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Information system paths

Acquisition as a critical event

Turku School of Economics/Information System Sciences

Master's thesis

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The purpose of this study is to elaborate on the difficulties organizations can face when switching an information system. This study assumes that the acquisition is a critical point in the path that the information systems life cycle will follow.

This study was conducted as a qualitative study utilizing interviews as the data collection method and grounded theory as a tool to analyse the findings from the interviews. In total seven interviewees were interviewed from six different organizations. Three of the organizations were system providers and three were users of information systems.

The study found that there are two distinct phases that are critical in acquiring information systems that have not been mentioned in previous literature. Also, the study extended the path literature when it comes to the reinforcing mechanisms that help form the path by adding two new mechanisms to the list. The new mechanisms are the relationship with the provider and system customization. As a final finding, the study also showed that a lock-in situation can be a very positive partnership between a system provider and a customer at its best.

The study offers new concepts for the fields of marketing and information system science to explore further. The new concepts found must be taken as results from a narrow set of interviews and need further research to fully understand the effects.

Key words: Organizational buying behavior, path theories, information system acquisition.

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Tämän tutkielman tavoitteena on avata organisaatioiden kohtaamia hankaluuksia liittyen tietojärjestelmien korvaamiseen. Tutkielman ohjaavana ajatuksena on, että hankinta on kriittinen kohta polulla, joka muodostaa tietojärjestelmän elinkaaren.

Tämä tutkielma on toteutettu laadullisena tutkimuksena käyttäen haastatteluja aineiston keruu menetelmänä sekä ”grounded theory” -menetelmää aineiston analysoinnin työkaluna. Kokonaisuudessaan tutkimuksessa haastateltiin seitsemää henkilöä kuudesta eri organisaatiosta. Näistä organisaatioista kolme oli järjestelmätoimittajia ja kolme tietojärjestelmiä käyttäviä organisaatioita.

Tutkimus paljasti, että tietojärjestelmien hankintaan liittyy kaksi vaiheita, joita ei ole esitelty aiemmassa kirjallisuudessa. Lisäksi tutkimus täydensi aiempaa kirjallisuutta liittyen teknologisiin polkuihin niitä vahvistavien mekanismien osalta lisäämällä erilaisten mekanismien listaan kaksi uutta mekanismia. Uudet mekanismit ovat suhde toimittajan kanssa sekä järjestelmän kustomointi. Viimeisenä löydöksenä tutkimus näytti, että parhaimmillaan lukkiutumistilanne voi olla myös positiivinen kumppanuus kahden eri toimijan välillä.

Tämä tutkielma tuo uusia konsepteja markkinoinnin ja tietojärjestelmätieteen aloille tutkittavaksi lisää. Uusia konsepteja tutkittaessa tulee huomioida, että ne ovat esiintyneet verrattain pienen joukon haastatteluissa ja näiden ymmärtämiseksi niitä tulee tutkia vielä lisää.

Avainsanat: Organisaatioiden ostokäyttäytyminen, polkuteoriat, tietojärjestelmien hankinta

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1 Introduction

1.1 Situation

Organizations use information systems to pursue their strategic goals (Arvidsson, Holmström, & Lyytinen, 2014). The link between organizational strategy and information technology strategy is a key concept in realizing the motivation behind the information systems usage. To understand why a certain organization uses a certain information system there should be some reasoning about how that information system helps the organization to reach its strategic goals. Alshamsi et al. (2019) emphasize the importance of having strategic management for information systems in place to enable the achievement of the organizations' strategic goals.

Doherty and Kerry (2009) argue that it can be challenging for organizations to gain a sustainable competitive advantage by using a certain information technology. The competitive advantage is usually perceived to be gained by lowering costs or by enabling differentiation from the competition. However, the technology itself can be quite easy to copy. To gain a sustainable advantage then, organizations need to carefully consider the IS capabilities that support the usage of the technology to its full potential.

For an information system, the most critical period is the specification and the initial development. As Rajlich and Bennett (2000) point out after these phases the backbone of the system is in place and changes start to become more minor. So, to understand the key concepts and motivation in the background of an information system one must critically look at the acquisition period. The acquisition period can also be viewed as the one with most risks and concerns. Riihimäki and Pekkola (2021) emphasize the importance of the early phases in the cases on public buying specifically.

There is also a popular literature stream referred to as path theories in this study. These theories are path dependence, path creation and path constitution. They all share the same basic message that past decisions influence today's options. (Arthur, 1989; Garud & Karnoe, 2000; Meyer & Schubert, 2007) One of the path theories findings is that organizations can end up in a situation where they become locked-in to a certain technology as they no longer have other options due to their previous actions. (Sydow, Schreyögg, & Koch, 2009).

The differences in path theories lie in how a lock-in can be dismantled. According to path dependence research only an external shock can push an organization off their current path. In path creation literature the organization is actively developing alternatives which may not be in line with their current path to keep their options open. Path constitution is the combination of the two before mentioned. It recognizes that dependence and creation are like the opposite ends of a continuum where most organization will be positioned somewhere between the extremes. (Arthur, 1989; Garud & Karnoe, 2000; Meyer & Schubert, 2007)

A lock-in refers to a situation where the options of an organization are limited for some reason. This can lead ultimately into a situation where there are no longer any alternative options available to a currently used technology. There are different ideas of how a lock-in can manifest. For example, lock-ins on a market level can be quite different from an organization level lock-ins (Sydow, Schreyögg, & Koch, 2009). The effects of a lock-in situation have not been at the centre of previous literature, however.

Organizational agility concerning information systems has also been a topic in many other articles. Tallon et al. (2019) present a literature review going over the previous literature about the topic which can be closely referred to the same concepts as in the path theories. This is outside of the main scope of this study but provides an interesting stream for more research in the future.

1.2 Problem

There are different ways in which technological organizational paths form. Different path literature concepts have slightly different ideas about the reasons and motivations behind the organizational decisions. All path literature concepts, however, agree that organizations are somewhat locked into the choices they have made. (Arthur, 1989; Garud & Karnoe, 2000; Meyer & Schubert, 2007)

There is quite a lot of literature available about the formation of a lock-in situation. This study will aim to add to that literature with the following questions:

- How can the formation of a lock-in be affected?
- What are the effects of a lock-in situation, can it be seen as a positive thing?

Also, it is quite clear that one of the most critical steps in the life cycle of all information systems is the acquisition process. However, there does not seem to be much literature explaining the acquisition of information systems especially. This study will aim to answer the following question:

- Are there specific factors to consider when acquiring an information system?

The two gaps in the literature are the main focus that this study aims to answer. They can be researched in the same study since there is a strong connection between the acquisition and the life cycle of an information system.

1.3 Response

The goal for this study is to find out the status of information system paths in Finnish organizations. This is done with a special focus on situations where a path becomes locked-in. A lock-in in itself might not be harmful though, so a key focus is to recognize in which situations a lock-in can cause problems for the organization.

The structure of this study is the following. In chapter 2 previous literature of organizational buying and information systems in general is reviewed to find out what are the key characteristics organizations pay attention to when acquiring information systems. The acquisition phase is critical because it is the timeframe when the organization is most open to change and different ideas.

Later in chapter 2 path dependence, path creation and path constitution literature are summarized to gain insights into key concepts behind the phenomenon. Path studies have provided a tool to inspect lock-in situations with a focus on the organization's historical decisions as a driver for the current situation. In chapter 3 the methodology of this study is presented and the key practicalities surrounding the study are highlighted. The selected methodology is grounded theory using qualitative interviews. In chapter 4 the results of the interviews are presented. The chapter is divided into subchapters based on a categorization done on the interviews to find out the central themes which were discussed. Chapter 5 presents the analysis where the key findings of the interviews are compared to what the literature has presented before. This is divided into two parts similarly to chapter 2. Finally, Chapter 6 presents the conclusions of this study.

1.4 Evaluation

The methodology chosen for this study aims at presenting the situation related to the life cycles of information systems and their acquisition in Finnish organizations. This leaves out all systems aimed at consumers. Also, there might be differences in different cultures and countries which this study will ignore. The results should provide useful ideas for practitioners which should be taken into account when planning the use and acquisition of information systems. This type of thinking should help in avoiding situations where an information system is limiting the performance of the organization. For academia, the results will provide new insights into when a lock-in should be avoided. This can lead the path research into further analysing which step during its history the path becomes harmful for an organization.

2 Literature Review

The literature review focuses on finding out what has been discovered in previous literature about the issues central to this study. These key concepts are organizational buying behaviour and the lock-in effect which is introduced in path theory literature. This chapter is structured around these two concepts. First organizational buying behaviour is defined in terms of marketing literature which has much research on the topic. After that, issues specific to purchasing information systems are discussed. Second, the lock-in effect is defined and the key reasons behind the phenomenon are highlighted. Also, some ways to deal with the lock-in effect are presented.

The organizational buying behaviour is important because this study focuses on organizations that are acquiring information systems or have done so. It is crucial to understand how the process of acquiring information systems works to understand its relation to the lock-in effect.

The lock-in effect is at the very centre of this study, so it must be defined, and its background researched to gain the knowledge needed to look at how the phenomenon is dealt with in practice.

2.1 Acquiring Information Systems

When organizations make purchases, the decision-making is generally considered much more complex than in a consumer market. Some of the reasons behind this are that in an organizational context there are budget and profit pressures as well as there are motivations of different individuals and business units that could be colliding. (Wind & E. Webster Jr, 1972) The aim of this section is to summarize key aspects of organizational buying behaviour and learn what specifics there are when it comes to acquiring information systems.

2.1.1 Organizational Buying Behaviour

Organizational buying behaviour has been researched by the marketing literature since the 1960s. The article by Wind and Webster Jr (1972) tries to sum up the previous literature into a model of organizational buying. They start from the environment of the buying organization. The environment sets some boundaries under which the organization must

operate. It is crucial to analyse the business environment to gain a good understanding of what it means for the companies operating in that environment.

The environment then affects the way a company is organized. The organization itself influences the buying process through four variables. **Organizational tasks** refer to which process is the buying situation related to. This affects the importance and way the purchase is dealt with. **Organizational structure** is also key as it defines the roles and responsibilities of business units and individuals in organizations. The structure has a strong influence on how different types of information and commands flow through the organization. **Organizational technology** affects the needs of the organization as anything new must be able to work with the existing technology. This means that the existing technology limits the options available to the organization. **Organizational actors** is the last variable. It means the individuals included in the buying process. They are often referred to as the buying centre. Usually, there are people with distinct roles in a buying centre. These roles are users, influencers, deciders, buyers and gatekeepers.

To understand how the buying centre works better, the social interactions within the buying centre need to be analysed. The key here is to understand the role of every individual in the buying centre and the ways they interact with each other and outsiders. This can help a salesman to act in a way that is expected by the different members of the buying centre.

Finally, also the individual level must be considered. Every individual making decisions inside the buying centre has their own motivations and reasons for their choices. Individuals can be categorized by their behaviour into groups, but ultimately every individual makes decisions differently, so it is important to try to recognize the motivations behind the decisions. These motivations can be task-related or non-task-related. Task-related motivations are those that are closely connected to the organizational activities and their completion as non-task-related motivations are more personal preferences.

As can be seen from this modelling of the organizational buying by Wind and Webster Jr (1972) there are many things to consider if one wishes to understand how organizations make buying decisions.

The article by Jagdish Sheth (1973) is an early attempt at modelling organizational buyer behaviour. He argues that individual expectations, product- and company-specific factors, joint decision-making and situational factors are key to understanding organizational buying.

Individual expectations are heavily reliant on individuals' background and their information sources. These expectations make different options seem most favourable to different individuals included in the buying process. This is quite similar to the individual level Wind and Webster Jr (1972) mention.

Product- and company-specific factors affect the type of buying process. The product can be either a once-in-a-lifetime investment or a repetitive purchase. These two will have very different buying processes. Also, the amount of risk associated with the purchase influences this greatly. Company-specific factors include company size and orientation, for example. These will also play a key part in how the buying process plays out. These two concepts relate strongly with the organizational structure and organizational technology from the model by Wind and Webster Jr (1972).

Joint decision-making is present every time there is a situation where many individuals are included in the buying process. There are many ways to solve the probable disagreement of individuals with different motivations and expectations. The key is to know how disagreements are settled. This is closely related to the social interactions of Wind and Webster Jr.

Situational factors are not strictly related to the rational decision process inside the organization, but still can manage to influence the situation. These are closely related to the environmental influence of Wind and Webster Jr (1972).

Johnston and Levin (1996) later summarized discussions about organizational buying from the beginnings in the late 1960s to the mid-1990s. They conclude that there have been three major contributions to the discussion. These three are:

- “Industrial buying and Creative marketing” by Robinson, Faris and Wind (1967)
- “A General Model for Understanding Organizational Buying Behavior” by Wind and Webster Jr (1972)
- “A Model of Industrial Buyer Behavior” by Sheth (1973)

Johnstone and Levin show that the three contributions have quite similar concepts and that they identify that the models have been very consistent with empirical research conducted in the field. They also add some new concepts which they found in the articles reviewed for their paper.

Inside the company, new concepts are decision rules and role stress. **Decision rules** are formed by the environment and the organization as well as the type of purchase. These rules can be written formally or very informal. **Role stress** refers to a situation where there is a conflict of interest between an individual's motivations and the expectations for his role.

Johnston and Levin (1996) also noted that many articles did not explain what was happening inside the buying company only but were also trying to explain **the buyer-seller relationship**. The relationship is affected by all the variables mentioned before as well as similar types of variables inside the seller firm.

Lastly, they recognize that **communication networks** exist both inside the buying company and on an interfirm level with the potential suppliers. Also, there can be communication channels between buying firms where they can exchange information about their experiences.

From all the articles they reviewed Johnston and Levin (1996) highlight the importance of risk perceived as a key factor in how the buying process shapes up. In summary, they argue that the greater risk perceived for the purchase the more complicated the buying process is.

In more recent marketing literature focus has shifted from describing the steps and concepts crucial in the buying process to the buyer-seller relationship and value as a mean of gaining a competitive advantage. The need to manage the interfirm relationships was first discovered around 1985 by Jackson (1985). This trend has led to a situation where many organizations have a few long-term key suppliers with whom they work closely together (Kalwani & Narayandas, 1995).

As buyer organizations have moved towards the model with key suppliers, the supplying organizations have realized the need to differentiate from one another. This differentiation can help them in securing the key supplier status. One of the key ways to differentiate has been discovered in literature as offering superior value. The key here is that the supplying

organization must either offer benefits to the customer or lower their costs (Narus & Anderson, 1998).

Ulaga and Eggert (2006) summarize the ideas presented above into a matrix. They divide the value that the relationship is evaluated on into benefits and costs. On the other hand, they divide value creation into the core offering, sourcing process and customer operations.

Sources of Value Creation	Relationship Value Dimensions	
	Benefits	Costs
Core offering	Product quality Delivery performance	Direct costs
Sourcing process	Service support Personal interaction	Acquisition costs
Customer operations	Supplier know-how Time to market	Operation costs

Table 1 Value drivers in Key Supplier Relationships by Ulaga and Eggert (2006)

In their empirical studies, Ulaga and Eggert (2006) discovered that out of all cases 80% of the time benefits were the key driver for value in a buyer-seller relationship. When it comes to the sources of value creation, according to their study the sourcing process has significantly more potential than the other sources. This shows that the actual product is not the key anymore in these relationships, but the focus must be shifted to service and support.

Heikka and Mustak (2017) investigate in their recent paper the purchasing of knowledge-intensive business services. Computer- and information-related services fall under this umbrella term. They argue that these types of buying decisions are carefully done as they can have large impacts on the buying organization in the future. Their aim is to study the factors influencing these decisions. They also point out that some of the previous research surrounding the topic has had a focus on the procurement of physical goods which means it might not be applicable to these types of services.

There is a clear link between purchasing of knowledge-intensive business services and the performance of the purchasing organization. The main difference between these services to tangible goods is that they can be more difficult to specify and agree upon. The services are usually provided by a service provider which the buying organization

should build a strong relationship with. This can help to overcome the difficulties in defining the service specifications.

Heikka and Mustak (2017) also combine notions from previous literature to create an understanding of the purchasing process of knowledge-based services. The process starts with the recognition of a need. Then the buying organization defines their purchase goals which define what type of service they need, and which service providers can help in fulfilling the need. Next, these providers are compared and the one that provides the best fit into the organizations' purchase goals is chosen. Then the service is assessed during and after the service delivery.

With their empirical research, Heikka and Mustak (2017) discovered eight factors that affect the buying decision in organizations when buying knowledge-intensive business services. A single purchasing decision can be influenced by any combination of these factors. The factors are presented next.

Convincing value propositions help the service provider in assuring the buying organization that they can provide a service which is beneficial. This factor is especially important to consider on the service provider side as it can help sales considerably. The quality of the service is difficult to perceive before the purchase decision, so the **perception of service quality** has a significant role in the decision-making. The perception is affected for example by the providers' reputation and customers' past experience. The perceived service quality can be the difference between competing service providers. **Perception of potential risk** can affect the willingness to purchase a service. The lower the perceived risk, the more willing the buying organization is. The service provider can lower the perceived risk by carefully explaining the risks and how they are dealt with. **Potential for customization** is crucial as the services usually have to be customized to fit the processes and the structure of the buying organization. This has led to many service providers selling their services in a modular fashion which enables the customer to select the functions that they need. **Quality customer relationships** play a key role as the services require both organizations to work together for the best result. A good relationship helps both parties as the provider gets to know their customer and learns what is valuable to them and the buying organization is in a position where communication is easier and there is trust in the service provider. In organizations, there are always people with different amounts of decision-making power. This leads to

individual preferences playing a key role in decision-making. This is closely connected to the relationship between the provider and buying organization as the relationship is in the end between participants from both organizations. **Geographical proximity** can also influence the decision as in many cases face-to-face meetings are the preferred form of communication. The last factor is the **availability of information**. The buying organization clearly needs to have a good understanding of the service to make a decision and the more information they have available helps them in making this decision.

Heikka and Mustak (2017) divide the factors into two groups: those that are related to the actual service and those that are related to the service provider. This division is presented in figure 2 below.

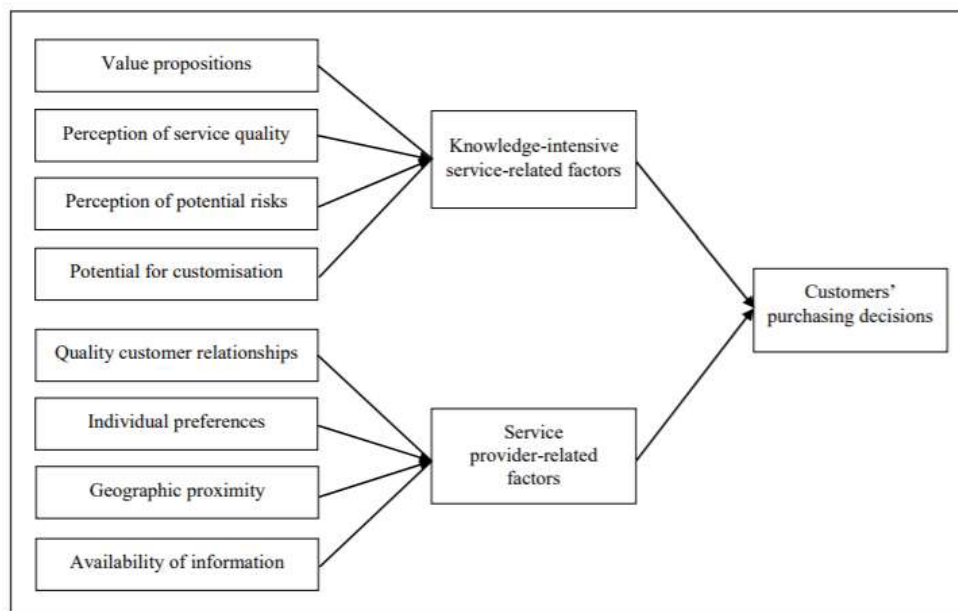


Figure 1 Factors affecting organizational buying by Heikka and Mustak (2017)

The distinctions are, however, not as black and white as the distinction above can show. All factors can have something to do with both the service and its provider. Also, some factors are easier for the buying organization to assess than others. As an example, it is much easier to evaluate the geographic proximity than the service quality.

In recent years there has also been widespread interest in the emotion of the people involved in organizational purchasing. This is somewhat of a different take on the more traditional idea of rational decision-making in an organizational context. Kemp et al. (2020) concluded that there is a clear tendency for emotional branding efforts to have a positive impact on organizational decision-making activities.

2.1.2 Information System Specific Factors

All the articles in the previous chapter are focused on general ideas about organizational buying so they should also be relevant when applied to a context of a company acquiring an information system. In this section, some IS (information system) specific articles will be summarized in order to find out if there are some specific factors which should be taken into account when acquiring IS's.

The role of information systems in many organizations is to provide support for the decision-makers. Information systems help in providing them with the correct information at the right place at the right time. In other words, information systems are tools used to remain competitive and to make the right decisions. (Pomffyová & Bartková, 2016)

Since the role of information systems is crucial in decision making the strategic planning of organizations' information systems has gained much attention. The key issue in the strategic planning of information systems is the connection to the organizations' overall strategy and goals. (Premkumar & King, 1992)

Planning IS was already highlighted in the 1980s by McFarlan, McKenney and Pyburn (1983). They argued that high costs, complexity and long times spent in the development phase are common characteristics of IS. They argue that the best way for planning depends much on the case. For example, the organizations' familiarity with certain technology affects the required resources the technology demands.

McFarlan, McKenney and Pyburn (1983) present also four stages of a technology assimilation process. The process starts with **identification & initial investment**. In this phase, the organization gets to know the technology and its possibilities. The organization also learns the key uses of the technology in this phase. Next is **experimentation & learning**. In this phase, the focus is on understanding what the technology can be applied to. For example, solving some of the organization's problems. This helps to gain the attention of the users which is important too. The decisions made in this step are very strategic and have a long-term effect.

After the technology is chosen and its uses defined starts the **control** phase. In this phase the focus switches from long-term to short-term as the organization tries to make the use of the technology as efficient as possible. After the efficiency is high enough the

organization moves to the last phase of **widespread technology transfer**. In this phase, the use of the technology spreads across the organization from the initial pilot projects. With the technology base built in the first three phases, the organization can focus on long-term goals again.

McFarlan, McKenney and Pyburn (1983) recognize also that usually as there are many technologies in use in one organization, the technologies can be simultaneously in different phases. This calls out for a general idea of how important the IS's are to the organization. McFarlan et al. (1983) present four different positions.

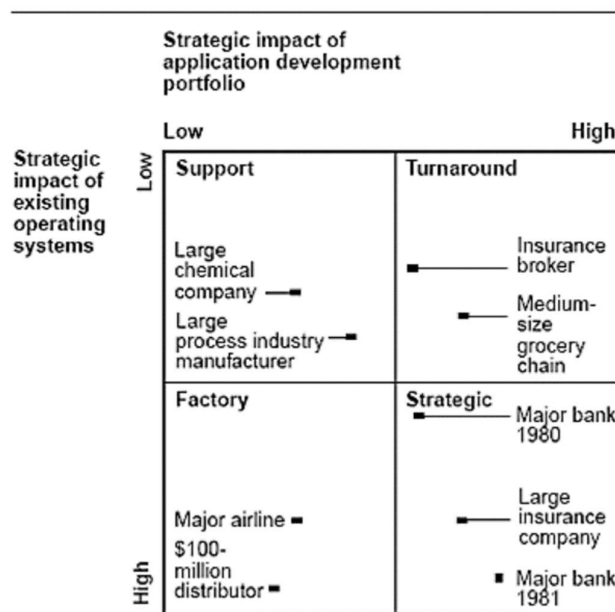


Figure 2 IT-Strategic grid by McFarlan et al. (1983)

The matrix shows that to get the most out of their IS's the organization needs to make sure that their IS planning activities are supporting the organizational strategy. This makes sure that the systems are used to gain benefits which are in line with the organizations' general strategy.

Another concept that has gained much attention in IS literature is the measurement of the success of IS's. In this field, one of the most influential papers has been the paper by Delone and McLean in 1992. To this date, the original Delone & McLean model has been cited in over 15 000 articles according to a search in Google Scholar (2018). (Delone & McLean, 2003)

The success model is built on three levels, which are technical, semantic and effectiveness. In the model systems quality and information quality measure the technical and semantical levels. These put together then determine the use and user satisfaction which are closely connected together. The use and user satisfaction then have both individual and organizational impacts. All of the four last concepts measure the effectiveness of the system.

In their ten-year update paper, Delone and McLean (2003) introduce a new concept in service quality to pair with information quality and systems quality as well as combine the individual impacts and organizational impacts into net benefits. These updates were based on the review of articles surrounding the topic during the ten-year timespan.

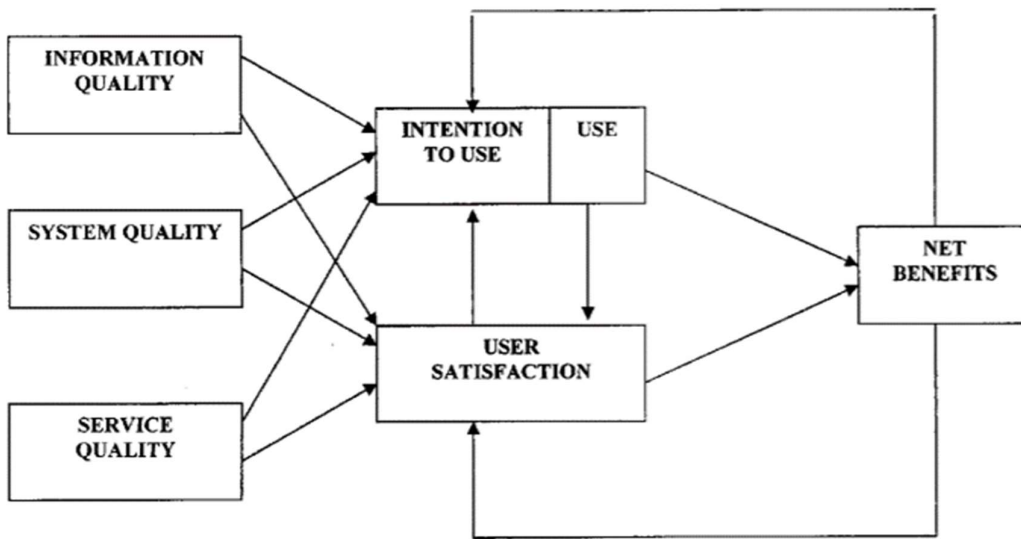


Figure 3 Updated IS success model (Delone and McLean 2003)

One key area Delone and McLean (2003) highlight is the importance of use as it enables organizations to gain benefits from the systems. This is at the centre of the whole IS literature as the role of IS is often to provide support and benefits to the organizations' main processes.

Rajlich and Bennett (2000) present their thoughts on the life cycle of information systems. They first introduce a traditional model with its five stages. These are initial development, evolution, servicing, phaseout and close down. The traditional model is linear which means that one stage needs to be completed before entering the next stage. Another model

is the versioned model which models the situation where the system developer releases an updated version of the software from time to time.

During the **initial development**, the backbone of the system is generated based on some initial needs. This stage provides the developer team with expertise in the domain and the problem and provides the basic architecture for the system. In the **evolution** stage, the initial system is modified based on learning and customer demands. This is the last phase where major changes are possible. In **servicing** stage, the system is kept in working condition with minor updates, but the old system remains the same. Systems which enter this stage can be considered ageing. In the **phaseout** stage, there are no longer any changes made. Now the organization using the system is only generating the remaining revenue with the system until it is abandoned. The final stage of **closedown** consists of removing the system from use and possibly replacing it with a new one. Data migration may be a key issue in this stage if the system had important data in it.

Rajlich and Bennett (2000) highlight the difference between the evolution and servicing stages. They argue that it is crucial for the buying organization to know the difference between these before they make a buying decision. They also highlight that distinct stages have very different requirements for different skills.

Li et al. (2014) have also researched the maintenance of information systems. They argue that the focus in organizations has shifted from software development to software maintenance. The goal of this is to make the current system stay relative for a longer time. The maintenance can be divided into distinct types of activities and various stages.

It is important for an organization using information systems to have an understanding of the different types of maintenance as they can be very different in nature. Kung and Hsu (1998) divide these into three general types: user support, repair and enhancement. Chapin et al. (2001) provide 12 types of maintenance activities in their paper. Li et al. (2014) match these two classifications in their study. This matching is seen in table 2 below. Their study resulted in showing that user support and repair match the classification of Chapin et al. (2001) well, but the enhancement activities occur in a different manner.

Kung and Hsu (1998) classifications	Chapin et al. (2001)	
	Classifications	Dimensions
User support	Training Consultive Evaluative Reformative Updative	Support interface Documentation
Repair	Corrective Reductive Adaptive	Software functionality/properties
Enhancement	Groomative Preventive Performance Enhancive	

Table 2 Matching of maintenance activities by Li et al. (2014)

Clearly, there are many factors organizations need to consider when acquiring an information system. It is important to have an understanding of the factors because if they are well defined it will help in choosing which solutions fit the organizations' needs the best.

All in all, the literature about organizational buying and information systems provides a wide variety of factors which influence the decisions. The acquisition process is clearly quite different in distinct cases when the buying organization's own characteristics and environmental factors guide the needs and goals.

Next, the main articles in path literature will be summarized to provide a view into how organizations can become locked into their technological solutions.

2.2 Lock-in Effect

Arthur (1989) describes how a lock-in effect can occur between two technologies competing for the same market. In the model, he presents the technologies that have increasing returns which leads to the situation where one random event which helps the other technology gain a foothold can be decisive. By gaining a head start one technology is established on the market which results in that technology developing even faster as it is used more. Arthur then argues that this can lead to a situation where the market can eventually be locked into a technology which may not be the best alternative.

A lock-in effect can also take place inside one organization. In this case, the company is locked into using a certain technology although it might not be the most efficient alternative. In this section, first the reasons causing lock-ins are presented and explained. After that, some ways of dealing with the phenomenon are presented.

2.2.1 Path Dependence

David (1985) introduces the case of QWERTY in his article. QWERTY keyboard layout has been adapted by the whole market even when there have been seemingly more efficient alternatives available. The case is a good example of path dependence. The alternative which gains the first mover advantage can generate such a good market position that it becomes difficult to replace it with an even better alternative.

To this day the designers of laptops for example have to live with the decisions made in the past. Of course, they are in no way obligated to use the QWERTY layout, but the market demands are very much leading the decision-making of the manufacturers. This phenomenon is called a lock-in. When a lock-in is caused by historical events it is often referred to as path dependence. (David, 1985)

Arthur (1989) describes how competing technologies with increasing returns compete for a market. He specifies that a small random event can tip the scales in favour of the other technology even if it necessarily is not the superior alternative. After one technology gains some traction often a market begins to get locked into that technology as the returns start increasing.

According to Arthur (1989), the lock-in generates and strengthens over time in cases where there are increasing returns. This means that the longer one option is used the more difficult it becomes to change it. So according to Arthur's logic, change is the easiest right after a choice has been made since the lock-in is not strong yet.

Arthur and David focus strongly on industry-level analysis in their work. They explain how an entire industry can become locked into one technology over time. Their examples are situations where there are two competing technologies which an industry can choose to use. Later path dependence has been applied to organizational context also by other researchers.

Sydow, Schreyögg and Koch (2009) study path dependence from an organizational point-of-view in their paper. First, they want to make a clear distinction between other forms of organizational rigidities and path dependence. The main difference according to them is that path dependence is a process which starts with the initial decisions that affect the later options. The goal of their study is to provide a theoretical model of how path dependence develops inside organizations.

They recognize that path dependence has different properties in distinct stages, so the states must be studied separately. The first phase is called the preformation phase. In this phase, there is a large number of alternatives available, and the choice cannot be predicted. Once a choice has been made an organization enters the cycle of self-reinforcing mechanisms. This is a critical point in the process and marks the transition into the second phase. Also, not like in market-level studies, the initial events are not small and random, but a result of a rational decision process that the organization performs.

The second phase is the formation phase. After the initial choice is made an efficient pattern will emerge which makes the process stabilize. This results in a path emerging. The reason the path emerges is that increasing returns work well in an organizational context as positive feedback strengthens the self-reinforcement. Although, options are limited there are still alternatives available in this phase.

The last phase is called lock-in. In this phase, the options are restricted even more to a situation where there really is one real option left. In the market-level studies, the lock-in is very extreme as it starts to dominate the market. At the organizational level, however, the action pattern that has emerged becomes embedded into the organizational culture and way of working.

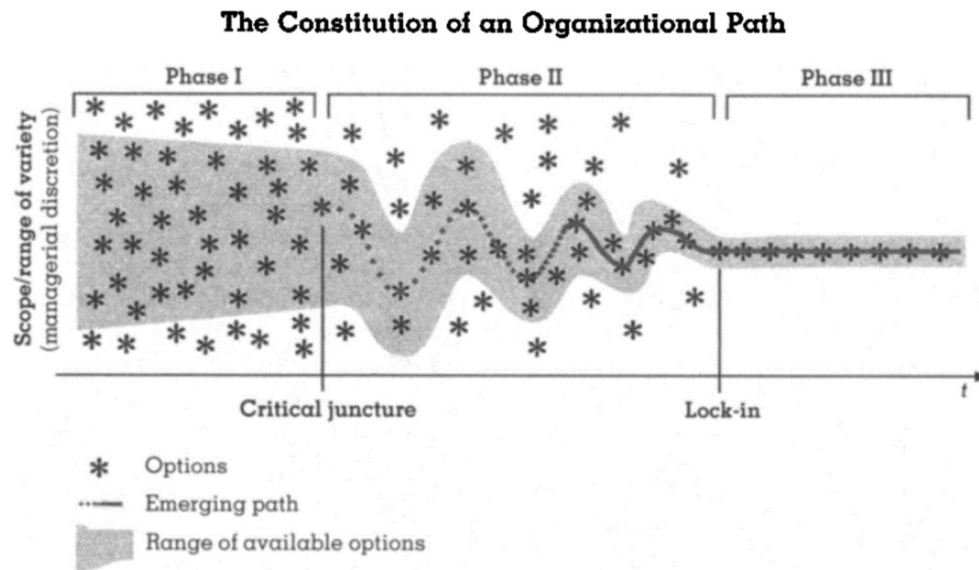


Figure 4 The constitution of an Organizational Path by Sydow, Schreyögg and Koch (2009)

Sydow, Schreyögg and Koch (2009) also recognize that self-reinforcing mechanisms are a key concept for path dependence. Their self-reinforcing mechanisms refer to the same thing as Arthur did with increasing returns in a way. They highlight four mechanisms that they feel fit an organizational context best. These are coordination effects, complementary effects, learning effects and adaptive expectation effects.

Coordination effects refer to when in an organization more actors adopt an organizational routine the more effective it becomes. Having more actors behave in a predictable way will lower costs spent on coordination. **Complementary effects** take place when there is a synergy between two goods or services so that they are more effective, or the organization can lower its costs. **Learning effects** mean that every time an action is performed it is done a little more effectively due to learning. Also, that option becomes more and more attractive for the organization over time due to the experience gained. **Adaptive expectation effects** are very much a social concept. It means that individuals' personal preferences can vary. The lock-in here is created by social pressure to belong to the winning group.

Sydow, Schreyögg and Koch (2009) also discuss path-breaking in their paper. Path-breaking means somehow escaping the path that an organization has developed. They define path-breaking as inserting at least one new alternative to a choice situation. This is very much the opposite to the path dependence process they introduced as it narrows

down the alternatives. Of course, the new alternative must somehow interrupt the self-reinforcing mechanisms to be a real option for the organization.

The key to escaping a path then seems to be in understanding the self-reinforcing mechanisms and being able to offer a superior alternative. Also, it is important to consider the inertia which has been built. To compete against these forces a superior alternative needs good justification which makes it attractive to the organization.

Sydow, Schreyögg and Koch (2020) have also written a reflection on their article from 2009 summarizing the reception which it has received over a decade. There has been a lot of discussion which has followed, and the article has gained support and critique both. However, it remains clear that the concepts of path dependence and difficulty for organizations to make certain changes is a crucial topic for still further research as the discussion continues.

2.2.2 Path Creation

Path creation was first introduced in the year 2000 to take a different view on the issues path dependence deals with. Path creation is also based on the notion that historical events guide the options available in the past. The difference to path dependence is that in path creation there is a mindful thinking process guiding the decision-making. (Garud & Karnoe, 2000)

A key difference to the classic path dependence literature must be noted when reading the paper by Garud and Karnoe (2000). This is because Garud and Karnoe talk much about entrepreneurs in their text which refers to a different level of analysis. While the classic path dependence literature focuses on the market and field level, Garud and Karnoe are clearly focusing on the organizational level.

Garud and Karnoe (2000) argue that path dependence leaves the decision-makers in a position where they can only follow what is the results of past events. Path creation is a way to compete with this. It turns the table so that the decision-makers deliberately make up the upcoming path instead of just following random events.

Garud and Karnoe (2000) use a case of Post-It Notes to describe the path creation process. Post-It Notes were invented by Spence Silver who has been interviewed about his invention. Also, it is crucial to note where Silver was working at the time of his invention.

He worked at 3M which was a strong player in the traditional glue market. Below I present the steps highlighted by Garud and Karnoe in the process of creating Post-It Notes.

Mobilizing molecules is the first step of the process. This refers to Silver experimenting with the chemical mixture of the glue that he was making. He knew that the result of his experiment might not be an optimal glue, but he still was interested to try out something new. This type of thinking is key for path creation. More generally, it can be said that in this phase something should be done differently to the current processes to gain new insights.

Mobilizing minds refers to the resistance that is likely to follow a very different solution than the ones the company has used before. In this phase, it is crucial to get people to understand the possibilities of the new solution. Even when 3M applied for a patent it was refused twice because the utility was not seen by the patent office. Instead of accepting the resistance, it was crucial that Silver kept believing in his solution.

Boundary spanning is the process of creating a shared space which can help people understand the idea from their own point-of-view. The shared space allows people to discuss the idea on a neutral ground. It is also crucial that there is a will to make adjustments in this phase to overcome any resistance.

Generating momentum is the act of gathering a team that can promote the idea further. When there are more people involved, there is a higher change to come up with a detail that can make the idea into a worthwhile product. This combination of minds is a powerful way to generate momentum for the idea.

The co-evolution of minds and molecules then requires flexibility from the team to combine their ideas into the best possible one. This allows the team to tune the idea which reduced the risk of becoming locked into a certain way of looking at the solution. In general, this type of flexibility is at the heart of path-creation thinking.

The virtuous cycle refers to the fact that when there are many people involved in the path-creation process the end product may be very different from the initial idea. This is a result of small events that may seem quite accidental. However, there is a substantial planning process behind these events, which makes the process a cycle that cumulates into a profitable product.

Mobilizing time highlights the importance of time as a resource. In the case of Post-It Notes, it took 12 years from the initial idea to mass production of the notes. This shows how long it can take for the process to move to a position where the idea can be finalized into production. In these situations, it is important that the team behind the idea are persistent and does not rush the development.

Time, timing and temporality refer to the fact that the time allocated for the deviation is crucial in defining how it is handled. Too little time means there is no room for the full process described above. Too much time, on the other hand, can result in endless tinkering of trivial details which is not effective either. The skill here is to accommodate the right amount of time (and other resources) to a deviation to give it a chance of making it.

The co-evolution of minds and molecules over time is a combination of the matters mentioned above. It means that there is a choice made to develop fresh solutions by deviating and then following the possibilities it brings. This process takes time and careful consideration of how many resources to place in a deviation at each point in time.

Out of the concepts presented above, the three last ones are more general considerations than parts of a path creation process (Garud & Karnoe, 2000). Also, the path creation process is not a linear process rather it can vary a lot in phases and there can be many rounds of the phases outlined by Garud and Karnoe.

2.2.3 Path Constitution

Path constitution is introduced by Meyer and Schubert (2007) to combine the notions of path dependence as stated by Arthur and David in their papers and path creation as stated by Garud and Karnoe. They argue that both concepts have made important contributions to technology development discussions, but that they still have some issues. For path dependence the issues are:

1. Actors are assumed to be rational while they have no control over the emerging path
2. Strategic planning or deliberate action do not result in increasing returns and a lock-in since they are purely emergent
3. A path can only be broken by an external shock

The issue Meyer and Schubert find with path creation is that it focuses much on the pre-market phase of a solution. This means that there is little evidence of what happens after

a path stabilizes and the solution starts to take up a position on the market. They provide the reader with a table summarizing both notions and their key differences.

	Concept of constitution	Path properties
Path dependency	<u>evolutionary-emergent:</u> Paths emerge behind the back of actors, they are not and cannot be controlled by them.	<ul style="list-style-type: none"> - History matters - Increasing returns - Lock-in
Path creation	<u>strategic-deliberate:</u> Paths can be deliberately created by actors, if they are able to mobilise the necessary resources.	<ul style="list-style-type: none"> - History and social actors matter - Increasing returns and mobilising actors - Lock-in

Table 3 The basic properties of path dependency and path creation by Mayer and Schubert (2007)

Meyer and Schubert use two different analytical dimensions to explain their idea of path constitution. These dimensions are modes and phases of path constitution. The modes are used to separate between the mindful and the random aspects of the path constitution. The phases are used to classify actions to a timeline which shows how the path processes shape up. The modes and phases are shown in relation in figure 5 below.

Path dependence and path creation can be viewed as being at the opposite ends of a continuum. This continuum, therefore, varies across totally unplanned processes and very strictly thought-out processes. Different empirical cases can be placed on different points on this continuum to assess their origins. Most cases are placed somewhere in the middle of the two extremes as usually the actors have some control over the process, but they may not be able to control everything related to it. This is what Meyer and Schubert refer to as the **modes of path constitution**.

Meyer and Schubert highlight three **phases of path constitution**. These are generation, continuation and termination.

In the **generation** phase, a path starts forming. This can be the result of either of the two modes described above. The crucial thing in the generation phase is however that, once

the path starts stabilizing and positive reinforcement starts to take effect, the path is likely to become locked in.

In the **continuation** phase, a path is being followed because of the positive feedback. This makes it so that the path stabilizes automatically even without support from the original creators of it. This process works very similarly in both path dependence and path creation. Meyer and Schubert call this mode of path constitution path persistence. They also recognize another mode of path constitution that can take place in this phase. This is called path extension. It refers to situations where mindful actions are needed to keep the path going. This is quite different from both earlier notions as mindful actions are used to keep a technological solution viable.

The final phase for a path is **termination**. This can happen in two different modes. If a path is deliberately exited Meyer and Schubert refer to it as path-breaking. The other mode is path dissolution which refers to a situation where emergent processes result in the termination of the path.

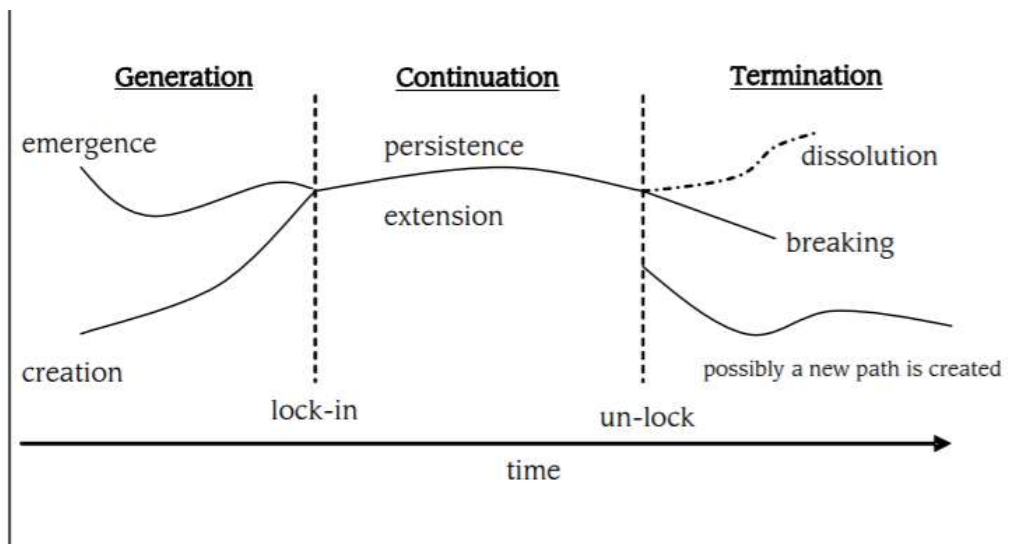


Figure 5 Phases of path constitution by Meyer and Schubert (2007)

Sydow, Windeler Müller-Seitz and Lange (2012) have also added to the literature about path constitution. Their goal is to present a methodology which can be used to measure and analyse paths.

First, they define a path as:

“Being a course of events interrelated on different levels of analysis, such as a single organization or an organizational or technological field, and in which one of the available technological, institutional or organizational options gains momentum in time-space, but cannot automatically be determined from the onset. This non-ergodic development is triggered by certain actions or events and driven by specific self-reinforcing mechanisms that not only cause the momentum but might lead the whole process into a lock-in that is, at least from a strategic perspective, inefficient”.

Key concepts in their definition of a path are the level of interrelatedness, triggering events, non-ergodic processes, self-reinforcing processes, lock-in and multiple actors. They define each of these concepts to further explain their definition of a path.

There are always multiple levels of analysis that are connected to a path. These can be organizational or field level for example. The path itself is formed on a certain level, but it is important to consider that all the other levels, in other words, the surroundings, are a part of that path. This is the main idea of **level interrelatedness**.

A path starts forming by a **triggering event** which can be considered a relatively small event, but it has strong effects on the future as it shapes the path in some way. An indicator of a triggering event is that it should be described as decisive and critical. The triggering events can be both mindfully created or emergent which means more sources help in identifying the key events.

The **non-ergodic processes** refer to the process of narrowing down the options as the path forms. Good indicators for this are the initial options that were relevant at the beginning of the process. As the process moves on some options cease to exist for various reasons and finally one option becomes the standard.

The **self-reinforcing processes** are a key component of the path theories. These are mechanisms that give positive feedback for a certain action. This then creates a positive ring as positive feedback guides to more similar behaviour. Indicators for this depend on the type of self-reinforcing mechanic in place. For coordination effects, for example, overarching institutions which push towards a common goal can be identified as an indicator.

A **lock-in** means a situation where the path advances to a point where there is only one option remaining which cannot be replaced even by more efficient alternatives. A lock-in can be based on cognition, norms or resources. The authors point out that a lock-in is

not final in many cases as there can be events that break the lock-in eventually. A good indicator of a lock-in situation is that there is a feeling that there are no alternative options available.

It is important to be aware of the **multiple actors** that are involved in the path process. These can be individuals, organizations or networks. For each actor, it is crucial to understand their role in the development of a path.

Path constitution has also been a topic for a paper by Singh, Mathiassen and Mishra (2015). They focus only on an organizational level unlike previous works by Meyer and Shubert (2007) and Sydow et al. (2012). They intend to highlight the processes, opportunities and challenges involved in organizational path constitution.

Singh et al. (2015) speak about innovation paths which they define as the progression of a certain technological innovation over time in a specific organizational setting. To be able to follow the progression they implement two facets of technological innovation presented by Dosi (1982). These are technological paradigms and technological trajectories.

The **technological paradigm** refers to an understanding of what types of problems are being addressed by a pattern of solutions. It describes the situation of technologies applied to certain tasks under the pressure of resources affecting their application. **Technological trajectories** constitute the different paths the in-which technology can develop. The paths are based on technological paradigms. Singh et al. (2015) transfer these macro-level concepts to the micro-level and call them consequently path status and path trajectory.

Singh et al. (2015) also highlight the triggering events presented by Sydow et al. (2012). They argue that these can be both internal and external. These triggering events can shape the status and trajectory of the innovation path inside an organization. The key here is to follow how the organization reacts to a triggering event. The response can be called **response mode**. They call the time, from a triggering event to the time the organization has reacted to the event and made some possible changes, a **path constitution episode**.

Singh et al. (2015) present one more key thought considering path constitution. It is the lock-in where a path can lead to a lock-in situation or if it can be managed in a way that provides sustainable innovation. They argue that the episodes are key in this process. The

episodes can either reinforce the current trajectory of a path or transform it which leads to the arise of more options for the managers to decide upon.

Construct	Definition	Variable	Definition	References
<i>Technological innovation path</i>	The progression over time of a technological innovation, embedded into organizational practices and arrangements	Path status	The characteristics of a selected technological innovation and how it is embedded into organizational practices and arrangements at a specific moment in time	Dosi 1982; Garud et al. 2002; Meyer and Schubert 2007; Sydow et al. 2012a
		Path trajectory	The sequence or patterns through which the innovation path develops over a considered period	
<i>Innovation path constitution</i>	The formation of a technological innovation path through historically determined as well as human agency influences	Reinforcing impact	The stabilization of the current path trajectory through progressive reduction of available innovation options	Meyer and Schubert 2007; Sydow et al. 2009; Sydow et al. 2012a
		Transforming impact	The destabilization of the current path trajectory through the introduction of actionable innovation options	
<i>Path constitution episode</i>	The period from when an innovation trigger occurs until the consequential changes in path status and trajectory have become manifest	Innovation trigger	The internal and external events that challenge the trajectory of an innovation path at key moments in time and prompt the search for alternatives to the current innovation path	Meyer and Schubert 2007; Mintzberg and Waters 1985; Sydow et al. 2012a
		Response mode	The continuum of organizational responses—varying from emergent to deliberate—to an innovation trigger	

Table 4 Foundational Conceptualization of Organizational Path Constitution by Singh et al. (2015)

Singh et al. (2015) applied this theoretical thinking to a case analysis of Southeast Health District, a public health organization in the state of Georgia. Through interviews and research, they identified seven path constitution episodes. The episodes were then analysed to understand what they meant for the trajectory of the innovation path. In these analyses, the triggering event was also identified for each episode and the according to response mode for the event.

They also discovered three innovation path statuses during the analysing of the episodes. These are core, scope and resources. The **core** refers to the key uses of the technology. The **scope** refers to the use of the innovation in daily operations. And finally, the **resources** refer to the different forms of support gained from the organization which shapes the usage of the innovation.

These statuses were then used to determine whether the path was actively shaped as in path creation or emergent as in path dependency. The result was that there had been one path phase of path dependency and path creation could be assigned to four different episodes.

As a result of their empirical research Singh et al. (2015) conclude that:

- The innovation core, scope and resources can be used to describe the path status
- The probability of the path reinforcing is higher when not all of the innovation core or scope options are realized
- The probability of the path being transformed is higher when all the innovation options are realized
- Organizations are more likely to merge their innovation paths if the resulting path can help to tackle current weaknesses
- Organizations are likely to separate their innovation paths when the path limits their options or is taking them towards a lock-in situation
- Technological innovation paths carry out unpredictably, but they may follow the path dependent life-cycle patterns at certain periods

3 Methodology

The goal of this study is to find out in which situations can a lock-in be harmful in some way to an organization as presented in the first chapter. The focus is on the lock-in effect and how it is established and how it can be escaped when needed. In this section, the methods used in researching this topic are presented.

3.1 Research Strategy

The issues that this study deals with are mostly opinions and interpretations of how organizations perceive the lock-in effect. This led to using qualitative methods as they fit the purpose of this study better than quantitative methods. The upside of qualitative methods is that they provide a deeper understanding of a certain phenomenon and its background.

Inside the category of qualitative research methods grounded theory was chosen for this study. Grounded theory was first introduced by Glaser and Strauss in 1967 (Glaser, 2017). The key idea of grounded theory is to carefully collect and analyse qualitative data to form new theories. The focus on grounded research is then evaluating the data and analysing it without using other theories in the data collection and analysing stages. (Urquhart, 2012)

For this study, the focus is not on building a new theory so grounded theory is used more as a tool for analysing the data. In grounded theory, data analysing revolves largely around coding. Coding is basically dividing the data into segments which can be labelled under some concepts (Urquhart, 2012). This helps the researcher to analyse the data systematically.

Grounded theory provides a good backbone for this study to provide more understanding of the effects a lock-in can have on an organization. It enables a focus on how organizations perceive their alternatives when it comes to their IT solutions. By leaving out the ideas of previous research in the data collection and analysing the results will provide a good understanding of the situation in the organizations that are researched. This allows also the themes for the analysis to emerge during the research process (Charmaz & Thornberg 2021).

In this study, six organizations were investigated. This made it possible to at the same time get a deep understanding of why organizations have made some choices and how the decisions and situations in different organizations compare to one another. Half of these organizations were system providers and the other half were organizations which use systems. This division provided insights from both perspectives of the information systems field.

Later in this study, the system providers will be referred to as provider 1, provider 2 and provider 3. All these providers operate in the business-to-business landscape. Provider 1 offers an IT-based service which aims at helping its customers operate and communicate more efficiently. Provider 1 is relatively small in size with around 20 employees. Provider 2 offers its customers customized IT solutions based on the customer's needs. They have around 50 employees. Provider 3 operates a SaaS-based service which is aimed at a specific function in mind. Their organization size is around 30 people. The interviewees from the providers all worked close to the customers which enables them to discuss the sales and the relationship aspects well.

The other half of organizations interviewed for this study consist of organizations which are customers to system providers. These organizations will be referred later to as organization 1, organization 2 and organization 3. Organization 1 is a provider of a certain type of grocery on a national level. They have around 120 employees divided between one larger factory and two smaller ones. Organization 2 works in the import and logistics sector in the Baltic Sea region. Their organization size is around 120 people too. Organization 3 is a factory within a large global pharmaceutical concern. The concern has around 800 employees in Finland in two locations. The interviewees from the organizations had all experience of being a part of system acquisition projects and worked as business managers so they also had been involved in the discussions about the states of their information systems.

Provider 1	Interviewee 1
Provider 2	Interviewee 2
Provider 3	Interviewee 3

Table 5 The provider interviews

Organization 1	Interviewee 4
Organization 2	Interviewee 5
Organization 2	Interviewee 6
Organization 3	Interviewee 7

Table 6 The user interviews

3.2 Data Collection

The main method used in data collection is interviews. This choice was made because interviews are a good way of gaining rich and meaningful information from people inside organizations. (Alshenqeeti 2014)

In this study, the interviews were done as unstructured interviews. The idea was to have a framework of topics to discuss made ready, but that there would be the freedom to follow any topics of relevance that might come up during the interview. This provided the researcher with the chance to find out what sort of thoughts there were in the organization in relation to the topic.

The unstructured way of doing interviews also made it possible to adjust the framework after each interview so that it would focus the conversation on areas that had proved to be the most fruitful in previous interviews.

As the study was done as a multiple case study there were several organizations which were under investigation. To get the information needed the interviewees needed to have a role in the decision-making when it comes to which information systems the organization is using and why. These, depending on the organization, were mostly IT managers and business managers.

As in grounded theory, when some data is gathered it is analysed right away. The analysing is done by attaching codes into segments of data as explained before. When the coding is done analytically the codes can help to reveal underlying meanings from the interviews.

As the coding progresses the codes are divided into categories. With clearly defined categories it is then possible to establish connections between different concepts which will provide deep insights into how lock-in situations are perceived by different organizations.

3.3 Limitations

The limitations of this study are mainly that the findings will only provide a snapshot of the concepts in a few organizations. This means that the results cannot be generalized but must be viewed as case studies which can bring up new concepts for further studies.

This study is also conducted in just one country which means that it is limited to the culture in Finland. If replicated in other countries, the results may be radically different to the findings of this study.

4 Results

In this section, the initial results of the interviews will be presented. This is done by presenting the different topics, i.e., categories, which rose up during the interviews. The categories presented here are those which were mentioned by many and are related to the topic. The main categories are:

- Problems perceived in lock-in situations or when switching or procuring an information system
- The procurement and sales of an information system
- The cooperation between a system provider and a system user
- Causes and change drivers
- Solutions which can help prevent problems

4.1 Problems perceived in lock-in situations or when switching or procuring an information system

4.1.1 External constraints

One problem which was mentioned by every one of the interviewees except for one was external constraints. These refer to situations where there is some force outside the organization which affects the decision-making inside the organization. This can put the organization in a place where it may not be able to choose the optimal alternative for itself due to the pressure coming from outside the organization.

When it comes to information systems the constraints often have to do with how different information systems can integrate into one another. Integration is a key enabler of effective cooperation between different players in a network. It helps the communication between the systems of all parties by removing manual work done by people.

External constraints can come in many different forms. In many cases, they have something to do with **the network** in which the organization is operating in. Typically, customers can demand certain types of solutions and providers work with certain technologies, for example. This limits the options for an organization if it wants to keep operating with these players. This concern was specifically raised by the user organizations.

At Organization 1 Interviewee 4 commented that they have a couple of very large and important customers. It is crucial for their business that the relationship with these customers work flawlessly. For this reason, it is also crucial that their information systems can communicate with the ones at Organization 1. The customers are so large that they are in a position to demand certain types of IT solutions from their customers. This means that when Organization 1 makes its decision about its information system it must take into consideration its customers' requirements. This can in some situations narrow down the options available for Organization 1.

At the time of the study Organization 2 was in the middle of changing its key information systems. Interviewee 5 said:

“The largest needs come from outside our organization because nowadays information is being exchanged in real-time and building these interfaces with the old system was challenging.”

This comment demonstrates how external forces can create a need to change a system which might operate fine otherwise inside the organization. These demands coming from outside the organization have a straight effect on the number of options available when choosing which information system, they want to use next.

Interviewee 5 continued to explain that they have electrical communication with all of their customers and with some of the suppliers too. This was a crucial factor when making decisions about the forthcoming new systems. The need to have these connections with many different players in their network can be very demanding to accomplish if the requirements differ much between different actors.

Interviewee 6 from Organization 2 continued to elaborate that during the change project it took surprisingly many resources and work to keep their customers informed on how to project was moving along. They were able to stay closely in touch with their customers due to the relatively low number of customers in the department where the change was first implemented. This continues to underline the importance of relationships in the network when it comes to decisions about information systems.

At Organization 3 the situation was quite different as it is part of a global concern. This means that there are central decisions being made about some core information systems. Interviewee 7 said that while they have the possibility to customize these systems to their own needs, they must live with the changes being made globally to the systems. In other

words, if they get the information that something in the current systems changes in some way, they must just make it fit their organization at first.

Interviewee 7 continued to explain that they have their specific systems on top of the global ones, but the more they have their own customized solutions, the more difficult the maintenance of the systems becomes. So, the situation at Organization 3 is that they are trying to optimize their own operations inside the boundaries set by the global concern, which sometimes might not be optimal for the local organization.

Provider 2 and Provider 3 also mentioned a **third-party** as an external constraint. This refers to a situation where the provider uses existing technology in some way within its own services. This then leads to a situation where the end customer is dependent on two separate actors. This is a typical situation in the market since usually organizations buy their IT solutions from one vendor, but this vendor can be using many other services to provide its own solutions.

Interviewee 2 at Provider 2 explained that whilst they make custom solutions for the customers to meet their needs, they start by looking at already available services on the market to see if some of those can fulfil the needs. If they find one, they use it and build whatever is missing on top of it in order to make it fit the customer's demands. This leads to a situation where the customer is using a service provided by one actor which is customized by another actor.

Interviewee 2 continued to state that the situations described above can lead to problems especially when it comes to updating the information systems. Because the system is reliant on two actors an update made available by one party may not fit the current system easily. This means that the customer may not get all the benefits from the work a provider is doing to improve the system, or it requires a lot of work to make the update available to them.

Interviewee 3 at Provider 3 explained that according to them there are third-party locks involved for every customer because customers use multiple information systems. The service Provider 3 provides is only a part of the whole ecosystem of the customer. This means that their service must be able to operate with the other systems that the customer is using. Interviewee 3 continued to explain:

“We work with everyone so if our customer is using Salesforce as a CRM and they want to switch to Dynamics, we don’t want to be a problem in this so we work as well with both.”

To enable their customers to use whichever systems they are using with the service of Provider 3 they provide an open interface which helps their customers in using the service with their current IT solutions. This helps them to establish a relationship with the customer which becomes one that is not easy to replace.

External constraints also have to do with the **general business environment**. Interviewee 7 at Organization 3 gave an example of a situation where the changes in the general technological landscape affected their decision-making. They had a relatively old communications system which had been working well, but changes in the way we communicate through the web and with mobile devices forced them to reconsider this system.

4.1.2 Replacing an existing information system

Another problem that was mentioned often was that replacing an existing information system can be extremely difficult. There seem to be many different causes for the replacement being so difficult. These will be presented here.

Some of the most often mentioned causes for the difficulty of the replacement were the investment, organizational learning and the amount of work involved in the replacement project.

Organizational learning refers to a situation where the organization has been accustomed to a specific way of working. This learning can be connected to an information system as it can be a crucial part of the processes that the employees work with. Replacing a system then forces the employees to reset their learning and start from zero experience.

At Organization 1 Interviewee 4 explained that when they changed their information system there were many issues when the new system worked differently than the old one. This means that the processes at Organization 1 must adapt to the change as well. This adaption process takes time and resources which means that the effectiveness of the organization is hindered.

Interviewee 4 continued to explain that the period of change is particularly stressful for the organization as there is an ongoing iteration of testing and fixing bugs. All of this means that the completion of the replacement project requires many resources from the organization. At Organization 1 they had employed one person solely for this project to cope with these requirements.

At Provider 1 Interviewee 1 had their own term for a similar type of situation as the one prescribed above. This term was stickiness. It means that once an organization starts using a software product and realizes the benefits of one it becomes difficult to get rid of. This happens because the system can free up the employees to do more challenging tasks while the system takes care of other things.

Interviewee 1 clarified that if their product can be helpful to the customer and if it is a part of their core functionalities it becomes almost irreplaceable. In this situation, the customer cannot replace the system because it provides them with a benefit that would be lost if not for the system. Other systems can provide a similar benefit, but the organization has learned to operate with the current one so switching to another requires spending extra resources.

Interviewee 5 at Organization 2 said that after they had switched to the new system the users still were looking to receive the same data at the same place as they had in the old system. This demonstrates the difficulties in changing work habits. It may take some time before the users get to know the new system well enough to realize its benefits.

Interviewee 5 also continued to explain that changing a key information system is difficult because it is connected to almost everything in the organization. Here we start to see how organizational learning comes into the picture. It became apparent that the previous experience in most cases made the switch harder than it would have been with no previous background in a similar system. The following comment supports this opinion:

“This is such a fundamental and total change that everything old has to go”.

This was further backed by Interviewee 6 who stated:

“The old system had been in use since the 90’s apparently so it had rooted itself very deeply to all of our procedures”.

The long time the systems have been in operation has clearly resulted in extensive organizational learning. Clearly, the system had very much grown intertwined with the processes inside Organization 2.

Interviewee 6 also continued:

“The technology is not the difficult thing; it is getting people involved”.

This comment refers to the opinion of Interviewee 6 that changing technology in itself is not difficult. The problem in changing systems arises when it comes to people and their ways of working. In these matters, previous experience plays a big part.

Interviewee 2 at Provider 2 explained that if their customer has a system which is connected to many of the customers' core processes, then the system becomes difficult to replace. This is due to the many connections all needing to be considered when switching one system. It is a case where the organization has adapted to working with the exact system that is in use.

In other situations, a recent **investment** can make the organization reluctant to change. These situations are mostly found in organizations which have recently made investments into something that they think they can use for a certain time in the future. This investment can be measured both in time and money.

Interviewee 4 at Organization 1 explained that their idea is that now that they have invested in this new system it should last at least for ten years. He backed this up with the fact that it is developed by one of the world's leading software companies. This means that the system should remain competitive according to Interviewee 4.

This comment shows that once an organization makes an investment it usually plans for it to remain competitive and in use in the long term. Because of this type of thinking a recently adopted system is particularly difficult to replace. Using technologies which are currently dominating the markets ensures this in the short term, but in a longer perspective, it is difficult to see what might happen in the needs of the organization and especially in the development of information systems.

Interviewee 5 from Organization 2 had similar ideas. Interviewee 5 commented that the current change is such large that it is impossible to look too far into the future before the

changes are fully implemented. Right now, the stress from the current project means that nobody is willing to think about doing something similar in the near future.

Interviewee 5 also said that it is difficult to see very far into the future. On a five-to-ten-year period, the plan is to keep the system that is being implemented in operation, but exact plans and actions will be determined in the future. Interviewee 5 continued that the pace of changes is making organizations shorten the lifecycles of information systems resulting in a faster pace for change in the future.

Interviewee 1 at Provider 1 saw that an investment made at a potential customer can be challenging for a system provider to deal with. A large investment is usually divided in accounting terms to depreciate over a set number of years. This makes it difficult to suddenly just throw away something during the time the depreciation is in process.

Interviewee 2 at Provider 2 commented that it often comes up in conversations with customers and potential customers that something was a big investment. This usually means that the customer is reluctant to give up the system which has had a large investment made in it. Interviewee 2 explained this phenomenon as a mental commitment where the large investment positions the system as a stable which cannot be changed in the minds of people involved in the investment project.

One more reason why replacing a system can be difficult is the **amount of work** involved in the project. Replacing a system requires the organization to step out of its comfort zone. The employees usually need to deal with matters they do not deal with in their normal workdays. In many cases organizations need to rely on extra workforce to complete these projects.

At both Organization 1 and Organization 2, some additional workforce was obtained to complete the projects they had undertaken. This means going outside the organization for additional resources which can be something an organization is not willing to do unless obligated to.

Interviewee 4 from Organization 1 commented that when you look at the project now it was crucial that they employed one person to only work on the project. In addition to the employee that was hired only to work on this project Interviewee 4 estimated that he had spent around half of his working hours on the project.

Interviewee 5 painted a similar kind of picture when it comes to the personnel they had involved in their project. They moved one person to work on the project full-time from their organization and had an outside consultant work on the project part-time. The interviewee continued to explain that these two persons were mostly concerned with the administration of the project which left a significant amount of work to be divided amongst the other staff of the organization.

These two examples show that smaller organizations usually need to rely on outside workforce to complete projects like replacing an information system. This is due to a lack of knowledge and personnel available inside the organization. Going outside the existing organization to look for competent workforce willing to take part in a project like this can be a challenge for a small organization that is not used to dealing with matters such as projects outside of their core knowledge.

Interviewee 7 from Organization 3 had a slightly different take on the amount of work needed in replacing a system. The concerns at Organization 3 were not on having enough personnel, but the time spent implementing changes which affect much of the organization. Interviewee 7 explained that in order to change a system they had to stop production which was not done lightly. The stop of production usually could last a relatively long time due to the amount of work needed to make the system ready to be included in production.

This type of thinking meant that in order to replace a system, a large benefit had to be obtainable by doing so. This means that incremental improvements can be difficult to make in some cases. The result of this avoidance of stops in production meant that most systems that are included in production were rather stable and changes were made to one production line at a time.

All the aforementioned reasons why replacing an information system are connected to each other. This means that there is always a combination of these factors, and other situational factors which make switching from a current system to a new one difficult.

4.2 The procurement and sales of an information system

4.2.1 Procurement of an information system

Interviewee 4 from Organization 1 explained that their procurement process for the information system which was almost fully implemented at the time was started by a common mapping phase together with their former partner companies. Together they had used a common system which now needed replacing.

The mapping phase included mapping out the alternatives available on the market and identifying the potential options to move ahead with. Once they had a list of potential options, they sent out requests for information to the selected providers. After this, some demo sessions were held by the providers to give further information about their offerings.

After the demo sessions were held Organization 1 was in a good position to analyse the options together with its partner companies. For the selection, they created a selection criterion which was used to score the different options. The most important criteria on the scale were compatibility and industry knowledge.

This process resulted in a selection of a system and a provider. Once the selection had been made Organization 1 held workshops with the provider with the aim of learning more about the possibilities of the system and with the goal of documenting the requirements they had.

At the time of the interview Organization 1 had replaced all of the functionalities from their old system which was being replaced. Interviewee 4 explained however that there were still new functionalities with the new system which were in the pipeline as they had found out new benefits which the system could provide.

Interviewee 4 also commented that the replacement project had been difficult at times. The main challenge was that the old system had been in use for a long time, and it had been heavily customized to fit their requirements. Oppose to this the new system didn't include the specific functionalities which they had gotten used to. This meant that the project demanded a lot of effort in testing and learning from Organization 1.

At Organization 2 Interviewee 5 stated that they had started their project of replacing key information systems already in 2012. This meant that the project had been ongoing for

around 6 years at the time of the interview. This fact paints the picture of how long and crucial these projects can be for the organizations which are acquiring information systems.

Interviewee 5 explained that the project started out with a phase where their goal was to find out if they can continue with their current system with slight modifications only. This was considered as the easiest option if seen as technically viable. However, the result of this investigation was that they needed a larger remodelling of their information systems. Interviewee 6 also explained about the first phase that it was quite unofficial, but it was very necessary to get a high-level understanding about what are the general needs of their information system currently and looking into the future. Interviewee 5 estimated that this phase took around one year to complete with the help of one consultant from outside their organization.

Once it was clear that Organization 2 needed new information systems, they began a requirements specifications phase. The goal of this phase is to map out their requirements in a clear document which could then be used later when asking for bids from system providers. Interviewee 5 commented that the requirements specification phase took a lot of time and resources. This phase was completed in the spring of 2015, so it took around two years to complete.

Once Organization 2 had the requirements documentation in place they were finally able to start discussions with system providers to understand what kind of options there were available for them. At this phase, the crucial thing they were looking for was the right kind of partner, explained Interviewee 5. They wanted their partner to share their core values and to be the right size to enable good communication. They also critically evaluated the response from each provider to see if they had truly understood the goals of the project. From a pricing point of view, they tried to view everything with a “+4 years mindset” so that they would take into consideration also the maintenance of the system.

Once a choice was made on with which provider and system they wanted to proceed, there was one more specification phase where it was determined in terms of the actual system what their requirements were. These specifications were the most specific as these need to be on a very detailed level so that the provider can proceed with the system setup.

Only after all these specifications were in place was Organization 2 able to start the actual project of replacing its system together with its chosen partners. At the time of the interview, they had just completed the first go-live with one of their business segments around six years after the first discussions were held.

Organization 3 had a slightly different approach to acquiring new systems than Organization 1 and Organization 2. Interviewee 7 explained that they had a detailed purchasing process which had to be followed. The idea of this was to make sure that whatever is being purchased follows the company-wide guidelines. A couple of things which Interviewee 7 especially highlighted about the process were that big parts of it are to make sure the data integrity remains high and that the whole chain of systems connected is evaluated.

The first phase of the purchasing process was a preliminary investigation. The goal of this phase was to identify the realistic options. Interviewee 7 further explained that this phase can take a long time in cases where a more complicated system is being acquired. This is due to many factors having to be considered. Among these factors are the data quality and ease of creating interfaces, the chain of connected systems and the future and lifecycle of the system.

Once the options are known, Organization 3 makes a choice based on its preliminary investigation. After this, a separate project team is established to conclude the installation project. The installation project itself can be complicated as usually there are details that were not fully agreed upon in the previous phases. The key to success is the collaboration between the providers and the user organization, mentioned Interviewee 7.

All in all, there are clearly similarities between the purchasing processes explained in the organization which were interviewed for this study. Each organization started the purchasing process by doing some kind of survey to further understand their requirements once a need for something new was discovered. The previous knowledge around the topic inside the organization impacts this phase a lot as some organizations do not have the capabilities to evaluate all the aspects related to the purchase. Organization 2 even began with a phase where they evaluated their current systems before making the decision that they had to replace those.

Once the requirements were more clear talks began with system providers with the aim of understanding the solutions available on the market and finally selecting the best fit. For the selection, each organization had their own mechanisms for choosing based on what it valued most.

Once a selection was made work started with the selected system provider. This usually began with a second, more detailed specification phase which went into more detail about the system. After this, the installation project began which can be very different based on the chosen methodology, the experience of the provider and user organization and the complexity of the system. The below figure summarizes the main phases identified in the interviews.

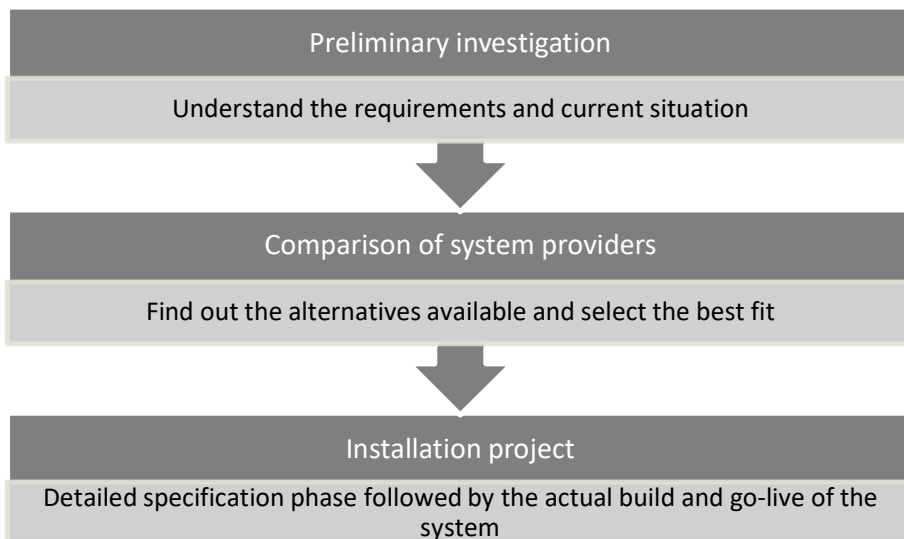


Figure 6 Procurement process at Organization 2

4.2.2 Sales of an information system

Interviewee 1 from Provider 1 explained that for them it is crucial to find the right partners to work with. This is because they require customers who have similar values and a certain amount of digital activity in the organization. To ensure that they find the right customers they have a specific sales process they follow.

The sales process at Provider 1 starts with the organization doing background research on potential customers. The potential customers can be nearly any organization. The idea of the background research is to find out if the organization under scrutiny fits the core

values and meets the requirements of Provider 1. After the background research is done for all the potential customers Provider 1 ends up with a list of organizations that meet their initial needs.

After the background research Provider 1 starts contacting the organization which made it past the first screening. At this stage, the key is finding the right person in the organization to contact, explained Interviewee 1. Usually, there are 3-5 persons who are in the right position for this. This is very beneficial when a salesperson from Provider 1 is trying to communicate the key values that Provider 1 can offer. The goal of the initial contact is to arrange a video meeting.

When you have the right person from a fitting organization the video meeting will provide useful insights into how Provider 1 can help the organization operate more efficiently. During the meeting it is important to explain the potential Provider 1 can offer to the customer, but also listen to the customer, said Interviewee 1. You can often find potential ideas if you listen to the customer explain their issues. If there is an issue Provider 1 can help with the next step of the process is a specs meeting.

The specs meeting already goes on a deeper level and improves the understanding between the two parties. If this results in beneficial results, it can be a start of a successful partnership. This usually results in monetary benefits for Provider 1 too.

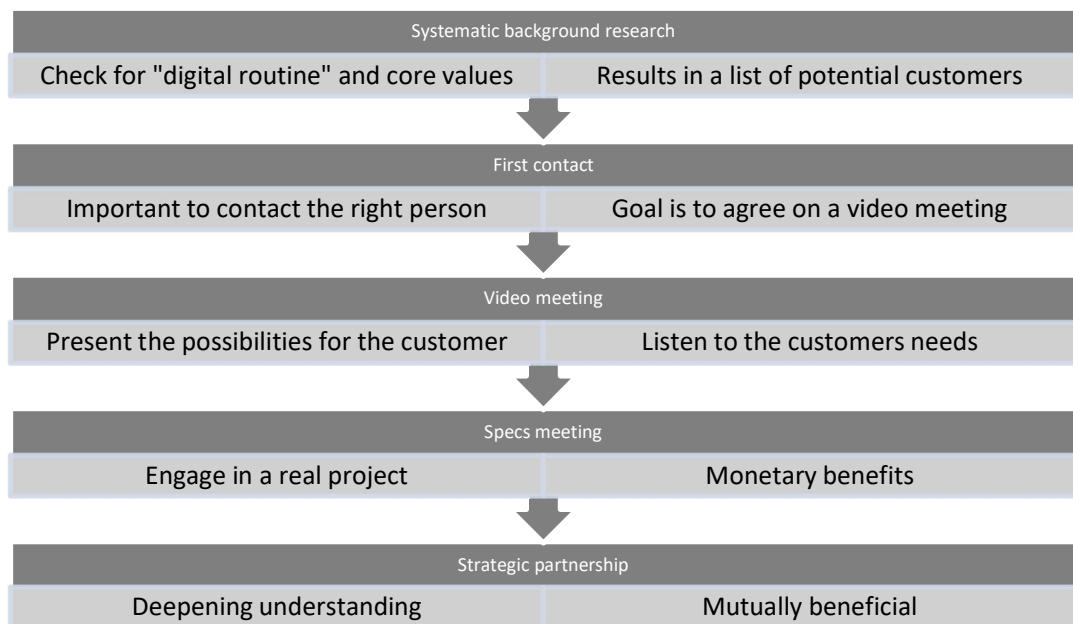


Figure 7 Sales process at Provider 1

At Provider 2 Interviewee 2 explained a different side of the sales of information systems. Interviewee 2 expressed that the sales process is very different for existing customers and potential customers. This is because of the different relationships the provider has with the two types of customers.

Interviewee 2 said:

“New customers have a clear need or idea”.

This comment refers to a situation where there is no trust between the two parties yet. Because there is a lack of trust the customer wants to define their own needs very specifically before contacting a provider. This means that when the first contact comes the project is quite strictly defined already.

Interviewee 2 also explained that the sources for new customers are public purchasing, contacts from inside their networks and sometimes a potential customer just contacts them straight. At Provider 2 the process worked in a way that the contact came from the customer side most of the time, according to this.

In the case of an existing customer Interviewee 2 commented: “if it is an existing customer and we know each other beforehand, then it can be an idea that there might be a possibility to develop something, but there is yet to be a clear vision of what it might be”. Interviewee 2 continued to explain that it is much easier to discuss with existing customers about potential development projects because there is trust between the parties and the two organizations have worked with each other before.

These needs usually come out in their regular collaboration meetings where the two parties discuss the projects that have been done and give each other feedback. Interviewee 2 explained that these are good changes to also learn about the possible projects coming up in the future. These meetings are a good place to discuss things like this because everyone should be familiar with each other.

Because of the reasons mentioned above, it is much easier for Provider 2 to obtain new projects from existing customers. Also, they have a larger say in how the projects are done when they get to interact with their existing customers from the start when the need for a project is first discovered. This means that key components of their sales efforts are

keeping the existing customers satisfied and being active in seeking new ways to work with them.

Interviewee 3 at Provider 3 explained that they are a clear market leader in their specific segment. This means that they are well-known among potential customers. This is also aided by happy customers which make good references. On top of this, they also do prospecting on their own to find potential customers.

The key thing for Provider 3 in sales is that they want to provide real value for their customers, according to Interviewee 3. Interviewee 3 commented:

“We ponder if we are really a good service for the customer and if we advance in the talks, we want to build a strong case explaining what we can bring in and if we cannot provide them with value, it is a good thing to notice for both parties because we do not want customers which we are unable to help”.

Interviewee 3 also explained that the sales process depends much on the customer. Provider 3 has customers who use their services for a short amount of time for example. In these cases, the sales process can be very quick because the scope is quite narrow. In other cases, their customers can use their services daily and the service can be a big part of their daily routine. These customers usually need more time during the sales process to optimize the solution to their specific needs.

To summarize, all the providers have their own approach when it comes to sales. But similarities exist also. Interviewees 1, 2 and 3 all highlighted that they want to provide value for their customers. This means that selecting or finding the right customers is very crucial to be able to find real value.

Some key differences were that Provider 1 had a clear-cut sales process to follow, whereas Providers 2 and 3 adapted more based on the customer. Provider 2 also had made a distinction between existing and new customers. The processes of communicating and selling these groups new services differ in many ways.

4.3 The cooperation between a system provider and a system user

4.3.1 Points of improvement

From the perspective of the user organizations, the general feeling seemed to be that the cooperation with the system provider worked well in general. The goals of the

cooperation were reached in all cases, though the estimated time or budget was overrun in some cases.

Although the relationship worked satisfactorily, there were some concerns raised during the interviews on matters that could have worked better. There were two main categories in which these points of improvement can be classified. These are resources provided by the provider and communications and the way of working.

The resources provided by the provider most often refer to the staff they provide for a project. There can be issues with the number of staff available or with the stability of the staff.

At Organization 1 Interviewee 4 explained that there were many little problems that they encountered during the deployment of the new system. The interviewee felt that at times the provider could have provided more resources in terms of people involved in the project. This comment reflects the changing needs during the project.

According to Interviewee 4, there are very different kinds of needs during different stages of the project. At points, there can be long times when the project is not moving further at all. At these times also, the resources from the provider are not needed. Other times it is crucial that there are many resources available so that the project can keep advancing.

At Organization 2 both interviewees expressed the issues they had faced during their project as there had been a personality switch at the provider. This caused the project to be delayed by some time as the new person had to get acquainted with the new environment. In addition to the time it took for the new consultant to get adjusted, the interviewees felt that the time building a relationship and understanding with the former consultant went to waste.

The way this issue is usually covered is through documentation which can help a new person in the project get on the same page. Interviewee 6 commented that although documentation can help it does not replace actual co-working and it leaves out a crucial part of understanding.

Both interviewees did understand also that the situation caused by a personal change can also prove difficult for the provider and that it is quite natural that people make personal

changes. This understanding does not remove the problems caused by the situation though.

The issues created by changing personnel were also recognized by Interviewee 2 at Provider 2. Interviewee 2 emphasized the need to build trust between persons from both parties. This trust needs to be built again from scratch when there is a change in personnel. This means that fruitful co-working will be out of reach for the time it takes to build trust for an effective relationship.

Issues in **communication** or in **the way of working** cause misunderstandings and an unnecessary struggle between the two parties. These arise from the differences in the two organizations and require adaptation from both parties to be overcome.

Interviewee 5 at Organization 2 explained that their largest problem during their ongoing project had been so far communication with the provider. Interviewee 5 felt that sometimes the two parties had their separate languages, and it was difficult to get the other party to understand. Interviewee 5 said:

“What is challenging about a project like this is that the consultants from the system provider speak their own language and we as users have our own language”.

Interviewee 5 continued:

“We think that we are answering their questions and that we understand what they mean and that they understand what we mean, that is a major challenge”.

This example provides insights into a crucial problem in the relationship. A project like this involves many parties at the user organization and it is important that there is a common understanding between the two parties.

Interviewee 6 from Organization 2 continued to elaborate on the difficulties encountered with the communication. Interviewee 6 explained that the two parties were used to working in such different ways that it was complicated to get everyone on the same page regarding the project. Especially the fact that there was no experience in working with projects like this at Organization 2 made it hard for the persons involved to adapt to the project work style employed by the providers.

Interviewee 6 continued to express that they would have expected the providers to adapt more to the way of working with their customers. This would have reduced the challenges experienced at Organization 2 and shared the stress more with the providers.

One way to tackle the issue with communication is the requirements specification. At Organization 2 this was done at the beginning of the project. Interviewee 5 explained that without the documentation gained from specifying the requirements it would have been impossible to discuss with the providers. Doing this forces the user organization to write down their requirements in a format that is understood by the providers.

However, doing this requires a lot of resources and time invested. Interviewee 5 explained that the definition of their requirements took around one year to complete. This means that the project takes a longer time than starting with a not-as-specific set of requirements in advance.

Interviewee 7 expressed a different type of concern when it comes to communication with their system providers. Their provider selection process includes a questionnaire which is used to specify if the provider has the resources needed by Organization 6. Interviewee 7 explained that most providers tend to answer everything with “yes” because they fear answering differently will eliminate them from the group of alternatives.

This means that communication between the two parties is not straightforward which may result in misunderstandings. For example, Organization 6 can base its decisions on the experience it thinks the provider has, although it may not actually have much experience in the matter.

Communication was also seen as a potential concern from the provider side. Interviewee 2 from Provider 2 explained that it is a common feature in the software business that it is difficult for the customers to know and express their needs. This puts more emphasis on the providers' expertise to provide the customer with good alternatives with their experience and understanding.

Interviewee 2 continued to explain that one way of dealing with this problem is using agile methods. Agile methods provide a way to get started soon and through learning establish what is useful for the customer. This removes the need for a very strict definition of the requirements at the start of a project.

4.3.2 Selecting the right partner

Many interviewees expressed that it is important to select the partners which whom you want to work with carefully. One of the selection criteria that was emphasized by many of the interviewees was to make sure that the **core values** match between the parties involved. This ensures that there are common goals to reach for the provider and the user organization.

At Organization 2 Interviewee 5 explained how they had evaluated and selected the providers from the set of alternatives. They wanted a partner who understood their needs and the scope of the project. This was evaluated by the price of the offer. Interviewee 5 explained that a price that is too low compared to their own estimates shows that the provider has not understood the demands of the project fully. Also, a price which is relatively high shows that the ideas between the two parties may differ.

Interviewee 5 also stated how they took a look at each provider's background to make sure that they would be a suitable partner. Things that they were looking at were the economic situation of the provider, the type of the company, their references and previous experience, how many consultants they had to offer and what type of project schedules they provided. The providers were given a score based on the factors presented above. For the final selection, the remaining providers were invited to present their ideas for the project at Organization 2.

Interviewee 5 also emphasized the **size** of the provider. It is important that the size is right because if the provider is too large you might not get the attention needed. Conversely, if the provider is too small, they might struggle to provide the resources needed to complete the project.

Organization 2 had also made a four-year-plus estimate for each system and provider to estimate the recurring costs. This can help to focus on the price for the whole life cycle of the system instead of only looking at the costs of the implementation project.

Interviewee 1 at Provider 1 said that the right customers are key for their operations as they are still a relatively small player in the field. The right customers are ones that believe in the product Provider 1 offer. This means that Provider 1 does not have to extensively market its products. In a situation like this, it is very important to find the right customers to work with.

Interviewee 1 explained that because they are looking for strategic partnerships, they want to select their customers themselves. This process is done by making a list of potential companies by checking that they meet the key criteria. These criteria include having the data needed for the product of Provider 1 to work for example. Companies which do not seem potential are discarded from the set of alternatives.

After the initial list is complete, they move to contact the potential companies. In this stage during the communication, they will get a better idea of whether the company is a potential partner for them. Interviewee 1 explained that once they get a first meeting organized you can quite quickly see if there is potential from the reactions of the other party.

Interviewee 3 from Provider 3 answered when asked about how customers should avoid harmful lock-ins:

“I think that for the customer it is beneficial to look for partners which share similar values as the customer itself. Every company has its own culture and a model of operation and if you can find a partner which shares these values and principles then the likelihood of things working out well increases”.

This comment reflects the importance of matching values and culture in selecting a partner. With a partner like this, it is easier to communicate and work together as the organizations are naturally similar in spirit. Interviewee 3 continued to emphasize the importance of communication:

“To be able to ask and demand and to explain your own needs”.

By having similar ideas about the operation, it is easier to communicate the needs of the user organization and for the provider to gain a deep understanding of the core processes of their customers.

4.4 Causes and change drivers

4.4.1 Causes for a lock-in situation

Many of the interviewees explained how they perceived how an organization can end up in a lock-in situation.

Interviewee 5 at Organization 2 said that when their organization was switching to a new system, they realized that **the employees in the organization had learned to use the old**

system. This was shown by the fact that when the new system functioned differently at some stages, the employees struggled because they expected similar processes as they had been used to in the old system.

Interviewee 5 continued to explain that this was one of the key challenges of the project. While the same employees remained at the organization throughout the project their job description could change which meant they had to learn new ways to work. This means that it will take some time before they learn to use the new system effectively.

This view was backed up by Interviewee 6 who explained that actually changing the system is not that difficult. According to Interviewee 6, the challenge lies within people, their **ways of working and ways of communicating.** This is all connected to how information flows through the organization also.

Interviewee 7 at Organization 3 explained that a key issue which might prevent them from updating some of their systems can be that it can be very **complicated to update** one system. Reasons for this can be that there is no possible maintenance window for that system or that it is connected to so many other systems that updating becomes extremely difficult or expensive.

Interviewee 7 continued that they also sometimes have the issue that large production **equipment has been manufactured to work with a certain system.** Also, in this situation making adjustments or replacing the system is very tricky as the manufacturers of the equipment usually want to avoid that.

In summary Interviewee 7 concluded that the systems with the most risk for a lock-in situation are the ones which are most specifically created for a specific purpose. This usually means that those systems are highly customized and thus difficult to replace.

Interviewee 1 from Provider 1 explained that from their point of view, one key reason why an organization might end up in a positive lock-in situation is that they always **customize their products based on the customer.** This means that their product is adapted based on the processes and needs of the customer. This means that their system quickly becomes an integrated part of the key processes at the customer.

Interviewee 1 continued to explain that a second cause for lock-ins can be **the relationship.** This means that when they can find a good strategic partner with whom

they can do long-term planning in an open and efficient way, the value brought in by that relationship is difficult to replace.

Interviewee 1 still gave one additional reason for lock-in situations which they have encountered with their long-term customers. Some of their customers that have been using their service for years have such a long history of different projects done based on the services on Provider 1 that **the amount of work** it would take to switch to some other service would be massive.

Interviewee 2 at Provider 2 explained that one way how organizations can end up even locked into a specific version of a system can be **the complexity of updating a system** which is developed by multiple actors. In these situations, the system has different features created by separate parties which means that if you touch one of those, the others might stop working correctly. Then you might end up in a situation where you don't dare touch anything to keep everything working as it is.

Interviewee 2 also mentioned that some **people “commit mentally”** to a system and might give comments like:

“It was such a huge effort and big investment to deploy this system that we cannot replace that expensive system”.

Interviewee 2 continued to explain that when people make decisions, it is hard for most to admit later that they might have been wrong. Then the commitment remains even if there are some clear drawbacks which could be observed.

Interviewee 3 at Provider 3 took a slightly different approach to lock-in situations. They had a clear idea that a lock-in can be a positive situation for both parties and is something for which you have actively worked to achieve. Interviewee 3 continued:

“We have to do the effort to become irreplaceable for the customer and thus we achieve the lock-in”.

This type of thinking leads to a situation where the customer gets so much value from using the services of Provider 3 that it does not make sense for them to even consider any other options. This is reinforced as time passes as the parties learn from each other and the relationship deepens. Also, at the same time, the customer organization learns to use the system even more effectively all the time.

4.4.2 Change drivers

In this chapter, some of the key issues that push organizations into making changes to their information systems are highlighted.

Interviewee 4 from Organization 1 explained that it is difficult to say what was their main change driver if you think about their current project to replace their ERP system. Mainly there were two types of issues which were common. First was whenever they had new employees who had to get acquainted with their old system. This proved to be time-consuming as the **system had grown very complex** and didn't use the easy **user interfaces** of newer systems. The second issue which arose often was **compatibility** with key office systems like Microsoft Office for example. This meant that there was significantly more manual effort in moving data.

Interviewee 5 from Organization 2 highlighted that a key change driver for them was **interfaces with outside systems**. This means that their partners required real-time data from their systems via different kinds of interfaces but building these interfaces with old technology proved to be time-consuming and expensive.

Another key issue which Interviewee 5 highlighted was the **user interface**. This was especially an issue with new employees, similar to Organization 1 above. The main issue was that the system was very counter-intuitive to use and required a lot of just remembering which button to press next. This meant that the learning curve to use the system effectively was steep.

Interviewee 7 from Organization 3 highlighted **information security** as one crucial change driver. This can happen when a system is very old, and the provider has published either new products or new versions. Then they will at some point stop supporting the older versions which means that those systems will no longer get any security updates. This can leave the systems at risk of being exposed. This type of situation is a powerful reason to start thinking about changes even though the daily operations might be running smoothly.

Interviewee 7 also gave another example that sometimes **changes in the general business environment** can force one to take action. These can be for example the emergence of a new technology which is quickly adapted all over the business environment. This can leave some old systems unnecessary or in need of drastic changes.

Interviewee 1 at Provider 1 explained sometimes it can be difficult to make their potential customers realize the potential that they can offer. In these situations, the customers can be locked into their current state. Here a helpful tool can be to look at the business perspective and find an issue or possibility which can be realized through the services of Provider 1. Interviewee 1 explained:

“When you look at it from the perspective of business and the needs of the people, it won’t leave any business managers cold”.

4.5 Solutions which can help prevent problems

4.5.1 Professional purchasing

When asked how organizations can prevent problems arising from lock-in situations Interviewees 2, 3 and 7 explained that purchasing is a key part of making sure the problems can be avoided. These views were also backed up by comments made by Interviewees 5 and 6 regarding their project and its success.

Interviewee 2 from Provider 2 said it is quite easy for their customers to go with the flow and just let the wheel keep turning and not plan the future too closely. This should be avoided, however, to avoid problematic situations. Instead of being reactive to situations happening in the business environment, **organizations should try to be proactive**. This means being active and rational in decisions.

By having people actively thinking about the future and the possibilities and challenges incoming it is easier to guide the organization in a way which supports the general business strategy according to Interviewee 2. This should help the organization in avoiding problems where the information systems contrast with the strategy.

To accomplish this, organizations need to have personnel who have a clear view on both the organizational strategy and how the strategy can be supported by information systems. Interviewee 2 continued to explain that according to the experiences of Provider 2 this knowledge is not part of an organizational structure but integrated with key personnel in the organization. Interviewee 2 said:

“It is no guarantee that this works if the titles and responsibilities are in check, we have noticed in some companies that there are experienced guys who have learned what is best for their company and they guide it while it may not be included in their roles and responsibilities”.

Interviewee 3 from Provider 3 said when asked how customers can avoid problems:

“To be able to ask and to demand and to explain your own needs”.

This refers to **the communication between the customer and the provider** which was referred to as a potential problem by many of the interviewees. According to Interviewee 3, it is very beneficial for the relationship if there is knowledge of how to communicate with a system provider at the customer.

Interviewee 3 continued:

“That kind of professional purchasing is quite important actually so that you know how to buy, and you know what you are buying”.

This comment emphasized the need for **know-how in information systems** and the specific needs of the organization when it comes to the systems. In addition to know-how, Interviewee 3 explained that an attitude which is positive to dialogue is important. This makes it easier for the two parties to get on the same page.

Interviewee 3 agreed with the comments of Interviewee 2 about the organizational structure not having big importance in the success. Interviewee 3 commented that it does not matter which organization or department they are dealing with as long as they have the know-how and right attitude explained above. Interviewee 3 also added that a key challenge in many cases is the ability to recognize the things that are already done well. It requires special skills to be able to communicate which things an organization wants to change from its current situation and which to keep similar.

When asked how Organization 3 can avoid being locked-into problematic situations Interviewee 7 replied:

“Perhaps if you think what is most important in keeping all systems up to date, it would be the purchasing process”.

In a larger organization like Organization 3, **a well-defined purchasing process** is a key factor in ensuring the successful operation of information systems.

Interviewee 7 continued to explain the benefits of a well-defined purchasing process:

“When purchasing you define all these things well enough that they are updateable systems, and they use certain standards and the interfaces used are standards it makes it easier if you need to change some equipment, system or a part of a system in some point of the chain”.

Clearly, a key factor in making changing information systems easier at Organization 3 then is using standards which ensure compatibility and previous know-how.

4.5.2 Strategic fit & mutual value

At Provider 1 Interviewee 1 expressed that they spend a lot of effort choosing the customers where they see the potential. This is their way of ensuring a fruitful partnership can be created for both parties involved. This means that the two organizations need to match on a value level with each other.

Interviewee 1 explained further that when there is **a deep trust** between the two parties, they are able to develop solutions on such a strategic level that the benefits gained are intertwined very deeply into the way of working of the user organization. This means that the relationship becomes difficult to replace as that kind of value is very hard to reproduce quickly.

Interviewee 1 continued to highlight that replacing just the technology is easy in itself. But replacing a process based on a certain technology solution is trickier. Then it is essential to look at the business at a high level and understand the basic drivers and constraints of the process. To make an effective change you must put the business process at the centre of the thinking and build around that, according to Interviewee 1.

Interviewee 3 at Provider 3 explained that whilst from a provider point of view they of course are looking for situations where the customer will not replace their solution, there are many ways to find a situation like this. The one which Provider 3 aims to follow is to provide such a good level of value and service that the customer simply sees them as irreplaceable. Through time this type of lock becomes even stronger than using licensing agreements or different clauses in their contracts, emphasized Interviewee 3.

Interviewee 3 also highlighted the importance of customer service as one of the key components in keeping their customers satisfied. Provider 3 has spent a lot of resources in making sure the level of customer service is high. According to their internal measurements, this is also reflected in the customer satisfaction levels. This attitude is also reflected in how much effort Provider 3 puts into training the users of their customers into using the system they provide. They always send a trainer onsite to get to know the customer organization in advance and all training is done onsite.

Interviewee 3 also explained that finding a **good strategic fit** is a key factor in ensuring a problem-free relationship. Failing to accomplish this means extra work on both sides as the customer will have requirements that cannot be met, and the provider has to do more customer service activities as the customer is not happy with the product. The strategic fit also grows usually into a long-time relationship where both parties continually learn about each other, and this makes communication and finding more values easier and easier.

The mechanism Provider 3 uses to ensure the strategic fit is that they spend a lot of effort before starting any deeper discussion with a customer into making a strong case how the customer could get value from their product. If the customer can agree with this case, then usually they have a similar mindset in place, and it is safe to proceed.

5 Analysis

5.1 Purchasing in theory versus practice

5.1.1 Process

In the literature Heikka and Mustak (2017) summarized the buying process into the following steps:

- Recognition of a need
- Define purchase goals (requirements)
- Find providers who can help fulfil the needs
- Compare and choose the best fit provider
- Assessment during and after service delivery

This process aligns well with the findings based on the interviews. However, there are some additional steps which were mentioned in the interviews. One of these was preliminary research with the aim of finding out whether it is possible to continue with the current solutions. This can be seen as a complementary step for defining the purchase goals or even the recognition of a need.

Another step which came up in several interviews was the need to have a design phase after the system provider had been selected. The idea of this phase is to carefully agree on the specifications of the system for which the build is about to begin. This phase seems to be typical for information system purchasing.

From a process perspective, it is good to also notice some information system specific factors which organizations need to consider. McFarlan, McKenney and Pyburn (1983) introduced four stages of technology assimilation. Their stages are:

- Identification & initial investment
- Experimentation & learning
- Control
- Widespread technology transfer

These stages may vary based on the organization's knowledge of the technology at hand. But it is crucial to note that the assimilation will always cause some issues during the

initial stages of the buying process as the organization might find it difficult to define its purchase goals. It is also important to notice that in many cases learning happens only after initial investment which means organizations need to be willing to invest to enable their staff to get hands-on experience from the technology. These issues were apparent in the interviews as many interviewees stated that complex purchases take a lot of time due to different difficulties in understanding and defining the technical solutions.

Still another thing to consider in the lifecycle of information systems, which is described by Rajlich and Bennett (2000). They recognize five different stages in the lifecycle of an information system:

- Initial development
- Evolution
- Servicing
- Phaseout
- Closedown

The most important transition to consider is the one from evolution to servicing according to Rajlich and Bennett (2000). After the evolution stage is over, any major changes to the system become impossible, or at least very difficult to execute. Lifecycle thinking was mentioned by one of the interviewees by name and many others clearly had thought about the future of the information system during the buying phase.

5.1.2 Factors

The literature also presented many different factors which should be considered when thinking about organizational purchasing. The following table summarizes these factors and presents which authors have brought these up:

Factor	Authors
Environment / Situational factors	Wind and Webster Jr (1972) Sheth (1973)
Product / Service factors	Wind and Webster Jr (1972) Sheth (1973) Heikka and Mustak (2017)
Organizational factors	Wind and Webster Jr (1972) Sheth (1973) Johnston and Levin (1996)
Relationships	Johnston and Levin (1996) Ulaga and Eggert (2006) Heikka and Mustak (2017)
Individuals	Wind and Webster Jr (1972) Sheth (1973) Johnston and Levin (1996) Heikka and Mustak (2017)

Table 7 Factors related to organizational buying

These are reviewed and compared with the findings from the interviews below.

Environment / situational factors

One key factor which was mentioned by slightly different names in many articles are the environmental/situational factors. This means different kinds of pressure and requirements which come from outside of the buying organization and yet still have an impact on their choices.

The existence of this kind of factor was quite clearly confirmed in the interviews as there were many mentions of outside pressure which affected the choices the buying organizations made. Mostly these were related to communication within their partner network in terms of interfacing with their systems. Other examples mentioned about external constraints were for example changes in the general business environment. In this case, major changes in the overall landscape affect the need to make changes to otherwise well-working systems. A good example in this category can be the change from communicating over landline telephones to mobile telephones and still to over-the-net videoconferencing.

Product/service factors

Another factor mentioned in nearly all articles was the product or service factors. This refers to the aspects of how the purchase goals are set in relation to the product or service

which is being acquired. Heikka and Mustak (2017) divide this area further into four different factors:

- Convincing value propositions
- Perception of service quality
- Perception of potential risk
- Potential for customization

Out of these four factors, the one including the evaluation of the risk associated with the purchase was mentioned most both in the literature and in the interviews. The perceived risk clearly affects the complexity of the purchasing process as higher risk leads to more carefully thought-out decision-making. In practice, this means that whenever the risk is seen high, organizations tend to put more resources and time into purchasing efforts to mitigate the risk. This is also affected by the importance of the system to the organization. McFarlan, McKenney and Pyburn (1983) introduced a matrix to present the different positions a system can take within an organization. This can be a very helpful tool to evaluate the importance of a system in question. The positions are:

- Support (Low strategic impact of existing systems and application development portfolio)
- Turnaround (Low strategic impact of existing systems, high strategic impact of application development portfolio)
- Factory (High strategic impact of existing systems, low strategic impact of application development portfolio)
- Strategic (High strategic impact of existing systems and application development portfolio)

None of the interviewees specifically mentioned these positions, but clearly there was always some understanding in the background about the importance of the system to the organization. This was apparent both on the user and provider sides.

From the other factors, the perception of service quality was mostly related to the selection of the provider based on the interviews. As it is difficult to evaluate the end results of a new information system, most buying organizations try to find out about the providers existing customers and how they would rate their services.

The potential for customization was also mentioned in the interviews as the buying organizations want to find the best possible fit for their organization. The fact that the

system being bought has the potential to be customized to their needs can mitigate some of the perceived risks.

The first factor of convincing value propositions is more related to the system provider as it is mostly up to them to make a convincing case for the potential customer that their solutions can offer them enough value to justify the risks. This point was mentioned in the interviews with system providers. They have different mechanisms in place to try and convince the customers that their services will be beneficial.

Organizational factors

Organizational factors refer to different aspects of the organization which will affect the decision-making process when it comes to purchasing. Wind and Webster (1972) identify organizational tasks, organizational structure and organizational technology as these types of aspects.

Organizational tasks refer to the branches of the company which are touched by the purchase. It defines who are involved in the buying process and also how important it is for the company. This was confirmed by the interviews as the buying organizations all involved many people from the relevant organizations at some point in the process. From the provider side, interviews showcased that for them a priority is to find the right people to discuss with from the customer. Here it helps to understand the organizational tasks which are being affected by the new information system.

The organizational structure further defines who are involved in the decision-making process and crucially what are the different roles they play. It can also have a great effect on how communication flows across an organization. Johnston and Levin (1996) added concepts such as role stress and communication networks as separate entities to highlight the potential issues faced during purchasing. The organizational structure was not mentioned in detail in any of the interviews, but it clearly played a part in the selection of who were involved in the buying processes at the companies which were interviewed. It also defines the ultimate authority who makes the final decision in many cases.

Organizational technology is a key concept for this study as it links heavily with the path theories. The key idea of the organizational technology is that the current technical situation affects the needs and options available to an organization. This was somewhat confirmed by the interviews, however, most attention was paid to the future of the

organizational technology and making sure that the technology choices remain valid and enable easy interaction with other systems inside the organization and also with third parties and their systems.

Relationships

Johnston and Levin (1996) first recognised that many of the other factors presented in earlier papers also have to do with the buyer-seller relationship. This thinking has been driven onwards by Ulaga and Eggert (2006) in their paper highlighting the value that the seller needs to be able to convey to the buyer. To do this they argue that the relationship and especially service and support are key concepts.

Heikka and Mustak (2017) also mention relationships as part of their listing of provider-specific factors. This together with the availability of information are among the factors which are easiest to control for the provider.

The importance of relationships between the buying and selling company was highlighted in all the interviews also. Some of the aspects here were finding a “good fit” and issues in the relationships.

Selecting a partner which shares the values of the company was seen as a kind of failsafe mechanic by many interviewees. The idea here is that when core values are shared it is easier to communicate and work together. In addition to the values, the size of the business was mentioned as a key factor for consideration.

In terms of the issues faced in relationships, there were two overall themes which emerged mainly from the buyer side. First were issues in the resourcing. This meant either issues in having the optimal amount of people available when needed or issues caused by people switching jobs or projects which meant that they had to be replaced and thus the personal relationships and learning would have to start from zero. Secondly, there were some issues where the working style or communication between the two different companies was so different that it caused major issues. To avoid this, it would need both sides to make adaptations in their organizational culture at least for people involved in the project.

Individuals

Many of the articles also highlight that there are always individuals making decisions in the end. This is important to note since individual preferences can be affected by many factors such as previous experiences and the values the individual holds. Johnston and

Levin also add role stress as something which can result in a situation where the expectations of the organization differ from the individual's motivation.

Heikka and Mustak (2017) also expand the individual preferences to play a key part in the relationships that form between the buyer and seller. This is due to the fact that relationships are always formed between people, not organizations, when examined closely enough.

This type of observation was backed up by interviewee 6 especially by highlighting the fact that relationships are always quite fragile during a project. Mainly this is due to the risk of people leaving the project. No amount of documentation and handover activities can replace the relationships that have been formed between the parties over time. Thus, this type of situation ends up causing a big delay as the relationship with the new person must be formed from scratch.

5.2 Path theories

The overall idea in the path theories is to look at the past to figure out how we have ended up in a current situation. Also in the centre of path theories are lock-in situations where a path leads to a situation where options diminish and eventually disappear.

All path theory literature agrees that mechanisms inside markets or organizations which enhance the path. Arthur (1989) calls these increasing returns, whereas Sydow, Schreyögg and Koch (2009) refer to self-reinforcing mechanisms.

The below chapters take a closer look at some of the key aspects of paths based on the literature and the findings from the interviews.

5.2.1 Dependency vs. creation

Path literature started out from path dependence which assumes that the path emerges without much control from the market or the organization which it affects. Later on, an opposing school rose which highlighted the importance of path creation by actively steering the path. These two have been combined as the notion of path constitution.

Path dependence and path creation make up the two modes of path constitution in the work of Meyer and Schubert (2007). Path dependence can be referred to as emerging and path creation as deliberate.

Real-life cases tend to be positioned somewhere between these two as these can be seen as two opposite ends of a continuum. This seems to hold true when compared with findings from the interviews. There were clearly organizations which were forced to make decisions with pressure coming from outside, making their decision-making closer to emergent. And specifically from the provider side, there was a clear intention for planning ahead and shaping the future deliberately.

There are also different phases of path constitution. Meyer and Schubert (2007) present three modes:

- Generation
- Continuation
- Termination

Whereas Sydow, Schreyögg and Koch (2009) present three slightly different phases:

- Preformation
- Formation
- Lock-in

The phases are otherwise quite similar, but Meyer and Schubert have an entire phase determined for the termination of the path. Sydow, Schreyögg and Koch, however, have divided the generation phase into two by having a preformation and formation phase.

The phases can also be seen in practice as usually at some point when a system has enough maturity it will enter the continuation phase. All of the interviews confirmed that there is a clear need to extend the path by maintaining and developing the systems further once they have been deployed. This is seen as a deliberate action to extend the path in the terminology used by Meyer and Schubert.

Of course, also the reinforcing mechanisms add to the persistence of the path, but this is more difficult to notice. But clearly, there is also the part of the emergent side during the continuation phase.

5.2.2 Reinforcing mechanisms

Sydow, Schreyögg and Koch (2009) identified four self-reinforcing mechanisms which lead to a path narrowing down:

- Coordination
- Complementary
- Learning
- Adaptive expectations

In this chapter, these are evaluated against the findings from the interviews.

Coordination

Coordination effects refer to when more actors start following the process and thus the process becomes more predictable. Based on the interviews, this happens both inside the organizations and in intercompany relationships.

Inside the company, this can often be mixed with learning as these are near to each other. However, there is a slight difference between learning to do one's task in the most efficient way and in being able to trust that others will do their tasks in an expected way.

In intercompany relationships, the coordination effects are especially strong as it helps both parties when processes become more predictable and the need to solve communication issues decreases.

Complementary

Complementary effects refer to a synergy which is achieved as goods or services work well together. This was confirmed to be the case with many systems as a clear driver to make changes was to enable better interface capabilities with other systems inside the organization as well as with systems at third parties.

It seems that this effect is particularly strong at first as the technology is up to date. However, as it begins ageing, this can turn into a challenge as technology advances and the system may fall back from the preferred interface solutions.

Learning

Learning effects was clearly the most recognized self-reinforcing mechanism based on the interviews. There clearly is a correlation to getting more value out of the system as the organization learns to use it in the most effective way. This is also clearly a known fact inside the organizations and industry.

This is a strong factor in causing lock-ins as the comments in the interview show that organizations realized that when replacing a system, there will be a period of inefficiency

and learning as the learnings from the old system don't apply anymore and it takes time to get to grips with the new system.

Adaptive expectations

The adaptive expectations effects is the most difficult concept to grasp out of the self-reinforcing mechanisms. It means that there can be social pressure to use the most efficient solutions which impacts the preferences of individuals.

There were not many comments that would either support or contradict this, so this point clearly needs more investigation. However, there was one supporting comment from Interviewee 2 of people "mentally committing" to systems. This is quite close to social pressure which makes it difficult to let go of a system.

New findings from interviews

There were a couple of other points which came up in the interviews also which can be viewed as separate self-reinforcing mechanisms. These were the relationship with the provider and customizing the system.

The relationship can be a powerful mechanism as it helps organizations get the most out of the system. And it works both ways so both parties want to keep it going and gain mutual benefits.

Customizing the system makes it fit better into the processes already present at the organization. In a way, this can be seen as the system learning to work with the organization as opposed to the organization learning to use the system. The end result with both is more effective use of the system.

5.2.3 Causes for lock-in

In addition to the reinforcing mechanisms presented above, there seem to still be more causes for lock-in situations. In the literature Sydow, Schreyögg and Koch (2009) make a clear distinction between path dependence and organizational rigidities. These organizational rigidities refer to a more traditional issue in organizations being slow to make large changes.

Examples of these rigidities can be for example a large investment, the amount of work perceived in doing something or a mental commitment to a certain solution. All of these

concepts can cause a lock-in to become stronger by making it difficult for an organization to make a decision which would go against the current path.

The interviews clearly confirmed the existence of these types of causes for lock-in situations. The investment and amount of work were present in almost every interview, especially on the user side, when thinking about the future after a new system had been taken into use. This meant that the organizations perceived that replacing the system shortly after it had been taken into use simply was not an option in terms of money and resources.

In a similar stream, some organizations perceived even updating a system to a newer version to be difficult. This can be due to different kinds of issues like finding a maintenance window or the complexity of the environment in which the system is used. Of course, all the reasons come down to being too expensive in the end.

5.2.4 Path termination

Many articles concerning the path theories also recognize that the path will sometimes be terminated for some reason. Many articles call this path-breaking, but here I will refer to it as path termination as per the phases of a path introduced by Meyer and Schubert (2007). Path termination can be further divided into two modes; dissolution where the path disappears without deliberate actions and path-breaking where the path is terminated by mindful efforts.

The change drivers which were found based on the interviews show that there are a lot of external forces present which in most cases push the organizations into making decisions for change. This is closer to the path dissolution as the organization does not actively plan for the changes, rather than reacts to different sorts of pressure coming from the outside.

A key issue pushing changes from the outside seemed to be system compatibility with other actors in the network in which the organization is involved. This means that a system which works well inside the company must be replaced because it is difficult to build interfaces within the partner network.

Other external issues which pushed the organization to make changes were information security and changes in the general business environment. Both these work in the same way as the compatibility issues before.

Examples of more deliberate path-breaking efforts were most often related to changing business needs. The need for a better user interface was mentioned in a couple of interviews as a concrete example of this. In this case, the need inside the company is the driving force when the organization starts to explore how to escape the current path to fulfil the need for a more modern user interface.

6 Conclusions

This study set out to investigate lock-in situations and the acquisition of information systems in Finnish organizations. As a result, the study provides some new findings which are not mentioned in previous literature.

For organizational purchasing and the process related to it, the study revealed that there are some specific phases which are very crucial for acquiring information systems. These phases are a preliminary investigation phase where the organization will learn about its viable paths and options and the design phase where the specifications for the system are defined.

The path literature on the other hand is based on the notion that paths are strengthened by reinforcing mechanisms. The study uncovered two new reinforcing mechanisms which are not previously mentioned in the articles covering the field. These new mechanisms are the relationship with the system provider(s) which will grow stronger over time and the customization of the system which helps the system adapt to the processes of the organization which is using it.

In addition to the reinforcing mechanisms, the study clearly showed that paths are also enforced by other mechanisms which are related to the rigidities of the organization. This is something which has been mostly ignored in the literature but is a crucial thing to consider when looking at the big picture of paths and the factors which affect their trajectories.

On a more general front, the study proved that lock-in situations can also be positive situations as it can enable organizations to form strong partnerships which benefit all parties involved. This is an important thing to consider when forming a mindset about these issues.

This study was conducted with a relatively small set of interviews in Finnish organizations which had recently undertaken an information system replacement project and with Finnish system providers. To further confirm the findings of this study, more research on the topic is still needed. A key topic for future research to focus on is the network effects and how these can affect organizations and their technological paths.

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