomschrijvingen

Hoofdstuk 2 Vooroverleg/beoordeling conceptaanvraag

Hoofdstuk 3 Omgevingsvergunning

Hoofdstuk 4 Vermindering

Hoofdstuk 5 Teruggaaf

Hoofdstuk 6 Intrekking omgevingsvergunning

Hoofdstuk 7 Wijziging omgevingsvergunning als gevolg van wijziging project

Hoofdstuk 8 Bestemmingsplannen

Hoofdstuk 9 Sloopmelding

Hoofdstuk 10 Diversen

Hoofdstuk 11 In deze titel niet benoemde beschikking

Titel 3 Dienstverlening die valt onder Europese dienstenrichtlijn

Hoofdstuk 1 Horeca

Hoofdstuk 2 Organiseren evenementen of markten

Hoofdstuk 3 Prostitutiebedrijven

Hoofdstuk 4 Splitsingsvergunning woonruimte (gereserveerd)

Hoofdstuk 5 Leefmilieuverordening (gereserveerd)

Hoofdstuk 6 Brandbeveiligingsverordening

Hoofdstuk 7 In deze titel niet benoemde vergunning, ontheffing of andere beschikking

C. Calculation of costs per group of resources per department

Organization unit	Labor costs	Material costs	Accommodation costs	Automation costs	Total direct costs
Cluster Territory					
Supervision and Permits	€ 1.684.773,00	€ 33.977,75	€ 194.892,76	€ 3.711,20	€ 1.917.354,70
Public Spaces	€ 1.073.869,00	€ 19.924,12	€ 114.282,66	€ 2.176,20	€ 1.210.251,99
Roads, Sewers, Traffic	€ 2.071.768,00	€ 53.450,30	€ 306.585,22	€ 5.838,07	€ 2.437.641,59
Public green and waste	€ 1.908.486,00	€ 51.000,83	€ 292.535,36	€ 5.570,53	€ 2.257.592,72
Total	€ 6.738.896,00	€ 158.353,00	€ 908.296,00	€ 17.296,00	€ 7.822.841,00
Cluster Society					
Social Development	€ 1.226.283,00	€ 21.107,10	€ 106.197,97	€ 14.590,00	€ 1.368.178,07
Employment and Care	€ 1.600.641,00	€ 29.637,01	€ 149.115,21	€ 20.486,18	€ 1.799.879,40
Civil affairs and Taxation	€ 1.019.498,00	€ 20.812,97	€ 104.718,07	€ 14.386,68	€ 1.159.415,72
Sports	€ 1.181.928,00	€ 29.189,92	€ 146.865,75	€ 20.177,14	€ 1.378.160,82
Total	€ 5.028.350,00	€ 100.747,00	€ 506.897,00	€ 69.640,00	€ 5.705.634,00
Cluster Business Management					
Information and Facilities	€ 1.804.721,00	€ 1.158.003,00	€ 176.260,96	€ 183.346,00	€ 3.322.330,96
Finance and Control	€ 1.129.147,00	€ 118.022,80	€ 97.896,84	€ 39.428,16	€ 1.384.494,80
Personal and Organization	€ 344.025,00	€ 277.494,00	€ 30.261,14	€ 0,00	€ 651.780,14
Communication	€ 212.469,00	€ 55.640,65	€ 15.859,41	€ 1.154,54	€ 285.123,60
Legal Advisory	€ 141.844,00	€ 13.215,20	€ 10.961,65	€ 4.414,84	€ 170.435,69
Total	€ 3.632.206,00	€ 1.622.375,65	€ 331.240,00	€ 228.343,54	€ 5.814.165,19

The labor costs, material costs, accommodation costs and automation costs were retrieved from key2Financiën. The resources are categorized by codes by which the costs can be categorized into the four given groups of resources. The costs are also given per department, which makes it easy to categorize the costs. In the Table above, the cluster Business Management is also included, to show the direct cost made by the overhead departments. The costs, retrieved directly from Key2Financiën, are also used to determine the amount of budget per department for 2013.

Next, the costs incurred by the cluster manager need to be allocated over the departments. Important to address is that cluster Territory also includes four project leaders in the costs incurred by general management. These costs are also allocated to the departments. The costs incurred by the cluster managers

General management Territory = € 481.611,00

General management Society = € 117.864,12

The management costs also include labor costs, materials costs, accommodation costs, and automation costs, whereas labor costs represents the majority of the costs. These costs will be allocated to the departments by using the practical time capacity.

The overhead costs also need to be determined. Hellendoorn has an internal database in which the overhead costs are allocated to the operating departments. The overhead costs are first allocated to the Board of Directors, cluster Territory, cluster Society, Business Management and Communication and the Secretariat. The overhead costs allocated to these departments are given in the next Table. The next step allocates the costs incurred by the Board of Directors and Business Management and Communication to clusters Territory and Society and the Secretariat. The clusters Territory and Society are performing the activities directly related to the products, so the costs incurred by the Secretariat cannot be allocated to the products.

Allocated overhead costs	Board of Directors	Cluster Territory	Cluster Society	BM&C	Secretariat	Total costs
P&O	7759	307405	220548	144422	7469	€ 687.603,00
F&C and Legal Advisory	12962	499561	367650	240696	12454	€ 1.133.323,00
I&F	29388	1150905	835843	547326	28442	€ 2.591.904,00
Administration		5172	3694	1478		€ 10.344,00
Geographic Information				16711		€ 16.711,00
Total	€ 50.109,00	€ 1.963.043,00	€ 1.427.735,00	€ 950.633,00	€ 48.365,00	€ 4.439.885,00
Overhead units	Cluster Territory	Cluster Society	Secretariat	Total costs		
P&O	€ 307.405,00	€ 220.548,00	€ 7.469,00	€ 535.422,00		
F&C and Legal Advisory	€ 499.561,00	€ 367.650,00	€ 12.454,00	€ 879.665,00		
I&F	€ 1.150.905,00	€ 835.843,00	€ 28.442,00	€ 2.015.190,00		
Administration	€ 5.172,00	€ 3.694,00	€ 0,00	€ 8.866,00		
Board of Directors	€ 96.913,00	€ 69.550,00	€ 2.349,00	€ 168.812,00		
BM&C	€ 626.954,00	€ 450.514,00	€ 15.283,00	€ 1.092.751,00		
Total	€ 2.686.910,00	€ 1.947.799,00	€ 65.997,00	€ 4.700.706,00		

The total overhead costs allocated the Territory and Society need to be further allocated to the departments also by using the practical time capacity of the department

D. Calculation of practical time capacity per department

The practical time capacity needs to be determined per year. Since the costs are also given per year, the practical time capacity should also be calculated per year. To calculate the practical time capacity per year, several steps need to be followed.

Organization unit	Estimated formation 2013 (fte)
Cluster Territory	
Supervision and Permits	24,83
Public Spaces	14,56
Roads, Sewers, Traffic	39,06
Public green and waste	37,27
Total	115,72
Cluster Society	
Social Development	17,94
Employment and Care	25,19
Civil affairs and Taxation	17,69
Sports	24,81
Total	86,65
Cluster Business Management	
Information and Facilities	30,23
Finance and Control	16,79
Personal and Organization	5,19
Communication	2,72
Legal Advisory	1,88
Total	56,81

- 5) Calculate the theoretical capacity per year
 - a) The work time per department is given in fte. One fte stands for full-time equivalent, which means one full workweek expressed in hours. The formation given in amount of fte is retrieved from the budget report 2013.
 - b) For the municipality of Hellendoorn one full workweek consists of **36 hours**. Multiplying the number of fte's per department by 36, the total amount of hours worked per week can be calculated.
 - c) Since the labor costs are given for the entire year, the amount of hours should also be calculated for the entire year. Normally there are 52 weeks in a year, but the actual amount of weeks that there will be worked is less. The Ministry of Finance provides calculation of the actual workdays a year. The number of available workdays a year is 261. This number needs to be reduced by the number of holidays (7), the average days off due to illness (14), and The average days on vacation (23.5).

The actual amount of workdays according to calculation of the Ministry of Finance is 216.5 days, or **43.3 weeks** (216.5/ 5).

6) The theoretical time capacity per department per year can be calculated by the following equation:

$$\text{Yearly theoretical capacity} = \# \text{ fte} * 36 \text{ hours} * 43.3 \text{ weeks}$$

7) The practical time capacity can be calculated by multiplying the theoretical time capacity, calculated by using the previous equation, with 0.8. The practical time capacity is given in hours, since the theoretical capacity is also calculated in hours.

By following these steps, the practical time capacity of each department can be determined. The next Table shows the theoretical and practical time capacity of each department.

Organization unit	Estimated formation 2013 (fte)	Theoretical working capacity	Practical capacity
Cluster Territory			
Supervision and Permits	24,83	38705,00	30964,00
Public Spaces	14,56	22696,13	18156,90
Roads, Sewers, Traffic	39,06	60886,73	48709,38
Public green and waste	37,27	58096,48	46477,18
Total	115,72	180384,34	144307,47
Cluster Society			
Social Development	17,94	27964,87	22371,90
Employment and Care	25,19	39266,17	31412,94
Civil affairs and Taxation	17,69	27575,17	22060,14
Sports	24,81	38673,83	30939,06
Total	86,65	133480,04	106784,04
Cluster Business Management			
Information and Facilities	30,23	47122,52	37698,02
Finance and Control	16,79	26172,25	20937,80
Personal and Organization	5,19	8090,17	6472,14
Communication	2,72	4239,94	3391,95
Legal Advisory	1,88	2930,54	2344,44
Total	56,81	88555,43	70844,34

To give an example of how the actual practical time capacity is calculated, the practical capacity of the department of Public Spaces will be calculated by using the equation given in 2) and 3).

$$\text{Theoretical capacity} = 14.56 (\# \text{ fte}) * 36 * 43.3 = 22,696.13$$

$$\text{Practical capacity} = 22,696.13 * 0.8 = 18,156.90$$

E. Interviews process activities (time drivers)

Interview Jan Meijerink: Civil Affairs

1. Which consecutive steps are necessary to provide this service?

- ❖ Intake requests
 - In some cases, a letter is sent to address that documents are expiring.
 - The make an appointment at the front office
- ❖ Verification of documents
 - The front office controls if the necessary documents are present or if additional documents are required.
- ❖ Decision making
 - The front office decides whether the request can be granted, or if further research needs to be conducted (e.g. in case of wedding ceremonies between people outside Europe). Feedback is given about the follow-up process.
- ❖ When the requests can be granted, the documents need to be prepared. An external company produces the travelling documents and driver's licenses. The costs to produce these documents must be paid by the municipality. Per product, the municipality pays a fixed amount to the central government.
- ❖ Distribution
 - In some cases, a new appointment has to be arranged, to exchange the documents and to make the payment. Otherwise, the documents can be handed over immediately (e.g. copies of personal data).
- ❖ The last step includes sending the financial data to finance and control, so that they can register the data in the financial database.

2. Which persons/ teams are involved in the process?

- ❖ Civil Affairs → for more than 95%
- ❖ Finance and Control → less than 5%

3. Which amount of time is necessary to conduct the steps in the process?

- ❖ The measure the time at the front office, the municipality uses a software program called GEBOS, to calculate the average amount of time per product for a particular period. The process time of services that can be conducted primarily at the front office, can be easily traced in GEBOS. Normally, travelling documents take about 20 minutes to process and driver's licenses about 17 minutes.

There some other conditions that has to be taken into account. The centralized government is setting maximum prices that municipalities can ask to provide certain services. Issuing ID cards and passports are maximized, so that municipalities are forced to process these services within the determined range. For each ID card or passport, the municipality has to pay the central government for producing the physical ID or passport. This payment is fixed (resp. € 15.30 and € 20.80) and should be integrated in the cost price.

In addition, municipalities are forced to perform wedding ceremonies free, for people who cannot afford to spend that much many. On Mondays, the wedding ceremonies are offered free. The downside of this obligation is that a majority of the couples want to marry on Monday morning. The revenues cannot compensate the costs incurred for performing wedding ceremonies on Mondays.

Interview Koos Nieuwenhuijse: Temporary rental of accommodation

1/2. Which consecutive steps are necessary to provide the service?

- ❖ Intake: Contact finds place by phone

- ❖ Verification (performed by Koos Nieuwenhuijse):
 - controlling presence of necessary documents
 - controlling ownership
 - controlling salability
- ❖ Decision making: the request will either be granted or not
 - When the accommodation is not empty, the permit request will be denied. A new request has to be made when the accommodation is empty (takes 15 minutes to process the second request)
- ❖ Production: Producing the physical permit is done by another employee of public spaces
- ❖ Distribution: the permit is distributed by post, including the invoice
- ❖ Administration: the permit request has to be administered by DIU and F&C

3. Which amount of time is necessary to conduct the steps in the process?

- ❖ The entire process consists of many small activities, which each takes 5 minute to execute. The process from intake till distribution takes about 30 minutes (5 minute per activity) and the administration will also take about 10 minutes (DIU and F&C)
 - So, the process takes about 40-45 minutes
- ❖ When the accommodation is not yet empty, this will add another extra 15 minutes to process the second request. This happens about 50-60% times of all requests.

When someone is requesting to extend his/her permit, this will take 15 minutes, instead of the 30 minutes, because the time for intake, control for ownership and salability do not have to be that extensive.

This service is requested between 40 and 50 times per year and remains stable.

Interview Jan Bulder: market stands and opening hours

1. Which consecutive steps are necessary to provide this service?

The process to grant permit requests for market stands are revised lately. Before, the market trader contacted the municipality to get permission, but this has been changed. Nowadays, the municipality is contacting the market traders, when there is a place available and lets them apply for the spot.

The opening hours of shops is still applicable and is processed following the next steps:

- ❖ Intake: The intake has to be done in writing, either directly to me or through the front office.
- ❖ Verification: The personal data and company information will be checked. In addition, the police will be contacted by phone, to make sure that the public safety is not affected.
- ❖ Decision-making: A note has been sent to the municipality council, to inform about the decision-making.
- ❖ Processing/distributing: a letter will be send to the company that the request has been granted, accompanied by the invoice.
- ❖ Administration: Finance and Control need to administer the financial aspect.

2. Which persons/ teams are involved in the process?

- ❖ Public Spaces → 95% (Johan Bulder)
- ❖ Finance and Control → 5%

3. Which amount of time is necessary to conduct the steps in the process?

- ❖ The entire process will take about 30 minutes, from intake until administration. This service product occurs once or twice a year.

4. Are there any recent developments regarding the above services?

The market stands recently reconsidered and no longer applicable for setting prices. As regards to shopping hours of companies, the municipality council has decided not to allow companies to open on Sundays.

Interview Frederique Geerink-van Woudenberg: Child Day Care centers1. Which consecutive steps are necessary to provide the service?

- ❖ Intake by mail or post
 - Preparing an acknowledgement of request
 - Sending information to Digital Information Utility
- ❖ Verification
 - Controlling the necessary documents
 - If not present, additional information is required
 - If the necessary documents are present and complete, the process will be started.
 - The Municipality Healthcare Institution (GGD in Dutch) performs an inspection on location, because the accommodations as well as the foster parent have to meet certain standards.
- ❖ Decision making:
 - Based on the decision making of the GGD, the the municipality of Hellendoorn formulates their conclusions. The advice can be positive or negative. The decision needs to be registered in the national day care centre database, positive or negative. If the decision is positive, a number is received, which registers the request.
- ❖ Processing
 - The final registration in the nation database needs to be conducted to allow someone to start a day care centre. The necessary documents need to be prepared.
- ❖ Distribution
 - The documents will be distributed by post, attached with the invoice.
 - A rapport has been sent to Digital Information Utilities
- ❖ Administration
 - Finance and Control are responsible for receiving and documenting the payment.

2. Which causes the process time to take longer?

- ❖ When people forget to inform the municipality when they move to another location, they have to request a new permit.
- ❖ When people decide to split up their accommodation to use one part as a day care centre, team supervision and permit has to be involved to make sure that the construction process is done correctly.
- ❖ It also happens often that people are sending parts of the application form on different moments. This will lead to repeating the same activities, which can double the time necessary to process the request.

3. Which persons/ teams are involved in the process?

The standard process involves (1) Information and Facilities, (2) Social Development, (3) Finance and Control, and (4) the GGD. The costs for inspection done by the GGD are fixed, depending on the type of day care centre and the age of children they want taken care of.

4. Which amount of time is necessary to conduct the steps in the process?

The normal process from intake until contacting the GGD to perform the inspection, takes about 15 – 30 minutes. When documents are missing, this will costs another 15 minutes, and when the application form is send in separate parts, this will add another 30 minutes.

The municipality has to make a decision within 10 weeks; otherwise, the request will be temporarily granted. It is often the time needed by the GGD to perform the inspection, which causes the delay in the process.

5. Are there any recent developments regarding the above services?

The day care centers branch organization is proposing to dispense the ability of municipalities recharge costs or, at least, maximize the costs until 500 euro.

Interview Trudy Regtuijt – Mensink: Dispensation of vehicles and parking

1. Which consecutive steps are necessary to provide this service?

In most cases, the permit requests are following a standardized process, which can be handled at the desk. The steps are as follows:

- ❖ Intake request:
 - A person is making an appointment
 - The person explains his request
- ❖ Judging the request:
 - The situation will be examined
 - Why is the road closed off?
 - Is it possible to grant dispensation?
 - The motivation of the person will be examined
 - Is it for a short or long period?
 - How is the person affected by the situation?
- ❖ Producing the permit:
 - Printing the card
 - Require a signature
 - Laminating the card
- ❖ Exchanging the permit

2. Which person/ teams are involved in the process?

Most permit requests can be at the desk. Team civil affairs and Taxation is responsible for activities performed at the desk. When there is a case that needs further examination, someone from team Roads, Sewers, Traffic is involved in the process. In very specific situations, the police have to be informed about the content regarding the decision. In case the decision has influence on the enforcement of the rules, the police will be informed.

3. Which amount of time is necessary to process the different steps?

The process time can be retrieved by GEBOS, which tracks the time spent per product at the desk. When someone of RST has to provide further information (myself), it can take up to 1.5 hours or 30 minutes, depending on the situation and complexity.

Interview Harro Meijer: Recreation Areas

1. Which consecutive steps are necessary to provide this service?

Important to address, is that only the service product mentioned in 1.20.2 is sometimes provided, the other are practically not requested. The services product under 1.20.2 involves a permission to use ground temporarily as a camping area.

The steps to process this permit requests is as follows:

- ❖ People can download the application form from the internet
- ❖ (If not, they make an appointment at the front office)
- ❖ Digital Information Utility receives the application form and they sent it to someone from recreation and tourism.
- ❖ The application form will be checked and determined whether the request can be granted.
- ❖ The permit will be sent to the person and the financial data will be sent to team Finance and Control.

2. Which person/ teams are involved in the process?

- ❖ DIV → team information and facilities
- ❖ Recreation and Tourism → Public Spaces
- ❖ Finance and Control
- ❖ (Front office → Civil Affairs)

3. Which amount of time is necessary to process the different steps?

- ❖ The entire process takes about 15 – 20 minutes, since it often regards requests that can be judged easy. Team Recreation and Tourism consumes the most time in the process.

Interview with Bas van Os: Cemeteries

1. Which consecutive steps are necessary to provide this service?

- ❖ Intake request:
 - Someone is making an appointment at the front office
 - The person is explaining the situation
 - The front office will contact the undertaker to prepare the ground.
- ❖ The undertaker is preparing the ground.
 - The departments Public Spaces and Public Green are involved in the physical preparation of the place. This will included the majority of the time necessary to provide this kind of service.
- ❖ The administration will be sent from the front office to Finance and Control and they will register the information into the financial database.

2. Which person/ teams are involved in the process?

- ❖ Civil Affairs = Front office
- ❖ Public Spaces
- ❖ Public Green
- ❖ Finance and Control

3. Which amount of time is necessary to process the different steps?

- ❖ Intake = about 10 minutes
- ❖ The preparation of the ground can take up to a week, depending on the amount of requests.
- ❖ Finance and Control is spending I think like five or ten minutes to register the financial data.