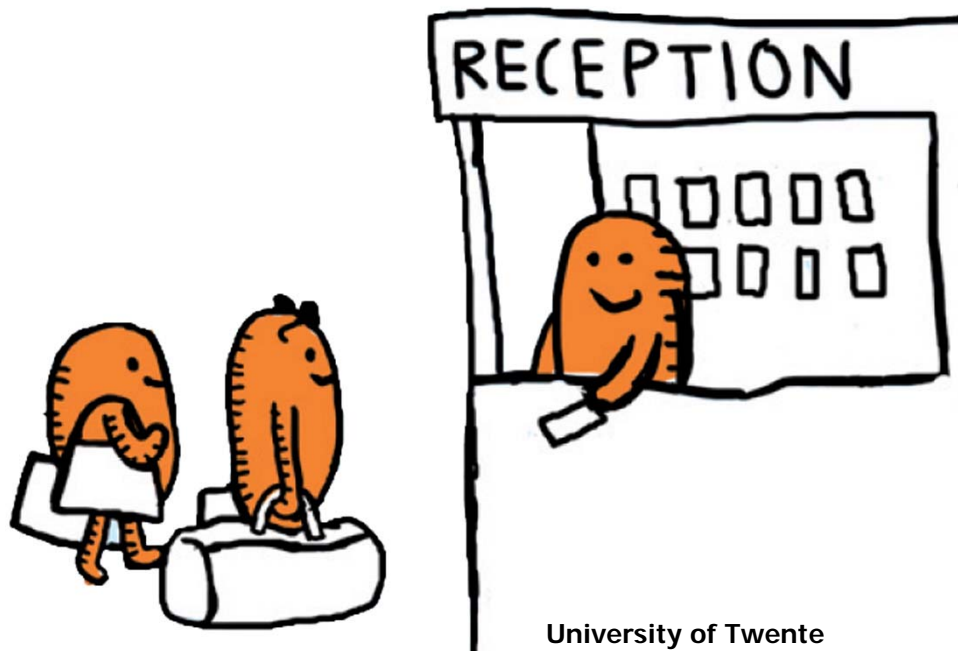


Electronic Payment in the Leisure Industry

How to address market needs for an electronic purse solution



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Special update

Groenlo, January 20th 2009

....Mr Willem Badenhop in the Management Board has decided to leave the Nedap organization after a tenure of 20 years. With effect from May 1st 2009 Mr Badenhop will continue his career outside Nedap... ..Mr Ruben Wegman will as General Director be Chairman of the Management Board.

The change of Nedap's Management Board – as shown in the official press release fragment above - quickly showed to have large consequences for this research. The new general director Mr Wegman showed to have doubts about the market potential and the progress of marketing its products in the Leisure Industry. To his opinion Nedap should focus on other potentially more profitable markets.

Mr Wegman has discussed this matter with Joep Thomassen, my supervisor and responsible for marketing products for the Leisure Market. They jointly agreed to stop marketing efforts towards the Leisure Industry, and Joep Thomassen would start another job within Nedap with immediate effect. This sudden change means that Nedap will not market its products within the Leisure Industry, and it means that the recommendations from my research will not be used anymore for developing a new solution.

Of course this is disappointing since I have always strived to offer good advice to successfully market a new payment solution for this market. To my opinion this could be possible, as can be seen in the recommendations. On the other side I have to admit that developing the new payment solution could be complicated for Nedap (as can be read as well). Therefore I can imagine that Nedap has chosen to focus on other product-market combinations.

Preface

Dear reader. In front of you lays the end result of graduating at Nedap and simultaneously finalizing my three years of master studies at the university.

Working at Nedap was a pleasant time. It has been interesting to see and feel how this company is outstanding in so many ways. Somehow Nedap has managed to create an atmosphere where intensive marketing and rapid product development goes along with a serene workplace. For me it has been an inspiring environment and in I am confident that this special place in Groenlo will stay in my mind.

The days I spent writing this thesis were not always that easy; there were hard days and moments of facing difficulties as well. This is why I would like to thank several people for their support. It took lots of precious time from several people to help me through: First of all Joep Thomassen from Nedap. He spent lots of his time to answer my questions, discuss my issues, read my findings and discuss these again. I am grateful to him because he taught me many things and he always had time for me. There were more; Michel Ehrenhard and Ariane Raesfeld Meijer from the University spent much time too for reading, analyzing and advising me how to properly conduct scientific research. For me as a former student mechanical engineering it took them considerable time to make me clear how to build a research report according to the rules of science. And last but not least my girlfriend, family, colleagues and friends because they supported me and encouraged me to succeed.

Before turning the upcoming pages please make sure there is a good cup of coffee at hand and you are sitting comfortable. I wish you good luck reading it.

Enschede, February 2009,

Niels Markvoort

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1. Introduction

1.1 Nedap

NV Nederlandsche Apparatenfabriek 'Nedap' is an internationally operating company with more than 600 employees and has its head quarters in Groenlo, the Netherlands. Nedap focuses on developing and supplying innovative and sustainable solutions in the fields of security and electronic control units as well as automation, management and information for organizations. Nedap focuses on different markets as shown in figure 1-1. In order to prevent distances between Nedap employees and customers, Nedap has an exceptionally flat organization structure. Excluding its subsidiaries, the organization in Groenlo does not have official divisions, departments or what so ever. All employees formally work directly for Nedap N.V.

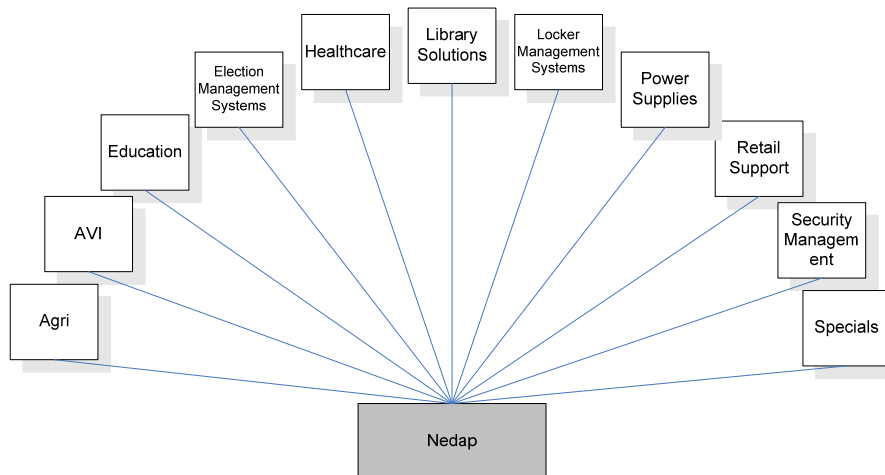


Figure 1-1. Nedap market groups

Despite having informal market group leaders, there is no middle management; there only is a two-headed board of management. Employees have a very high degree of freedom and are encouraged to work in a creative and open way with both colleagues as customers. The creative climate and culture of Nedap is elaborated in Appendix G.

In order to keep the organization in Groenlo focused on innovation, Nedap N.V. has subsidiaries for sales activities and has multiple subsidiaries abroad. All of these are focused on marketing, sales and after sales support. The European organizations are responsible for marketing Nedap products from several market groups. In the Netherlands there are two sales subsidiaries: Nedap Beveiligingstechniek and NSecure. Nedap Beveiligingstechniek is responsible for sales of products from Nedap Retail Support and Library systems. NSecure provides customers the products from Nedap Security Management.

1.2 Nedap and EASi Access

Nedap Retail Support is a customer group within Nedap and focuses on retail shops. Retail Support is one of the larger market groups of Nedap and provides solutions that control loss prevention. Nedap Retail focuses on improving the profits of its retail customers by considering loss prevention as an integrated part of their business process. Years ago, Nedap was the first company that offered an internet connected Electronic Article Surveillance system (EASi Net). The uniqueness of this system was the possibility to provide retail management with useful information and control. EASi Net has been improved continuously and still is a core product of Nedap Retail.

Based on the same philosophy, Nedap Retail recently developed an access management system for retail shops (EASi access). This system offers a unique solution for access management; it does not use door keys, locking codes or keys for show cases. Just like EASi Net it is internet connected and gives retail management the control of authorizing access to specific rooms for employees and others. And EASi access gives insight into the use of stock rooms, offices and show cases.

The uniqueness of EASi access showed to be not only interesting for retail shops. Surprisingly, one of the first companies that showed interest in EASi access was a bungalow park.

Just as retail shops, bungalow parks have difficulties with access management using keys. Keys have to be handed over during check-in and check-out processes. Visitors losing keys force park management to replace locks. Furthermore, many third parties need to have access for cleaning and maintenance services. Keeping track of all keys and controlling access to all park facilities is a costly and time-consuming task, as market research showed (Tuenter, 2007). Nedap Retail saw valuable opportunities for access management within holiday resorts and continued putting efforts to market its system within the leisure industry. At this moment, a pilot project for EASi access within a bungalow park has started. Park management gets the possibility to authorize visitors with access to specific bungalows and facilities as a swimming pool. Results of this pilot will be used for refinement of an EASi access system for holiday resorts.

Simultaneous market research within the leisure industry revealed that many companies not only have difficulties with access management but also need a better solution for their payment processes. Using special coins for showers, using cash for small payments like ice creams and drinks, and distributing the cash around the park seem to be costly. Potential customers made clear that an access management system with an integrated payment solution would be highly valued.

1.3 Electronic Purses

Preliminary research revealed that a payment solution in the form of an electronic purse (a device supplied with a chip where 'money' can be put on) should be most suitable. From a technological perspective, barriers seem to be limited. Current payment solutions (such as electronic purses for public transport and payment cards for vending machines and canteens) are based on standardized technology and Nedap should be able to build a system upon these standards. Possibilities seem good from a technical perspective.

Seen from a market perspective we get another view on electronic payment solutions. Since the late 1990's, many pilot projects for electronic purse solutions – both small-scaled as nationwide - have been launched around the world. Most of the nationwide attempts have resulted in failure. European results are relatively good compared to pilots in other continents, but original expectations have never been met. "In Europe several schemes have simply been discontinued and only a handful are doing reasonably well, particularly in the Benelux" (Van Hove, 2006). After existing for twelve years; with 174.8 million transactions in 2007 (Currence, 2008) the Dutch Chipknip is considered as doing well. However, the original goal for Chipknip was to offer an alternative payment solution for small amount cash payments. Figures show us that in 2007, 80% of all Chipknip transactions were used for parking, vending machines and catering facilities (Chipknip, 2008). For these sorts of payments the Chipknip is a success. For other payments, Chipknip has never reached its expectations for payments. Upcoming implementation of the Single European Payments Area – SEPA - further endangers the Chipknip. With this, SEPA will replace and might end PIN and Chipknip within years.

1.4 Nedap and a payment solution

Nedap had a Recreation market group in the past. This market group offered systems to companies within the leisure industry, including a payment solution. An employee of the former Nedap Recreation underlines difficulties with the past system.

Occurring reliability problems seriously harmed the trustworthiness of Nedap's system. This is one of the reasons that Nedap Recreation withdrew these systems. Nowadays only Nedap LoXS remains with electronic locker systems. Nonetheless, according to current employees of Nedap, there still is a need for a payment solution.

At this point Nedap saw an opportunity for a graduation assignment. Nedap could use advice on how to extend its access management system with an electronic payment solution. Is there a way to create a payment solution that meets customer demands?

1.5 Goal and Problem Statement

Companies within the leisure industry indicate that they would like a system for access management including an integrated electronic payment solution. Nedap assessed the needs for access management within the leisure industry and has installed prototype systems. With this, there is an adequate base to further develop EASi access for the leisure industry.

However, Nedap does not know yet how to create a payment solution. Technologies for developing an electronic payment solution seem to be available. The difficulty lies in the challenge to unite these technologies creating a unique solution that adds maximum value to customers, their visitors and Nedap. The goal is as following:

Creating a unique electronic payment solution that – in combination with access management – offers maximum value to the leisure industry

Reality shows that there is no single appropriate e-purse solution for the entire leisure industry. The right e-purse solution depends on the type of company.

For example the Amsterdam Arena: visitors of this stadium come to see Ajax playing - or the Rolling Stones - and this is their most important drive to come. The Arena is just a place where this superstar or football club is playing, that is why they visit it. The fact that the Arena card is not that easy to use as cash payments can be slightly annoying, but it will not be an immediate reason to stop visiting an event there.

For other companies within the leisure industry, the situation is different. Leisure companies like hotels, bungalow parks and camping parks need visitors to leave satisfied; this makes them come back again or tell their acquaintances about their nice stay. These types of companies depend on their hospitality, and rely on their visitors' perception of hospitality. Leisure companies will therefore carefully consider the consequences for their visitors when deciding to adopt an electronic payment solution.

I presume that many companies within the leisure industry are very sensitive for changes that affect their hospitality. I therefore argue that the leisure industry's investment choices are highly dependent on the solutions' impact on hospitality. For me, as a graduating student, two important pillars need extensive research.

*What do potential customers need for a payment solution?
An what do visitors of these companies require?*

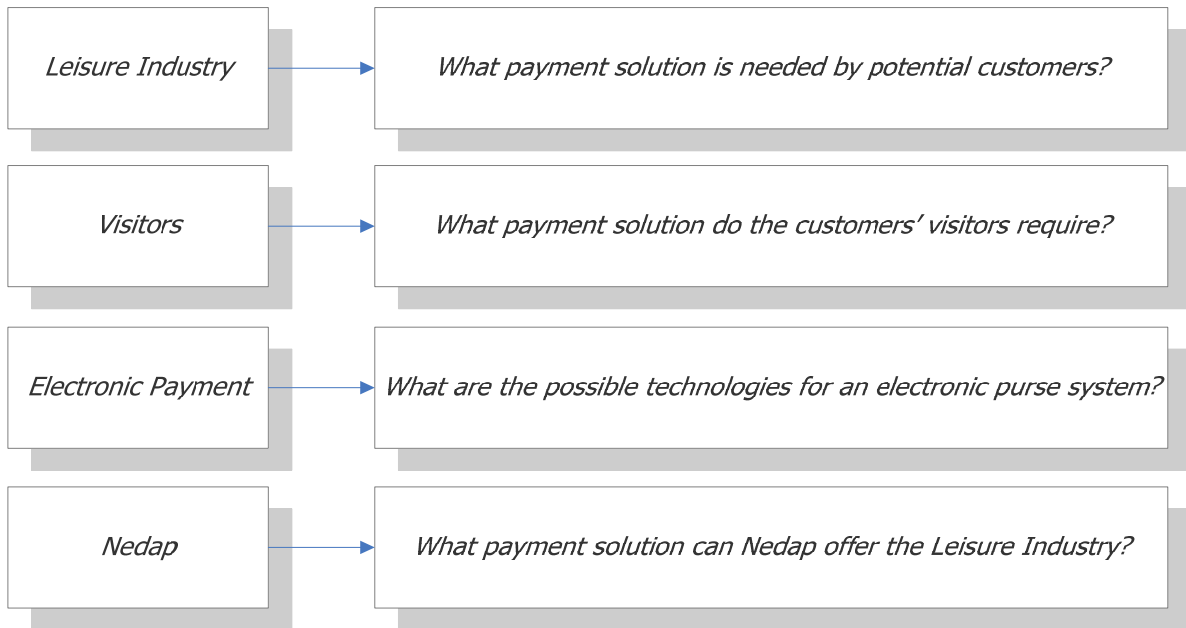
These aspects will form the base of my assignment; all research will be built around these two pillars.

1.6 Research Questions

For Nedap it is important to know what potential customers need, and what their visitors require. These market requirements are useful for upcoming decisions about creating a payment solution.

What are the market requirements for payment solutions and how should Nedap address these?

In order to give an answer to the main research question, several steps have to be made. These steps will provide altogether an answer for the main question.



The questions above mentioned will be the main questions for each research object and form the base of the research. The basic research process is shown in Figure 1-2. This research process will be elaborated in Chapter Three.

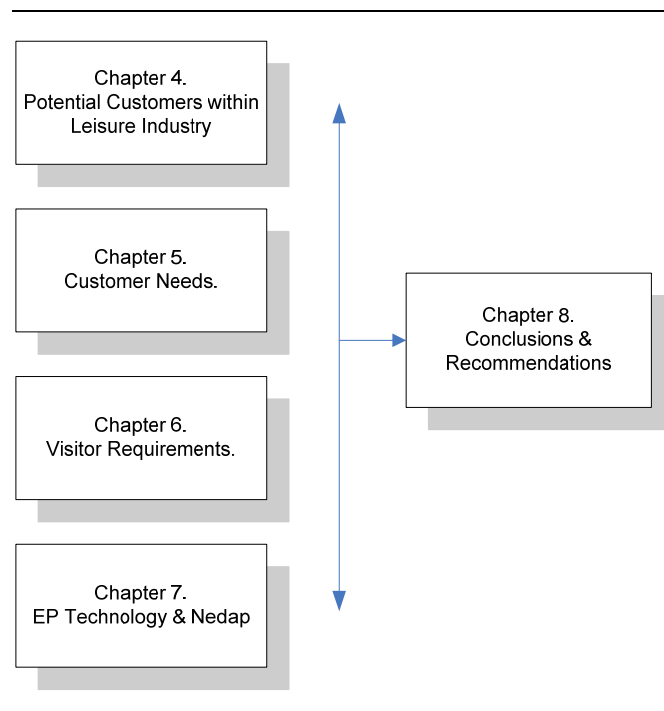


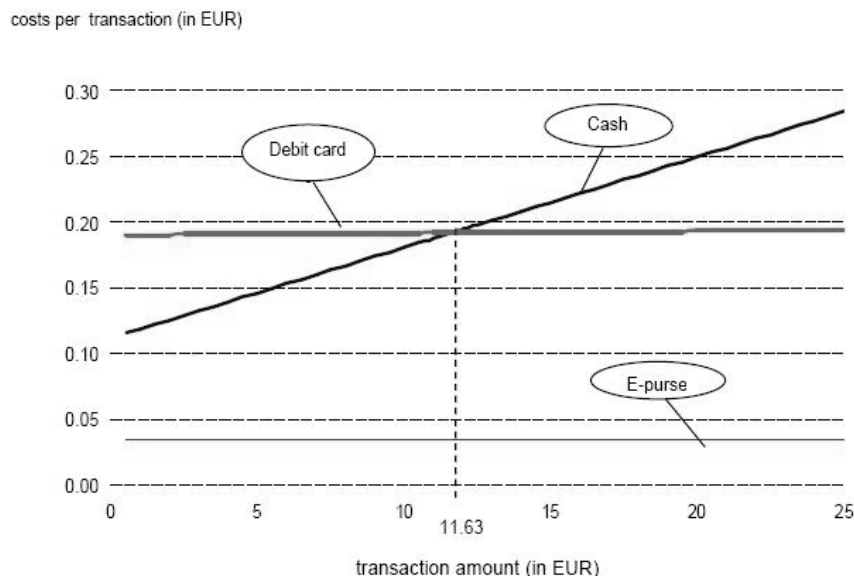
Figure 1-2. Basic research Process

2. Theoretical Framework

2.1 Introduction

"Payment systems and payment services are certainly not for free. They impose resource costs on society, so there is much to be gained by designing payment systems efficiently." (Bolt, 2006). According to Hancock and Humphrey (1998), it has been estimated that in 1995 the US spent 225 billion US dollars just to make payments. This accounts for 3% of US gpd or 3000 US dollars per household in 1995. For the Netherlands, Brits and Winder (2005) calculate that the social costs of various POS payments amount to 0.65% of Dutch gpd in 2002. As can be seen in figure 2-1, costs per payment strongly differ per payment instrument.

Figure 2-1. Variable costs of Cash, Debit card, E-purse. (Derived from Brits & Winder, 2005)



In an attempt to decrease costs for payment systems and services, many organizations have launched systems that facilitate electronic payments.

EP solutions can save enormous costs; they provide advantages for both banks as merchants.

It is known that Electronic Purse (EP) systems have been initiated in many countries around the world. In the upcoming paragraph, an explorative study about EP projects has been done. It is known that many pilot projects for electronic purses have been executed and analyzed. Despite the final goal is to develop an EP solution for local use in leisure companies – which is something different than launching a nationwide public payment solution - it does seem useful to learn about these experiences. In paragraph 2.3, - using Rogers' innovation theory (1995) - an attempt will be made for answering why many EP schemes fail and some succeed. The ways to achieve advantages will be described here as well as ways to avoid failure.

Finding out the reasons for success or failure of an EP system will give me more knowledge about EP systems, and more important: how to develop an EP solution. The last paragraphs of this Chapter address the theoretical approach of this research. Paragraph 2.4 addresses the need for developing a customer driven payment solution and appropriate theories. Paragraph 2.5 elaborates theories of properly investigating customer needs. Paragraph 2.6 describes how Nedap's competitive position will be analyzed.

Altogether this Chapter provides the framework for investigating the possibilities for Nedap to develop an EP solution for the Leisure Industry.

2.2 Worldwide EP projects

"In the first half of the 1990's, when the technology underwent its first implementations, many of the operators of electronic purse schemes – and many analysts, for that matter – had high hopes." (Van Hove, 2000). According to Truman *et al.* (2003) original expectations were optimistic: "...smart card technology presumably offers numerous advantages, including shorter transaction time and greater convenience for consumers, lower cash handling costs and fewer transaction errors for merchants, and greater earned float and less assumed risk for financial institutions." Europay Austria, for example, was confident that their Quick EP would displace 20% of cash transactions within three years of launch. In Belgium, Proton's target was 5% in five years (Van Hove, 2000).

Unfortunately in 2000, many pilots around the world had been shut down because of a largely indifferent public. Other pilots that still ran by then only had limited success. Despite several attempts in almost every continent; the only continent where these limited successes have occurred was Europe (except for Hong Kong). In 2000, Continental Europe was clearly leading the world in the implementation of EP's. This did not mean however that European results were promising. No EP pilot met its original expectations but initiatives in the Netherlands, Belgium and Luxembourg showed relatively good results. To be more specific of relatively good result; the Belgian Proton was a success with an average 1.5 transaction per card per month in 2000. To gain better insights in the reasons of success and failure of EP schemes, several trials have been analyzed more deeply.

Some studies were useful: Truman *et al.* (2003) have thoroughly investigated the New York City trial – which was a failure. Van Hove (2000) has observed and analyzed European EP schemes for many years and carefully described the results of these EP schemes during the first years after launch – with the Dutch Chipknip as a modest success. Chau & Poon (2003) have analyzed the Octopus EP scheme in Hong Kong, and made an attempt to explain why the Octopus card is such an immense success story. Appendix A shows a summary of the analysis of several EP trials. Results of this analysis are elaborated in the upcoming paragraphs.

2.3 Explaining successes and failures

Important lessons have been learned from previous experiences. Using the innovation theory of Rogers (1995), it becomes clear that the success of a future EP solution seems very sensitive to incautious implementation.

Rogers defines five innovation characteristics, including relative advantage, compatibility, complexity, trialability and observability. Tomatzky & Klein (1982) concluded that relative advantage, complexity and compatibility are *consistently* related to adoption and use behaviours. Rogers defines relative advantage as the degree to which an innovation is perceived as being better than, superior to, or advantageous over the idea that precedes it. Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. High relative advantage, low complexity and high compatibility are theoretically related to an inclination to adopt and use an innovation. The study of Truman *et al.* (2003) of the New York City EP trial showed that relative advantage and complexity indeed affect the adoption and use of the innovation. The perceived relative advantage of the EP in the New York City trial showed to be insignificant. Despite being easy to use and therefore limiting the complexity of the innovation, the EP trial was a failure.

Findings from other EP schemes align with Birch (1998). Birch suspected the following: "*retail POS is the least useful place for consumers to tender an e-purse because it does nothing that they can't already do with notes and coins (and it's less convenient)*". Instead, the use of EPs is "*more attractive to consumers in places where notes and coins are inconvenient: vending machines, parking meters, subway tickets and so on*".

As it seems, nowadays in 2008, Birch proved to be right. Except from the Octopus cards being used in retail in Hong Kong, there is no EP that is successful in retail for small purchases. Summarizing the results from worldwide EP pilots; there is one main requirement that shows to be the most important driver of success:

*For achieving success: an Electronic Purse solution needs to offer significant advantages to both operators **and** end users*

When comparing EPs to cash, it becomes obvious that there is no generally preferred payment method. The preferred payment method depends on the kind of payment.

2.3.1 Achieving advantages with EPs

As said, consumers' preference to use either cash or EPs depends on the payment itself. In certain circumstances EPs offer significant advantages over cash, and consumers accept using EPs. When EPs do not offer significant advantages, consumers prefer using cash. Offering high relative advantages to customers with electronic purses is not easily done. There are however several ways of offering advantages I could derive from my research:

Ways to offer relative advantages to visitors with EPs:

Use EPs

- ..when coins and notes are inconvenient
 - ..at unattended points of sale (POS)
 - ..when speed of payment is crucial
 - ..as an all-in-one replacement for access cards, payment cards and cash
 - ..for offering discount prices
 - ..for offering loyalty programs
-

Note that the last two advantages mentioned are of a supplementary kind. Discount prices and loyalty programs do probably not lead to acceptance but could improve the frequency of using EPs.

2.3.2 Avoiding EP failure

In general, perceived advantages of EPs compared to cash showed to be not incredibly high. This is not favourable for the adoption and use of EPs. Reminding the study results of Truman et al., relative advantage fosters the acceptance and use of EPs as an alternative for cash. Complexity of EP usage however threatens the acceptance and usage.

Since the relative advantage seems to be modest, it is highly important to avoid any complexity using EPs. Therefore, one should be highly aware of the lessons learned from previous attempts. Important aspects are as following:

Important aspects to consider for avoiding failure of EPs

- avoid merchants to use both cash and EPs. A dual system does not offer advantages
 - achieve immediate possibilities, and make consumers clear about the possibilities
 - strive for high repetitiveness of use
 - supply readers at unattended POS as much as possible
 - secure ultimate reliability (losing money in an untraceable system drives people mad)
 - replace coins, this is more effective than replacing notes
 - replace cards instead of adding another one in people's wallets (integrate functions like access, registration and payment)
 - secure immediate wide acceptance
-

With these findings in mind it becomes more effective to investigate customer needs, as will be done in later stages of the research.

2.4 A Customer driven EP solution

Nedap does not have the intention to launch a nationwide electronic payment solution for consumers. Nedap focuses on potential business clients, and intends to offer a solution for use only within its customers' companies. According to Truman et al. (2003), there are three different research contexts; *typically* usage of an EP for purchases in communities, *special use* of EPs for e.g. public transport or gas stations and *general use* of EPs in large communities and with a wide range of merchants. The target group of the intended EP solution is for *typically* usage, and this is a completely other group than for instance all inhabitants of the Netherlands.

However, the fact that the intended payment solution is company limited instead of nationwide does not mean a change in common preferences of customers and their end users. Many organizations try to decrease costs for processes that relate to cash payments. Because the costs and risks of cash are often considerable, companies push using electronic payment and try to abandon cash. An example of this development is the Arena card. In the Amsterdam Arena, all points of sale solely accept payments with the Arena card. In this way they accomplished to get a cash-free stadium, this decreases both costs as risk.

The question is however: do visitors appreciate these developments? About ten years ago, Birch (1998) found that people have the attitude to prefer using cash rather than electronic purses for small amount payments. Figures from Bolt (2006) show that in the Netherlands only 2.5% of all retail payments were done by the Dutch EP version, the Chipknip.

In a search for support, I tried to find scientific literature with studies that investigate Electronic Purse solutions. How to develop an electronic purse system? How to make sure that an EP solution suits to usage in the leisure industry? What do customers appreciate in an EP application?

Many studies investigated EP systems and many articles have been found. However, the large bulk of these studies have been carried out from a technical perspective. What are reliable communication protocols for transactions and clearing instructions? See for example Torres *et al* (2007), Lin & Chang (2007) and Fan *et al* (2007). Second most found studies were from a bankers' perspective - what is the ideal fee system, how many costs can be saved – as for example in Wright (2003). It appeared that investigations concerning consumers' opinion towards EPs are very limited. Although there are some studies that investigated end users' opinions in an attempt to explain why EP projects failed, the results are limited.

For the successful development of a new product – an Electronic Purse solution for use in the Leisure industry - it seems highly important to obtain an understanding in what customers need (Kärkkäinen, 2001). Next to the benefits a company can obtain when adopting a cashless payment system, the Leisure industry is likely to be very sensitive towards the opinion of its customers – their visitors. Therefore, I choose to study both the needs of the Leisure Industry as well as requirements of their visitors. This requires a methodology that carefully assesses customer (the leisure industry) needs as well as the customers' customers (the visitors) needs.

In short, the aimed Electronic Purse system will neither be developed from a bankers' point of view, nor from a technological point of view. Instead, customer needs will be carefully assessed and an eventual system will be developed on the base of these needs.

2.5 Investigating customer needs

Many studies have thoroughly investigated customer need assessment methods. Appropriate theories and methodologies are however dependent on many variables. There is a distinction to make between marketing of product market combinations that already exist, and marketing of new products (Urban & Hauser, 1993). Moreover, there is a difference in the type of customers – industrial or consumers (Kotler, 1997; Kärkkäinen, 2001).

Tidd and Bodley (2002) argue that the effectiveness of different tools depend on the *novelty* of the product and the *complexity* of the product. Electronic payment itself already exists. An e-payment system for the leisure industry does not necessarily mean developing a novel product. However, a web-linked access management system with an integrated e-payment system for the leisure industry is, to my opinion, novel. Since the payment system requires sophisticated electronic components and information technology the complexity of the system is, undoubtedly, high.

Table 1. The effect of product novelty on the tools used for new products and services and development. Derived from Tidd & Bodley, 2002.

	High novelty		Low novelty	
	<i>Usage (%)</i>	<i>Usefulness</i>	<i>Usage (%)</i>	<i>Usefulness</i>
Segmentation	89	3.42	42	4.50
Prototyping	79	4.33	63	4.08
Market experimentation	63	4.00	53	3.70
Industry experts	63	3.83	37	3.71
Survey/focus groups	52	4.50	37	4.00
Trend extrapolation	47	4.00	47	3.44
Latent needs analysis	47	3.89	32	3.67
User-practice observation	47	3.67	42	3.50
Partnering customers	37	4.43	58	3.67
User-developers	32	4.33	37	3.57
Scenario development	21	3.75	26	2.80
Role-playing	5	4.00	11	1.00

Despite being most used the usefulness of the tool 'segmentation' for a high novelty new product development has, according to Tidd & Bodley, the lowest score. I argue that segmentation can be useful for a more focused and more efficient marketing process, but agree that a clear assessment of needs and requirements is impossible with this tool.

According to table 1, the most effective tools for development of a novel product are *prototyping*, *survey/focus groups* and *partnering customers*. In this stage, *prototyping*, *partnering customer* and *user-developers* is difficult because of unclear customer needs, resulting in unclear prototype functionalities. Furthermore, risks are high. In case of a failure in the prototype system, actual money can get lost. This endangers the willingness of a partnering customer, the system's reliability, and Nedap's reputation. Furthermore it is costly to develop, build and install a prototype system at a willing partnering customer. Therefore customer needs should get clearer first. As a result, *surveys* seem to be the most important and effective tool at this stage.

According to Verschuren en Doorewaard (1995), there are many survey techniques. The decision for a technique is dependent on what data and what knowledge needs to get clear. In order to avoid choosing an inappropriate survey technique, I searched for more support. A certain study seems suitable. Kärkkäinen *et al* (2001) not only investigate the needs of customers, but addresses other issues as well. It addresses the critical success factor of need assessment for customer-driven product and business development for companies producing industrial products. Furthermore, it helps to ensure that customer needs are considered when making development decisions in the different phases of product development. Without prescribing exactly what process to follow and what actions to take, it presents several tools that help to clarify needs and objectives of customers. More interesting, the suggested process of need assessment – as shown in figure 2-2 - offers a practical process guideline and supplies useful insights.

The methodology of Kärkkäinen aligns with the vision of Nedap as well. Nedap strives for creating products that add maximum value to their customers. Nedap closely cooperates with its customers and highly focuses on the needs of these customers. Based on these needs, Nedap attempts to develop unique products. With this, Nedap tries to develop customer-driven products that offer maximum value to its customers.

Figure 2-2. Selection table for need assessment tools in common need assessment problems. Derived from Kärkkäinen (2000).

	need assessment outline	Creative group interview	Framework for one-on-one interviews	Trace matrix for business chains	Voice of customer interpretation table	Competitive position analysis	house of quality (QFD)	Pugh concept selection table	problem source assessment	assessment of future competitiveness
<i>Customer, Customer relationship</i>										
1. The concept 'customer' is not clear – whose needs should be met?	■			■						
2. What is known about customers and their needs – what more has to be known?	■									
3. From which sources can information about customer needs be found?	■									
4. Customer does not see the customer orientedness of a company		■				■				
5. There are few contacts between company and customer		■	■			■				
6. Needs and goals of customer are unknown		■			■					
7. Customer is not able to express his needs / needs are not understood		■	■		■					
8. It is difficult to see the whole picture of customer needs				■	■		■			
9. Customer business chain is long or complex				■						
10. Difficulties to distinguish the important needs from the less important			■			■	■			
<i>Competitors</i>										
11. Competitive situation is not known or evaluated systematically			■			■				
<i>Development activities, Product development</i>										
12. Time is wasted in development meetings to irrelevant issues							■	■	■	■
13. Distinct goals for product development are difficult to be set							■	■	■	
14. Customer needs are not sufficiently taken into account in development stage.								■		■
15. There are difficulties in choosing the best concepts from many alternatives								■		■
16. There are difficulties in assessing the competitiveness of a new product.										■
17. Lots of defects occur after the launch of the product.									■	
Colours:										
<div style="display: inline-block; width: 15px; height: 15px; background-color: black; margin-right: 5px;"></div> A solution to the problem										
<div style="display: inline-block; width: 15px; height: 15px; background-color: gray; margin-right: 5px;"></div> A useful tool										

Since Nedap does not really offer products to the Leisure Industry yet, the concept 'customer' is not clear. This has to be solved first, and I will do this by starting to gather information from the Leisure Industry. After that, when the concept 'customer' is clear, it is time to assess customer needs. A detailed study for gathering specific knowledge about the organization's choices, needs and requirements is needed. When combining the outcomes of Table 1 and figure 2-2, it seems most useful to investigate customer needs with one-on-one interviews. But how to make sure that the actual needs are assessed when conducting the interviews? As Kärkkäinen shows, it is important to get a whole picture of customer needs. Moreover, the important needs need to be distinguished from the less important.

Anderson & Narus (1998) agree it is highly important to understand what customers value. As they state; "the essence of customer value is to deliver superior value and get an equitable return for it...". The Customer Value Model gives suppliers insights in the customers' business and helps finding ways to increase the value of their offerings. The gathered information from this model is useful for development, marketing and sales of the product/service.

Anderson & Narus explain that building a Customer Value Model is not easy, but it is an effective way of practically finding out and understanding what customers value. Since this is exactly the goal of this research, The Customer Value approach seems useful for this research, and aligns

with Nedap's corporate strategy as well. Using the value model for the future EP development should enable Nedap to offer a solution with superior value to its customers.

Citing Anderson & Narus; "Value in business markets is the worth in monetary terms of the technical, economic, service, and social benefits a customer company receives in exchange for the price it pays for a market offering". Value is expressed in monetary terms such as euros per month. By benefits, net benefits are meant, in which any costs a customer incurs in obtaining the desired benefits, except for purchase price, are included.

A market offering has two elemental characteristics: its value and its price. Raising or lowering the price does not change the value of a certain market offering. Based on the value an offering offers and the price to pay for this offering, customers decide their purchases. Important aspect is that there is *always* an alternative. For example, alternatives for a future Nedap EP solution are cash systems, a special coins system (e.g. showering coins), or a competitors' EP solution. The essence of the definition of value is captured in the following equation:

$$(Value_{supplier} - Price_{supplier}) > (Value_{alternative} - Price_{alternative})$$

In this case, the supplier is Nedap. Simply put, the equation shows that the customers' incentive to purchase a future Nedap offering must exceed its incentive to pursue the next best alternative. The customer value model will be composed by assessing all value elements. Anderson & Narus provide the following steps for developing a value model:

Building a Customer Value Model

1. Generate a comprehensive list of value elements
 2. Gather data
 3. Validate the model and understand variance in the estimates
 4. Create value-based sales tools
-

Value elements are anything that affects the costs and benefits of the offering in the customer's business. To be most effective, the list needs to be as complete and precise as possible. This value model is shown in Appendix D.

Parallel to the actual value assessment it is important to understand what potential customers *really* need. Customers are not product developers; Ulwick (2002) argues that it is important to take this into account when interviewing customers. Customers only know what they have experienced. They do not know the newest technological developments and therefore are not aware of the possibilities. When asking your customers for solutions, there is a high risk of putting efforts in new product development without having success. To be successful, outcome-based customer interviews must deconstruct – step by step - the underlying process of activity associated with the product or service. With this, one should come to the understanding of what customers value, and this "...is a far more fruitful exercise than merely asking them to submit their own solutions."

During the interviews special attention will also be given to weak signals (Ansoff, 1975). Innovative ideas are not only the result of carefully assessing customer needs within a specific theme; they can also come up by coincidence. Nedap strives to take these weak signals serious and find out whether it is possible to come up with unexpected product-market combinations. According to Ansoff, detecting these weak signals could lead to these coincidental innovations and therefore I keep this in mind during the interviews.

2.6 Competitive situation analysis

In order to answer the last research questions (as shown in paragraph 1.5) it is necessary to investigate what EP solutions competitors currently offer. Moreover, it is necessary to find out the capabilities of Nedap. Since Nedap does not offer a payment system yet, most questions in Figure 2-2 are inappropriate. Two statements however are highly important: the competitive situation is unknown and it is difficult to assess the competitiveness of a new (future) product. At a certain moment Nedap has to decide whether and how to develop a competitive product. In order to make a sound decision, Kärkkäinen shows that the competitive situation of Nedap and a future payment solution needs to be analyzed.

3. Methodology

3.1 Research Process

Figure 3-1 shows the research process. It is based on the research questions and guided by the development process from Kärkkäinen (2001) as shown in Figure 2-2. The vertical arrow-ended lines represent a confrontation and evaluation, in line with Verschuren en Doorewaard (1995).

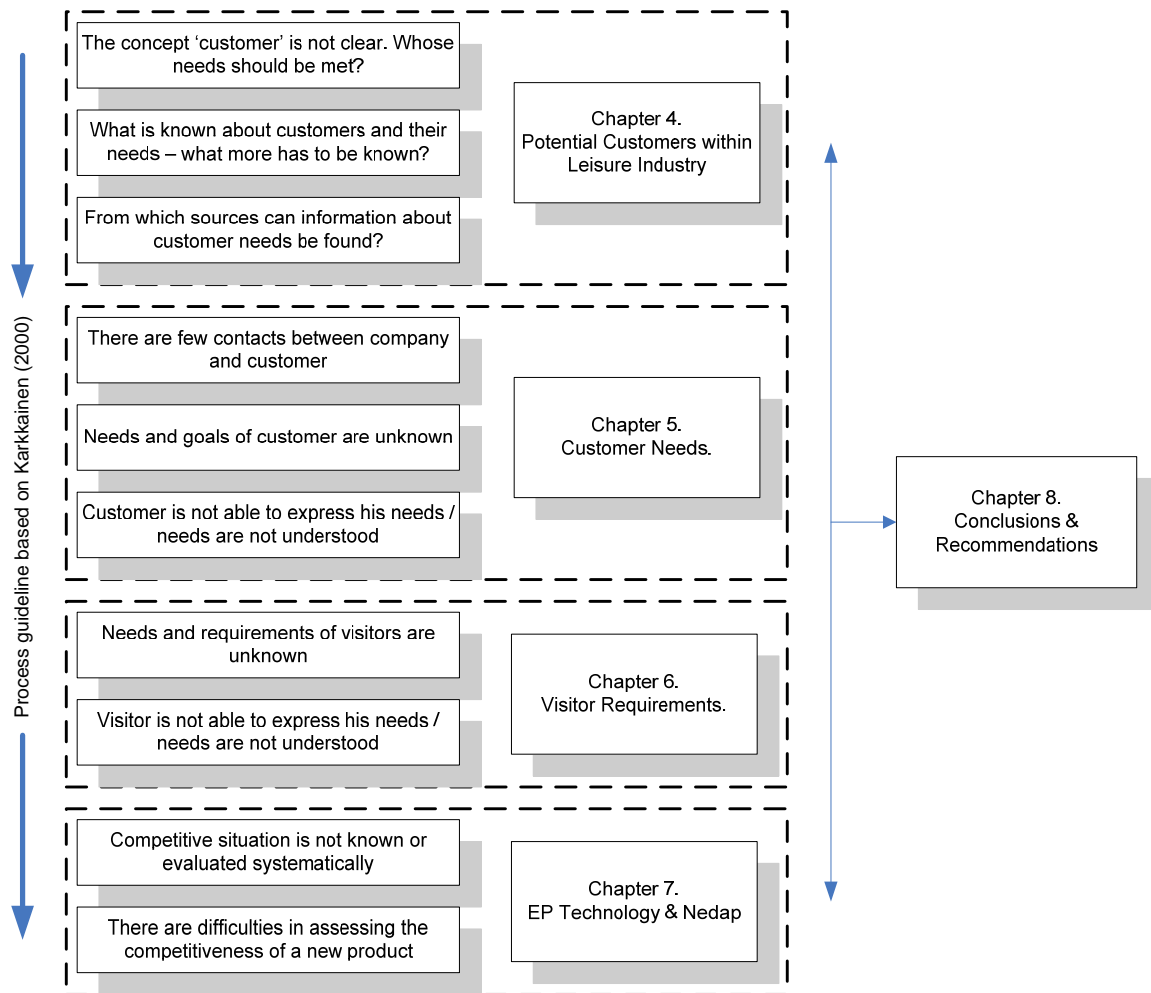


Figure 3-1. Overall research Process.

Chapter Four focuses on deriving customers from the Leisure Industry as a whole. In this Chapter the Leisure Industry needs to get clear and customers need to be derived from a need assessment outline. Chapter Five focuses on the actual need assessment of potential customers. At the end of this Chapter, customer needs should be clear. Since I suspect the Leisure Industry is highly influenced by the opinion of its visitors, Chapter Six will address the requirements of visitors. It needs to get clear what visitors require in a payment solution. The competitive situation of Nedap will be investigated in Chapter Seven. The offers of current suppliers of EP solutions will be investigated, and the competitiveness of a future payment solution that Nedap could develop will be assessed here. Chapter Eight will confront all the gathered information from the previous Chapters, resulting in opportunities & threats and strengths & weaknesses. Conclusions and final recommendations will be described here. The research will end with discussing applied theories and reflecting my research design.

This Chapter addresses methodologies that have been applied in the upcoming chapters. However, not all methodological issues will be stated in this Chapter. For clarity and readability, every research Chapter (4, 5, 6 and 7) starts with specific methodologies elaborated in the introduction paragraphs.

After analyzing the fragments, labeling the fragments was started. This showed to be a delicate matter; labels have changed several times in order to improve the validity. Figure 3-3 shows the result of labeling. All fragments from all employees have been put into one file and were labeled. With AutoFilter I was able to select fragments dependent on labels.

	Label	fragment
278	access & security control	Nou die elektronische deursloten kan je al terugwinnen door je personeelskosten, dat is al terug te winnen.
279	access & security control	met een slagboom is het hele traject weg, dan kan je terug van uiteindelijk 35 receptionistes naar 4. Die daar nog zitten voor de glimlach en de vriendelijkheid naar de klant. Dan heb je mensen die nog vragen als ze binnenkomen: mag ik echt door?
280	access & security control	Daarom zetten zij dat op de meeste parken neer, zelfs op de meest niet rendabele parken zetten we meteen deursloten erop. Is het niet nu, dan voeren we de bezetting op en dan is het zeker tegen die tijd rendabel.

Figure 3-3. Label the fragments, order and reduce the fragments, establish the validity of labelling, define core labels.

Despite being time-consuming the methodology of Baarda *et al* seems appropriate. For the last two steps, *Determine the inter-subjectivity* and *answering the problem statement* I made an attempt to validate the outcomes:

After analyzing the statements and answering the problem statement, outcomes showed that a loyalty system and obtaining purchase information was highly valued by respondents.

In order to determine the inter-subjectivity; respondents have been called. Next to informally speaking about the results, I presented four statements to the respondent. From these four statements, respondents had to agree with two. In this way I made an attempt to validate my conclusions.

The statements are shown in Appendix F.

From the seven respondents, two were not willing to discuss the findings. The remaining five respondents did choose two statements. Since not all respondents explained their opinion, the reliability of the validation is doubted. The conclusions however seem to be valid.

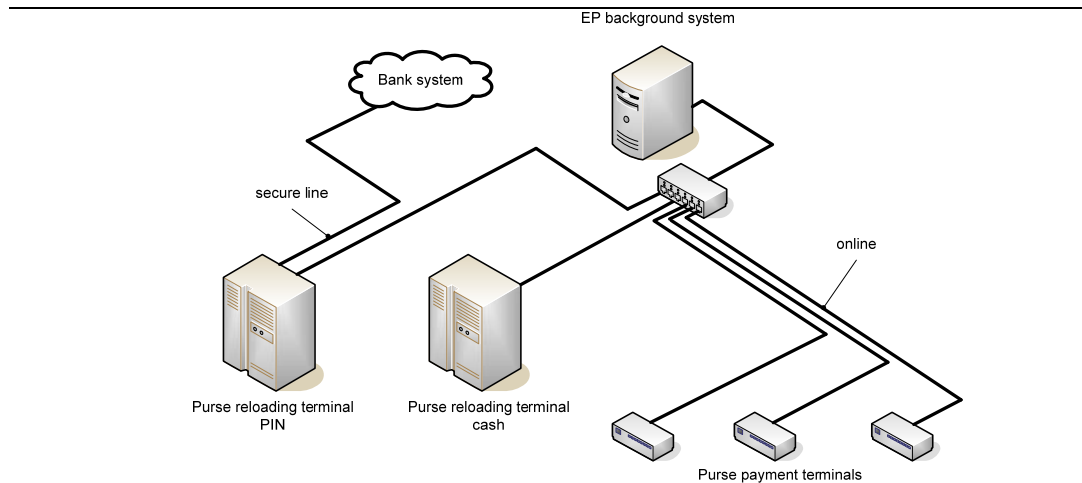


Figure 7-1. Possible *cash in system* architecture.

Figure 7-2 shows a possible architecture of a cash on card payment system. Since all necessary information is on the card, there is no system needed to manage all payments. The cash on card system is, as obvious, remarkably simply. Using this architecture, payment terminals act as money 'destroying' machines. For example, the payment terminal on a sauna 'destroys' money during the time a visitor heats the sauna.

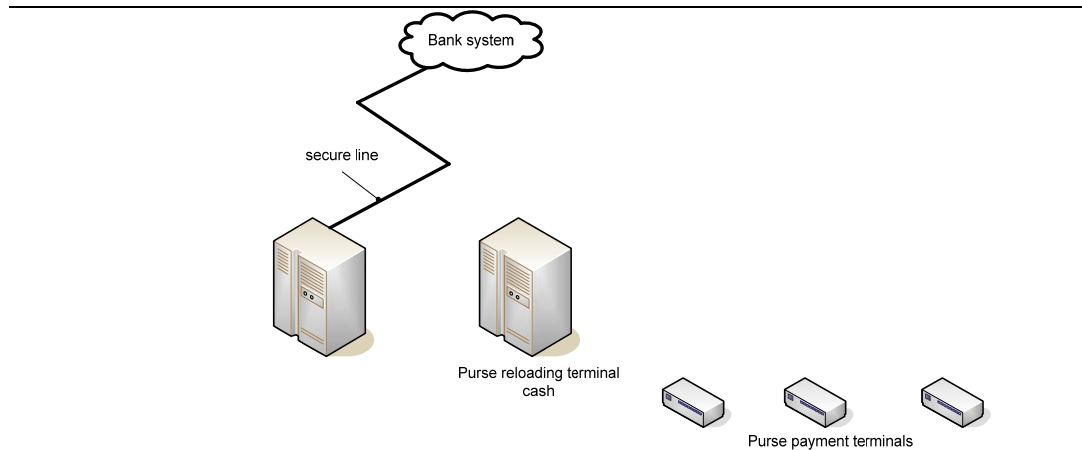


Figure 7-2. Possible *Cash on card* system. No background system or linkages are needed.

As shown the choice between cash in system or cash on card has huge consequences for the design of the payment system. Despite being far less complex, the cash on card system is not always used. Reasons are the limitations a *cash on card* system has. Table 16 shows some main characteristics.

Table 16. Main characteristics of EP architecture.

	Cash on card (offline readers)	Cash in system (online readers)
losing money when losing EP	yes	no
online payment terminals needed	no	yes
insight in payments for park management	no	yes
fraud detection possible	no	yes
integration with dynamic access control system	no	yes
anonymity EP holder	yes	no*
EP usable in different parks of one chain	yes	yes*
System failure when network is down	no	yes

**variations are possible.*

Despite the higher complexity of a cash in system architecture the limitations of a cash on card system cause many operators to implement a cash in system architecture. This enables them to enhance security and offers insights in transactions and spending per POS.

7.2.3 System components

An electronic purse consists of a microchip planted in a device. As shown in picture 7-3, electronic purses can entail contact-chips, or contactless chips with an antenna.



Figure 7-3. Contact chip card, contactless card, key fob, wristband and key.

There are different companies that produce these cards on a very large scale. For Example, NXP produces the well-known MiFare cards and Sony has its FeliCa card. Because of the large scale of these cards, prices have become reasonable. The IC's in the purses can easily and securely store data and communicate with specially designed readers. Readers – or terminals – can charge the cards with an amount of money, and transfer the 'money' to a server. Terminals can be stand alone or connected to a network.



Figure 7-4. Various EP payment terminals.

As Figure 7-4 shows, there are different readers, some are supplied with a display that shows instructions. It is important to keep in mind that leisure companies welcome visitors from different countries. If a reader is supplied with a display, it is important to show instructions in the language of the specific visitor.

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Definitions

CBS

Centraal Bureau voor de Statistiek, a Dutch governmental organization for socio-cultural statistics.

DNB

De Nederlandsche Bank, the Dutch national bank.

EASi Access

The access management system from Nedap Retail Support. It is an internet-connected access management system that facilitates controlling access by an internet portal.

Electric money

An electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transaction, but acting as a prepaid bearer instrument.

EMV

Europay MasterCard Visa, three card payment organizations who jointly developed a framework for compatible chip cards and chip card terminals.

E-purse

Electronic Purse; an electronic device where electronic money can be stored on

EP

Electronic Purse; an electronic device where electronic money can be stored on

Horeca

Dutch term representing the industry of Hotels, Restaurants and Cafés

IC

Intelligent Circuit, also known as Chip.

MiFare

The ISO Standardized Contactless RFID chipcard technology that has been developed by NXP Semiconductors.

Payment instrument

A means of making a payment eg cash, Chipknip, credit card or debit card (PINpas)

PIN

Stands officially for Personal Identification Number, but is by Dutch people (and in this research) often referred to as debit card.

POS

Point of Sale, a point where payments are processed

RS

Retail Support, market group within Nedap NV

Appendix A. Worldwide EP trial results.

European Results

One of the main reasons of the success in Luxembourg was the simultaneous start of MiniCASH *together* with widely installed terminals on public telephones and parking meters. "By the end of 1999, unattended POS (U-POS) applications accounted for more than half of the total volume of transactions (di Bartolomeo, 2000). In Belgium, the most popular use for Proton cards was public payphones. Vending machines equipped with Proton interfaces were the second most popular use. In Austria, vending machines accounted for more than half of the total of Quick transactions.

The French Moneo - that had launched much later – learned from the lessons abroad and its pilot in Tours was rather successful because of the simultaneous installation of Moneo parking machines and the acceptance of Moneo in all the Tours buses. Next to U-POS transactions, public transport also fosters the success of EP schemes. Rolfe (1997, p.13) argued that "transportation is the most effective way of kick-starting an electronic purse project into viability – far more so than cash replacement in outlets like bakers' shops or newspaper vendors' stands".

New York City trial

Truman et al. (2003) have thoroughly investigated the New York EP trial. This trial was a joint attempt sponsored by MasterCard, Visa, Citibank and Chase and ran from October 1997 through 1998. It found place in New York City's Upper-West Side area, where 600 merchants and 50,000 consumers were invited to participate in the trial. Merchants were, after acceptance, supplied with a Smart Card Reader (worth between US\$ 300 and 600) at no cost. After acceptance, consumers were supplied with a smart card that had a stored value of US\$ 25, again at no cost.

During the trial, no transaction fees were incurred by either group. The trial was a costly investment, tens of millions of US\$ were spent to development and promotion efforts. The sponsors were of the opinion that smart card technology would provide several advantages over cash for small purchases in retail shops, both for merchants as for consumers. Despite acknowledging acceptance difficulties, the financial giants expected that the smart card eventually could replace cash for small purchases in retail.

Truman et al. found their assumption - that the perceived advantage by merchants and consumers would positively affect the acceptance and usage of the new technology - supported. Moreover, consumer perceptions of the complexity of using the smart card would negatively affect the acceptance. From an extensive study based on surveys, Truman et al. found the following:

New York City smart card trial results

Merchants found the technology not difficult to use.

Merchants disagreed that the technology lowered costs or reduced transaction time.

Consumers perceived insignificant advantages.

Consumers were not willing to buy extra equipment that could be used for the smart card.

Important remarks

- The marketing campaign could have been unclear. Some consumers did not understand how smart cards were different from credit or debit cards.
- Key merchant sectors as transportation (taxis and subways), communication (pay phones), and retail (vending machines, kiosks, newspaper stands) were not included.
- The geographic area of the trial could have been too little. Many consumers were a large part of their day outside the trial area.
- Consumers use to carry numerous special use cards for video rental, gas station chains, health care, driving privilege and so on. Another card may consumers to experience a "card-overload"
- Cash is not uniformly perceived as inconvenient.

Dutch Chipknip

The Chipknip has been launched in 1996 as a nationwide EP solution. Nowadays in 2008, the Dutch Chipknip still exists. Figures show that there were 174.8 million transactions in 2007 (Chipknip, 2008). Figures show that the Chipknip has made continuous progression since 2002. As it seems the currency transition from Guilder to Euro has fostered the success of Chipknip. This can be explained by the adjustments in payment terminals (e.g. parking meters) to make them Euro - and Chipknip - ready.

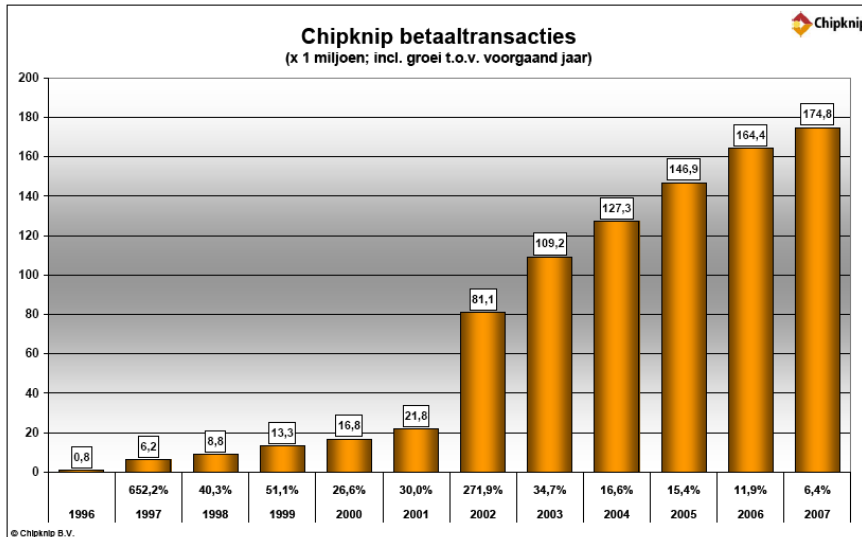


Figure 8-2. Annual volume of Chipknip transactions 1996-2007

Experiences from pilot projects show that the amount of payment terminals influences the number of transactions. There are no figures that show the amount of payment terminals over the years, only the amount of active payment terminals in the previous year is known. In June 2007 there were 103,712 terminals; in May 2008 there were 94,956. This shows a minor decline of terminals. The amount of transactions from January 2008 until May 2008 slightly increases.

It seems that the Chipknip is no more expanding in terms of terminals, but the amount of transactions still is. Additional information tells us more; the Chipknip has strongly positioned itself in the so-called PARVENCA - parking, vending and catering – segment. Figure 8-2 shows that around 80% of all transactions occur in this PARVENCA segment.

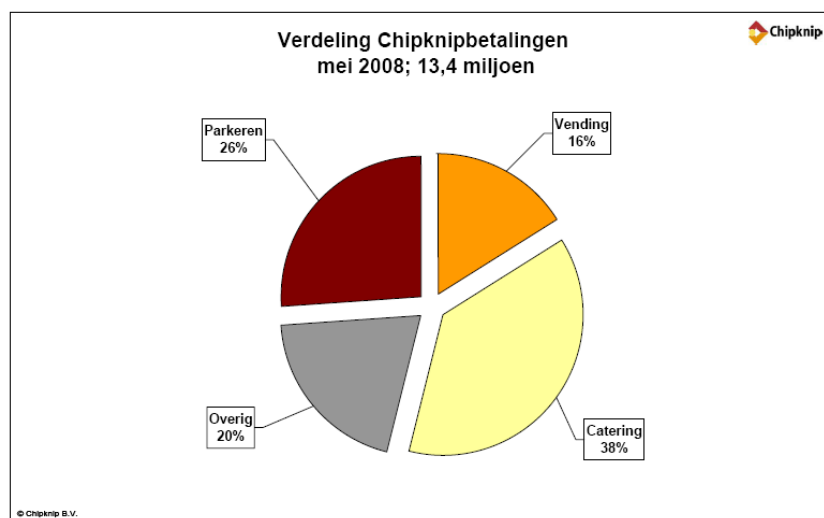


Figure 8-3. Distribution of Chipknip transactions. (chipknip.nl, 2008)

Original bankers' goals to replace cash with electronic purses at retail point-of-sale (POS) have resulted in failure. Consumers seem to have driven the Chipknip towards its current position.

Hong Kong Octopus Card

The Octopus card is a contactless rechargeable payment card for public transport. The system has been launched in 1997 by a joint venture of five public transportation operators of buses, underground, ferries and mini-vans in Hong Kong (Chau and Poon, 2003). The system was a vast success; in 1999 the Octopus system in Hong Kong recorded 30 million transactions *a week*. According to Chau and Poon, its huge success is due to the following four factors:

A captive market with high transaction volume. About 75% of Hong Kong's residents commuted to work with public transport, often using multiple forms of transport. Before Octopus, customers had to pay with different methods - like magnetic stripe tickets for trains - and coins for other types of transport. Octopus represented a win-win for all involved.

The superior efficiency of Contactless smart cards. Regardless of how fast the data read time for the technology is, with the extreme passenger flow of Hong Kong, the physical handling of a normal a slot-based card should be the bottleneck. With the contactless card, passengers need not remove the card from their wallets or purses, they simply wave their cards over the reader. This improved efficiency and convenience but also reduced risk of losing the card.

The direct-conversion approach. In contrast to trials for public transport in other countries, passengers in Hong Kong had no other choice than adopting the new system. The former stored-value tickets just expired, and within several months the conversion had been completed. Despite some technological and logistical glitches during the initial launch, the consortium managed to resolve these problems satisfactorily over time.

Trust among the Octopus stakeholders. The underground railway operator MTRC became the first company to implement the system. The ability of MTRC to coordinate with the other transport operators to deploy the the same system was critical to the success of Octopus because it laid the foundation of standardization, which is usually the most difficult step in deploying any sector-wide system. Despite some operators being competitors, they recognized the potentials and overcame their fears.

Nowadays, Octopus cards are being used by 95% of the population from 16 till 65, generating over 10 million transactions *daily*. Octopus can be used in almost all Hong Kong's transportation systems and also retail outlets, wet markets, self-service businesses, leisure facilities, schools, parking and access control (octopus.com, 2008). These facts show the tremendous success of Octopus, but how did they accomplish this? As it seems Octopus continuously expanded its system over time. Figure 8-3 shows the Octopus milestones.



Figure 8-4. Octopus Milestones (octopus.com.hk)

Remarks and limitations

In the attempt to find explanations for acceptance and usage of a future Electronic Purse solution, the literature seemed useful. There are however important limitations to the study that has been carried out this far.

Currency system

First of all, it became clear that – despite worldwide attempts - European voluntary EP scheme results seem to be better than others. What would be the reason of this? I suspect that – next to the previous reasons mentioned – there are other important aspects causing the differences. One of the differences that could highly influence the success of EP schemes is the currency system – and its resulting societal behaviour.

Compared to European currency systems, the US dollar system is different in several ways. US citizens use bank notes way more than Europeans – 0.50\$ and 1\$ coins are rarely used compared to 1\$ notes. In the Netherlands for example, notes were starting only from about 5\$ (NLG 10,-). Today's Euro system even uses coins until a bank note worth about 7.50\$ (€ 5,-). This results in Americans less using - and caring about - coins than Europeans. This while replacing coins showed to be more effective than notes.

Moreover, countries show to have large differences regarding card payment. The US is characterized by a high usage level of credit cards. On the contrary, other countries rarely use credit cards but mainly use debit cards instead - or solely cash.

Scale

Until now, only EP trials have been studied that took place on a wide scale. The acceptance and usage levels can be fully different when launching an EP system in a closed environment with a community less than e.g. 1,000 consumers. Smaller scale trials could cause consumers to be more easily aware of the possibilities, they could get used to the system more easily, and they could discuss and help explain their experiences with other consumers inside the community.

Recent E-payment developments

Some findings have been based on ten year old studies. The poor results in the past could have been caused by the fact that people simply were not ready for this kind of electronic payment instrument. Recent payment solutions like online shopping & purchasing, Internet Banking and iDEAL have been accepted widely and are being used more and more. I suspect that these developments influence people's opinion toward electronic payment methods.

Voluntary versus obligatory

As the Octopus launch made clear, it can foster success to oblige people using the new payment system. Hong Kong commuters simply had no other choice than to start using Octopus.

This could however seriously endanger a success as well. Visitors stay voluntary at leisure companies. If they are obliged to use an EP system and this system shows reliability errors or usage complexity, the visitors could simply end their stay and never come back.

Commercial interests

As we see in the case of Octopus, the project has been initiated by public transport operators. These companies have no obvious commercial interests; the Octopus holding was founded as a non-profit organization. The New York City trial was sponsored by commercial companies. Despite heavy investments, it is commonly known that these companies have the objective to gain profit eventually. I suspect this could influence people's attitude towards the initiatives.

Questions for further research

It seems useful to investigate current usage levels and customer satisfaction at small scale EP user communities. In this way; two unknown aspects can become clear. First we get to know up-to-date knowledge, second we can investigate small scale effects more deeply.

Appendix G. Nedap Culture

Nedap is very customer-focused. In close cooperation with (potential) customers, Nedap strives for developing unique solutions that add maximum value to its customers' processes.

However, staying ahead of competitors is, as Jan Romein (1937) argued with his "*Wet van de remmende voorsprong*", highly difficult to maintain. Many successful companies at some moment lose their competitive advantage and get beaten by others. By organizing around customer groups, Nedap is able to put itself in the position of its customers.

This kind of organization is only successful if employees act responsible. Nedap requires employees like entrepreneurs, working in a high degree of own responsibility and perseverance.

"If you are of the opinion that you have knowledge, added value, that Nedap has not, but has a need for, you can contact us whilst underpinning your added value for Nedap."

Working like an entrepreneur not only stands for own responsibility and perseverance. It is also known that intrapreneurs are '*the dreamers who do*', and that they can increase the speed and cost-effectiveness of technology transfer from R&D to the marketplace (Pinchot III, 1987). Nedap seems to be highly aware of this, as director Willem Badenhop explains.

"Most important when doing your work is to pretend it is your own product and you are responsible to satisfy the customers yourself"

It shows that Nedap's philosophy aligns with the findings of Pinchot: 'You cannot have cost-effective innovation unless you hire, train and encourage intrapreneurs'.