

# Potential Pitfalls in the Implementation Process of an Information System

- A Framework for Identifying Pitfalls for Companies in the Start-up Phase Aiming to Implement an Information System

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*Potentiella Fallgropar i Implementeringsprocessen av ett Informationssystem*

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## **Abstract**

Although many information system (IS) implementations are considered to have the resources necessary to be successful, they often fail. This is especially challenging for small IS providers who lack a proven process for gaining willingness to use and onboard a new customer. Hence, there is a need to develop a framework to identify potential pitfalls in such implementation matters, from designing the system until successfully onboarded customers. This paper aims to target this issue and proposes a framework for identifying common pitfalls during the implementation process of an IT system. Moreover, this paper applies the framework to an IS provider in the start-up phase by focusing on the system user. With the support of the framework and based on the company's context, this paper presents identified pitfalls and suggestions for actions that the IS provider can take to avoid them. IS models are selected and applied considering the company's needs and previous literature. The IS models considered are Value Network Analysis (VNA), Extended Technology Acceptance Model (TAM2), and Theory of Planned Behavior (TPB). As a result, seven pitfalls are identified considering organizational culture and leading change, user resistance, complexity, mandatory reliance, value demonstration, experience and control, and weak links.

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# **1 Introduction**

## **1.1 Motivation**

The digitization within today's society sees no sign of decline. This trend contributes to seeing more use for information systems (IS). Often, several new functions are built into an existing IS, thereby increasing the complexity of the system [6]. All the possible uses for IS contribute to more initiatives to apply IS as a tool in new areas. However, many of these initiatives are quickly abandoned and considered unsuccessful. Many of these initiatives were doomed to fail already from their implementation start and companies continue to waste unnecessary resources on doomed projects, simply by getting stuck in multiple pitfalls reducing the likelihood that the system solution will be used in long term. Hence, there is a need to illuminate the reason behind all these failed projects and to investigate how these pitfalls can be avoided. Especially, these pitfalls need to be considered at the beginning of the implementation process to ensure the optimal conditions already from the start.

Previous literature within the IS field covers multiple types of IS models considering different aspects such as user acceptance and resistance towards using a system. An IS model is a tool for measuring how users perceive and behave towards certain technology. However, because of the various versions of IS models, there is a need to summarize and compare them to each other. There is also a need to apply them into a framework that does not require direct input from the end-user, but still considers their needs. This is often desired for start-up companies that do not have any customers yet. Today, this type of framework is missing.

Moreover, there is a lack of clear general guidelines on what to consider for a new IS provider on the market to create a successful implementation of complex IT systems focusing on the needs of the customer. Additionally, the information system literature covering small companies in the start-up phase is close to nonexistent. This can be the reason for the many failed projects and is hence, of high importance to dig deeper into. As the industry is constantly evolving, a reasonable assumption is that the implementation processes and user expectations also change over time. Hence, this paper seeks to identify and highlight the most common pitfalls in this implementation process. The framework proposed in this research is adaptable to many different types of information systems but also comprehensive enough to stress-test companies' strategies reasoning for an implementation process from

the perspective of users. With this at hand, start-up companies are allowed to fill in the gaps for their own strategy of implementation. To confirm the model's applicability, a smaller start-up company is invited as an object to further complement the framework and apply it. This small company has been running for approximately one and a half years and has not yet a full implementation of its intended system. Hence, the company is still in the implementation stage and is a suitable part of this research.

## 1.2 Aim

This paper aims to propose several potential pitfalls faced by companies in a start-up phase. A pitfall, in this research, refers to a potential mistake or oversight that can be made during the implementation process of an IS. The definition of an IS is explained at the beginning of the theory chapter. The main focus of this report will be on customer users, identify criteria related to their acceptance, and how to onboard an organization to a new system solution. These aspects will hereinafter be referred to as implementation.

Moreover, the paper aims to provide a framework for this identification process, specially designed for start-up companies and their prerequisites, which are applied to identify the pitfalls. The framework is defined as a guide to be used by start-up companies when implementing an IS, for avoiding mistakes and to form new, company-specific ones. The framework is intended to be used in the whole process of implementation and designed to the specific needs of the company. However, the framework is mainly intended for use at the beginning of the implementation process. In this research, a company in the start-up phase refers to a company that has been running for approximately up to two years and has not yet developed all the functions that the company intends to implement. Moreover, the company has also not yet arranged a customer agreement where the product is used on a full scale and hence does not have the possibility to receive customer feedback.

The framework proposed aims to guide any company with such prerequisites with their implementation of an information system, and more specifically how to adapt to the customer's user settings to increase the probability of a successful implementation. The definition of successful is investigated in the theory chapter and later applied together with the pre-conditions of the company. The purpose of the suggested framework is for these IS providers to ensure that they have the necessary tools for a successful implementation process with a focus to reach acknowledgment from the intended users. Moreover, the paper aims to apply the framework to a specific company's implementation strategy and present which parts may need to be improved based on the suggestions by the framework. The purpose of the framework is to rationalize the implementation process of IS of companies in the start-up phase in the future.

Additionally, this research is aiming to create value for the customers of such an IS, which are the ones that are actually using the system and experience the benefits and drawbacks of it. The framework and the pitfalls that this research aims to propose can lead to an implementation process of the IS that is more adapted to the needs of the customer organization, aiming to fulfill their specific needs. This can rationalize the work and the work motivation in this organization.

Moreover, the research aims to contribute to further research within this field by proposing a framework to create an information system like this. The research aims to provide a combination of suitable IS models that can be applied to identify multiple pitfalls. These IS models are defined as models found in the IS literature that can be applied to evaluate any IS.

### 1.3 Research questions

As previously mentioned, this work aims to propose a framework for identifying and proposing pitfalls considering the implementation process of the company's system. The proposal and application of this framework is executed by answering the following two research questions:

1. Which are the information system models to be used in this framework?
2. What pitfalls of the implementation process can be identified using this framework, seen from a customer point of view?

### 1.4 Delimitations

This research is conducted in collaboration with a small start-up company and hence, has to be adjusted to fit into the business model and values of the company. As a consequence of this, restrictions can occur that can affect the research. For example, there may be an economical restriction that means that the results of this research can not be performed in practice. Additionally, the company is a start-up and has not fully implemented its system yet. Hence, massive changes and re-planning can occur during the process of the project that makes the work of this paper and its suggestions out of date and unusable.

One of the biggest limitations regards the fact that the company is a start-up, with yet a minimum number of customers. Hence, one of the earliest faced delimitation, that can be pointed out, is the lack of customer feedback the authors could have used in their study. As the study aims to investigate a system that is aimed as a product for the customers of the company, the customer apprehension of the system is highly valuable to take into consideration. Hence, one of the most vital limitations is to get this necessary feedback and comprehension without any feedback or input from the potential customers.

The target group that is the system's customers can also differ much in character, as the need for consulting purchases applies to many different company sizes and industries. This leads to another challenge in concluding how the use of the system can contribute to strengthening the experience for customers' customers, as it is also efficiencies in internal processes at customer companies that GROW intends to solve. With this as a starting point, the work will mainly focus on touching on theoretical frameworks around the first link in the customer chain and its intended users.



## 2 Background

This chapter provides a background of the company used as a baseline in this research. A description is presented of the company that the developed models used in this paper are to be applied and analyzed on.

### 2.1 About the Company

The company wishes to remain anonymous and is therefore referred to as "GROW" throughout this paper. GROW is established in Sweden and was formed in the autumn of 2019. Its business is a tech consultant sourcing provider that aims to develop a system solution to digitize the process and the work it entails to carry out purchases and administration throughout a consulting assignment's life cycle.

GROW has seven employees who have a total of ten different roles. The roles are divided into belonging to two different units: *Operations* and *Tech*. Operations intend to manage sales along with the relationships with customers (consultant purchasing company) and suppliers (consultant providing company), while Tech is focused on developing the software system. As of today, the system is only in an early stage and GROW is conducting usability testing within the tech team and through feedback from some minor customers and supplier users. The existing roles within GROW are:

- **Tech Operations:**
- Front-end developer
- Back-end developer
- Full stack developer
- UX/UI developer
- Chief Technology Officer (CTO)
- Scrum Master (SM)
- Product Owner (PO)

- **Business Operations:**
- Chief Executive Officer (CEO)
- Vendor Business Partner (VBP)
- Program Lead

GROW's customer focus is on large organizations that handle at least 100 external consultants annually. GROW aims to assist its customers with all processes around purchasing, handling, and follow-up of its external workforce. There are many functions that GROW intends to develop to facilitate the customers' processes but their core process focus is the cycle through a customer's consultant purchase. This cycle goes through many steps, including sending requests to GROW about their needs for the required skillset and profile of candidates. GROW's mission, to act as a broker, is to find, assess suitable candidates and present these to the customer. To find suitable candidates, GROW uses its supplier network, which consists of 140 consulting companies with a focus on different industries and expertise. To find consultants, GROW sends out inquiries with job descriptions from the customer to its suppliers. In that step, GROW offers its suppliers to present candidates. Once the suppliers have applied for the positions, GROW performs an initial selection from all of the applications. When a sample of qualifying candidates is found, the sample is presented to the customer, and the customer decides whether they assess the candidates as a fit for the positions. If the consultants get hired, compensation is paid for successful intermediation by GROW. This broker service is performed today and is common in a traditional setting by carrying out applications, meetings, telephone calls, and email contacts. GROW sees this way of working as inefficient and cost-consuming for all parties, and thus sees an opening for a better solution by building a system functioning for this process. GROW's vision is *"To make the sourcing process smooth and easy for everyone who uses their broker service and platform solution. We are reshaping the way to procure and interact with consultants"*

Digitization of this entire process implies that many different stakeholders are evolving around the system. Although GROW's main focus is on system users, they have identified more stakeholder categories. These categories include *consulting purchasing companies* (referred to as customers), *consulting companies*, (referred to as suppliers), their *consultants*, and GROW's own *staff*. It is primarily this platform and the implementation around it that constitutes the practical analysis in this paper. Additionally, each and one of these stakeholders has user categories (see Figure 2.1). The user categories are created based on the need for features they have, rather than placing them in a category based on their job title. This choice is made because many stakeholders have users who could be classified into several categories, depending on how they are assessed. An example is a supplier manager, who is also working as a consultant. Instead of starting from the functional need this person has in the system and enabling this, the focus changes from a functional perspective, and that user can be categorized as both within GROW's system.

### **Vendor Management System (VMS)**

Vendor Management System (VMS) is a business system that links the stakeholders being part of the consultant life cycle in a single system. With this as a solution, the procuring customer receives the ability to handle sourcing, acquire talent, paying and control the overall management of their temporary workers. To handle this entire interaction process, there are many required functions that the system must achieve to fulfill these user types' needs. Some of these functions are:

- Time report
- Purchase requests
- Invoicing
- Financial overview
- Schedule administration
- Attest routines
- Contracting

### **Customer**

Customers form the part of the system's functions that are aimed at the customer's users. In this part, the client company must be able to order recruitment, follow up, price negotiate, approve, store, and administer their consultants. Instead of each consulting buyer handling their own consultants individually, this can be made within the same system throughout the customer organization. Moreover, the system must contribute with real-time data about the customer spending and ensure that every recruitment and management follow compliance. In this way, GROW intends to reduce the administrative costs incurred by its customers through its solution and contribute with a better overview of the customer's costs around consulting management. GROW has identified three different types of users within the customer organization, namely the *Purchaser*, *Human Resources/Procurement*, and *Attest*. However, the title and function of these roles in the individual customer companies can vary. For many customers, for example, some users correspond to multiple or even all of these user categories. However, GROW considers this during the development of the system, by doing it as openly and adaptable as possible to handle such scenarios. The *Purchaser* is the type of user who carries out the actual purchase of the consultant, while the *Attest* is the one who has the authority to approve the decision that such a purchase may lead to. Today, GROW conducts less structured user tests and receives ongoing feedback on various releases with functions in their system.

### **Supplier**

Another part of the VMS tool is aimed at the suppliers and their supplier managers. For this part, GROW has the ambition to create a system environment where the consulting companies can handle, receive requests for assignments, negotiate prices, present candidates, and manage scheduling for their consultants. For example, consulting managers should be able to upload, edit and manage their consultants' resumes directly in the system. In this way, the user is allowed to respond quickly to inquiries with candidates who are considered suitable for an incoming assignment request.

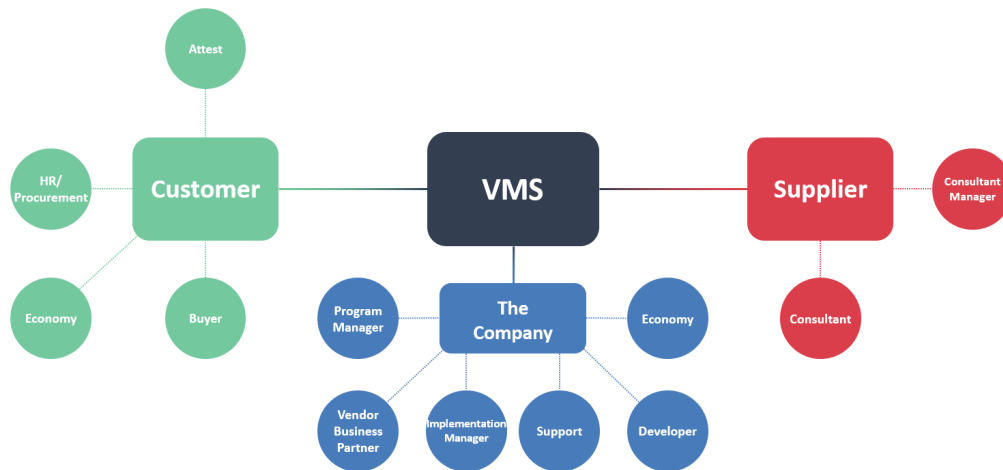


Figure 2.1: The company's system solution.

### Consultant

The consultants are defined as the part of suppliers that is the workforce for sale at the consulting companies. Moreover, there are special functions for this user category. Consultants report their times to follow up on the project's budgeted number of hours, and this is performed directly in the system. In this way, the consulting manager can follow up on how the project proceeds in time based on the reported time implemented by all consultants.

### Company Users

The company (GROW) users refer to all roles that are already existent in their daily work or are intended to use the tool in the future. These are: *Economy*, *Program Manager*, *Vendor Business Partner*, *Technical Support*, *Implementation Manager*, and *Developer*. These users use the system in different ways and also contribute to different information exchanges with other users in the system. Each role has unique contributions to creating value for the different users.

## 2.2 Implementation process

GROW has an established process for how its implementation should be made, which can be seen in Figure 2.2. Although it has not yet been used in practice, it has been developed with industry experience from similar work done by the employees at previous jobs. The process is divided into two phases: *Configuration*, and *Roll – out*. Configuration intends to map customer-specific conditions, its needs, and how to adapt the system in those unique settings. This phase is divided into three steps that represent the initialization of the implementation process. When these steps are completed, the process moves to the Roll-out phase. Roll-out is intended to test these customization's followed by the use of the system.

### Identify

The identification step aims to be a preparatory part that seeks to identify which stakeholders exist around the system and which the intended users are at the client organization. Once these have been mapped, a needs analysis is performed of the customer's current operations, including how to work with the same problems today and processes that VMS intends to

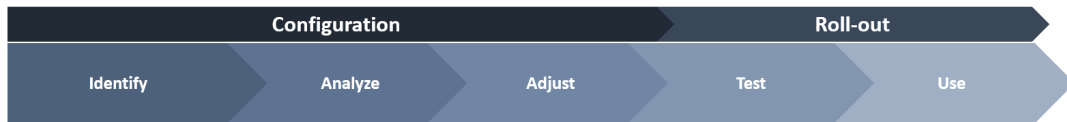


Figure 2.2: The company's implementation process.

solve. Based on this data, an assessment is executed of how the VMS solution can contribute to improvising that methodology.

### Analyze

In the analyzing phase, a survey is made of which functions in the VMS solution are applicable based on the client environment. For example, one identification may be that special functions become superfluous, as the customer already has solutions that they are satisfied with for the same purpose. In connection with this step, a migration of the existing consultant contractors and suppliers that are currently active in the client organization is also carried out.

### Adjust

Based on the identifications in the previous steps, the adaptation of the system solution is carried out based on the customer's specific needs. This can be, for example, setting up processes for approval, structure for invoicing, and other requirements. Some of the functions that are possible, however, can be considered irrelevant to the specific situation of the customer, and these features are not forced through.

### Test

In the initial stage of this phase, user acceptance testing, education, training for key stakeholders and users is carried out through a production environment. GROW aims to set a go-live date for proceeding to the next step in the implementation process.

### Use

During this step, the system is launched. This is performed in a gradual step of integrating the VMS solution with the customer. Initially, only a few features are launched and more added in a step-by-step process. This is conducted where each step has an iterative integration process with feedback input to refine the functioning of the feature. The stakeholders and users, knowledge about the system are strengthened from continuous support from the team responsible for the implementation.





## 3 Theory

This chapter presents literature and theory which has been developed within the field of IS. The chapter starts with a discussion of the importance of successful IS. The following part of the chapter presents some of the models in IS theory and ends with a presentation of how these models have been used in previous research and the findings of these. Moreover, different success factors that are pointed out by previous literature are presented.

### 3.1 The Importance of Successful IS

An information system is a distributed network system including a varying amount and kind of components with different quality. The integration of these components and the service provided to the user is the definition of an information system [39]. One of the researchers within the field of IS is Taylor (2017) [33]. Taylor highlights the importance of performing IS research on a more professional and scientific level, and that previous researchers that have shown criticism towards IS research is based on this lack. He claims that IS research is the core of digital development and that it produces knowledge that can lead to new technologies which have a positive impact on organizations [33].

Additional literature that covers the question of successful IS is Savoie (2016) [27]. This section concludes the most vital findings and statements of Savoie. Savoie claims that the purpose of IS is to encourage the information flow in any organization and to optimize this flow in order to make the correct information reach the correct person at the correct time, without any unnecessary intermediates. Moreover, he claims that the goal of successful IS is to encourage smarter decision making, adapt to changing requirements, and meet the needs of the customer. Savoie (2016) states that "Regardless of the individual goal, the IS is the equivalent of the central nervous system of our bodies. It doesn't matter how strong our muscles or how active our brain, if the signal (information) can't be sent along the nervous system (network) in a timely manner, the body simply won't work. The same holds true for our organizations." [27].

### **The Difference Between Technology and IS**

Savoie (2016) explains the vital difference between any technology and an IS. Technology is a tool with the purpose to make an IS work, and is worthless without users who know how to operate the tool. To compose an IS system, these technologies need to be combined with any user who has correct knowledge within the field [27].

The purpose of an IS is to transfer information between different parts of a network [27]. Savoie (2016) claims that the IS has five different tasks. To produce the correct data, in the correct place, at the correct time, to the correct person in the correct format. He means that an IS fulfilling only some of these requirements is only partially functional although it may seem to the employees in the organization that it is fully functional because they have not evaluated it carefully enough [27].

### **The Steps for a Successful IS**

Savoie (2016) has proposed multiple steps for implementing a successful IS. These steps consist of different questions and tasks for the employees of the organization to answer. The first step in the implementation process is to have a conversation with the company and employees where they get the chance to explain what they do daily. The goal of this step is to produce a flowchart where all the inputs and outputs of the processes are visualized [27].

The second step of the process involves a more detailed overview of the processes. At this stage, the employees should answer why the processes listed in step one are performed in a certain way. This is supposed to help the organization to see if the organization does not take benefit of the new technologies that are formed by the adaptive society [27].

In step three, it is time for the employees to reflect on how they know that they perform a certain task or process most suitably. The purpose of this step is to find the blanks in the organization where the employees fully trust the computers and the information they give them, although the reality is not reflected by this. By only relying on computer information, employees take less responsibility for their actions and do not know how to act in new situations occurring in the organization [27].

### **The Information Ladder**

IS consists of four layers of information, visualized in Figure 3.1. The first step, *data*, can be defined as everything that could be used as input to the process of decision making. Data is a wide notion that basically can be explained as everything [27].

The next step on the information ladder is *information*. Information and data are terms that often are confused with each other. However, information is data that is structured with a common and shared meaning of it. For example, a set of number can be seen as data, but these numbers do not mean anything useful until further information about the meaning of them are given. This is explained as information and the task of an IS is to turn data into information [27].

The third step is *knowledge*, which can be explained as the procedure of someone using or acting in the unity of the information they have. Information can stay at the information level if the individual cannot do anything with the information. However, if the information is transformed into knowledge, it can be used as an advantage for the organization. Savoie claims that the IS are valuable for transforming data into information. However, it desires human capability to turn it into knowledge [27].

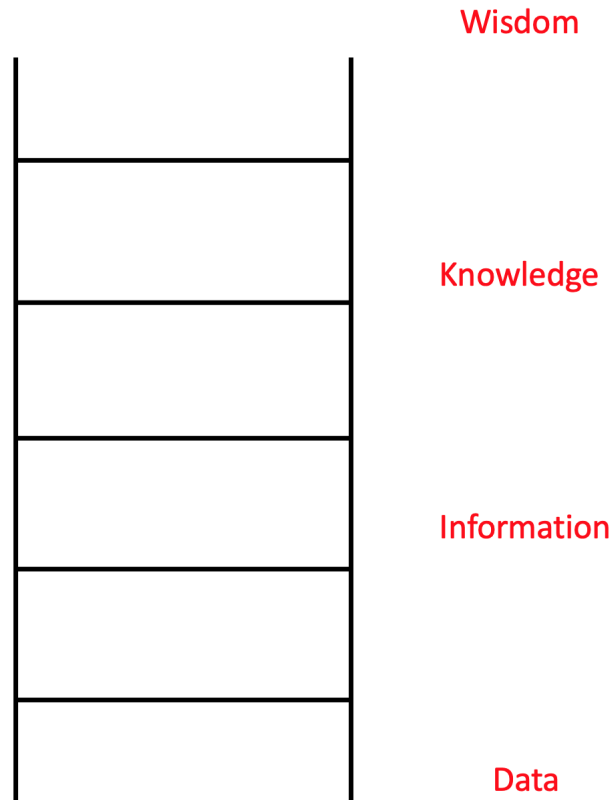


Figure 3.1: The four layers of information in an IS.

The fourth and last step of the information ladder is *wisdom*. This is the capability to know how to properly use the knowledge gained. In this dimension, human factors as learning from the past and previous experience are vital parts. This is something that computers are not capable to do. The technology can be used as tools that facilitate human decision making [27].

### 3.2 Value Network Analysis

To properly understand the dynamics of an organization, the Value Network Analysis (VNA) is a valuable tool. VNA is a model used for understanding the whole value chain of any organization and provides a clear picture of all the relations that are both produced and gained [24]. By using the VNA, it is possible to visualize all value-creating relationships of an organization, considering both tangible and intangible assets [16]. Tangible assets are physical, such as purchased market reports, while intangible ones are non-physical, such as human knowledge, which is harder to measure [5]. However, both tangible and intangible assets should be considered equal to the value network analysis [4]. VNA is using these tangible and intangible assets to find work and business relations within the organization [16]. One example of a value network created by VNA is shown in Figure 3.2 [1]. Additionally, the VNA takes relationships as consumers and customers into account in the value creation chain [24].

When visualizing the value network, nodes represent participants and their performance within the organization. Furthermore, arrows in one direction represent the relationship (deliverables) between two participants [16]. These deliverables are both financial and non-financial [5]. Furthermore, the exchange is an important aspect of the VNA. If one node has a one-way arrow to another node, but without any arrow in return, this is seen as a gap in the value network and should be considered in the analysis [16] [1]. The main outcome and purpose of using the VNA model are to identify critical relations that otherwise are not obvious for the organization. The model also serves the purpose of highlighting the most valuable and value creating relationships in the organization [24]. The output of the network can for example encourage reconstruction of processes or how the planning should be performed between different departments to maximize the workflow in the organization. This model and technique can be applied to companies entering a merger, or how the departments should be structured. Moreover, VNA can be used with the purpose to find a suitable business model [16].

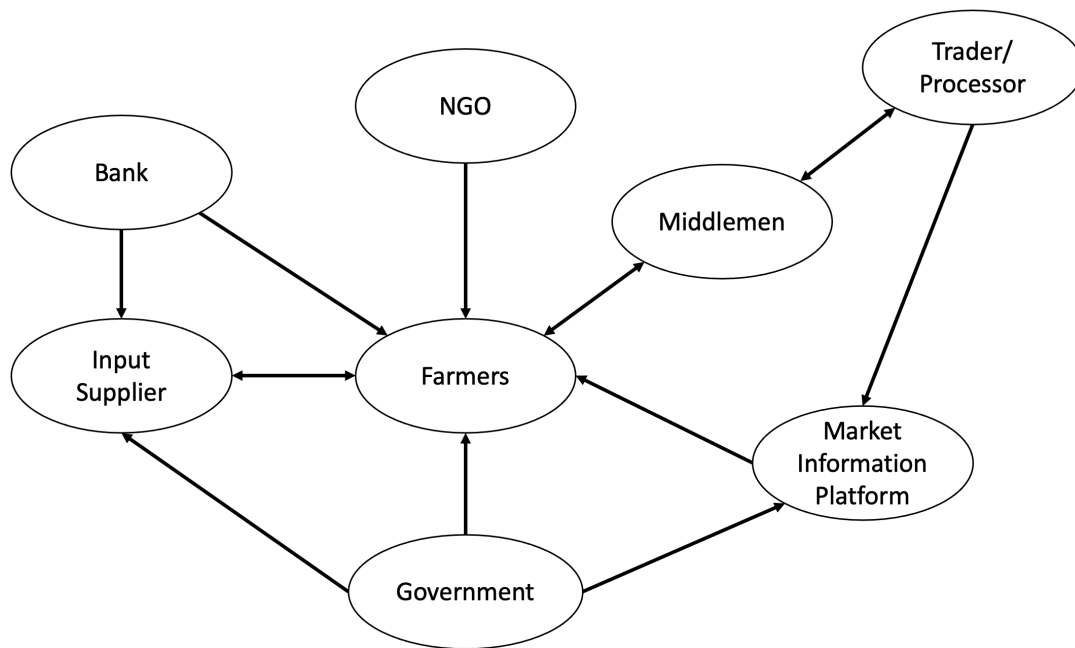


Figure 3.2: Visualization of a value network using VNA

### The dimensions of the VNA

Figure 3.3 shows the dimensions which need to be considered for each stakeholder when performing the VNA. These dimensions are to be considered after visualizing the value network of the organization and should be performed on each relation (arrow) in the network [5]. This section explains the use of these dimensions in detail.

The first dimension is called *Asset Utilization* and refers to the question of how much value the stakeholder creates in each of the financial or non-financial assets of which the stakeholder is a part. The question is often answered using a scale with low, medium, and high but can be adapted to suit the purpose. These indicators can for example be speed, hour, cost, etc. [5].

The second dimension is the *Value Conversion* and involves the question if the stakeholder's value input has successfully been converted to any type of value output. This is considered for all the stakeholder's assets. The most useful indicators for the value conversion are add, extend and convert. The stakeholder can either add value by adding it as an intangible deliverable to any other partner, extend value by contributing to any other stakeholder or convert the value into a tangible value that will make the organization gain profit [5].

The third dimension, *Value Enhancements*, is the question of what makes the specific value output unique for its own purpose. A value can for example be added or converted to contribute to serving a unique purpose in the organization. This can be accomplished by enhancing value input and being able to discover something from an expert point of view or by distributing any value output to other stakeholders within the organization [5].

*Recipient Perceived Value* is the fourth dimension that should be considered in the VNA. This dimension has the purpose to identify the receiver of the output value delivered by another stakeholder. The measurement score for the perceived value dimension is typically low, medium, and high and is best identified by performing impact analysis. By using an impact analysis, the data and estimate of the value are more likely to be accurate. The perceived value can be compared with the cost of the asset utilization to gain a better understanding of the effectiveness and new potential value creating strategies [5].

The last dimension is called *Social Value* and takes all the values into consideration to the social benefits and potential drawbacks of it. This dimension considers the values benefits and costs for the industry, society, and environment [5].

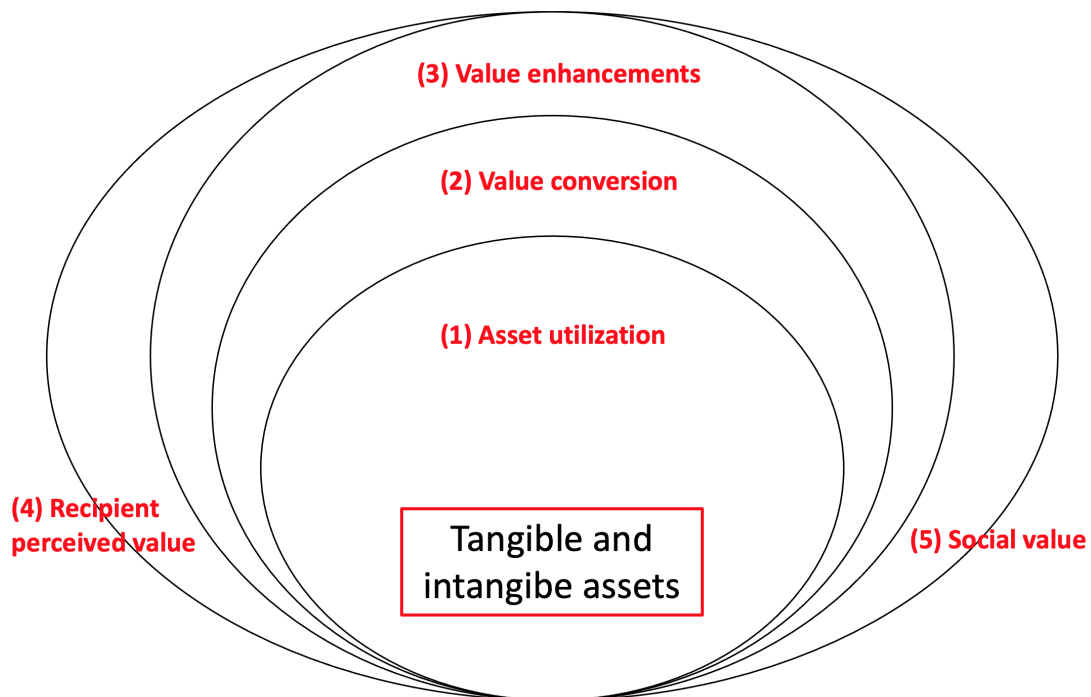


Figure 3.3: The dimension of the VNA.

### Use of the Model in Previous Literature

Caar and Stray (2019) have investigated an organization's expansion strategy by positing a well established product into a new market segment [16]. They see the importance of highlighting any stakeholder relationships etc. in such transformation and hence, they use the VNA to visualize these [16]. The findings of Caar and Stray are that the VNA enabled acceptance of change within the organization because the model exposed the need for an additional department, which was an accepted proposal. Additionally, they found that the main processes towards reaching this business goal were more defined. The necessary improvements highlighted were improved communication, more clear responsibilities, etc. Findings regarding the VNA model itself were that it is of high importance to define the tangible and intangible assets before any analysis is performed on stakeholders [16].

### 3.3 IS Success Models

In this section, the models investigated in the literature study and later evaluated are presented. The models presented in the section are the Theory of Planned Behavior, Technology Acceptance Model, the Multilevel Model of Resistance, DeLone and McLean IS Success Model, and Task-Technology fit theory. Despite that all models within IS are relatively old, they have been used and applied in literature and research in current publications, and hence, they are still seen as relevant for purpose of this research.

#### Theory of Planned Behavior

Theory of planned behavior (TPB), visualized in Figure 3.4, is a model intended for explaining behaviors. The model assumes that behavioral intention is the most determining factor in the social behavior of a human. One characteristic of TPB is its ability to identify salient factors which have an impact in creating intentions to perform an actual behavior. TPB is a valuable method for predicting intentions to use IT and is developed from a closely related theory, the theory of reasoned action (TRA), which focuses on attitude towards behavior and subjective norm. However, TRA does not take situations into consideration where people cannot fully control behaviors, and hence, TPB was developed to solve this issue. TPB has been included and evaluated in a lot of previous research which invigorates the usefulness of the model [7].

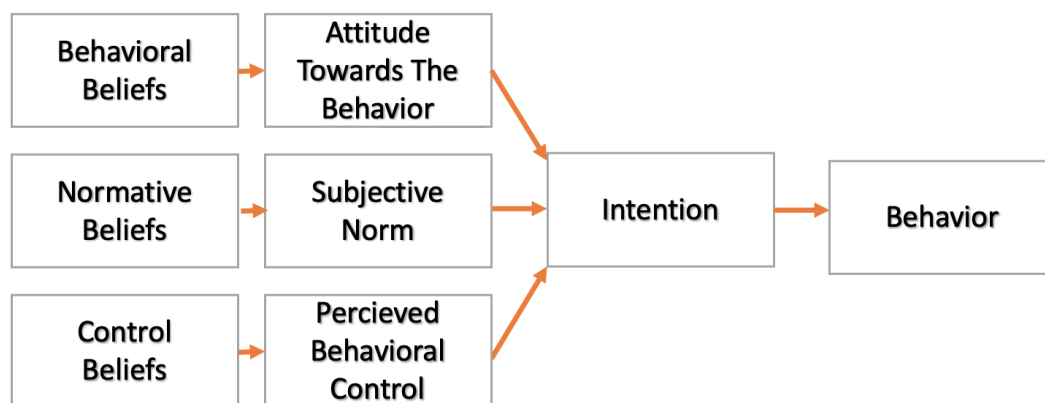


Figure 3.4: Visualization of Theory of Planned Behavior.

Behavioral intention is defined as the intention that an individual shows to execute a certain behavior. TPB proposes that the behavioral intention is an effect of:

*Attitude Towards the Behavior:* TPB advocates that the intention to perform a behavior is influenced by the attitude the people have towards the behavior. This attitude includes the perceived benefits and consequences of using the system or something else that the individual associates with this behavior. [7].

*Subjective Norm:* Moreover, TPB suggests that this is influenced by the subjective norm, which is in turn influenced by normative beliefs. Normative beliefs are perceived judgments of others in the surrounding [7].

*Perceived Behavioral Control:* Lastly, behavioral intention is influenced by the perceived behavioral control of the behavior. The perceived behavioral control is explained as the individual's difficulty in executing a certain behavior. This parameter is influenced by the number of accessible control beliefs. These control beliefs can be caused by previous experience of the behavior and information from relatives that can have an impact on this [7].

### Technology Acceptance Model

Another valuable tool for conducting the research intended in this paper is the Technology Acceptance Model (TAM). The purpose of TAM is to explain the relationship between user behavior and the specific technology that is used in the organization. Furthermore, the tool can be used for pre-studies to predict how a certain technology will be used or accepted within an organization or a group of people [38]. TAM has been modified several times and one of the more recent versions was created in 2005 [21]. A visualization of TAM can be found in Figure 3.5.

Four parameters are used to measure the outcome of user acceptance. When using TAM, the relationship between these four parameters is investigated and how they affect each other [38].

The first one is *Perceived Usefulness* and refers to what extent the user believes the used system will contribute to their performance improvement. The second parameter used is *Perceived Ease of Use* and is connected to how the user believes the used system will help with the facilitation of usability. The third parameter is *Behavioral Intention to Use*, which is the attitude that the user has when one uses the system. It is the amount of acceptance or rejection the system gets from the user. The fourth and last parameter is named *Actual System to Use* and is related to the user's tendency to use and continuous use of the system [38].

#### The relations

The relations of TAM are visualized in Figure 3.5. One of the relations between the dimensions proposed in the TAM is that the intention to use depends on the perceived usefulness and the perceived ease of use. Furthermore, the perceived usefulness is dependent on the perceived ease of use. The actual system to use is dependent on all three previous parameters and is a final measurement of how well the user accepts the system [21].

#### Extended TAM

TAM has been modified in an extended variant called Extended TAM, referred to as TAM2 throughout this paper. With the original TAM as a basis, TAM2 adds multiple theoretical

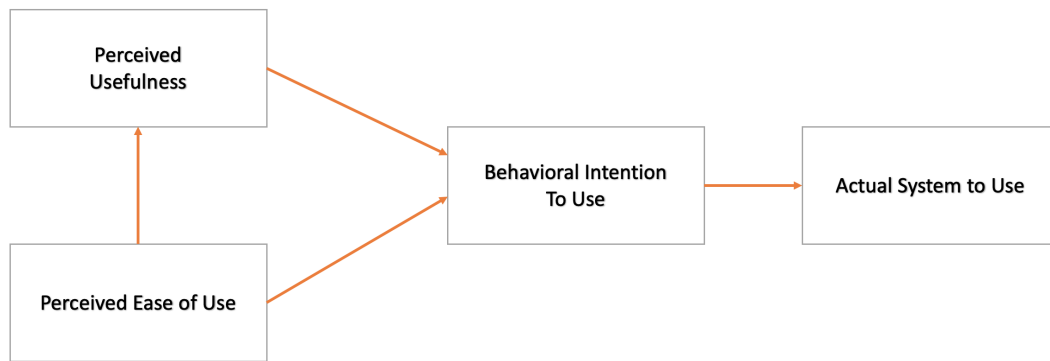


Figure 3.5: Visualization of Technology Acceptance Model.

additions to capture aspects such as social influencing processes and cognitive instrumental processes. These two dimensions are further split into multiple categories. For the social influencing processes, the categories are *subjective norm*, *voluntariness*, *image* and *experience*. These four categories are described as different forces regarding the individual user with the option to either adopt or reject a new system. Whereas the three categories within cognitive instrumental processes incorporate the user's perceived usefulness judgment in comparison with other viable options to the system. These categories are *job relevance*, *output quality* and *result demonstrability*. This judgment is based on the system's capability to contribute to the user's ability to accomplish their work [37]. The full model can be found in Figure 3.6 and a summary of all the dimensions can be found in Table 3.1.

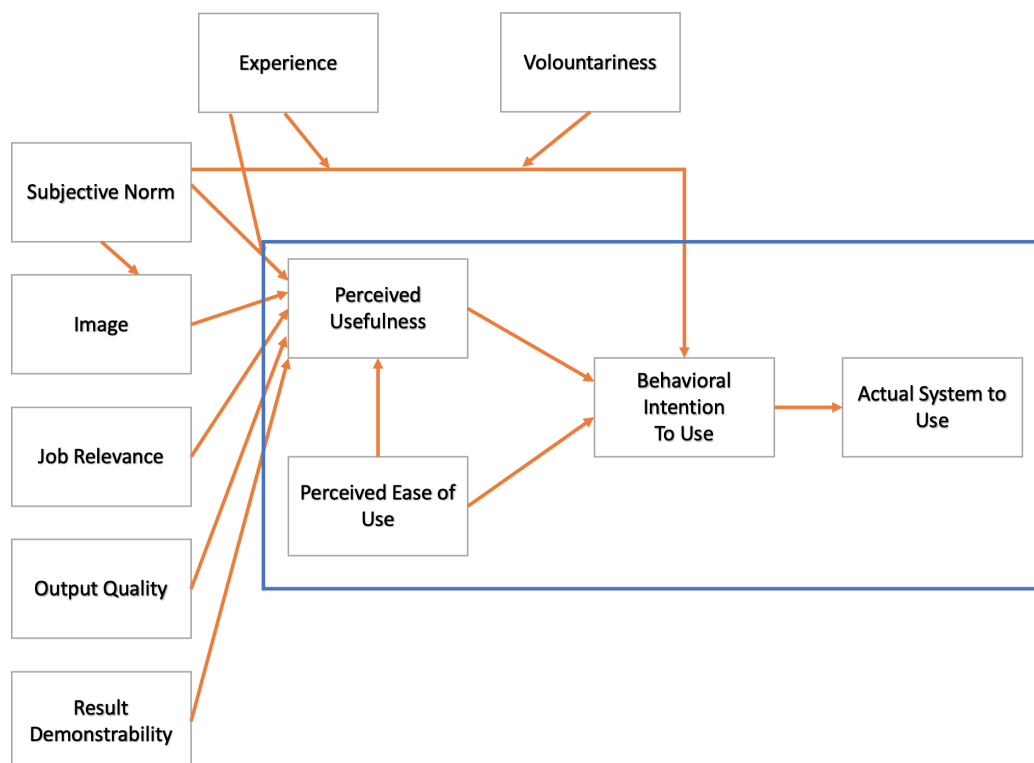


Figure 3.6: Extension of the Technology Acceptance Model.



The *Subjective Norm* is based on the person's perception that important people to this person think he should or should not perform a certain behavior. This suggests that the direct effect of the subjective norm is that the person may choose to perform this certain behavior, even with the belief that the behavior is not for their own benefit. In TAM2, it is theorized that the direct result of subjective norm, from compulsory use, will be strong in an initial stage, but decrease as the user learns the system from using it over time [37].

*Voluntariness* is the result of the separation of using a new system from a mandatory to a voluntary context. This is defined as "the extent to which potential adopters perceived the adoption decision to be non-mandatory" by Venkatesh and Davis (2000) [37].

*Image* is to the degree where the use of an innovation is perceived to strengthen one's status in their social system meaning that the use of the system would enhance the user getting more acceptable by their coworkers or superiors [37].

*Experience* refers to the degree to which the impact of subjective norm will decrease caused by more experience of using the system. If an individual is familiar with using a system, subjective norms will most likely influence the intentional behavior less [37].

*Job Relevance* is explained as to what extent the individual believes the system is useful and important for performing their job or the specific tasks it tends to serve [37].

The *Output Quality* is measured in how well or efficient the system or function is at performing the task it tends to solve. Moreover, this parameter refers to how well the quality of the output is from the system [37].

*Result Demonstrability* refers to if the results are possible to demonstrate and experience. The user of the system needs to clearly see the benefits and results of using the system [37].

The last parameter, *Perceived Ease of Use*, is included in TAM and refers to the same definition as above [37].

Process	Variable	Definition
Social influence	Subjective norm	"A person's perception that most people who are important to him/her think he/she should or should not perform the behavior in questions" (Fishbein & Ajzen, 1975, p.302) [11].
	Voluntarienss	"Extent to which potential adopters perceived the adoption decision to be non-mandatory" (Venkatesh & Davis, 2000, p.188) [37].
	Image	"The degree to which use of an innovation perceived to enhance one's social status in one's social system" (Moore & Benbasat, 1991, p.195) [25].
	Experience	"The direct effect of subjective norm on intentions may subside over time with increased system experience" (Venkatesh & Davis, 2000, p.189) [37].
Cognitive instrumental	Job relevance	"An individual's perception regarding the degree to which the target system is applicable to the individual's job. Job relevance is a function of the importance within one's job of the set of tasks the system is capable of supporting" (Venkatesh & Davis, 2000, p.191) [37].
	Output quality	"In perceptions of output quality, users will take into consideration how well the system performs the task that match their job relevance" (Davis, Bagozzi & Warshaw, 1992, p.985) [8].
	Result demonstrability	"Tangibility of the results of using the innovation will directly influence perceived usefulness" (Moore & Benbasat, 1991, p.203) [25].

Table 3.1: The dimensions of TAM2.

### Multilevel Model of Resistance

The Multilevel Model of Resistance (MR) explains the resistance existing when implementing IT systems. To better understand the types of resistance that exist, research is performed to define resistance through semantic analysis. The researchers describe five different key components regarding resistance. These five components are; *Behavior*, *Object*, *Subject*, *Threats*, and *Initial Condition*. Resistance behaviors are described across a spectrum from passively uncooperative to engaging in physically destructive behavior. The object of resistance is about not identifying and understanding a particular object. From a lack of understanding, resistance indirectly follows against it. Perceived threats are the component affecting the resistance to the effect of the change, rather than the change itself. One example of such are loss of status or power. The next resistance type is the initial conditions. Initial conditions, such as

established routines and distribution of power, can influence the resistance of an object. The subject of resistance is the part where new resistance behaviors are adopted and can consist of a group, individuals, or an entire organization [19].

### DeLone and McLean IS Success Model

DeLone and McLean Information system Success Model (DM IS) was first introduced in 1992 by H. Delone and Ephraim R. McLean. The model has been widely used in previous studies and has been vital in areas as knowledge management systems, learning success systems, implementation success of enterprise resource planning, etc. Additionally, DM IS has been widely used in combination with other theories [32].

The first version from 1992 consisted of six dimensions to consider in an IS. These were: *Information Quality*, *System Quality*, *User Satisfaction*, *System Usage*, *Individual Impact*, and *Organizational Impact* [15] [32]. According to the DM IS from 1992, these dimensions also contributed to nine relations [15]. However, other researchers have claimed that this model was incomplete and needed more dimensions to be completed and useful [35]. The outcome of these claims was an updated version. In the updated version from 2003, which was updated by the original authors of the model, the new dimensions, *Intention to Use*, *Service Quality* and *Net Benefits* were added to the model [15]. The new version resulted in ten dimensions visualized in Figure 3.7 [16]. The model has been shown to work successfully in areas such as mobile banking and digital library [30]. However, although the authors of the DM IS model has provided an updated version, they encourage researchers within the field to continue exploring the model and the dimension to continue the improvement [35]. Many of the different relationships can be identified using these six dimensions and these are further presented in detail below [15] [32].

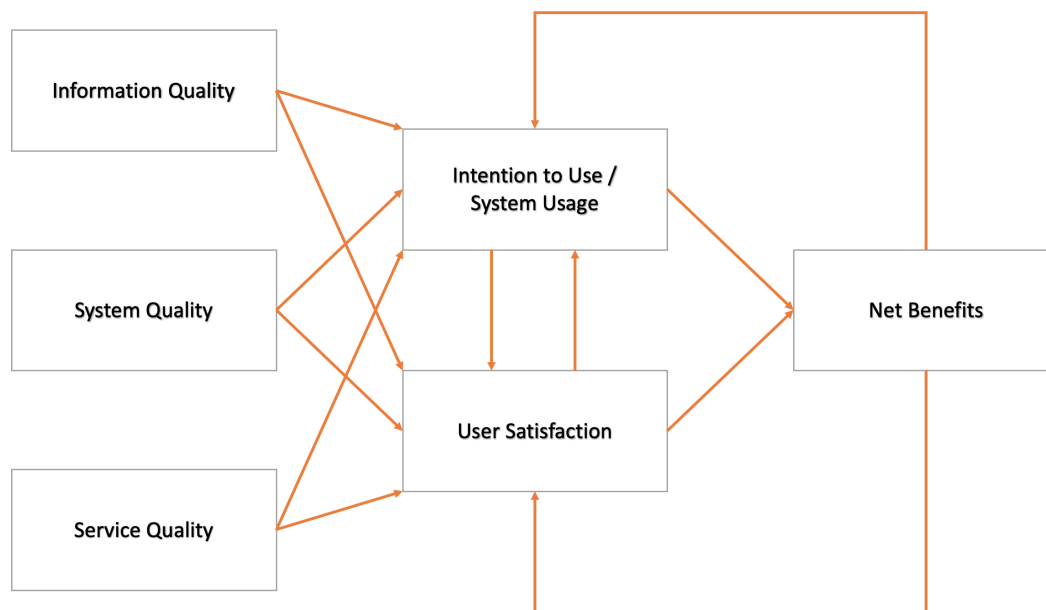


Figure 3.7: Visualization of DeLone and McLean IS success model.

*Information Quality*: The meaning of the dimension Information Quality refers to the quality of the information touched by the system. Information Quality is the most commonly used dimension for evaluation IS systems [10].

*System Quality:* System Quality can depend on factors as usability, availability, adaptability, etc., that affect the quality of the system [10].

*Service Quality:* The System Quality dimension is measured in the quality of the services that any IS delivers to the customer or organization. Service Quality is also important and has become even more essential lately as the amount of e-commerce and customer support has increased through digitization [10].

*System Usage/Usage Intentions:* The System Usage and Intention to Use is the measurement of how willing the user is to use the system or to what extent the user uses it [10].

*User Satisfaction:* User Satisfaction is the measurement of how satisfied the user is when using the system [10].

*Net System Benefits:* The dimension Net System Benefits is an overall score based on how well the user fulfills the other dimensions. It can be seen as the overall value of the system [10].

### Relations

As can be seen in Figure 3.7, all quality dimensions affect both user satisfaction and the intention to use the system. A quality of any kind will eventually lead to lower net benefits from the system, both from a user and organization perspective. The System Usage and Usage Intention are directly influenced by all the quality dimensions and will have a huge impact if the user of the system will be satisfied or feel any desire of using the system. These two dimensions also influence each other in a way that an unsatisfied user will not be willing to use the system and vice versa. Moreover, the Net Benefit affects the Intention to Use and the User Satisfaction back because the user will feel that the system is valuable [10].

### Task-Technology Fit Model

The Task-Technology Fit theory (TTF) is a model for defining the relationship between the task that the IS is supposed to solve and the technology of it, invented in 1995 by Goodhue and Thompson. The model provides a likelihood measurement on how well a specific technology would suit a certain task that is to be performed by the user and how it would increase their performance [29] [36]. The TTF model is visualized in Figure 3.8 and the dimensions used in the model are further explained in detail.

#### The Dimensions

The first dimensions of the TTF is called *Characteristics* and is divided into *Task* and *Technology Characteristics*. The first dimension, task characteristics, refers to any physical or cognitive actions or processes, that are performed by the individual. This characteristic is performed in the cognition of the technology/system that is supposed to fulfill the specific task. The *Technology Characteristic* dimension is, in contrast to the *Task Characteristic*, the tool that the individual use to perform the task [29].

The *Task – Technology Fit* dimension measures how suitable the specific technology is at supporting the individual with the specific task. The Task-Technology Fit dimension can for example be measured in the form of data quality, authorization to access data, data compatibility, ease of use/training, systems reliability, etc.

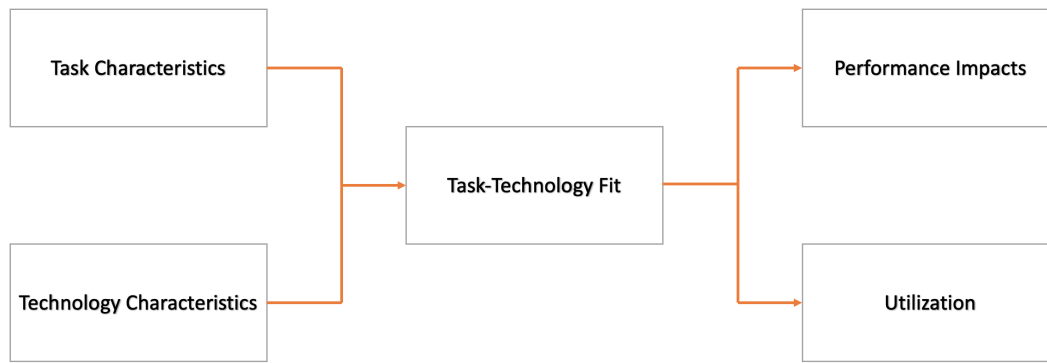


Figure 3.8: Visualization of Task-Technology Fit Model.

The last dimensions, *Performance Impacts* and *Utilization*, refer to the impacts that the use of the technology will have for the user and in what sense they will actually use it [29].

As can be observed in Figure 3.8, the performance impacts and the utilization are affected by the fit and the task of the technology. If the technology does not serve well to help the user with facilitating the task, the user will not feel the desire to use the technology or experience any benefit from using it [29].

### 3.4 Implementation Success Factors

The IS success theory is based on the challenge of defining the success factors that determine whether an IS is successful or not. To determine whether a system can be considered successful, a measuring function as a variable must be developed. A challenge that exists around this applicant, is the tremendous amount of different ways to define success in this area. Hence, a large part of the work is to organize several different theories and tie the sum of them together into a concept that dictates what is required for IS success. This concept consists of several categories, all of which are part of what other workers have contributed to [9]. Previous literature suggests that the technical level is an important factor. This factor describes the accuracy and efficiency of the system which becomes the process of information. The next factor is the semantic level, which is the success of conveying the information with the right intention. The next step after the semantic level is the efficiency level, which describes what effect the receiver receives based on the information received [28].

Other research which has influenced the IS success model replaces the word efficiency and replaces it with influence. According to, Mason (1992), the level of influence is defined as "the hierarchy of events taking place at the receiving end of an information system used to identify the different approaches used to measure production at the level of influence" [23]. Moreover, the information is suggested to go through its production where the product eventually affects the individuals or the organization's performance [23].

Based on these modelers and several other contributing research papers, models for IS success have evolved to suggest six categories in which all descriptions are central to the decision. These are: *System Quality*, *Information Quality*, *Use*, *User Satisfaction*, *Individual Influence*, and *Organizational Influence*. The first category is system quality and focuses on the features desired by IS itself. The system produces information which is the system quality. Others focus more on the quality of information, including accuracy, meaningful-

ness, and timeliness in the system. For the influencing part, a lot of research has been done by analyzing the information interaction between the product and its recipients. This is performed by measuring usage or user satisfaction. Other researchers have placed more focus on Individual Impact, which regards how the information product has influenced decisions made by management. In addition to this, there is research on Organizational Impact, where IS impact on organizational performance has been evaluated [9].

Furthermore, the categories are considered to have many dependencies and relations. The finding from this was a better opportunity to evaluate what is significant around the decision of what can be important for a successful IS implementation [9].

### **Critical Success Factors**

Critical success factors are best described as factors that are necessary for a successful implementation of any system or project implementation [31]. The process of identifying critical success factors can be complex based on the level of complexity of the organization but the benefits of identifying these are many, and hence, seen as a vital part of organizations [20]. The usage of finding critical success factors can either be as management information, a company feature, or as an executive tool. Moreover, critical success factors can be used as a visualization of the skills and key resources which is needed to be successful in a specific market [13].

### **TAM and DM IS**

Hidayah, Nur Aieni et al. (2020) has investigated the user acceptance of the mobile application AIS [2]. They highlight user acceptance as one of the most important factors to take into consideration in the implementation of a successful IS. The models used to find the user acceptance for the AIS application is a combination of TAM and DM IS. The combined model consisted of eight variables in total and used the variables information quality, system quality and service quality from DM IS model and perceived use fullness, perceived ease of use, and acceptance was used from TAM. The method for testing these models was to ask multiple students who were using the application about the perceived usefulness, using a questionnaire. The result of Hidayah, Nur Aieni et al. shown to be accurate and helped to receive a better understanding of the characteristics of the IS [2].

### **TAM and TTF**

TAM is widely used in combination with other models and has, except DM IS also contributed to researches in combination with the TTF model. Vandue et al. (2020) designed a combined model of TAM and TTF and made it suitable for gamification [36]. They used TAM as a baseline and added the characteristics of TTF to investigate how the gamification task of the technology influenced the acceptance of the user and if the gamification was successful in learning [36]. The findings of Vandue et al. are in favor of their hypothesizes, that TTF was useful in explaining and predicting how user acceptance is related to gamification. However, the study also included the aspects of social influence and social recognition, which makes it impossible to only see the results of TAM and TTF combined individually [36].

### **MR**

In contrast to the other four models, MR has not been investigated or used by many researchers. The only previous literature found is conducted by Lapointe and Rivard (2005), who are the founders of the model [19]. They created the model by identifying the five most vital parts of resistance, which they found are behaviors, object, subject, threats, and initial conditions. These parameters were found by conducting case studies in hospital settings.

One of the founding was that the groups influenced the individual's potential resistance to the new system, which is called the initial condition. They claim that behavior of resistance will evolve if this initial condition is threatened by the new system [19].

### ERP systems

Syafirialiany et al. (2019) have previously investigated the success factors of a specific ERP system using the DeLone and Mclean IS success model. With the use of this model, the authors find three critical success factors for the specific ERP system they investigate. The first one is that user satisfaction plays an important role for the user to feel any benefits of the system. The second critical success factor involves the quality of the system. They claim that the quality of the system is vital in the decision if the user will use the system or not. The last critical success factor regards how the user uses the system and is also important to take into consideration for the user to feel any benefits of using the system [31].

Additional research on critical success factors includes the work of Lubis et al. (2020) where they, in addition to Syafirialiany et al. (2019), investigate critical success factors of an ERP system [3]. The ERP system belongs to a large company. Lubis et al. find that the success factors include user acceptance, individual influence, quality of the information in the phase of the implementation, the key user influence, and the management process of the implementation. Moreover, the authors found that factors that did not influence the process of a successful ERP system were organizational impact, top management support, system quality, etc. [3]. A common critical success factor claimed by both Syafirialiany et al. and Lubis et al. is the user acceptance of the system.

### Executive Information Systems

Other literature conducted within the field regards Executive Information Systems (EIS). An EIS is an IS with the purpose to facilitate information- and decision making for any management team or organization [17]. Kammaruddin et al. (2011) have performed an investigation of the critical success factors in an EIS system by conducting semi-structured interviews. The result of their findings is a theory for the process of a successful EIS implementation. This theory of critical success factors is divided into four different groups: *people*, *process*, *product*, and *organization environment* [17].

The critical success factors within the categorization people refer to the support given by the management and the technical and interpersonal skills of the employees in the organization. The category process refers to the different tasks in the planning session. Examples of processes are development methodology, system requirements, system maintenance, and infrastructure of hardware and software [17]. The third category, product, refers to the main products and all the belonging features and functions that are related to the system. The last and fourth category is organization environment and involves sub-categories as plan and policy, best practices of management, and lastly, politics and culture [17].

Grossman and Walsh (2004) have specifically dug into the field of ERP implementation and presents advice for avoiding pitfalls that can come with the implementation [12]. The authors claim that it is important to not skip the planning although it is often the cause because of the cost in form of resources it takes. Many risks are identified during the planning phase of an IS implementation. Grossman and Walsh also highlight the importance of adapting the IS to the customer organization, to fully maximize its potential, rather than forcing the customer to adapt to the system [12].

Another identified pitfall is the promising of a certain implementation time where the IS provider promises the customer to have a finished system at a specific time. They mean that software implementations always take longer time than expected. Additionally, they claim that the results of a system will take much longer time than expected, and hence, it can be hard for the end-customer to feel its potential direct. The result of the system must be measured for a long time period. Moreover, Grossman and Walsh claim that the training period of a system never can be skipped and is necessary for the organization to feel the benefit of the system [12].

### 3.5 Organizational Change

Another important aspect to consider when implementing a system is organizational change. Turner (2014) means that leading change should be performed as the act of a project and he describes project management as transforming something from a vision into reality [34]. Organizations need to be flexible and adopt new strategies and cultures. The management process of the a project can be divided into five different stages which are: *Planning the work, Organizing the resources, Implementing by assigning work to people, Controlling progress and Managing and leading*. Turner means that it is important to study the organization before implementing the change and plan the work accordingly. Moreover, the resources should be organized in correlation to this planning and thereafter, the implementation can start. During the implementation, the one leading the change needs to have control over the organization and manage any deviations from this [34].

Moreover, Iverson (2010) claims that most people fear change [14]. He states that this resistance to change is caused by five factors which are stated below.

*Lack of Knowledge or Skill:* The first factor is caused by the individual's belief that one lacks the necessary knowledge or skill required to enforce a change [14].

*Physical or Resource Restrictions:* The second factor that is claimed to have an impact on the resistance to change is the individual's belief that the change requires something that the individual is not capable of doing. This can for example be a lack of money, time, or not being strong enough [14].

*Negative Past or Future Projections:* Iverson defines the third factor as the individual's belief in the capability to do something based on past experiences or future projections. This can for example refer to the individual having the attitude that the one is bad at performing something or the fear of doing it [14].

*Discomfort:* Number four refers to discomfort. People may like things as they are currently executed and/or do not dare or want to move out of their comfort zone [14].

*Fear of the Unknown:* The last factor that can cause resistance to change is the fear of the unknown. This factor can refer to lots of different categories and is the fear of not knowing how the outcome of the performance will be [14].

Furthermore, literature has shown that more complex functions in an IS have a negative impact on the perceived ease of use when introduced to new technologies [18]. A study of Hyo-Jeong et al. (2009) shows that members of an organization are less likely to use a certain technology if one apprehend it as difficult to use and are not used to such complex features. This happens although the technology has shown to be useful for the organization. Hyo-



Jeong et al. claim that the introduction of such complex features should focus on alleviating the concerns of the user towards using the technology [18].

## 4 Pre-Study

Before conducting the main study, a literature study and identification of criteria need to be performed to be able to choose the most suitable IS models. In this chapter, the conducted pre-study is presented in the form of the proposed method and its results. The pre-study aims to select relevant IS models which should be used in the framework and applied to the company's settings.

### 4.1 Method

In this section, the overall method for conducting the pre-study is presented. The pre-study is divided into two parts. The first part includes finding all the criteria which the IS models need to consider to be suitable for this research. The second part of the pre-study is constituted of a literature study which is the basis for choosing the IS models. The criteria investigation and the literature research are conducted simultaneously and the detailed approach of these two parts is further explained below.

An overview of the research method for the pre-study can be found in Figure 4.1. Moreover, the interviews conducted in this phase are presented in Table 4.2 and are explained in more detail later in this chapter. The interviewees can be found in Table 4.1 In addition to these formal interviews with the company, the researchers of this paper have conducted informal meetings and chats with the company to solve ambiguities and to receive a wider apprehension of the context. These informal meetings are not documented in this research and vary a lot depending on the situation.

Interviewee	Role
Interviewee A	Program Lead
Interviewee B	Product Owner

Table 4.1: Overview of the employees from GROW used in the interviews conducted in the pre-study.

Interview	Interviewee	Questions in Appendix
Interview focusing on retrieving background information about the company.	Interviewee A	A.1
Interview focusing on finding the criteria acting as a baseline for the selection of IS models and method.	Interviewee A Interviewee B	A.2
Informal meetings/chats with the company to solve ambiguities and understand the context.	Interviewee A Interviewee B	-

Table 4.2: Overview of the interviews conducted in the pre-study.

### Finding Criteria

Before choosing what IS models to use for the identification process of the pitfalls, it is important to be aware of the factors affecting these. These factors can for example be constraints within the company which make it impossible to receive some information or any other obstacles making it impossible for the company to work at the specific problem. Hence, an investigation that presents these criteria is performed. Worth mentioning is that this criteria extraction is a chosen method based on the circumstances of this research and the specific company. This part may not be necessary in all cases of identifying pitfalls for a company in the start-up phase and can vary. In other cases, these criteria may already be known which makes it possible to skip this step. The reason for conducting this interview in this research is for the authors to get a necessary understanding of the company. To find the criteria based on the restrictions and possibilities of the company, a qualitative interview is performed to understand these. In correlation with finding the criteria, another interview is performed to get a better understanding of the company itself. This information is presented in the background chapter and is used as a foundation for the research.

### Qualitative Interviews

To find the criteria of the company, qualitative interviews are performed in parallel with the more informal ones. The formal and informal interviews are conducted with two represents from GROW: interviewee A and interviewee B. Interviewee A has the role of program lead and interviewee B of product owner. This gives the questions answers from both a business and a technical perspective. These interviews follow the guidelines of Runesson and Höst (2009) [26]. Because the guidelines of Runesson and Höst are from 2009 (12 years old), this is taken into consideration and updated to match the current situation of the society. Additionally, these guidelines are adapted to match the preconditions of the company.

Runesson and Höst (2009) propose a structure specified for case study research in the field of software engineering. They highlight the value and importance of interviews and mean that qualitative interviews are best suitable for making conclusions based on the data received. However, every step and decision made in the process of the study needs to be presented in the research [26]. This is made by including the interview questions as an appendix in this paper and the answers are presented in the result chapter. Moreover, Runesson

and Höst claim that the analysis has to be conducted in parallel with research because the process is adaptable and new findings will change the scope of the analysis [26]. Hence, the qualitative interviews are performed in parallel with the analysis to find new and interesting information that can be of value for the research.

Moreover, Runesson and Höst bring up the importance of recording the interviews to be able to recap what was said and discussed [26]. All interviews in this research are conducted digitally due to the current pandemic Covid-19, which facilitates the recording possibility. They also discuss the different kinds of interviews possible: unstructured, semi-structured, and fully structured [26]. The interviews for this research are performed as semi-structured. The questions are prepared beforehand, but any additional questions or discussions to gild the interview are accepted. The choice of semi-conducted interviews is motivated by the need for extra information. The different dimensions of the models are complex and, hence, can benefit from more informal information to get to best possible understanding of the company and its pre-conditions.

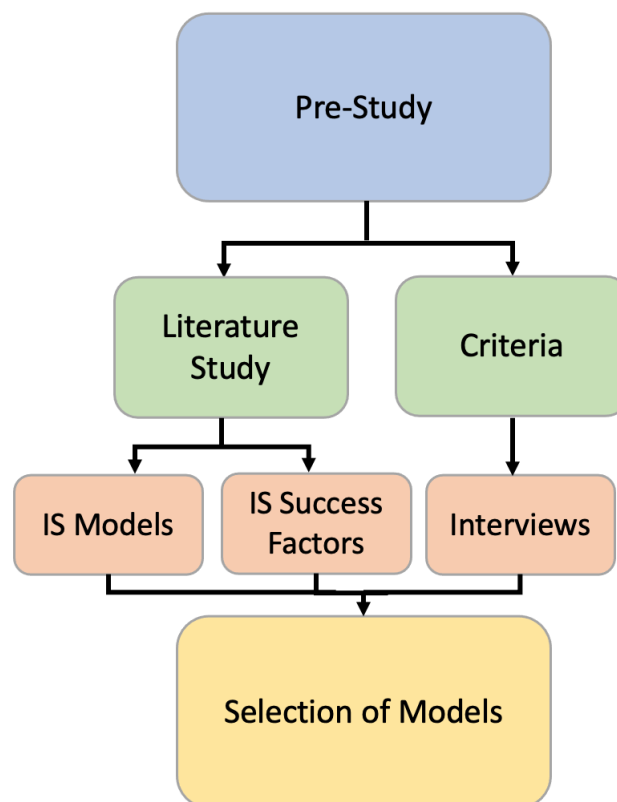


Figure 4.1: Overview of the pre-study.

### Literature Study

The literature study is conducted in parallel with finding the criteria that the IS models need to consider. This research aims to get an understanding of the various models existing for the implementation process of IS systems. The literature research is divided into two parts. The first part considers the various models. The aim is to find some models within the IS theory to have a relatively wide basis and increase the possibilities to find models that

are suitable for the pitfall identification based on the criteria that are produced. The other part of the literature study is to investigate different success factors. The reason for doing this is motivated by getting knowledge about what previous research has been done within the field and also to get an understanding of the various factors that need to be taken into consideration. By doing this, the risk of redoing previous findings is decreased.

The system covered by the previous literature mostly regards ERP systems (some EIS), and not VMS systems, which is the system used by the company of this research. However, VMS is similar to ERP but is relatively new within the field, and therefore, literature does not yet exist covering VMS systems. Hence, the ERP literature compensates for the VMS. Additionally, previous literature within the field is a basis for determining the method of finding the steps in the pitfall identification.

Literature on IS and IS models have been around for a long time and therefore, there exists a lot of old research within the field. However, the information system field is still relevant and there is still a lot of research made within the field. Hence, the literature base mainly consists of research that has been published within a frame of a couple of years from now.

## **4.2 Results**

This section presents the results of the pre-study. First, a result of the criteria of the company is presented, followed by a discussion of the suitability of the models based on these and the findings from the theory chapter. With these steps as a baseline, the models found most suitable for this research are selected.

### **Criteria**

Based on a semi-structured interview with employees of the company, multiple criteria were identified, which is a basis for the selection of the models. The interview questions aiming to find the criteria can be found in Appendix A2.

### **Customer Contact**

The first criterion that is identified from the interview is the minimum amount of customer contact possibilities available for the researchers of this paper. The company is in a start-up phase, meaning that the customer contact is still fragile and does not exist in such an amount making it possible to utilize this as a resource. Hence, the only information and feedback possible to get is through the internal employees at the company and their experience of the customer use.

### **IS Features**

Another criterion identified from the interview regards the possibility to measure the effectiveness and usability of the different functions that the system aims to provide. In the current situation, there is only a minimum amount of features that are finished in the system. The features finished include the time reporting system and admin interface. However, more are planned to be finished in the next couple of months. The minimal amount of features in the current situation obstructs the possibility to measure how well the functions of the IS facilitates meeting the expectations of the user.

### **User Resistance**

In the current situation, the company does not take any special arrangements into consideration regarding any resistance that can occur when facing new IS. However, the interviewee expresses the importance of this problem when introducing new systems. Hence, this belief is based on the interviewee's previous experience at other companies and is not something that the company is currently evaluating or anything they have faced during the process hereunto. Moreover, because the possibility of receiving user feedback is minimal, the user resistance is difficult to test. This is possible to do in a later stage of the implementation process when the amount of customers has increased rapidly.

### **User Acceptance**

User acceptance in the system, in general, is tested by a feedback channel where users who use the time reporting system can provide feedback at any time. However, no continuous and planned tests are performed at the system and this feedback happens irregularly as the user uses the system. This criterion is, as the resistance criterion, correlated to the minimal possibility to receive direct user feedback of the system, and is thereby hard to test.

To ensure that the system provides a strong information quality, the company uses agile development in the form of scrum to set clear user stories and requirements for the functions. However, they feel that the current working to receive a strong information quality is a bit weak and strive to improve it. To ensure strong system quality, the previously mentioned tests are performed on the customer and internally at the company. The feedback they get is often provided when the system suffers from any bugs, and hence, they see potential in working harder to increase the system quality. They believe that feedback not only regarding bugs is necessary to improve the system and the user acceptance. Furthermore, the company sees the need for further improvement in the service quality because this is something they are currently not working on. They believe that all these parameters will be easier to work on when the company has expanded more on the market because the number of users will increase.

### **Evaluation of the Models**

In this section, an evaluation of the models introduced in the theory chapter is performed and is a basis of the selection of these. A summary of the advantages and drawbacks with consideration to the criteria of the companies is showed in Table 4.2. The models evaluated are VNA, TAM/TAM2, MR, DM IS, TTF, and TPB.

### **Value Network Analysis**

The VNA serves an important purpose to include in identifying the pitfalls because it provides an overview of the organization. To get an understanding of all the stakeholders and value networks it is important to get an apprehension of what relations are necessary and efficient and which are not. This is a specially suitable model because it uses the internal network of the organization, which matches the criteria with an almost infinite resource of internal company information. A potential drawback with selecting this model may be the fact that the VNA serves the purpose to maximize the efficiency in the organization with an existing IS, while the purpose of this research is to examine an IS still in the implementation phase.

The result from the interviews conducted with the company shows a big desire for a network representation of the organization and its stakeholders. Hence the VNA model is used in the pitfall identification to visualize the IS. However, the model's purpose in this research is to provide the different relations and networks of the IS and not the organization, and

Model	Advantages	Disadvantages
VNA	<p>Provides a clear overview of the organization and its stakeholders.</p> <p>The researchers have an infinite resource of internal information making it possible to utilize this.</p> <p>Desired by the company to visualize the organization in such a network.</p> <p>Can be useful in enabling acceptance of the change and to define the main processes needed in the implementation.</p>	<p>May be more suitable for an overview of an already implemented system and organization. Possibly hard to apply on a start-up company.</p>
TAM/ TAM2	<p>Concerns the user acceptance in correlation to the purpose it tends to serve.</p> <p>The company clearly states that they do not evaluate user acceptance in the current situation and are in need of it.</p> <p>User acceptance is valuable to evaluate to satisfy the potential future customers.</p> <p>TAM2 includes user's background, experience, subjective norm etc., that are not considered by any other of the other models.</p> <p>Widely in combination with other models in previous research.</p>	<p>Minimal possibility to measure customer satisfaction by involving users of the system. Only possible to get input from internal employees at the company.</p>
MR	<p>Concerns the user resistance acceptance of the system which no other model clearly does.</p> <p>Investigates the initial user behavior in relation to other circumstances than only the system itself.</p>	<p>Only one previous research has been done on the model.</p> <p>Minimal possibility to measure customer resistance by involving users of the system. Only possible to get input from internal employees at the company.</p>
DM IS	<p>Wide range of dimensions which provides a broad perspective of the system and its possible weaknesses and strengths.</p> <p>More focus on the IS system compared to the other models.</p> <p>Regards the importance of user satisfaction, system quality and use of the system, that has been highlighted by the literature as important factors to consider in the implementation of an ERP system.</p>	<p>Minimal possibility to measure user satisfaction by involving users of the system. Only possible to get input from internal employees at the company.</p>
TTF	<p>Concerns how well the technology serves the specific task.</p>	<p>Difficult to measure because only minor parts of the whole system is implemented in the current situation.</p>
TPB	<p>Provides a perspective considering behavioral intention, which none of the other models take into consideration.</p>	<p>Narrow perspective if used only by itself.</p>

Table 4.3: Summary of the advantages and disadvantages of the different models with consideration to previous literature and the criteria.

hence, the model is adapted to this. Moreover, the model Caar and Stray (2019) claim that the VNA can be useful in enabling acceptance of the change and to define the main processes needed in the implementation [16]. Enabling acceptance is important for the company for the customers to feel satisfied and a willingness to use the system.

### **Technology Acceptance Model**

The clear benefit of using TAM is the model's concern of user acceptance in correlation to the purpose it tends to serve. The model is useful for predicting a group of people's perceived reaction to a certain technology. This is useful in the settings of the company because they state that this is something they are currently not working with. Furthermore, user acceptance is a valuable parameter to evaluate for ensuring maximum satisfaction for the potential customers that the company aims to have in the future. TAM2 is a broader version of TAM covering more dimensions and is hence regarded as more suitable than TAM for this research. The benefits of TAM2 include the consideration of the user's background, experience, subjective norm, etc., that can have varying impacts on the perceived usefulness of the system/function. These dimensions are not considered by any of the other models. Moreover, TAM has been widely used in combination with other models in previous research, as presented in the theory chapter.

One drawback of the model with consideration to the criteria of the company involves the minimal possibility to measure user acceptance and hence, only possible to evaluate using input from the internal employees at the company.

### **Multilevel Model of Resistance**

The main advantage of the MR regards the model's consideration of the user resistance. This model investigates the initial user behavior concerning other circumstances than only the system itself, as for example factors as group influence. However, group influence is somehow covered in TAM2 in the form of social influence. Additionally, because the criteria obstruct the possibility to test the matter of resistance on the system, it is difficult to use in practice for this research.

The biggest drawback of MR is the amount of previous research conducted on the model. During the literature study, only one published paper regarding the MR could be found. Hence, the information and knowledge regarding the MR is too vague and is not of much value as input to the framework. Hence, the model does not provide enough content to be used for analyzing the company and is therefore not chosen as a selected model.

### **DeLone and McLean Success Model**

The main advantage of the DM IS model is the combination of parameters that influences the net benefit. The model considers multiple dimensions which include both user acceptance and how the system is running. The model is suitable with consideration to the criteria because it focuses on the specific IS system, rather than the user experience. Moreover, as Syafirialiany et al. (2019) claim the importance of user satisfaction, system quality, and use of the system of an ERP system, the DM IS is most likely suitable for this purpose [31]. The model regards all these parameters and provides a perspective of them. The DM IS provides a broad overview and includes the different categories of *people*, *process*, *product*, and *organization environment*, which was pointed out as important consideration factors by Kammaruddin et al. (2011) [17].



The drawbacks of the DM IS model refers to the same as TAM: the minimal amount of customer feedback that is possible to collect for this research. However, TAM (more specifically TAM2) is found more suitable in this setting because it provides a broader variety perspective due to the user's personal dimensions, and considers user acceptance.

#### **Task-Technology Fit Model**

The TTF model serves the advantage of defining the relationship between the IS task and the technology of it. However, this parameter is also included in TAM2 as *job relevance* and hence, does not complement the other models in any unique way.

The main drawback of this model, with consideration to the company criteria, is the difficulty to measure the usefulness because the implementation process is not finished and the system lacks many of the considered features in the current situation. Hence, the TTF model is difficult to use and apply to the company and deselected for further use in this research.

#### **Theory of Planned Behavior**

The benefits of TPB include its ability to regard the behavioral intention, which none of the previously discussed models take into consideration. From this research's point of view, the behavioral intention is considered important because the lack of customer contact is minimal. Hence, predicting behavioral intention can be seen as a complement to this and TPB provides a valuable approach to use in combination with any of the other models.

The drawback regarding this model is its narrow perspective in consideration of the needs of this research. The only focus considers the behavior as a consequence of perceived intentions and, hence does not provide a broad overview of the user acceptance by itself. However, as mentioned previously, a possible solution is to use the model in combination with another one to add the perspective of intentional behavior.

### **4.3 Selection of IS Models**

This section presents a summary and a selection of models that considers the relevant dimensions to be used for this research. Based on the literature study of the models in combination with the criteria of the company, the models selected are VNA and TAM2. The motivation for this selection is based on the desire of user perspective that is expressed by the company and seen in the criteria. Hence, the focus is on the customer part in the network. The selected models are in combination with each other seen as valuable for this purpose because they cover a broad perspective of user parameters. However, the models need to be adapted to match the criteria, by, for example, minimizing the customer and user questions and focusing on the information from the internal parts of the organization. TAM2 and DM IS are seen as relatively similar in this context, but as TAM2 provides more variety in the perspective of the system and includes a better variety of parameters, it is chosen over DM IS. Moreover, inspiration is taken from TPB to include an even wider perspective of parameters. By including TPB, a perspective including perceived intentions is provided.

However, although the rest of the models discussed are deselected, inspiration from the literature regarding these are still considered and used to propose the framework and identify the pitfalls. The motivation for using information and insights that these other models contribute to is because they are seen as valuable for the understanding of IS.

## 5 Method

In this chapter, the method for conducting this research is presented. First, the identification process for the pitfalls is presented which includes the application of the IS models. Secondly, the method for analyzing the output of these models is presented. Lastly, the method for proposing the pitfalls based on the results is presented. The framework proposed is visualized in Figure 5.1.

### 5.1 Application of the Models

In this section, the framework for identifying the pitfalls is presented. The pitfalls are identified by applying the models selected in the pre-study. The steps of the implementation are inspired by the proposed stages by Savoie (2016), which are presented in the theory chapter [27]. A summary of the interviews conducted in the research can be found in Table 5.2 and the interviewee representatives from GROW are presented in Table 5.1. In similarity with the pre-study method, informal interviews are conducted but not presented in this phase. Moreover, inspiration is taken from Hidayah, Nur Aieni et al. (2020) to combine TAM with other models to make it more flexible for the specific research [2].

Interviewee	Role
Interviewee A	Program Lead
Interviewee B	Product Owner
Interviewee C	Full Stack Developer
Interviewee D	Vendor Business Partner
Interviewee E	Scrum Master

Table 5.1: Overview of the employees from GROW used in the interviews conducted in the method.

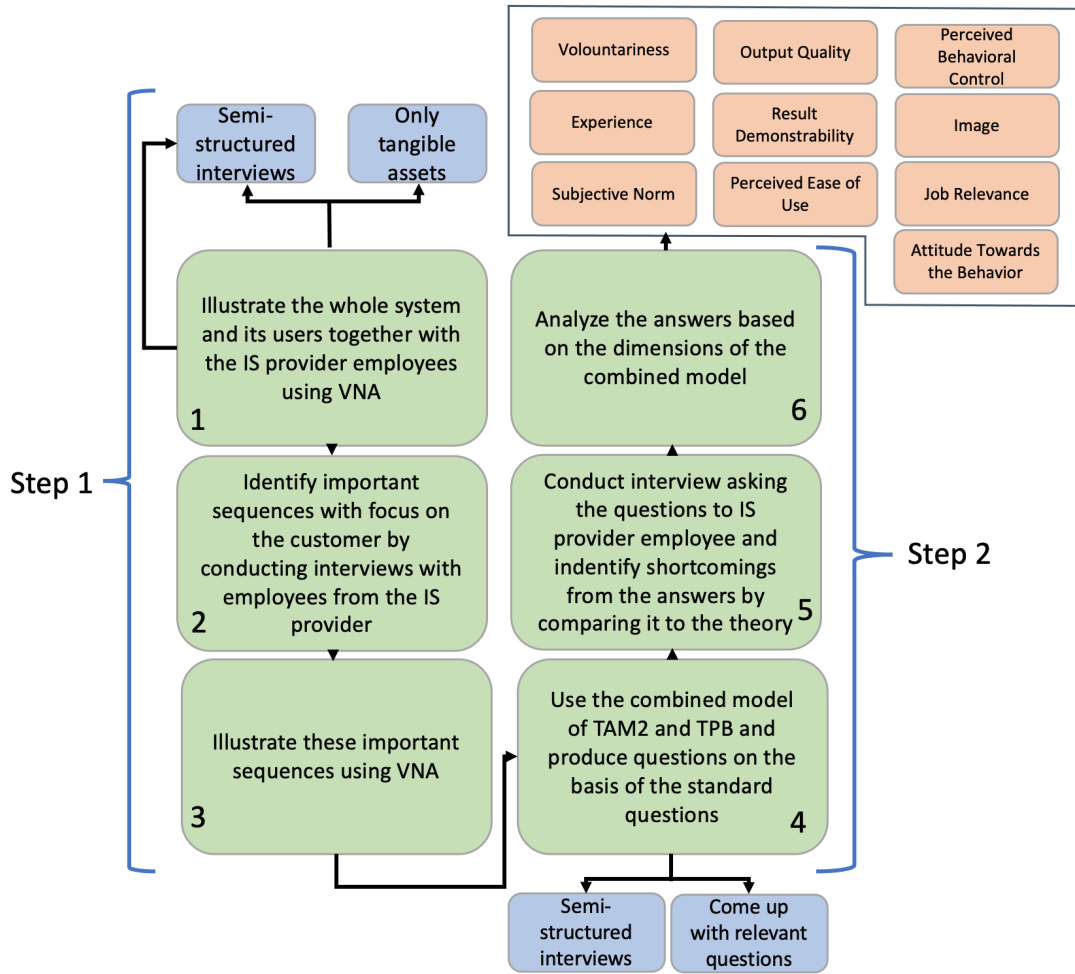


Figure 5.1: A visualization of the proposed framework.

### Step One: VNA

As a first step, Savoie proposed the act of sitting down with the employees and visualizing the organizational network and their relations [27]. This step is performed in the form of a VNA. The VNA is conducted through a series of semi-structured interviews with employees of the company.

During the first interview where a value network is produced, the whole system network is visualized by one employee of the organization. The model is modified and adapted to suit the purpose of this research. Instead of fully focusing on the organization, the model is adapted to only focus on the essential parts of the IS they provide and its users. However, because the organization only contains seven employees, where most of them are working on the system, the whole organization is indirectly included in the network. This research is limited to only focusing on the tangible assets in the value network.

During the second VNA interview, the relations are further investigated with the five dimensions of the VNA: *asset utilization*, *value conversion*, *value enhancements*, *recipient perceived values* and *social value*. This is performed through a series of questions that can be found in Appendix A.3. The second interview is conducted with inspiration from step two proposed by Savoie [27]. This step aims to give the authors a more detailed overview

Interview	Interviewee	Questions in Appendix
Interview to create and visualize the VNA.	Interviewee A	-
Interview to analyze the VNA that was visualized in the previous interview.	Interviewee A Interviewee B	A.3
Interview focusing on finding the perspectives of the parameters in TAM2 and TPB.	Interviewee A Interviewee B	A.4
Informal meetings/chats with the company to solve ambiguities and understand the context.	Interviewee A Interviewee B Interviewee C Interviewee D Interviewee E	-

Table 5.2: Overview of the interviews conducted in the research.

of the processes in the organization and to clearly see if the organization does not take full benefit from technologies and relations. The VNA is modified in step two as well to be more suitable for this research. By investigating the five dimensions in Figure 3.3, the system's value contribution can easily be identified and more adapted to a company that does not have a fully implemented system. At the end of this step, several sequences in the network are identified and selected. A sequence, in this case, is defined as several relations affecting each other in the network. These sequences are developed in consideration of the customer's perspective, which has been pointed out as the most important perspective by the company.

### Tool for Visualizing the Network

The value network is created using the tool Kumu <sup>1</sup>. This tool is chosen over other similar tools for creating value networks because it is free of charge for public projects and includes multiple functions which make it easy to modify the network. Moreover, the tool provides functions facilitating sharing and saving of the network. It is possible to use other tools created in the purpose of VNA.

### Step Two: TAM2 With Influences of TPB

The third step proposed by Savoie involves a reflection made by the employees. In this step, the employees should reflect over if they think all tasks are performed most suitably or if they can be improved [27]. The step performed in this research is somehow modified and rather focused on the gaps of the system provided by the company. To complement the dimensions not covered by the VNA, TAM2 and TPB are applied to get a deeper and more detailed understanding of the needs of the system. TAM2 and TPB are applied on the sequences identified from the VNA and analyzed with consideration to *perceived usefulness* and *behavioral intention*. For the best possible combination of models, the VNA is used as the foundation which provides a broad overview of the different parts and deliverables concerning the system. An interview is performed to get an understanding of how the parameters in TAM2 and TPB are handled and thought of by the company. The combined model that is

<sup>1</sup><https://kumu.io/>

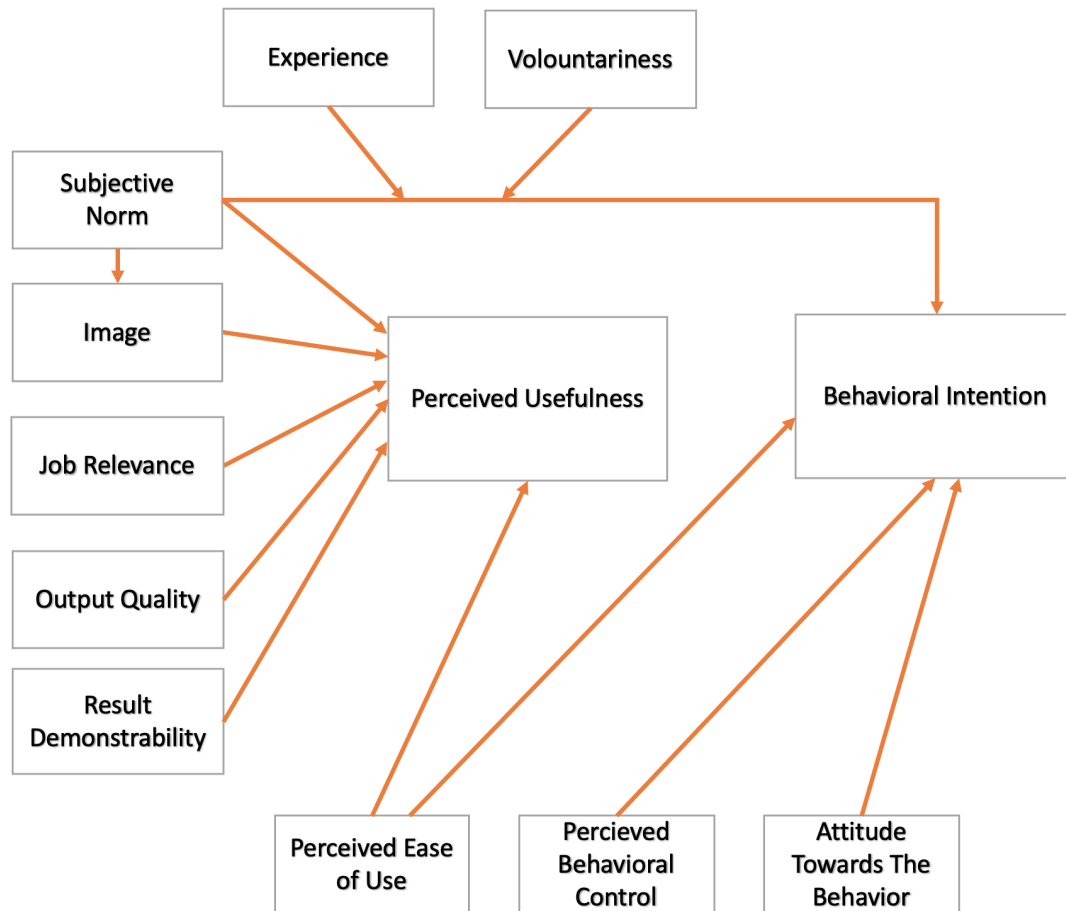


Figure 5.2: The combined model of TAM2 and TPB that is used in this research.

used for this stage can be found in Figure 5.2.

This combined model mainly focuses on the parameters included in TAM2, but influences of TPB are used to include a perspective of behavioral intention, which has been pointed out as an important factor in the literature. Several questions covering the parameters of these models are created, which should contribute to an indication of the strengths and weaknesses of the system. These questions are asked for each of the identified sequences in the network and focus on the relations where the customer is included. Moreover, the questions are individually created for each of these relations and can be found in Appendix A.4. After the interview, each relation and stakeholder in the VNA is further analyzed based on *perceived usefulness* and *behavioral intention*. The purpose of this is to dig deeper into the relations of the VNA with consideration to the usability of the IS. After this step, a perspective of how these parameters are handled in the system should be given.

The questions related to the combined model can be found in Table 5.3. The answers to the questions are used as an indication to find any loopholes or strengths of the IS. If the *perceived usefulness* or *behavioral intention* are identified as weak based on these questions, these deliverables may indicate weakness with the system and vice versa.

Dimension	Question
Subjective norm	How important will it be for superiors that this task is performed in the system and not in any other alternative?
Voluntariness	When functions are implemented in the rollout phase: will it be a requirement that the need be started immediately or is it voluntary for the users?
Image	How should the company work to make the system function part of the socially accepted way of working at the customer?
Job Relevance	How does this function help to simplify the execution of the task for the user?  What does that relationship look like today?
Output Quality	How much better is this method compared with the working methods that exist today? Did it make it easier? 1-5  Is it more time efficient? 1-5  Is there any other alternative course of events for the same purpose?
Result Demonstrability	Will one be able to measure these improvements, how?
Experience	How much training is needed to use functions independently? Will previous experience in any way contribute to the need for education
Perceived Ease of Use	How is the function designed to give the user an idea that it is easy to use and simpler than the traditional way?  How do you prioritize between more complex functionality and simplicity in this particular function?  Have you developed functions to make it be perceived as simple as possible, if so how?

Table 5.3: Questions related to the combined model.

## 5.2 Analysis of the Models' Application

In this section, the method for conducting the analysis based on the results from the models applied to the company is presented. After the application of the models, an analysis of the results is performed. The goal of the analysis is to find the strengths and weaknesses of the system with consideration to an effective value exchange between all parts in the value network. This is made to ensure user satisfaction and an efficient IS. The output of the VNA is used to identify the stakeholders, relations, strengths, and weaknesses of the value creations in consideration of all parts of the network.

Furthermore, the VNA is used to set a foundation for the use of TAM2 and TPB. Moreover, the outcome of these models is used to show the IS effectiveness from a user perspective. The strengths and weaknesses identified in both these models are used as a baseline to the final pitfalls presented. The answers from the interviews are used to receive an apprehension of these sequences in consideration of *perceived usefulness* and *behavioral intention*. These parameters are analyzed using *experience*, *voluntariness*, *subjective norm*, *job relevance*, *output quality*, *result demonstrability*, and *perceived ease of use*.

### **5.3 Proposing Pitfalls**

In this section, the method for identifying and proposing the pitfalls is presented. After all of the interviews are conducted, the results from these are analyzed from different perspectives to identify potential pitfalls of the system or any specific function in the system. This analysis is performed with the answers from the last performed interview as a baseline and is formed from a customer's perspective. From this analysis, multiple pitfalls are extracted and summarized. The pitfalls are identified from the specific company but are translated to more general guidelines with the purpose to be useful for a broader mass of companies. For example, this regards specific functions in the system of the company that is converted to a more general setting.



## 6 Results

The result chapter is divided into three different parts. The first part presents the application of the models, which include the identified sequences and the results of the interviews. Secondly, an analysis with the parameters from TAM2 and TPB is made. The third and last part summarizes the identified pitfalls that were identified in the second part and suggest methods of how they can be avoided.

### 6.1 Application of Models

In this section, the result of the models' application on the system is presented. The application of the models is presented which includes the identified sequences and the results from the interviews. The results from both the VNA and the essentials from the answers of the questions based on TAM2 and TPB are presented.

#### Identified Sequences

In this section, the most relevant sequences identified of the network/system are presented. Four different sequences are identified and described: *request*, *agreement*, *time*, and *insight* sequence. A representation of the whole network can be found in Figure 6.1.

#### Agreement Sequence

Figure 6.2 represents the first identified sequence, the agreement sequence. This sequence starts with *Onboarding* followed by *Master Agreement*, *Supplier Agreement*, *Subcontract Agreement*, *Company Invoice and Supplier Invoice*, *Customer Payment*, and *Supplier Payment*. This sequence refers to all contracts and payments made to the system. The sequences are described as bidirectional thicker arrows representing that one transition to another sequence and return to it when the new sequence is completed. All to illustrate the flow in the system.



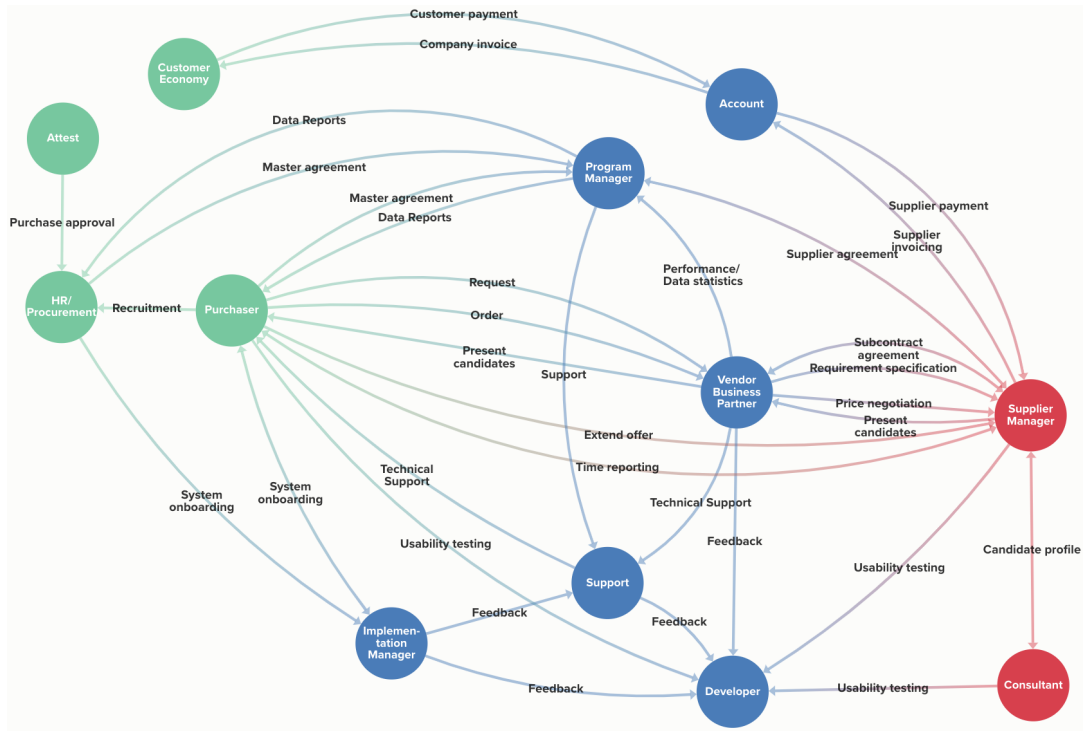


Figure 6.1: VNA: The full value network of the system.

### (1) Onboarding

The onboarding step starts with negotiations and discussions about how GROW should supply the customer with the correct type of arrangement to completely meet the customer's preferences. This can vary between different customers. Such an agreement mainly states the payment model to be used between the parties and what VMS deliver models for the specific company will look like. The model contains a description of the deliverables included in the payment model, and how these are intended to work in the environment that is adapted to the customer's settings. Once the agreement is in place, the following step is to onboard the customer with the use of the system. This is performed depending on what terms were set within the agreement. The implementation manager is responsible for the customer learning to manage the system and its functions. This is arranged based on the implementation process that is presented in the background section.

### (2) Master Agreement

When the negotiations are completed, a master's agreement is written. The master's agreement states the conditions under which external labor operates as temporary staff within the purchasing company. These conditions are usually set by the customer without any constraints from GROW.

### (3) Supplier Agreement

This agreement constitutes the same terms and conditions as the master agreement seen in the previous step. In this way, the same conditions as required for external labor from the customer, are agreed upon between GROW and suppliers. With a supplier agreement in place, the procuring customer can start hiring an external workforce through this linked agreement chain. When such a need for external labor occurs, the *request sequence* is initiated.

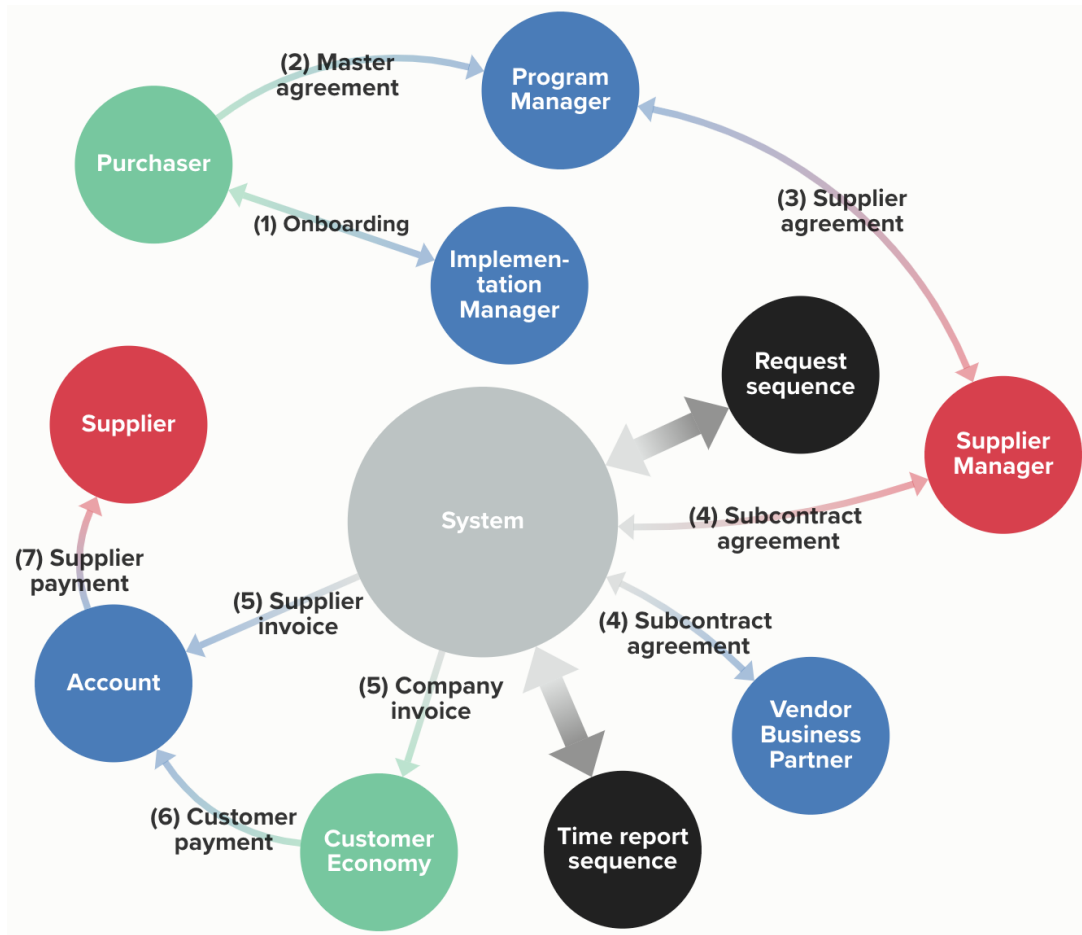


Figure 6.2: VNA: Agreement sequence of the system.

#### (4) Subcontract Agreement

In this step, descriptions of individual-specific agreements for each consultant who takes employment with the buyer are defined. This agreement states the hourly rate, the amount of time and is registered in the system and sent to the VBP. Once the actual subcontractor agreement is in place, the consulting assignment is carried out. During that period of work, the *time report sequence* is initiated to administer the time reports and the approval functions within the system.

#### (5) Company Invoice and Supplier Invoice

Once the assignment is completed, the system sends out invoices based on the terms stated in the subcontractor agreement and the payment terms that exist between the customer and GROW. The invoices are sent out simultaneously from the system.

#### (6) Customer Payment

In this step, the customer makes the payment to GROW's account. Here, the customer can structure what best suits their wishes. Invoicing can be consolidated, e.g., based on the project, team, or business unit to best suit the customer's settings and economy administration.

*(7) Supplier Payment*

Once the customer payment is made, GROW keeps their brokerage fee and forwards the remaining amount to the supplier, based on the pricing details within the previous agreements with the supplier.

**Request Sequence**

The second identified sequence is the request sequence, visualized in Figure 6.3. This sequence consists of the relations *Purchase Approval*, *Request*, *Requirement Specification*, *Candidate Profile*, *Present Candidates*, *Candidate Applications*, and *Recruitment*. This sequence is intended to describe the wish to hire, or request, that the customers makes when an order of consultants is to be made in the system. The sequence begins with GROW agreeing with both the customer and suppliers.

*(1) Purchase Approval*

The entire request sequence is initiated by a need for expertise from the customer company. The typically responsible role for fulfilling that need is a purchasing role. In many cases, this role requires the approval of a superior who has the authority to decide on the procurement of external staff. In some workplaces, the same individual can be the approving role and the purchaser at the same time. If that is the case, the interaction shown does not take place. However, for larger organizations, a division often occurs. This is not an exchange of information that goes through the system, but at least, GROW has no initial intention of taking over the ownership of this interaction.

*(2) Request*

When this is approved, the purchaser sends the request to the VBP. This request constitutes an assignment description, specifications of which competence, start date, length, and other related data for the assignment. In this request, the purchaser has the option to select to which suppliers the request will be distributed. It can either be sent to all suppliers in the network or limited to a certain preferred supplier to take part in the assignment request. Another option is to select the VBP to identify candidates based on the requirements specification for the assignment in a more outreach fashion. This is more similar to how the work is performed today, but with a system solution included. Once the VBP receives the request and its details, the request will be registered in the system.

*(3) Request Registration*

In this step, the VBP converts the purchaser's request to fit the input format in the system. Such a request can come in different formats, which requires the VBP to adjust to fit the system format. Once these adjustments are made, the VBP registers the request in the system. Once this is finished, the request is available for the selected suppliers.

*(4) Requirement Specification*

All supplier managers who match the requests receive a request from the system. Receiving this request may depend on whether the individual is a preferred supplier or that the VBP has registered the suppliers' possession of the required competence.

*(5) Candidate Profile*

The supplier manager assesses whether a particular consultant is suitable for the specific assignment. In this step, the supplier manager ensures that the consultant is available during the requested period and may also take the opportunity to edit the consultant candidate's resume bringing it up to date.

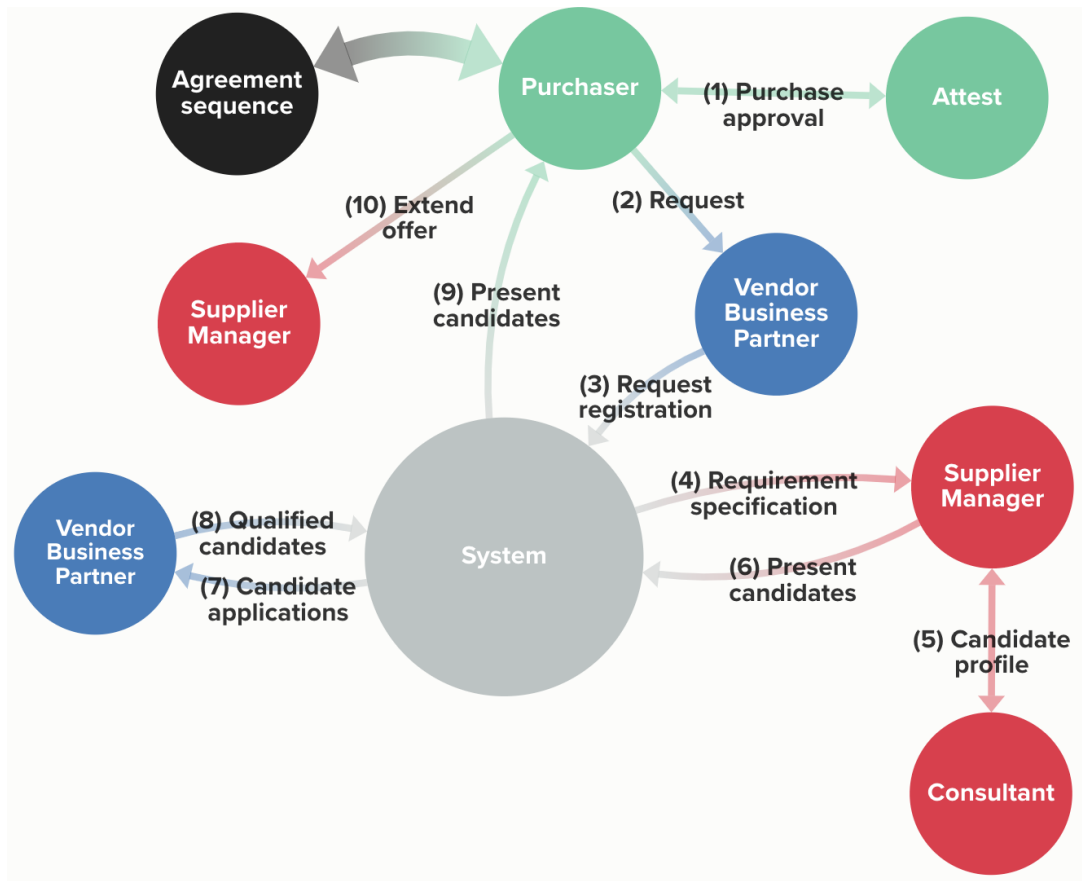


Figure 6.3: VNA: Request sequence of the system.

*(6) Present Candidates*

The supplier manager registers the application for the candidates regarding the associated assignment related to the request in the system.

*(7) Candidate Applications*

In this step, the applications are registered in the system and the VBP conducts screening and review to sort out those who are considered most qualified for the assignment.

*(8) Candidate Applications*

The few candidates that remain from the previous reviewing step are forwarded in the system and sent to the purchaser for the final recruitment process.

*(9) Present Candidates*

In this step, the candidates are presented to the purchaser and face the interview and recruitment process. This process can vary depending on the purchasing company's external recruitment setup. The system solution offers support for administration around this process, such as administration of the applications and present suggestions of available time slots for scheduling appointments for the candidate and recruiter to meet.

*(10) Extend Offer*

This is the final step in the sequence and is reached when the buyer has selected the candidates one has chosen to hire for the assignment. When this is finished, the process moves back

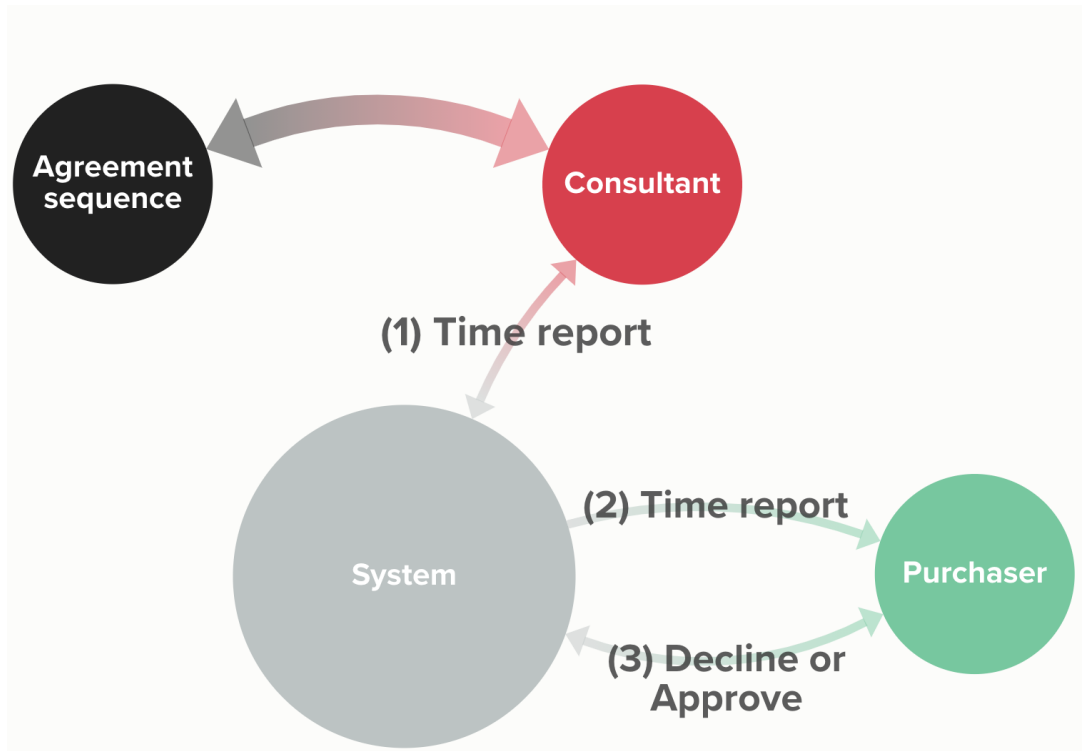


Figure 6.4: VNA: Time report sequence of the system.

to the assignment sequence, where a contract is written between the partners, whereupon the assignment begins and the sequence regarding time reporting is initiated.

### Time Report Sequence

Another identified sequence can be found in Figure 6.4 and is the time report sequence. This sequence consists of two *Time Report* relations and the *Decline or Approve* relation. This is initiated once a subcontract agreement is signed in the agreement sequence and runs while the assignment is ongoing. During the assignment, the sequence will return to the agreement sequence every month for the invoicing, performed in steps (5)-(7) in the agreement sequence.

#### (1) Time Report

In parallel with the consulting assignment, the consultant performs time reporting. This is executed directly in the system by the consultant as a user.

#### (2) Time Report

When the consultant's time report is registered, the purchaser is notified of this. At this stage, there are opportunities to categorize the various consultants' time reports to facilitate an organized overview of the external workforce currently operating within the customer organization.

#### (3) Decline or Approve

The hiring purchaser can choose to either approve or decline the consultants' time reports, depending on presumed errors. This is performed before the invoicing that usually takes place by the end of the month. This enables the system to consolidate all the invoices to one single, to keep it more simple for the customer's economy administration.

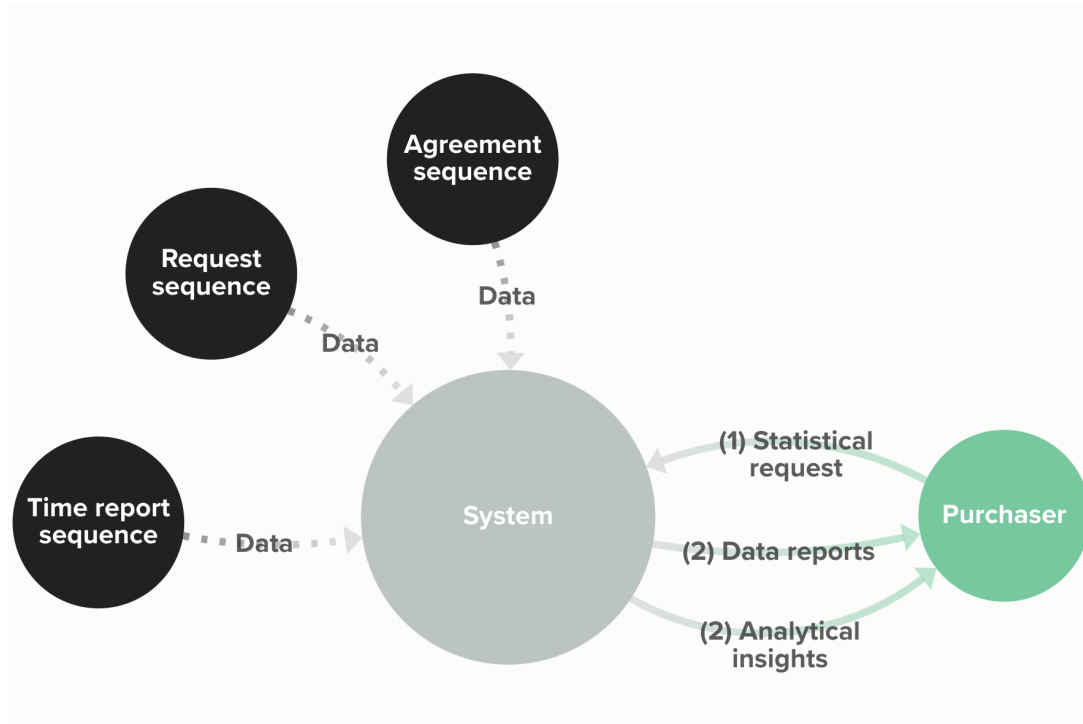


Figure 6.5: VNA: Insight sequence of the system.

### Insights Sequence

The last identified sequence is the insight sequence, visualized in Figure 6.5. It consists of *Statistical Request* and *Data Reports and Analytical Insights*. This sequence runs in parallel with all the previously presented sequences. This handles the actual data collection that is performed regarding all data points in the previous systems, such as the time it takes to recruit, time reporting, total spending, and other valuable data for system users. GROW has chosen to collect this data to be able to present it to the various user categories in the insights sequence.

#### (1) *Statistical Request*

The system monitors and saves the data generated in the system throughout usage. The data is gathered from all relevant user input from the agreement, request, and time report sequence. The customer-specific statistics can be accessed by the purchaser through a request sent to the system.

#### (2) *Data Reports and Analytical Insights*

Once the system receives a request, the user can access information about contract details including length, price, extent, and time approvals. This data can be compared with the budgeting and forecasting made by GROW. Moreover, the data is configurable to some extent, to suit that specific user preference. This configuration can be adaptable to make the data reports relevant to the internal customer reporting need. The purchaser can configure own scenarios by manipulating data metrics such as consulting spending and hours per team, projects, and programming languages to align different strategic objectives.

## TAM2 and TPB

In this section, the result of the application of the TAM2 and TPB is presented. The models were applied by forming questions to analyze GROW's perspective regarding the contributory aspects of the system user. The section is divided into the different sequences and presents the answers from the interview. The questions are asked for each relation with the perspective of the customer in all of the four sequences.

### Request Sequence

GROW believes that the request sequence will increase efficiency by using the system and highlights the importance of the VBP in this process. The VBP is a subject matter expert who has experience within the field of recruiting IT consultants and will learn about the potential pitfalls from the practical experience from previous customer journeys. Furthermore, the VBP is a strong negotiator. They will do it daily, are informed about market prices, and they will get insights into what type of competence is the most requested, which will be a valuable asset for GROW.

The system replaces the traditional analog process for recruiting, which is commonly used for mailing and make phone calls. Instead of this way of communication, the VBP will be able to have direct contact with the customer and together produce a suitable requirement specification for assignments. Moreover, the VBP will be able to introduce the customer further to how to use the system and the functions correctly. GROW strives for this system function to engage the users within the sequence although they fear the unknown challenges of being successful in it.

Furthermore, the VBP acts as a supporter and registers the request in the system for the customer. When registering a customer request, everything will be converted into an automated format that is generalized for every candidate. With this, GROW intends to try to get rid of biased elements in the process and counteract the possibility of discrimination within recruiting. To succeed with this they intend to anonymize the candidates and to convert all resumes automatically to a identical format. In this way, they want to lead the decision-makers to focus only on what GROW considers important in this process, i.e. competence and experience. Not design, gender, age or similar characteristics that easily fall victim to discrimination. All candidates will be compared according to only their relevant experiences and their ability to perform the assignment. According to GROW and the interviewee, this is a more efficient and fair option compared to the current practice where all resumes and requests look different and are uploaded in multiple formats. To compare different resume styles and content is time consuming and could make the judgment slightly based on layout, gender, sex, or other irrelevant information. Instead, the final aim is a seamless system where all functions can cooperate.

Except for uploading resumes and creating requests, generating appointments for interviews are supposed to be made automatically based on the available time slots in their schedule of the people involved. GROW believes that this solution will contribute to increased efficiency and decreased communication complexity because the process will be more atomized and the traditional communication lead time will be shorter. For example, less responsible people can be involved in the booking process of an interview.

### Agreement Sequence

*Master Sequence:* The results regarding the agreement sequence show that there are not any requirements from GROW that restrict the customer in how the system has to be used. The only requirement set is that all invoicing should be made through GROW. However, the

employee in the interview means that all parts in the system will be used by the customer because otherwise, where the strong motivator is that they will be paying for something they are not using otherwise.

However, the management team of the customer will in most cases set requirements that the system should be used in the organization, and GROW will emphasize such an order. Moreover, specifications are set in the agreements that specify how the system will help the customer organization and what results are supposed to be obtained. Additionally, GROW must ensure that this system is online at the customer's organization all the time. This means that the system must have a high availability and reliability, which set high demands on system performance and networking. GROW will provide some measurable performance data points to the user, e.g. the time it takes for the supplier to answer any request and other measurements regarding the users, but how well the whole system works is considered more difficult to measure.

*Onboarding:* Moreover, during the onboarding process of the system, GROW is working to make the system socially acceptable in the customer organization. They do this by mapping the current process of work. With this, GROW can help to provide a sound solution to the implementation. Their vision is to build the process to fit the system to the customer and not the customer to the system. The system strives to be flexible.

GROW strives after that the education necessary to use the system should be minimal. If the customer previously has used other systems with similarities, they should experience this system as a relief in the setting of being more user-friendly and easy to use. The system is designed to only contain the relevant part of the specific user. E.g., a consultant who only uses the system for time reporting should only see this function and not lots of other advanced functions. The goal of the system is for it to be self-explaining and not in need of an introduction education. However, users, such as HR, who have more interaction with the system, could require more of an introduction. In total, GROW believes it will take approximately one month for all parts to be familiar with the system. The system support will be introduced when needed, and not through long-term onboarding and education.

*Company Invoice and Customer Payment:* The interviewee of GROW believes that the process of handling invoices for consultant companies without a VMS is more disorganized. Invoices are sent in different formats and the customer must compare and double-check that the invoice details is in line with the time that the consultant has reported and pricing. This has to be performed for every single consultant mission, although it only may amount to a small sum of hours. Summing up all these minor external workforce assignments leads to a great sum of work effort and can be made way easier by using the VMS. The workload by using the system is minimized and the process for similar task as invoicing is more atomized for the customer. The supplier does not have to invoice, keep track of all the consultants and a lot of extra work is obscured. This improvement will mostly be measured in the subjective feeling of control that the customer has and how much time it takes.

### **Time Report Sequence**

The traditional way for performing the time report sequence is, according to the interviewee, most commonly not by a system and performed using some shared sheet where the consultant regularly declares one's time. This is usually considered a fairly simple solution as it is in its current form. This way of doing it does not require that much mental effort in comparison to their way of doing it in the system and hence, GROW believes that this solution can be perceived as equivalent or worse than the traditional way. The interviewee believes that the time reporting function of GROW might be too complex in current format and should be



simplified to be more user-friendly.

However, although the time reporting function may not be seen as user-friendly and simple, this function can be used interactively with other functions of the system. E.g., this time reporting creates automatic invoices that previously would have been made manually. Moreover, different kinds of insights can be extracted from the time reporting. The goal is for the consultant to only time report through this system and not additionally through the consultant's belonging company. The big advantage is that this time reporting data will be contributing to valuable data insights.

### Insight Sequence

For the insight sequence, the interviewee means that there is no easy way to monitor and access this statistical information today. The only way is to create own spreadsheets and manually feed in any information. This is where GROW sees big potential with introducing their system and is, according to them, one of the main strengths of their VMS system. The interviewee believes that this is such a feature that the customer may not know they desire until they get to experience the benefits of it. GROW believes that such a function can improve the organization such that it can contribute to data-driven and strategic decisions based on solid and trustworthy data. In that way, the customer can easily access and display trends and get a broad overview. Making the use of the system throughout tremendously valuable in terms of data.

Moreover, GROW means that consultant-based costs constitute a big part of a consultant company's expenses. Regarding the complexity of the insight function, GROW strives to illustrate complex back-end data simply. They aim to make the system user friendly and mean that a system that has everything but is hard to navigate through, is useless.

## 6.2 Analysis of the Models' Application

In this section, the result of the model application analysis is presented. The analysis is performed based on the results presented in the previous section and the IS theory that is presented in the theory chapter. The analysis is presented with a perspective from *subjective norm and image, job relevance, output quality, result demonstrability, experience, voluntariness, perceived ease of use, attitude towards the behavior, and perceived behavioral control*.

### Subjective Norm and Image

Subjective norm refers to how relative people to the individual influence the person to use the system by the individual's belief about how they think one should act. Image, which is influenced by the subjective norm according to TAM2, is, in this case, for individuals in the customer organization to receive a higher social status because they are using the system. This relation is reasonable because if the surrounding people of the individual show any resistance toward using the system, the individual will most likely receive a lower social status if one breaks this norm by accepting and using the system. The results of the interview reveal that GROW helps the customer to get the system socially accepted in the organization. This is performed in the onboarding phase in the agreement sequence by mapping the current situation of the organization and after that, providing a sound solution to the problem that is accepted by the whole organization.

According to TAM2, the subjective norm influences perceived usefulness, behavioral intention to use, and image. The fact that subjective norm influences behavioral intention is further supported by the TPB, and hence, seen as a vital part to consider when implementing IS. The behavioral intention to use is defined as if the individual has any intentions to perform a specific behavior. This is influenced by the subjective norm because if the individual believes that the important people in this person's surroundings will not accept the use of such a system, the individual will most likely intend to perform a behavior to not use the system.

As stated in the theory chapter, the management process of the implementation is an important success factor that needs to be carefully considered in the implementation process of an IS. Moreover, the subjective norm and image are highly correlated to user acceptance and user satisfaction of the system. If the individual experiences that one's relatives and surrounding do not accept the use of the system or function, they will probably not feel an acceptance or satisfaction towards using the system or a specific function of it.

**Since subjective norm is something that is imprinted in the customer organisation's culture, GROW must be aware of it to implement the system correctly. This is not something that GROW currently does to the same extent as they should and, hence, can be identified as a pitfall.** This should be taken into consideration before and in the onboarding phase of the agreement sequence. The literature states that the organization is constantly changing and that it is important to take this into account when implementing a system. It also states that much time must be put into the planning phase of the implementation and this has been identified as a typical pitfall in previous literature. Previous research has also shown this also should be adapted to the need of the customer. For the system to be accepted and meet user acceptance and satisfaction, GROW must adapt to the organization's culture and thus implement the change accordingly. According to the literature, many aspects should be taken into account when performing this and it is something that GROW should consider. Hence, it is important to consider how the system will be accepted by the customer organization. GROW must help with introducing the system in the customer organization in a sound way that does not create any resistance to using it.

As the literature states, the main factors of resistance are lack of knowledge and skill, physical or resource restrictions, negative past or future projections, discomfort, and fear of the unknown. These factors need to be carefully considered when deciding the implementation strategy for the specific organization. As a suggestion, a pre-study of the organization should be performed based on the culture of the organization. From the interview answers, it can be observed that GROW strives to produce a flexible system that is customized for the customer's needs already from the agreement sequence. This is also important to consider in the implementation phase of the system and is something that GROW needs to take in consideration. GROW must help leading change in the organization.

### Job Relevance

Job relevance is the individual's apprehension if the system is useful in the setting of performing the work-related tasks it tends to serve. GROW states that the system is flexible in such a way that it is adaptable to the needs and the work tasks of the customers. This flexibility is considered in the agreement sequence. Each role in the customer organization has different functions that obstruct them from seeing redundant information that does not concern them. Moreover, all the functions in the system contribute to facilitating the work tasks in the organization. This is especially seen in the insight and request sequence where the customer can easily access valuable data and be provided with ready-made templates and formats.

As in the case of subjective norms and image, user resistance can have an impact on job relevance as well. The customer may feel that one does not have resources in the form of time to use the system. However, because GROW strives to have the system self-explaining and minimize education necessary, this should not be the case. The customer can have a previous bad experience of using similar systems or being fearful of the unknown that can cause resistance to use the system. Especially, this can happen when introducing the insight function, which is a task that the customers do not currently have any support for. The customer may be unfamiliar with this type of system and hence, be skeptical of the consequences of it. **Hence, user resistance can be seen as a pitfall in this case which will make the user uninterested in using the system.**

TAM2 proposes that job relevance influences perceived usefulness. If the customer, in this case, does not feel that the system or function contributes to the facilitation of this system, the customer will not feel any point in using it. This can occur if the function does not fill any valuable aspect or if the function is too complex for the customer to use. **A possible pitfall in consideration of this can be seen in the time reporting sequence. This function is somehow job-relevant but is not much easier to use from a customer perspective than the traditional way of performing this using a shared spreadsheet document.** Once again, the literature highlights the importance of user acceptance in the implementation of IS and also advocates user acceptance before complexity. A time reporting system that is more complex than before will most likely not increase user acceptance or satisfaction. As Hyo-Jeong et al. propose in their study, an individual will feel resistant to using a technology if one feels that the system is difficult to use although it is proven to have a positive impact on the whole organization (namely high job relevance and output quality). This can be solved by alleviating the concerns of the user towards using the technology. The best handling of complexity can be seen in the request sequence, where the complexity is highly reduced for making a request. The stakeholders get more direct contact and fewer people are involved in the process. This is seen as a strength of the implementation process of GROW.

According to the literature, a flexible and adaptive system is advocated because it can adjust to changing conditions. A flexible system is easier to adapt to different cultures and different types of organizations, which makes it possible to also adapt the implementation process of the system. By this, it is possible to identify the possible resistance factors towards a new system in the organization and thereafter adapt the implementation of the system accordingly. For example, if one resistance factor regards the time it takes to learn a new system, the system can be implemented successfully.

### Output Quality

In the interview, it is mentioned that GROW strives to have an easy-to-use system rather than a complex one. This can for example be seen in the insight, request, and agreement sequence and is something that is also advocated by the literature which claims that adding complexity decreases the perceived ease of use. If the system is too complex, the ease of use will decrease and the customer will feel resistant to using the system.

The model TAM2 states that the output quality influences the perceived usefulness of the system. If the customer organization, in this case, feels that the quality of the output is weak, they will most likely continue with the traditional way of performing a task, without the system. An obstacle considering this is the potential difficulty to measure the output quality and also, as is stated as a previous pitfall from the literature, that it takes time for results to show up. The customer may not know in advance if the system will provide a strong output quality and parameters as user resistance, e.g., caused by a previous bad experience, can

affect this as well.

Moreover, as stated in the literature, it is important to ensure that the data in the organization is transformed into wisdom, using the information ladder. If the data is not successfully transformed into knowledge as an output, the output quality will most likely be poor and the customer will not feel that the system contributes to perceived usefulness. Hence, GROW needs to consider these steps in the information ladder when implementing the system in the customer organization. The system needs to be adaptable for the specific customer organization to ensure a successful transformation from data into knowledge. This needs to be considered already from the agreement sequence.

### **Result Demonstrability**

TAM2 claims that the results need to be demonstrated and experienced by the user for one to feel that the system is useful enough to use. When it comes to the question of result demonstrability, GROW will include specifications in the agreement sequence that specifies what results are supposed to be obtained from the usage of the system. This will help the users in the customer organization to experience the value of introducing the system into the organization. However, from the agreement sequence, it can be observed that GROW perceives difficulty in measuring the outcome of the whole system and that the results mostly will be based on the users of the systems. This can be explained by an already common pitfalls mentioned by the literature that states that the result of an IS can take years to experience. The literature covered in this research mostly covers the user acceptance of the system and, hence, these measurements are concluded to be enough.

Even here, user resistance can be a problem. If the customer has bad experiences from previous use of similar systems or if one has a fear of using the system because of a lack of previous experience, the result demonstrability will not have a chance to be shown before the user feel resistance towards the system in the first place.

Moreover, GROW claims that the system aims to be designed as user-friendly as possible, which can be seen in the request, insight, and agreement sequence. Supported by the literature, this is highly important for the customer to feel that the system will be simple enough to use and most importantly, better than the previous way of performing the task. If the system is too complex to use or seems to be complex to the customer, the perceived usefulness will decrease and the risk of user resistance increase.

### **Voluntariness**

Voluntariness affects the user's feeling that the use of the system takes place voluntarily. From the interview, it appears that GROW will encourage the management of the customer company to make the use mandatory for the employees. This is considered necessary, as the value created by the system has a direct correlation with the volume of consulting transactions (usage) that is made in the system. To ensure that all external workers are managed through the system and realize these values, the use of the system is encouraged to be made mandatory. In this way, the customer company realizes the great values the system can contribute to.

However, the introduction of mandatory may lead to the complete disappearance of the feeling that the system would be used voluntarily, even among the users who would have done it although it had been completely voluntary. This can be perceived as limiting for the individual user, who may have preferences in continuing with old work habits. A possible consequence may be that the customer company finds itself in a situation of user resistance.

However, the theory highlights positive effects by prescribing the use of the system in an initial stage, as this can lead to an increase in use and that the users build up a user experience early on. This early established experience can later contribute to a faster way for the users to get over the hurdle, which the use of a new system can sometimes mean. Although, after a certain period of time, one can reach an acceptance and not have to rely on mandatory and subjective norms as governing variables.

From the findings in the research of TAM2, it appears that mandatory introduction of the system can initially help to strengthen the introduction of the use. However, with the diminishing effect this has in the long run, other elements are required that control continued use. **If IS providers and GROW, in particular, fail with identifying this need and relies on that the authority influence will continue to influence that users continuously use the system, there is a risk of falling into a pitfall.** For example, practical alternatives to use should be evaluated based on social information. This social information could be gathered from user research tests or similar to identify once the initial mandatory effect diminishes. The aim of such an effort should be to identify means to increased prestige associated with the use of the system to increase identification.

### Experience

This dimension points out that experience gained from regular use implies that the effects obtained from subjective norms diminish as the user gains more experience. It is a reasonable assumption to claim that previous system experience from similar solutions will reduce the time it takes to start using the system and GROW assesses that previous user experience from similar systems will have a positive effect on reducing the need for education training.

GROW has made various assessments about the exact need for training to build a customer experience. Depending on the customer's preferences for how the system should be used, there are different solutions. One solution is that a dedicated employee from GROW is working at the customer's workplace and handles the system's main use on behalf of the customer. This is included in the role of the VBP. Such a role is relevant for six months before any boarding for handover takes place. In this scenario, the customer will be able to familiarize themselves with the system in the exchanges that take place with the representative from GROW. From these interactions, value contributions and output from the system will also be displayed during that period. Based on this, much will be gained to convince about the use of the system when it is introduced to be used in a more self-sufficient strategy by the customer themselves. This is in line with the previous pitfall literature that states that the education of a new system is of high importance.

Another potential solution is that the customers themselves use the system directly, without any representative from GROW. In such a setting, the knowledge of the system's existence is likely decreased, as well as the trust and belief in its ability to contribute. There is no experienced track record of how the system can contribute to getting the job finished. According to TAM2, it appears that at such a stage there is a need for users to rely on the opinions of others (e.g., superiors) about the system. With superiors showing the way and setting the use as mandatory, users will eventually also gain experience in the tool.

GROW claims that user experience from similar systems can help reduce the need for training and the challenges of using it. However, according to the research that emerges from TAM2, this should not be overestimated. This research indicates that the importance of early experience decreases and becomes insignificant approximately three months after the system implementation. At this stage, when the norm no longer influences the use of the system, the strengths and weaknesses of the system become more apparent and more visible among the

users. Relying too much on previous user experience or the own perception that the system is easy to use could potentially be adding to a pitfall and should therefore not be overestimated. Instead, GROW should consider conducting some sort of educational efforts to ensure that users have acquired the practical knowledge needed, ensuring that user acceptance is not lost.

From the material obtained from GROW, it is clear that much focus is placed on designing the system to be efficient and easy to use. The theory of TAM2 presents this as a good natural focus but claims that it is even more important to compare the result of using the system against not using it, i.e., to compare the use of the system with how it was before it was used. In this way, the leverage of using the system can be made more apparent to strengthen the user's acceptance of its perceived usefulness. **Too much focus on ease of use, and not on the perceived output value can potentially add to a pitfall. This especially important to consider in the insight sequence.**

### Perceived Ease of Use

The most important focus of GROW is user-friendliness. This focus aims to facilitate for the user to use the system which should be perceived as easier than the traditional way of doing it. The system should contribute with simple functions and the user should be in an environment where the interface is visually appealing. In this way, the use is aimed to be intuitive and simple. This should contribute to better perceived ease of use and is evident, e.g., in the function regarding invoicing in agreement sequence. This is performed completely digitally and automatically, something that today takes a lot of resources from the customer company and suppliers.

When GROW prioritizes between making the system simple, with a few functions, or complex with several functions, priority is given to simplicity. This focus on trying to put simplicity first should probably help to increase the perceived ease of use among the intended users. The theories in TAM2 show that a correlation between high perceived ease of use also leads to perceived usefulness among users. In this way, the notion of usefulness for the example with the function around invoicing should also contribute to the perception of usefulness as higher in the system, just from being created as simply as possible.

GROW's believe that only a short education is required for using the system is also an indicator of the work for simplicity. If that hypothesis is correct, users should also experience the system as easy to use at an early stage. However, there is a risk that users do not experience it that way and only receive a short education when the need may have been greater. Then, a reasonable assumption is that the positive effect of perceived ease of use according to TAM2, instead results in an opposite effect since the users might run short lacking a user introduction of the system. This means that low perceived ease of use potentially could add to that one also does not perceive the system as useful. Such a scenario would most likely be detrimental to GROW and could generate resistance or undermine acceptance. Since the system's contributing values have a clear exponential relationship with the amount of workforce and usage handled in it, the leverage that using it would entail would not be measured and compared to the option of not using it with obvious and positive contribution. Thus consolidating to the notion that the system is not actually necessary.

From the information that emerged from the interview about the sequences, it appears that there are steps in these where the system's solution can be perceived as requiring more effort than the traditional way of achieving the same result for the users. This is a great risk, as the literature rather points out that it is important to emphasize exactly why the system solution is better than the alternatives. An example is when the supplier manager is expected to post his candidates in the system. The traditional way, which is to email

their candidates' resumes, in exchange for having to upload them instead, will probably be perceived as more difficult and time-consuming, at least initially. Since it is clearly described that the value of the system comes from how much it is used, a clear risk exists here. A reasonable assumption is that there is an invisible threshold level in the number of suppliers who must use the system to supply a sufficient number of candidates in the assessments. Instead, if the number of supplier users who register candidates is insufficient, the quality of those presented to the customer will also decrease. Putting a snowball of issues in motion. This is a challenge, that the system have lots of similarities with a chain that depends on each single links, in this setting many user categories being satisfied with the system and seeing the value with its functions. **Should a chain be weakened, for example then with supplier manager incentives be low, e.g. registering applications in the system that is considered more difficult, it will have effects on the entire sequence. This effect will occur even if other parts in the chain work well. This is thus a potential pitfall.**

### Perceived Behavioral Control

The perceived behavioral control, in this context, concerns the user's perceived challenges of enacting a certain behavior. Putting it in perspective around the system is a reasonable analogy to the user's feeling of actually being able to manage the system and its functions. To deal with this, the user's self-confidence and ability should be strengthened at an early stage. Although GROW does not explicitly mention this as a focus, some initiatives indirectly contribute to them working for this. A contribution to strengthening this feeling is the focus on simplicity that GROW has in the development of its system. With a simpler system with few functions, the threshold for the user to experience the feeling of actually being able to handle the system is reduced. Another contribution to strengthening this feeling is the training, which will provide the user with the means and tools to exhibit a specific behavior. Additionally, GROW does not intend to completely omit the customer when it is onboarded but will have the support that continues ensuring that users can receive the necessary support in the system.

Another challenge correlated to this is to avoid overestimating of the user's ability to be self-propelled in the system. Although the focus on simplicity helps to reduce the effort required for learning, it is important not to abandon the user too soon. Indeed, the effects of mandatory and subjective standards need to be trusted over a period of time, but as these diminish over time, the sense of control must also be introduced to users. Putting the entire use directly in the customer's lap, without any further onboarding or training, could strengthen the feeling that the user does not feel that one has the control necessary to dare to use the system. **Although customer support is a good step in supporting, one can probably end up in a pitfall if this is perceived as sufficient for all users.**

### Attitude Towards the Behavior

The attitude towards the behavior concerns the user's feeling of certain behavior. In this context, it means the feeling of using the system. This attitude will affect how likely a user will enact a certain behavior, in this case, the use of the intent of the system. Although the governing elements such as superiors put the use to be mandatory, the certainty that the user appreciates it cannot be ensured. Hence, it becomes especially important for GROW to encourage the behavior that may result in the effect of changing the user's skeptical attitude. This attitude can change if the user experiences the system to generate more value than the alternatives, although these values can express themselves in a sensation for the user. Moreover, the system should explicitly present values. In this way, management puts measurability on sensation, which in turn can align attitudes more positively towards the intended use of the system.

### 6.3 Potential pitfalls

In this section, the identified pitfalls from the application of the models in the previous section are summarized and presented. These pitfalls focus on the weaknesses of the system and are generalized from the analysis of GROW to be less specific and possible to apply for companies in multiple settings. The pitfalls identified based on the analysis can be found in Table 6.1. These pitfalls are believed to affect the perceived usefulness and behavioral intention negatively.

#### (1) *Organizational Culture and Leading Change:*

The first pitfall identified in this context is the case of not considering the culture or being a part of leading change in the organization when deciding the method of implementation. This will most likely occur in the onboarding phase, where the customers will show resistance because the system is not adapted to their needs. To avoid this, GROW needs to carefully investigate and design a method for implementing this type of change that the system will use for the specific organization. The leading of the change should be seen as a project and must be considered from introduction until the system is fully implemented in the system.

#### (2) *User Resistance:*

The second identified pitfall is the possible user resistance that can occur when implementing such a system which can be caused by multiple factors that are stated in the theory chapter. In similarity with the organizational culture and leading change pitfall, the user resistance is also most likely to occur in the onboarding phase. To minimize the risk of user resistance it is, once again, important with flexibility and to introduce the system in a way that is best suitable for the customer's organizational culture. Moreover, a feeling of resistance is a natural reaction to everything that does not feel correct. Hence, a solution to user resistance is to avoid all of their other pitfalls and follow their solutions.

#### (3) *Complexity:*

The third identified pitfall, that also can occur in the onboarding phase, regards a high complexity of a certain function. Although GROW strives to implement the system as user-friendly as possible, certain parts are still apprehended as too complex for the customer according to the analysis. A possible solution for avoiding systems that are apprehended as complex in the eye of the user is to perform multiple user tests before implementing the system in the organization to get an apprehension on how the system and all the functions may be handled. Moreover, a possible solution is to introduce training sessions where the concerns of the user regarding the technology are alleviated. Previous literature has found pitfalls in rushing an IS to be finished and means that one should not set a specific date when the IS should be finished. These kinds of projects always take a longer time than expected, and this is especially important because an IS that is fully adapted to an organization will have to be modified several times. Hence, to avoid having too complex functions in consideration of the customer's needs, it is important to set a long time period for both the development of the system and the onboarding.

#### (4) *Mandatory Reliance:*

The fourth pitfall considers relying for too long on having the introduction of the system mandatory and the long-term effect that this influence can have on the user's willingness to use the system. This is most likely to happen after the onboarding phase when the customer is supposed to start using the system by themselves. To counteract this, the IS provider can carry out user tests, surveys, or other measures to identify when this effect is diminishing, and from that stage instead, rely on social structures to encourage the use of the system. In the IS literature, lots of examples can be seen where they highlight not putting enough



time into the planning phase as the biggest pitfall. Mandatory reliance is one of these cases. By investigating the customer and how they will perceive a system like this, it is possible to identify the level of reliance needed in that specific organization. Hence, a solution is to invest resources into this investigation in the planning phase.

(5) *Value Demonstration:*

Although user-friendliness is demonstrably a necessary focus, it is important not to put too many resources there. However, it is important to clearly demonstrate the added value that the use of the system entails, especially when system use has an exponential relationship with the value output it generates. This is the fifth identified pitfall and often occurs after the onboarding. A way to ensure that it does not become a widespread problem is to ensure that there are functions or other additions in the implementation early in use that demonstrate the values that follow from the use of the system. These may be measurable against the alternative of not using the system, where the choice of using it triumphs. The literature supports this pitfall and claims that the result of any software takes a long time, often years, to measure. Hence, it is important to make the customer aware of this time period.

(6) *Experience and Control:*

The sixth identified pitfall, also most likely to occur after the onboarding, is to completely rely on users' previous experience from other systems, simplicity, and support function. This may be insufficient to create user experience, show the clear added value and self-confidence required for use by users. To instill self-confidence and user experience, it is important to have some form of training or practical collaboration with the users. This pitfall has been pointed out as a problem in previous literature, by, e.g., Grossman and Wolsh, who claim that the training of a system is the most important factor to consider for ensuring success. As previous literature has pointed out, it is required to put resources into the planning phase of the implementation. This includes research about how the customer perceives the system to be easy to use. Putting time and money into planning is often skipped because it is considered unnecessary or inefficient, but this is one the most important part to consider for a successful IS.

(7) *Weak Links:*

The seventh and last pitfall is to fail in considering the sequences as a chain with different users who have different needs and incentives to use the system. This is something that can be seen when demonstrating the results of using the system, where the system will show to not create value for the customer. The focus should be to identify the weak links in the chains to strengthen them specifically. The IS provider must work to ensure that the user at both ends of the chain has sufficient perceived value. This can either be done for the function that is currently weak (e.g. uploading the candidates for the supplier manager) or in other functions for the user category that compensates for the increased workload the system solution entails because of that function. Identification of weak links is also something that should be carefully considered in the planning phase of an IS and is strengthened by the previous literature. Once again, putting resources into the planning phase is required.

Potential pitfalls	Suggested Solutions
(1) Not considering organizational culture and leading change.	<p>Identify the organizational culture and design a customized method for introducing the system.</p> <p>Include change management from the introduction of the system until it is fully implemented in the organization.</p>
(2) User resistance in the customer organization.	<p>A flexible implementation that is suitable for the specific customer organization.</p> <p>User resistance is a natural reaction to all of the other pitfalls. This can be avoided by applying the solutions of them.</p>
(3) Too complex functions from a user point of view.	<p>Alleviate the concerns of the customer towards using the technology and perform multiple user tests.</p> <p>Make sure to have a long time period set up for designing and onboarding the system to the customer. Expect it to take a much longer time than expected. This allows the customer to provide feedback along with the implementation.</p>
(4) Relying for too long on mandatory system usage.	<p>Identify when this effect diminishes and make efforts to transform other more socially influenced user habits.</p> <p>Put time and resources into the investigation of the customer organization in the planning phase. What are their experiences and how much mandatory use will be required?</p>
(5) Lack of value demonstration from too much focus in other areas.	<p>Make sure to allocate resources in the development to value demonstration and not only on user-friendliness.</p> <p>It takes time to be able to measure the output in software projects. The customer must be informed of this.</p>
(6) Taking for granted that the use of the system is perceived as easy and a sensation of control by the customers from previous experience and simplicity focus.	<p>Training or practical collaboration with the customer.</p> <p>It is important to map the customer's feeling towards the system's ease of use already in the planning phase to adjust the onboarding and the functions to this.</p>
(7) Failing to identify weak links from the functions' ability to create value for customers.	<p>Identify the weak links in the chains to be able to strengthen them specifically.</p> <p>These weak links should be identified already in the planning phase of the system. This allows it to be identified and dealt with at an early stage.</p>

Table 6.1: Summary of the identified pitfalls and their suggested solutions.



## 7 Discussion

### 7.1 Results

In this section, a discussion of the produced results, that is presented in the result chapter, is performed. The section begins with a discussion of the models considered in this research. Additionally, this section provides a discussion of the results regarding the proposed framework and identified potential pitfalls.

#### Models

In this section, a discussion of the IS models considered in this research is performed. Since these models are discussed more extensively in the pre-study chapter, they are discussed minimally in this chapter. In total, five IS models and the VNA are compared to each other based on the conditional environment the company operates in. These are: *Value Network Analysis*, *Theory of Planned Behavior*, *Technology Acceptance Model/2*, *Multilevel Model of Resistance*, *DeLone and McLean IS Success Model*, and *Task–Technology fit theory*.

One of the biggest concerns about the models, which has been mentioned previously in this paper, is the age of the models' founding. For example, DM IS was introduced in 1992, which is 29 years ago from today, and TTF from 1995, etc. However, as also has been mentioned, these models are frequently cited in more current papers which indicates their reliability being accurate to this today. The only model that is not cited in more current papers is the MR, which also is deselected accordingly. Although the topic itself is related, such a criterion will disqualify itself for further use within this work. As for future research, a valuable aspect to investigate is how well these old models work in the setting of today's society. Perhaps they would work better if they were more updated to, e.g., consider other dimensions.

Moreover, TAM and DM IS are considered to be similar according to the analysis in the pre-study. This similarity is based on the similar dimensions of IS covered by the models. However, TAM, and especially TAM2, is considered to be easier to use without customer feedback and is believed to consider a wider number of dimensions. Hence, TAM2 is selected as a better choice of model for this research.

Another important aspect to consider is the wide theory that exists regarding IS models. The models covered in this research are limited to the time and restriction of a master thesis, and hence, do not cover all the models available within this topic. This is something that could be investigated by future researchers. There may exist other models that can fit into the proposed framework in this research.

### **Framework**

One of the aims of this research is to propose a framework for identifying pitfalls in the implementation process of a start-up company. This has been performed and presented in the method chapter.

This framework is based on the IS models discussed in the previous section. Hence, the framework would look different if other models are chosen. The framework aims to fill in the blanks of IS research regarding start-ups in the implementation phase. It can be used by any start-up, in the beginning, to identify and avoid pitfalls that can occur along with the implementation which causes the system to fail. As there is no literature covering how to propose a framework like this, it is hard to compare with previous literature.

As the use of this framework produced multiple pitfalls to consider, it is seen as successful in this research and the research question can be successfully answered. However, to fully know the potential of this framework, it needs to be applied in other settings of other researchers. Hence, it is important to conduct future research on this research.

### **Proposed Pitfalls**

In this section, a discussion of the proposed pitfalls is performed. In total, the framework in this research is used to identify seven pitfalls. These are *organizational culture and leading change, user resistance, complexity, mandatory reliance, value demonstration, experience and control, and weak links*.

As mentioned previously, these pitfalls are analyzed from the outcome of the company and converted to be more general and possible to apply to a wider range of companies. Although these pitfalls cover many aspects, more can be identified using other or more models, namely another version of the framework. The pitfalls are identified from the perspective of TAM2 and TPB, which is considered to provide the broadest number of perspectives. However, supplementing other models can help identify more pitfalls that have not been considered in this research.

Most of these pitfalls involve the IS implementation process and how it should be best implemented in the organization. Less focus regards the actual system and how the functions should be designed (this is only seen in the complexity pitfall). This implies that the biggest focus is on the way of implementing it rather than the system itself, although the literature highlights the importance of a user-friendly IS. However, this can be explained by the fact that the implementation process is a part of how the user will perceive the system, and if the system and its functions are introduced in a way that clearly proposes its benefits, the user will perceive it as user-friendly. If the system also looks easy to use, this will increase the likelihood that the user perceives the system as easy to use.

Moreover, the pitfalls are clearly reflected by the dimensions in the models. For example, voluntariness is reflected by mandatory reliance and value demonstration by result demonstrability and output quality. Moreover, subjective norm and image can be found in the organizational culture and leading change and experience and control is reflected by the dimension experience in TAM2, etc. This is reasonable because the pitfalls are identified from these perspectives and hence, the results are supported.

### **Suggested Solutions of the Pitfalls**

In conjunction with the presentation of the pitfalls, multiple solutions are suggested. These solutions are based on the findings from previous literature. By extending the IS research with different focuses it is possible to propose more solutions to these. The literature existing within IS is wide and, hence, there are more aspects to consider than what is presented in this research.

Although these pitfalls will occur in different places in the implementation process, the related solutions should be considered and planned already from the beginning, in the planning phase, to be avoided throughout the whole process. A common factor of these solutions is, hence, that they all should be considered before starting the implementation of the system and that all of them can be avoided by deciding their arrangement at an early stage.

Moreover, many of the suggested solutions are related to adapting the system and introducing it into the organization to the customer's customized needs. This, for example, includes the solutions of organizational culture, a flexible implementation, and identifying when the effect of mandatory diminishes in the organization. Another common factor considering the solutions is to put more resources on everything than what is expected to be needed. This is especially true for time and money.

## **7.2 Method**

In this section, a discussion of the selected method is performed. The section begins with a discussion of the advantages and disadvantages of the method. Additionally, this method is the framework proposed for identifying these pitfalls and is a part of this study. The strengths and weaknesses are followed by a section on source criticism on the sources used in this research. Moreover, consideration and discussion of the terms *reliability*, *replicability*, and *validity* are embedded in this section.

### **Advantages**

The method used for proposing the pitfalls is mainly considered as successful. A big advantage with the method used and proposed in this research is that other researchers trying to replicate it may not have to perform the whole process, from pre-study to defining pitfalls. If the researcher aims to find pitfalls for a similar type of company, one does not have to perform the pre-study and the investigation of models. The researcher can apply the same models and methods to find the specific pitfalls for the company. Moreover, these pitfalls can work as general guidelines for all companies, and then, the findings of this research work as they are. If the researcher is to identify pitfalls in completely different settings, one can use the same method for finding other types of models. Hence, a possible method is to use other combinations of the models proposed. In conclusion, it is possible to apply the method proposed in this research from different stages, depending on the situation of the specific company and the aim of the research.

Another advantage of this method also concerns the framework. This advantage considers that the proposed method in the framework does not require the same amount of customer contact as the previous methods in the IS literature do. A start-up company at the beginning of the implementation process of a system does rarely have contact with a potential customer who can test the system. Hence, this framework is valuable from the point of view of providing this type of research in the field and may encourage more future research of start-up companies.

Furthermore, the usage of semi-structured interviews is seen as successful in this framework. The usage of semi-structured interviews allows the questions to be adaptable to the specific company and enables a wider context of the system. However, semi-structured interviews contribute to a decrease in the *reliability* of this method because the interviewee has the possibility to change the scope of the interviews based on where one heads the questions. However, this is valuable if the pitfalls are supposed to be customized towards the specific company, and hence, the decrease in reliability does not occur as a problem. Moreover, using the tool Kumu to visualize the organizational network works well and is recommended for future research.

For proposing the main method, Savoie (2016) is used as the main inspiration. Savoie proposes steps to ensure that IS is used in a way that converts data into knowledge in the organization and is used in combination with the literature on the different models in the theory chapter [27]. Compared to Runesson and Höst, Savoie's work is conducted more closer in time and therefore seemed like a reliable alternative [26] [27]. Additionally, the proposed steps of Savoie are in line and works well in the setting of using a VNA. Hence, Savoie is seemed to be a suitable choice of inspiration for the method [27].

### Disadvantages

Some disadvantages can be pointed out with the method used in this research. The first part of the method, the pre-study, which includes finding the criteria of GROW, can be difficult to replicate. The researchers of this paper found it difficult to select valuable interview questions that could contribute to the selection of IS models and can be improved with additional support from previous literature to improve the replicability. This is something that can be pointed out as improvements for future researchers aiming to improve this framework.

The part of extracting criteria is mainly based on the theory of Runesson and Höst (2009) [26]. As mentioned in the method chapter, these guidelines are somehow old and, hence, need an adaption to the current situation. They propose that every step should be presented, to perform the analysis in parallel with the interviews to be more adaptable and additionally, to record the interviews [26]. The recording of the interviews is effective and useful. The authors of this research found it valuable to re-listen and recap what was said in the interview to get a better context and understanding of the topics discussed.

Additionally, from the view of *replicability*, it is valuable to present every step in the method. Furthermore, the analysis is conducted in parallel with the interviews, which enabled the possibility to include valuable information from the literature into the interviews. However, the method for conducting this is desired to be more clear. Without clear guidelines for proposing this, the results will be affected negatively because the necessary steps may not be performed.

The term *validity* can be discussed and viewed from different perspectives. From one perspective, validity is low in this framework because the pitfalls, which are the measured output, can distinguish themselves from what the researcher believes one measures. How-

ever, with a view from the other perspective, the output measured in this research is the pitfalls, and also the result. The pitfalls may differ depending on the company, and the researcher may experience insights during the research process. Hence, the validity of the method is seemed to be high.

As stated in delimitations, there is a risk that start-up companies change strategy or re-plan their business, including the system during the process of applying the model. This is something that is encountered during this research, as expected. This causes the process of the research to slow down, already implemented parts had to be reconfigured and the scope of the research had to be slightly changed. However, the output and contributions of this research were not affected by this and other researchers can use the same method, although it needs to be considered by everyone conducting this method.

### Source Criticism

The number of sources available regarding IS theory is tremendous. Because of this, it facilitates the possibility to be selective of the existing sources. The sources selected for this research are mainly first-hand sources from peer-reviewed papers and journals and some books as well. This combination is motivated by ensuring making the same statement. Additionally, as the main part of the literature study contains the different IS models and how these are used in previous literature, this is not selected with as much consideration to being peer-reviewed. The reason for investigating the models is to receive an apprehension of what previous studies have done and not only focus on information extracting. The search process of the sources is conducted through reliable databases, seen from the perspective of this research, as university libraries and Google Scholar.

As previously mentioned in this paper, the age of the sources is taken into consideration when choosing sources to receive up-to-date information about IS. A large part of the sources are from 2020 but exceptions are made in some cases. For example, the book by Shannon et al. from 1949 and the work of Richard O. Mason from 1992 [22]. However, these two sources are mainly used for raw information on implementation success factors. The researchers of this paper believe that it is valuable to combine IS success information from different times to receive a wider apprehension about what the literature thinks about it and how it has evolved.

Furthermore, another source from 1992 is used, which is DeLone and McLean [9]. The argument for choosing this source is because the research is conducted by the original authors of the DM IS model, and hence, a first-hand source. This model has been widely used in later research and, hence, seen as reliable. The last source used that is not from the twentieth century includes the work of Grunert from 1998, which refers to the theory on critical success factors [13]. The selection of this source is motivated by the same reason as the previous ones.

## 7.3 The Work in a Wider Context

In this section, a discussion of ethical and societal aspects related to the work is performed. This research can contribute to a trend where people using IS put more trust in this type of technology. It aims to create a more user-friendly system with minimal complexity which will make the user feel more encouraged to use it. As a consequence, organizations are allowed to be more effective because the system can handle tasks that the employees previously had to do manually, which generates more time for other tasks. On the other hand, this can cause less desire for employees and hence, a decreased amount of jobs. A decreased amount of jobs can increase poverty and decrease the standard of living. Furthermore, the IS presented in this research can contribute to a more fair recruitment process of candidates. The recruiting

manager compares each candidate based on only their task requirements towards the position without any consideration to gender, age, design of resume, etc.

However, putting too much trust in technology can have vital consequences for organizations. If people rely too much on technology, they may restrict their thinking because they leave it to the system, which makes them less aware of mistakes made by the system. Moreover, people may stop thinking outside the box and not encourage innovations that will lead to a more ineffective organization. As previously mentioned in the literature, the users of the systems must use the system as a tool for facilitation, but not as a substitute for their own thinking.

This research aims to find the pitfalls that companies need to consider in the implementation process. If this pitfall identification and application is performed successfully, it can help organizations to work more efficiently in the implementation process and hence, give more companies the chance to succeed with their IS. This comes from companies paying more consideration and being aware of these pitfalls. These companies do not have to make these mistakes by themselves and, hence, leaves them more time to increase the awareness of additional ones.

Additionally, the question of security in organizations is important to consider. When using an IS for handling invoices, contracts, etc., the system will handle all these and they do not have to be sent manually through different systems, emails, or by post. This is especially important for consultant companies because they are receiving these documents in multiple forms. Having all documents in one place decreases the risk for external people to reach this or any other confidential information.





## 8 Conclusion

This research aimed to propose a framework for identifying and proposing solutions to avoid pitfalls considering the implementation process of GROW's system solution. This framework is produced by answering two research questions and this section concludes the answers of these two. The first one considered which information system models to be used in the framework proposed by this research. The answer to the first research question is the Value Network Analysis, the Extended Technology Acceptance Model, and the Theory of Planned Behavior. The Value Network Analysis was chosen because it is a model that presents an overview of all stakeholders around the product. This model formed the basis for the visualization of all information exchanges that took place between the stakeholders. Extended Technology Acceptance Model was chosen as it contributes to many different parameters that are important to take into account regarding user satisfaction and willingness to use the system. This is a perspective that is well in line with what GROW wants to achieve. Theory of Planned Behavior considers behavioral intention, which is complementary to the other models and strengthens the whole with additional perspectives. These models are compared and analyzed in consideration of the findings of previous literature and the extracted criteria of GROW analyzed in this research. Moreover, these models are compared together with other IS models: the Multilevel Model of Resistance, DeLone and McLean IS Success Model, and Task-Technology fit theory.

The second research question considered what pitfalls could be identified using the proposed framework. This question is answered by seven identified pitfalls: *organizational culture and leading change*, *user resistance*, *complexity*, *mandatory reliance*, *value demonstration*, *experience and control*, and *weak links*. All these pitfalls should be considered already in the planning phase to ensure they are avoided but they can occur at different places in the implementation phase. The consequence of not considering organizational culture and leading change will most likely be shown in the onboarding phase, where the customers will show resistance because the system is not adapted to their needs. User resistance and complexity are also most likely to occur in the onboarding phase when the customer faces the system for the first time. An implementation lacking value demonstration, mandatory reliance, or consideration to perceived ease of use will be shown after the onboarding phase when the customer is supposed to start using the system by themselves. If the implementation fails to identify the weak links and put focus on these, this will be shown at the result demon-

stration of the system, where the system will show to not create value for the customer. Moreover, all of the pitfalls can be shown in the presence of user resistance, because a natural response to a bad system implementation is for the customer to feel resistance of using it.

These pitfalls were proposed by identifying sequences where the IS was included for the customer organization. These were clearly visualized using VNA. Furthermore, the seven pitfalls were identified by analyzing these sequences using multiple interview questions inspired by the dimensions of TAM2 and TPB. Based on these theories' dimensions, questions were tailored to cover GROW's position on the dimensions raised by the models. Based on the answer, an assessment could be made as to whether these answers were in line with what the theory advocates and to be able to determine whether deviations may involve pitfalls.

The purpose of this research has successfully been achieved and a framework for identifying and proposing pitfalls considering the implementation process of GROW's system has been proposed. This framework and the proposed pitfalls can be used by companies in the start-up phase ahead. Furthermore, this research has contributed to a comparison of IS models and seven proposed pitfalls, which is also a valuable tool for future research within the IS field. By this, the work proposed has helped future start-ups to increase their chance of succeeding with their IS and the conclusions of this research can be used for any type of start-up aiming to implement an IS.

## 8.1 Future Work

There are multiple ways to extend the work performed in this research. However, the most relevant aspect is for future researchers to validate the framework proposed. The model presented in Figure 5.2 should be further tested in different settings to ensure its validity. Each of the dimensions should be tested to see the outcome of perceived usefulness and behavioral intention. Moreover, there is a desire to continue the investigation and comparison of IS models. This research contributes with a summary and comparison of six (including VNA) different IS models, but there are more available in the field. An interesting aspect to investigate regarding the models is both to include new ones that may add or substitute to the framework or to find more uses of the existing ones. Moreover, the comparison of the models contributes to insights by itself and thus, does not have to be used only for this framework. For example, future researchers can use this model contribution to create new frameworks for other purposes or perhaps to compose new IS models.

Furthermore, as there were some difficulties encountered in this research regarding the creation of the framework, these are valuable to consider in future research. For example, the researchers of this paper found it difficult to select valuable interview questions that could contribute to the selection of IS models. This could be further investigated by additional support from previous literature to improve the replicability. Perhaps this could be combined with the investigation of the IS models that were discussed in the previous paragraph. Additionally, the researchers of this paper found it difficult to propose a clear method for conducting the interviews in parallel with the literature study. A future researcher could polish and define these guidelines to ensure that the framework applies to other research.



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# Appendix

## A.1 Background Interview Questions

1. Can you describe the company?
2. What problems are you solving?
3. What is your vision?
4. How many employees are you?
5. What are the roles of each employee?
6. When was the company formed?
7. Does the company have any special focus? (eg against IT consultants as partners, certain companies with a turnover of x million/year, etc.)
8. Can you describe the system/service?
9. Who are the users of the system?
10. How long have you been working with the system?
11. What is the goal of the system?
12. Are any user tests being conducted today?
13. Do we have the possibility to interview:
  - a) Customers?
  - b) Users?

## A.2 Criteria Interview Questions

1. How do you work/what have you developed to ensure that the system/service is:
  - a) How good is the system itself? How easy is it to use? Easy accessibility?
  - b) How well the service itself is delivered in the system?
  - c) User satisfaction?
  - d) Willingness to use/Use of the system?
2. Are there any of these that you think you need to work on more?
3. How do you perceive the customer to look at your system from a perspective from
  - a) Information quality?
  - b) System quality (how good is the system itself? How easy is it to use? Easy accessibility?)?
  - c) Service quality (how well the service itself is delivered in the system)?
  - d) User satisfaction?
  - e) Willingness to use/Use of the system?
4. Which stakeholders (entities) are there directly or indirectly connected to the system?
5. How will communication take place between these entities?
6. What type of communication is most valuable to each entity?
7. What communication will take place between these entities? (e.g., Time reporting consultant manager/consultant)
8. How many of these stakeholders will the system affect for an individual customer at the customer himself? User? (e.g.m One VBP per customer who uses the system with a turnover of x number of consulting kronor)
9. Do you have any idea how willing the customers are to replace their current working methods with the system? Have you thought about how you handled reluctance to use the system?
10. Have you encountered it?
11. Any special scenarios when it could occur?
12. How do you feel today that the system solves all the problems that you have the ambition to solve?
13. What are the most central features of the system? Which of those features are good enough to solve those problems today?
14. Have you developed an implementation strategy today and is available for us (the research group)? Yes
15. Could you describe your implementation strategy?
16. How much theoretical basis does the implementation strategy rest on, compared with practical experience? (e.g., we have industry experience/empirical knowledge and will completely build the strategy on it rather than theoretical and literary basis)
17. What do you consider to be the 3 most important steps in an implementation process?
18. What are the main challenges within those steps?



### **A.3 VNA Interview Questions**

For each stakeholder in the network, analyze them based on the four dimensions:

1. Describe what the relationship looks like today between the stakeholders (e.g., how is the value exchange done today?)
2. In each relationship that the stakeholder is a part of: how much value is created?
3. In every relationship that the stakeholder is a part of: how has the value input managed to be transferred to a value-creating output?
4. In each relationship that the stakeholder is a part of: what makes the specific value creation unique? Ex if it adds or transforms some type of knowledge that is of value to someone else. Maybe the stakeholder has a specific knowledge that allows him to look at the problem from a different perspective?
5. In every relationship that the stakeholder is a part of: Who is the recipient of the value creation and what value does it get out of it?

### **A.4 TAM2 and TPB Interview Questions**

#### **Agreement**

##### **Master Agreement**

1. Will the agreement require the system to be used in a certain way?
2. Will this lead to managers making it mandatory to use the system or will it get help voluntarily?
3. Will the agreement include requirements for improvement results that the system brings?

##### **Onboarding**

1. Will the company work to make the system part of the customer's socially accepted way of working? How?
2. How much training is required to use the system independently?
3. Will previous experience in any way help to reduce the need for education?
4. Have you developed the system to make it as simple as possible? If so, how?

##### **Company Invoice and Customer Payment**

1. How is this task usually performed today?
2. How much better is this method compared to the working methods that exist today?
  - a) Will it require more/less mental effort?
  - b) Does it make it easier?
  - c) Is it more time efficient?
3. How does this feature help simplify the execution of the task for the user?
4. Will it be possible to measure the presumed improvements the system solution entails, how?

### **Time Reporting**

1. How is this task usually performed today?
2. How much better is this method compared to the working methods that exist today?
  - a) Will it require more/less mental effort?
  - b) Does it make it easier?
  - c) Is it more time efficient?
3. How does this feature help simplify the execution of the task for the user?
4. Will it be possible to measure the presumed improvements the system solution entails, how?

### **Insights**

1. How do customers usually follow up the statistics today?
2. How is the function designed to give the user an idea that it is easy to use and simpler than the traditional way?
3. How much better is this method compared to the working methods that exist today?
4. How do you prioritize between a more complex functionality and simplicity in this particular function?
5. Is there another alternative course of events (can you do it any other way) for the same purpose?