Universität Rostock

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Bachelorarbeit

Evaluation von Instrumenten zum Wissensmanagement in Small-Scale Business Units am Beispiel von Wissenskarten

Evaluation of Instruments for Knowledge Management in Small-Scale Business Units Using the Example of Knowledge Maps

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Abstract

The importance of knowledge management rises more and more. But besides enterprises, it becomes important for the public administration, too. In the hanseatic city of Rostock a pilot project started, that introduced two knowledge maps as a first basis for a future knowledge management system in several public agencies. These first maps are developed, but not implemented yet. This bachelor thesis is about the evaluation process of these knowledge maps. This evaluation process is supported by the use of the Knowledge Management Success Model of Jennex and Olfman, that bases on several years of empirical studies and further development. The process of evaluation has three steps: First the map got presented by their creator, Mr. Hengl and then discussed by several representatives of the agencies. The impressions of this discussion is used to develop a comprehensive survey, submitted to the participants of the discussion. Finally the results of the discussion and the survey are used for a comprehensive evaluation and suggestions for the future development of knowledge management solutions in the public administration. These suggestions does not only include a basic strategy, but concrete advises and requirements for a successful knowledge management, too. Towards a modern and successful knowledge management system for the agencies of Mecklenbug-Hither Pomerenia.
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Motivation

The term of ”knowledge society” was established in the 1960ies. The fundamental idea of this phrase is that in a modern production not only the working power and the owned material determine the value of a product. The knowledge that is needed to create the product or provide the service becomes an own factor in the production chain. As the term knowledge society connotes, this development is not only relevant for companies, but for all the other parts of public life. Especially public institutions struggle with this change. In 1999, Hill wrote that only a few offices in the public administration understood the functional meaning of knowledge management. But since 1999 certain things had changed. The lack of knowledge management was noticed by the administration and projects to establish knowledge management in the public sector were founded by the state. In the federal state ”Mecklenburg-Hither Pomerania”, the development of a manual for knowledge management is one of this projects. And exactly this project is also the reason for the following thesis.
As part of his master thesis, Christoph Hengl developed two knowledge maps for several agencies of the public administration in the city of Rostock. The task for this thesis will be to evaluate the results. The research questions for this are:

- What is the benefit in the use of knowledge maps for the issue of knowledge preservation?
- Is there already a reference model for the evaluation of knowledge management systems and if there are several alternatives, which of them is the best fitting?
- How should the evaluation be constructed to achieve as much response as possible?

The thesis includes four chapters. The first chapter is about the fundamentals. General terms will be defined and the idea of knowledge maps according to Eppler will be introduced. Based on those explanations, chapter two shows how the process of evaluation was planned and performed. The results of this evaluation can be found in the third chapter of this thesis, followed by a final conclusion in the last chapter.
1 Fundamentals

This chapter introduces the basic terms for the rest of this thesis. It starts with a section about the term of knowledge and what it describes. For further use also the difference between need and demand of knowledge is clarified, before, in the second part, the knowledge maps and their implementation according to the ideas of Eppler are described. In the end of this chapter the results of Mr. Hengls master thesis are discussed and the reader will learn about the current state of the project.

1.1 Terms of Knowledge, Knowledge Demand and Knowledge Need

To understand the importance and complexity of this project, it is crucial to understand the term knowledge and how it is related to the terms of information and data. In his “knowledge stairway” [Nor11], North begins with characters as a basic level. If these have any syntax, e.g. when they are ordered in an alphabet (Krc03), they become data. They can be read, but they do not transport any information to the recipient.

To create information, the adding of a syntax is necessary. This is not only reduced to a grammatical syntax. Formal syntaxes are possible, too. It is important that the recipient is able to understand this syntax. If this information is related to any context or experiences of the recipient, knowledge is created. [Nor11] In other words, information must be processed by the user to become knowledge and it can only be learned and classified when it is connected to knowledge that is already existing in the receivers.
mind. The information serves as a medium to transfer the knowledge.\cite{Hau02}

Furthermore, knowledge can be subdivided into two different forms. One of them is the explicit knowledge. This is knowledge that can be expressed formally with regular expressions and instructions.\cite{NT97} The opposite of this is the tacit knowledge that cannot be transferred directly to other people, because it is inextricably linked to the experiences of the owner.\cite{NT97} The only way to transfer it is to use a similar pool of experiences and views that can be provided through general communication and exchange of experiences, e.g. via metaphors, analogies or models.\cite{Gro09}

Another way to classify the knowledge of an organisation is to see what kind of content it is carrying.\cite{Epp02} Eppler uses the following four categories to show how his maps cover the different areas of knowledge (more about this in the next section).

- **Know-how**: knowledge that is experience based and developed through the routine of employees
- **Know-what**: Knowledge about facts
- **Know-why**: knowledge about the reason something is done
- **Know-who**: knowledge about contacts that are adept with a given situation or task

\cite{JL06}

The management of all this knowledge becomes more and more important.\cite{Hei03} An organization with an efficient knowledge management is able to master problems, regardless of whether it is because of a competitor, internal problems or other reasons. With the overview about the knowledge sources in the organization it is possible to identify and improve processes faster. For manufacturing companies it can be used to communicate problems of their products faster. The R & D department benefits from this better knowledge and information flow and product cycles become faster. But the most obvious target for knowledge management are companies in the tertiary (service
provider) and quaternary (information provider) sector. They can improve their products directly and feedback can be used directly for current and future project. But not only the flow of information and knowledge is improved. The knowledge gets repackaged and augmented to prevent an overflow and to increase the efficiency. [Leh12] Of course these are just examples for the benefits knowledge management can bring, there are many other advantages that can be focused with.

But one general goal of knowledge management is to identify knowledge that is already in the organisation and knowledge that is still lacking. [Leh12] Because it is sensed very individual, it is not that easy to identify the amount of knowledge that is really indispensable. Taking this into account, two additional concepts will be introduced: The knowledge need and the knowledge demand. The knowledge demand specifies the type, amount and character of the knowledge that the user sees as important for his task. [KR96] This depends mostly on the experiences of the user and it often does not match the exact requirements of the process. These requirements are specified by the knowledge need. The knowledge need is completely objective, but hard to define. [KR96] The task of knowledge management is to enable the participants to define their knowledge need as close as possible to the actual knowledge demand. [Leh12]

Furthermore, knowledge management deals with the right usage of knowledge and the hedging against future loss of knowledge. [KR96] To do this, organizations install "Knowledge Management Systems" (KMS). Maier defines these in the following way:

"A knowledge management system (KMS) is an ICT [information and communication technology, editor's note] system in the sense of an application system or an ICT platform that combines and integrates functions for the contextualized handling of both, explicit and tacit knowledge, throughout the organization or that part of the organization that is targeted by a KM initiative. A KMS offers integrated services to deploy KM instruments for networks of participants, i.e. active knowledge workers, in knowledge-intensive business processes along the entire knowledge life cycle. Ultimate aim of KMS is to support the dynamics of organizational learning and organizational effectiveness." [Mai07]
Strictly speaking this definition assumes a digital system and defined roles as knowledge manager or knowledge worker in the organization, but none of the two is given in the observed public agencies. The target of the whole project is to establish such a system, but currently the whole project is still in a very early stage. Because of this, these assumptions should not be seen so rigid.

An important term in this definition is the "knowledge service". It describes an resource that enables and/or improves the ability of the user to create, acquire, identify, secure and accumulate knowledge. They are classified in basic knowledge services, as for example search engines that show knowledge according to a specific keyword and high-level knowledge services, which work more on their own, e.g. a clustering service that pushes information about conspicuous knowledge elements.[Mai07] As already mentioned, the used system is only available in a printed version. Hence there are just a few very basic services that can be offered. Nevertheless the evaluation is necessary to see if knowledge maps are recommended for knowledge management in public agencies or not. The development of an appropriate system can be the next step, if the results show that the users see them as useful.

The following section will be about these knowledge maps, what they are and why they seem to be an appropriate tool in the first place.

1.2 Knowledge Maps

Usually knowledge maps are interactive, intranet based hypertext maps, which illustrate references to experts, experience reports and formalised processes. [Epp02] The fundamental idea behind them is to illustrate the tasks and actions of participants in an organisation so that they are oriented in their environment and improve their own methods. They are a special kind of knowledge management systems according to the definition of Maier. They offer an ICT platform and - based on that - several base- and
high-level knowledge services. The goals (improve organizational learning and organizational effectiveness) match with this definition, too. [Mai07]

But of course the knowledge maps have problems, too. The last benefit for example can be great for costumers, but if competitive enterprises get access to the maps they can use them to recruit crucial specialists of the organization. Or they can approach in a field where the competence of the organization is underdeveloped. Furthermore, several knowledge elements base on the individual assessment of each employee. This can lead to the Dunning-Kruger effect [Her02] and depends strongly on the introspection of each participant. Other problems are the search for an appropriate structure of the map, that bases on the shared context of the participants, and the updating process. [Epp06]

The existing map in the public agency do not follow the ideas of Eppler completely. They are not digital, therefore less interactive and offer just a few knowledge services. They are no real knowledge maps as Eppler suggests them, but they are a first step towards an comprehensive knowledge management system in the agencies of Mecklenburg-Hither Pomerania. Hence these prototypes are treated like ”real” knowledge maps.

As a regular map a knowledge map should answer four questions:

- Where is the position of oneself?
- What positions are reachable from the current position?
- What is the fastest way towards these positions?
- What resources are necessary to reach this points?

Therefore, 3 basic functions of knowledge maps can be identified: Orientation in the environment, assessment of the personal/organisational knowledge portfolio and planning of the next steps [Epp02]. Usually, a knowledge map consists of a basic architecture and knowledge elements. The basic architecture is a visualised context, that is shared by all
participants and easy to understand. For example the (visualised) business model of the enterprise can be such an basic architecture. The elements are organised and linked in this context and can have different forms. To enable users to find person with a certain ability, the elements can be a profile, for identifying the strengths and weaknesses of different task force a team description may help, etc. They also do not have to be related to certain persons. Manuals, reports and all other connectible subjects can be put into the basic architecture, too. But the link between the elements is not necessarily a specific line or an arrow. Even the position of the different elements can be an expression how things are related to each other. Of course it is important for the creator to avoid the case, that the elements present an undesired connection, that may lead to a wrong conclusions.

The resulting maps have certain advantages against other forms of knowledge management. One reason is that the barriers to enter the knowledge management system are usually very low. At least the usage of the maps needs only the ability to work with an web browser and to understand the context of the maps. But for users, this context is often easier to understand than a complex IT systems. Hence also beginners in an enterprise are able to use knowledge maps. But not only users benefit from the knowledge maps. The people who established the maps can benefit from them, too. The personnel development can use the maps to identify experts with unique knowledge. Keeping this in mind, they are able to prevent those people to leave the enterprise and even in the worst case the knowledge map shows clearly the requirement profile for a substitution. The map can be used for marketing as well, by showing the map to new consumers to give them an overview about the competences of the enterprise. But of course these maps have risks, too. It is necessary to have someone who keeps the maps up to date. Otherwise it may lead to the situation that the map becomes outdated and the other participants stop to use it. Another risk is the determined structure of the map. Once the map is created, it is hard to change the rules. If these do not apply to the organization any more, the knowledge map needs to be redesign and with the transmission in
a new concept knowledge got lost. Another problem can be the information overflow, that is always a risk for the usability of knowledge maps. Users want to find the needed information easily. If they have to search for too long, they will quit using the knowledge map. One way to ban this risk is to be less detailed or to generalise departments, topics, etc., when the user ”zooms” out of the map. A problem that cannot be solved that easily is that the dynamic structures of an enterprise are hard to describe with a static knowledge maps. Nevertheless knowledge maps provide a possibility to display the knowledge and its carriers in a company. It is not always suitable for a company, but especially in organisations with less dynamic process it can be a valid method for knowledge management.

Eppler uses a categorisation where knowledge maps are organised through 5 main questions:

1. Where can I find relevant knowledge?
2. How can I assess the knowledge?
3. How can I understand the knowledge?
4. How can I use the knowledge?
5. How can I develop the knowledge?

For each of these questions, Eppler suggested a specific knowledge map that answers it:

**Knowledge Source Maps** are used to identify carriers of knowledge in the organisation and enable participants to find them. This is helpful, especially when the user is looking for tacit knowledge that is, as already mentioned, always connected to the experiences of a person and hard to externalise. The main task for this kind of map is to show the participants the ”know-who” in the organisation.
**Knowledge Asset Maps** show the general resources for each field of knowledge. Typically, they are visualised as a balance where the knowledge of every unit (for example the individual employees or whole divisions) in certain fields is recorded. This kind of maps is often seen as a supplement to the source maps. [Noh00]

**Knowledge Structure Maps** implement a logical hierarchy for the existing fields of knowledge. The goal of this is to give an overview about the relevant parts of a topic [Noh00] and a general structure to classify new knowledge. Hence it helps especially to visualize the know-how in the organization.

**Knowledge Application Maps** connect the existing processes of an organisation with their knowledge. For this, it shows the relevant knowledge and its sources for every process to support the know-how in the organisation.

**Knowledge Development Maps** are used to show the steps that someone must take to develop a competence. They are often amended by a Knowledge Acquisition Map that also includes the external incoming of knowledge into the organisation. [Noh00]

This classification will be the basis for the rest of this thesis, but nevertheless there are a few other ways to classify knowledge maps. For example there is the approach of Yu-Hui, Yu-Lung and Jih.-Kun. They found 6 different categories divided into 3 scopes. The largest scope is organisation-wide, that contains the categories of Association maps and Tool maps. These are used to show the relations in the whole company, especially between the different methods and resources that are relevant for the whole company. [TWL06] On the opposite side, the scope is limited to the individual person. The only category for that is, according to Yu-Hui, Yu-Lung and Jih.-Kun, the Index. In between are the cross functional categories, like hierarchical, process-oriented and
label knowledge maps. This short digression should show that there are other methods to map knowledge. One reason to choose Epplers approach is that the maps that were installed in the public office based on his idea. For another reason his approach seems to be easy to adapt, because it does not base on any hierarchical structure. The approach of Yu-Hui, Yu-Lung and Jih.-Kun seems to be more appropriated for companies and organisations in a larger scale, but not for the public administration of a city.

Of course the different kinds of knowledge maps are important, but also the way how they are implemented in the existing organisation is crucial. The maps in the current project are not completely implemented yet. Nevertheless the implementation phase is important and maybe it is possible to use this evaluation to avoid problem areas. Hence the implementation should be discussed, too.

Eppler suggests a process with five steps:

1. Identification of knowledge intensive process
2. Identification of knowledge resources
3. Codification of knowledge resources
4. Integration of the codified knowledge in a visualised interactive figure
5. Provision of capabilities to update the figure

In the first step, the processes are identified which need much knowledge input from many knowledge sources. These sources can be human e.g. co-workers, costumers, etc., as well as databases, documents or other non-human sources. These sources should be found in the second step. But this does not only concern the sources that were used in the step before, but also the sources that are not used yet. After the second point of Eppler, the knowledge resources, carriers and processes are identified and analysed.
In the following these entities got codified. Primarily this means that they should be tagged. A deliberated hierarchy is developed to arrange the different topics in an easy and intuitive way. A good structured map does not only help the users, it also helps the developers, because it is easy to expand and modify. In the fourth step, the entities get visualized as a map in accordance to the codification rules. According to Eppler this step deals with the technical environment and the practical integration, too. The last step is a task for the long run. To keep the knowledge maps usable, it is crucial to update them. Eppler focuses the use of decentralised methods for this, where each participants help to keep the map accurate.

Of course there are other approaches how to implement a knowledge map. Nohr for example is on the same line as Eppler, but his last step focuses on the usability in a different way. Nohr suggests to introduce a set of rules to clarify the responsibilities for the subject areas. And in the end he suggest a comprehensive evaluation of the knowledge map and if it is necessary changes in the knowledge maps and the processes how the maps are created and managed. [Noh00] This last step can be seen as the topic of this thesis. But before this evaluation can be done the current state of knowledge maps in the public agencies should be described.

1.3 Status Quo

Founding on the same ideas and approaches, Christoph Hengl developed knowledge maps for event coordination. The main goal was "the compilation of a catalogue consisting of knowledge management measures in order to improve the handling of knowledge within the public administration of the hanseatic city of Rostock" [Hen13]. As a result of his work, he developed an activity diagram that describes the process of applying a motion. Based on that, a knowledge application map was designed (figure 2.1).

The description is in German, but generally it is easy to understand. In the inner circle, the five main steps of the process “applying a motion” are visualized. The ring around
Figure 1.1: The knowledge application map created by Hengl according to the idea of Eppler [Epp02] with the three circles: process steps, competences and tools [Hen13]

This circle lists the competences that are needed for each step and the outer ring shows the tools that are crucial for the task and support or need a specific competence.

An example: In the first step of the process - the receipt of the application - the core requirements are socially competence and knowledge about internal structure and processes. Because it is necessary to submit an motion in a written form the important tools for this are the (physical) mail box for letters and the e-mail inbox. Of course the telephone is used often by people who do this, but usually this is part of the second step, the application review or maybe the unofficial step before the receipt, when people call the agency and ask for what they have to do.
As mentioned in the section before, this type of map is meant to give an overview about the knowledge that is needed to fulfil a task/process step and to visualize the interdependencies between knowledge and processes. The weak point is that knowledge without a connection to any process step cannot be shown in this map. But this knowledge can be crucial, too. Especially for dynamical processes. Hence this map can be only part of a bigger knowledge management system.

This knowledge application map is amended by a knowledge asset map (figure 2.2), also developed by Hengl.

Figure 1.2: The knowledge asset map created by Hengl with three pseudonymised persons [Hen13]. According to Eppler [Epp02]

This map, in form of a table, illustrates the abilities of employees in the agency. In four different competence fields, the people were asked to evaluate their knowledge. [Hen13]
Of course this is also the weak point, because an assessment based on the own opinion is completely subjective. Furthermore it is necessary to see if the data privacy of the employees is regarded in anyway by this map. To accomplish this, an open exchange with the personal representatives is important. [Epp02]

The advantages of this map are, that everybody can see, where to find competent co-workers and see how competent they are by comparison with others. [Epp02]

Both maps were presented recently to the employees of the agency. They have not worked with them yet. But this is not necessary for the first evaluation. The first and second impression of the maps can still be caught.

This leads directly to the next chapter, where the plan for this evaluation is described and preparations are made.
2 Preparation for the Evaluation

The topic for this thesis is to evaluate two knowledge maps for some public agencies in the city of Rostock. To accomplish this, several evaluation models were reviewed and measurements for the evaluation got identified. These reviews and the final decision for the best fitting model are the topic in the first part of this chapter. The measurements are the subject of the second part. Based on the model and the measurements, the right questions for the evaluation created and combined into an questionnaire for the survey. Basically the evaluation has three steps, summarized in these three points:

1. A discussion with the future users of the maps, after Mr. Hengl's final presentation

2. A online-survey, submitted after a couple of days

3. Comprehensive analysis of the discussion and the survey

When his master thesis was finalized Hengl held an presentation about the results he found and he introduced the knowledge map prototypes he created. After this a discussion started, that is also part of the analysis, because it showed the thoughts and opinions right after the first contact with the knowledge maps. After six days an online survey was submitted to see how the knowledge maps were processed in the heads of the participants. This survey took about two weeks, where the employees had the chance to submit their thoughts about the current state and future developments of the knowledge maps.
Based on the impressions from the discussion and the survey a comprehensive analysis was conducted. This includes, besides the reflection and interpretation of the results, several suggestions for the further development of KM in the public administration.

**2.1 Reference Models for the Evaluation of Information and Knowledge Management Systems**

The first step, for the conduction of this evaluation, is to search for a proper reference model, that show what is important in the evaluation of a KMS. Several models were found and are presented in the following. The first one is the original model that gives the basis for all the approaches.

**The IS Success Model**

The IS success model from 1992 bases on the communication research of Shannon and Weaver, who identified three different levels of communication: The technical level, the semantic level and the effectiveness level. The technical level is measured by the system quality and represents how well the tools and technical services of the systems serve the purpose of the information system.\[SW64\] The purpose of the semantic layer is to show how much of the intended meaning is given by the information from the system. [SW64] In their model, McLean and DeLone measure it with the indicator named information quality. The effect that can be measured on the receiver side is represented by the effectiveness level that is measured by four different indicators: The use, the user satisfaction, the individual impacts and the organizational impacts. [DM02]

But of course, these six indicators cannot be seen completely independent from each other because they share an handful of interdependences. E.g. an IS with an high system quality probably encourages users to work with it and this again improves the usage, the user satisfaction, the individual impacts and finally also the organizational impact [DM02]. To visualise those interdependences, DeLone and McLean created a
model that can be seen in figure 3.1.

Figure 2.1: The model of IS success that was developed in 1992 by DeLone and McLean.[DM02]

Eleven year later, in 2003, they published a reviewed model, that added several changes to the original approach. On the first layer, next to "system quality" and "information quality", an additional concept was introduced: the "service quality". The reason for this is that a provider of information systems will usually not only offer the product, but also services for the users. Hence it is important to include them in the model to visualize the whole information system.[DM02] Another new concept is the "net benefit" that replaces the individual and the organizational impact. But it represents far more then these both. Other impacts, as the impact on the society, the industry, the costumers, etc. are part of the net benefit. Each information system has its own target and so it would be impossible to describe them all in this model.[DM02] The concept of "system use" was expanded by the "intention to use". "System use" is just a behaviour and very vague. E.g. the usage can be voluntary or enforced by the management. The "intention to use" was introduced to avoid those problems by visualizing the support of the users for the system. The arrows in the figure(3.2) may confuses, because the intuition says that user satisfaction causes an increase in the use, but the model describes it the opposite
way. But what the user satisfaction improves is not the usage, it is the intention of the participants to use the system. And a good user experience with an high quality system increases the user satisfaction.

![The updated IS success model according to DeLone and McLean](image)

**The Knowledge Management Success Model by Maier**

To adapt this model for knowledge management systems, several changes should be done. Ronald Maier thought the same way and developed an own model for knowledge management system success. Unfortunately he released his approach already in 1998. Hence his concept does not base on the renewed model of McLean and DeLone. Nevertheless he made several legit changes, that should be considered in this paper. One of the changes is that he renamed the different levels of the model. The first level of system and information quality is named "system & service level" and deals with the system itself, its organizational and technical construction. The second level is about the usage and the behaviour of the users that work with the system. It is called deployment level. In the final level, the impact level, effects on all participants and the organization are measured. But also the categories themselves were changed.

The information quality on the first level is replaced by the knowledge quality. In
Figure 2.3: The KMS success model adapted by [Mai07] based on the original model of [DM02]

Other words, this means that also the context of the knowledge needs to be transmitted and saved in the system. This includes the owner of it as well as the links to other elements of knowledge. [Mai07] As implemented in the updated version of DeLone and McLean, the service quality was introduced. But in this case it is about the knowledge services that focus on the roles, like knowledge worker, knowledge broker, specialists, etc. According to Maier, the elaboration of these roles can increase the usefulness of a knowledge management system. This usefulness is not measured in a net benefit, but in the former categories of impact on individuals and impact on the whole organization. As new concept, the impact on collectives of people is added. This concept is determined by the user satisfaction and the system use and has strong interdependencies with the impact on individuals. Those again determine the already known organizational impact. The reason to introduce this concept is that the formal and informal groups in a organization are, according to Maier, the most important entities to develop, deploy and evaluate a new knowledge infrastructure. [Mai07]

Even if this may look different from the renewed model of DeLone and McLean, it has most of the made changes in it. The service quality is implemented by both, of course
with another focus, but still it is implemented and the ”net benefit” is just a substitution for all the different stakeholders a information/knowledge management system can affect. Thus, the reduction towards the individuals, the groups and the organization is just an explicit case for the model.

Just two things are missing in the model of Maier: The split of the system use into the ”Intention to use” and the ”Use” and the feedback from the impacts on the delivery layer towards the deployment layer. But indeed both concepts are legit and should be added to the model of Maier.

**The Knowledge Management Success Model by Jennex and Olfman**

But there is another approach that adapts the model of DeLone and McLean: The OMIS success model, created by Jennex and Olfman. OMIS stands for organizational memory information system and was created to use the findings of DeLone and McLean for the implementation of an organizational management platform. [JO98]

![OMIS Success Model Diagram](image)

Figure 2.4: The OMIS success model adapted by [JO98] based on the original model of [DM02]

In the same way as Maier, Olfman and Jennex added several points to their model.
Something that leaps to the eye is the enlarged category of system quality. This is divided into 3 subcategories. First of them, the "technical resources", describes the capabilities of the organization to run an OMIS from the technical point of view as there are the quality of the hard- and software, the abilities of the administrators and the users and made experience. It determines the second subcategory, the form of OMIS as well as the third one, the level of OMIS. The form means the extent of computerized content in the OMIS. The level describes one of the main tasks of the OMIS: to connect a current situation with events from the past. Jennex and Olfman say that this parameter is the most important one in the category of system quality and if it is not possible to determine the others, it can be used as surrogate for them. The other parts of the model are mostly inherited from the original model.\textsuperscript{JO98}

But when DeLones and McLeans renewed model was published, Jennex and Olfman adapted theirs to the new form. The new model was called "knowledge management success".\textsuperscript{JO04} To prevent confusion between the knowledge management system success model of Jennex/Olfman and the one of Maier, each model has a tag from now on with a "(M)" for Maier and an "(JO)" for Jennex/Olfman.

In the new KMS success(JO) model the category of system success stayed the same, only the names changed from "Level of/Form of OMIS" to "Level of/Form of KMS". The form still stands for the amount of computerized knowledge and the level expresses the proportion of knowledge that can be linked by the system to past events. The concept of information quality became more detailed: It was supplemented with the component of knowledge to the new category "information and knowledge quality". The task of the category is to ensure "that the right knowledge/OM with sufficient context is captured and available for the right users at the right time."\textsuperscript{JO04} 3 subcategories are provided: The "Knowledge Strategy/Process", the "Linkages" and "Richness". The knowledge strategy is the general idea how the knowledge in the organization is acquired, processed, used, developed and shared. The knowledge process describes the proper handling with knowledge. The knowledge strategy and processes are not exactly about the knowledge
Figure 2.5: The updated KMS success model created by Jennex and Olfman according to [JO06].

itself, but about the way how the knowledge is managed in the organization and they influence the other parameters, too. The richness states the amount of usable knowledge/information and the amount of useless knowledge/information in the knowledge management system. The linkages show how strong these elements of knowledge are connected to each other. An high number of linkages and an high degree of richness can only be achieved by an appropriated strategy and according to this appropriate knowledge processes. But of course the ratio between costs and benefit should be considered in this. [JO04] The knowledge service quality is about the services that are provided by the KMS. According to Jennex and Olfman, the quality of these services is determined
by the "support of the management". They have to provide the necessary resources and prepare their colleagues for the KMS. The services themselves are categorised into "user knowledge management services" and "information system knowledge management services". The User KM services offer a tool or an interface for the user to become active and improve his work (a basic example to accomplish this would probably be a chat client in the system). The IS KM service helps the user with a functionality that is fully done by the system and helps the user to work more efficient (e.g. a search engine).

On the second level, the user satisfaction and the system use were combined in one category "Use/User Satisfaction". As in the original model the use, in terms of hits, number of active users, etc., and the user satisfaction are measured in this category. Other new concepts are the "Perceived Benefit" and the "Intent to Use". The perceived benefit measures not the actual success of the system, but the success that the users feel. This is a very important factor if the use of the system is voluntary and a good position to ask the participants about their motivation. Of course it also affects the intent to use the system, that is already known from the concept of DeLone and McLean.

On the third layer Olfman and Jennex stay with the concept of a net benefit as McLean and DeLone implemented it. According to them there are always several different stakeholders in and outside an organization and there cannot be any set definition about the relevant groups. So the definition of relevant groups should be done separately from project to project. In the explanation of their model Jennex and Olfman concentrate mostly on the impact on the individual user as well as the impact on the whole organization. In the end, the task of the knowledge manager is to define which knowledge has a positive effect and which does not. As a result, knowledge resources can be extended in one area and deleted in another. Thus, the net benefit does not only affect the intend to use/perceived benefit and the usage/user satisfaction anymore, but also the fundamental knowledge strategy and processes of the organization.

The model of Jennex and Olfman offers several new ideas for the evaluation of knowledge
management systems. They focus not only on the use and the user satisfaction, but also on the perceived benefit. In the other models this would probably fit into the sections of user satisfaction and indeed: The user satisfaction is influenced and influences the perceived benefit. This idea is a true benefit according to the other models. But does it really fit for the evaluation process?

**The Choice for a Reference Model**

Or, to go further into this question: What model should be used as reference model for the upcoming evaluation? Several different candidates were shown and each of them has their own advantages and disadvantages.

There is the modern model of DeLone and McLean that is the most generic one. This can be a problem if not enough guidance is given by the model. Another approach was made by Roland Maier. His model is supported by a long catalogue of appropriated measures that may offer the necessary basis. Furthermore there is the OMIS model from Jennex and Olfman. This approach is appropriated for the current situation, too. One goal of the knowledge management project for public agencies is to establish an organizational memory. Nevertheless the approach focuses mainly on the technical side of the system [JO98], but this evaluation focuses on the usage and the user satisfaction of the participants.

And then there is the last model: The KMS success model [JO] offers several new perspectives. E.g. it introduces the concept that not only the impact of the system is important, but also the recognition of this impact by the users. It also offers an catalogue of success factors that can be used for measures, but this is not as comprehensive as the one of Maier.

Hence the KMS success model of Jennex and Olfman is used as reference model, because it offers the most detailed view on the different categories. But of course the suggested measures of Maier will not be unattended. Because the net benefit needs to be replaced by a selection of appropriate stake holder groups the categories from the
impact level of Maiers model are used as its replacement. both approaches share many of the components it seems legit to use them in the same context.

The effects of this decision can be seen in the following section, where according to the model of Jennex/Olfman a survey will be developed and translated afterwards.

2.2 Measures for the Evaluation

The knowledge management system success model of Jennex and Olfman includes eight different categories [JO06] and each of them should be considered in the coming evaluation. Jennex and Olfman argue that only the categories on the second level can be researched by a survey. [JO04] This might be right in several cases. Hence this survey will concentrate on these categories, but Maier also suggests several measures for the other categories and probably there are some points that should be considered in the evaluation, too. hence his catalogue is researched, too.

Success Factor of Jennex and Olfman

To compare different evaluation methods for KMS and to see if any of them covers all the necessary areas of knowledge management, Jennex and Olfman composed a list of 12 success factors for knowledge management and the successful use of knowledge management systems. Jennex and Olfman set them into relation with the categories of their model and showed what was covered and what was not. In the following each of the success factors is shortly discussed and checked if it is relevant for the evaluation at hand. In table 3.1 the names of the factors can be found and from what part of the KMS success model (JO) they are covered. As already mentioned earlier, Jennex and Olfman suggest that only the values on the second level (Intent to Use/Perceived Benefit and Use/User Satisfaction) can be researched by interviews or surveys with the users on a reliable base. Following their argumentation, the research focus on them. Nevertheless there are many interdependences between all the concepts. Thus it is researched if any
of them offer something that can be asked in the survey, to improve the final analysis. The first success factor is about the "Integrated Technical Infrastructure including networks, databases/repositories, computers, software, KMS experts". Because the evaluated system is an offline method, the space for questions regarding this factor are strongly limited. Furthermore the technical status quo is a question for the upper management and the initiators of the system, not for its users. Hence there it should not be used as a measurement for the survey. In contrast to this "a Knowledge Strategy that identifies users, sources, processes, storage strategy, knowledge and links to knowledge for the KMS" is probably there. But, as the factor before, it is not appropriate, because this is something for a head knowledge manager and not for the regular employees. The same applies on the question if there is "a common enterprise wide knowledge structure that is clearly articulated and easily understood". Hence it is no part for the survey, too. In opposite to this, the culture of the agency can be researched during contact with the employees in very easy way. Actually is the best way to get a real picture of the agencies enterprise culture by asking directly, because the culture is something very dynamical and differs from group to group. Hence the factor "an organizational culture that supports learning and the sharing and use of knowledge" is part of the measurements. Another important task of the survey is to see, whether the participants are motivated to use the knowledge maps or not. The right incentives and trainings are crucial for this. Hence this is an important success factor as well. Jennex and Olfman call this "Motivation and Commitment of users including incentives and training". It is covered, as the point before, by the "Perceived Benefit" construct. Without "Senior Management support including allocation of resources, leadership, and providing training" the chance for the KMS to become a success decreases clearly. For the evaluation it could be interesting to ask what kind of support is desired by the future users of the system. Currently there are no measures that "are established to assess the impacts of the KMS and the use of knowledge as well as verifying that the right knowledge is being captured". Because of this, it makes no sense to evaluate this in the survey. Additionally the factor
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Related Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF1</td>
<td>Integrated Technical Infrastructure including networks, databases/repositories, computers, software, KMS experts</td>
<td>Technical Resources Construct</td>
</tr>
<tr>
<td>SF2</td>
<td>A Knowledge Strategy that identifies users, sources, processes, storage strategy, knowledge and links to knowledge for the KMS</td>
<td>KM Strategy /Process Construct</td>
</tr>
<tr>
<td>SF3</td>
<td>A common enterprise wide knowledge structure that is clearly articulated and easily understood</td>
<td>Form Construct</td>
</tr>
<tr>
<td>SF4</td>
<td>Motivation and Commitment of users including incentives and training</td>
<td>Perceived Benefit Construct</td>
</tr>
<tr>
<td>SF5</td>
<td>An organizational culture that supports learning and the sharing and use of knowledge</td>
<td>Perceived Benefit Construct</td>
</tr>
<tr>
<td>SF6</td>
<td>Senior Management support including allocation of resources, leadership, and providing training</td>
<td>Perceived Benefit Construct</td>
</tr>
<tr>
<td>SF7</td>
<td>Measures are established to assess the impacts of the KMS and the use of knowledge as well as verifying that the right knowledge is being captured</td>
<td>Net Impacts Construct</td>
</tr>
<tr>
<td>SF8</td>
<td>There is a clear goal and purpose for the KMS</td>
<td>KM Strategy/ Process Construct</td>
</tr>
<tr>
<td>SF9</td>
<td>The search, retrieval, and visualization functions of the KMS support easy knowledge use</td>
<td>Level Construct</td>
</tr>
<tr>
<td>SF10</td>
<td>Work processes are designed that incorporate knowledge capture and use</td>
<td>Perceived Benefit Construct</td>
</tr>
<tr>
<td>SF11</td>
<td>Learning Organization</td>
<td>No clear tie</td>
</tr>
<tr>
<td>SF12</td>
<td>Security/protection of knowledge</td>
<td>No clear tie</td>
</tr>
</tbody>
</table>

Table 2.1: Success factors and their relations towards Jennex and Olfman according to [JO04]
does not aim on the opinions of the user, but on a general state of the system. The same applies on the next factor: "There is a clear goal and purpose for the KMS". The goal has to be set by the management and cannot be researched during an survey among the employees. Hence both points should not be part of this inquiry.

Because a digital system is lacking, "The search, retrieval, and visualization functions of the KMS support easy knowledge use" cannot be used completely. There is no search engine in the system, so the general structure of the maps is more important to make knowledge easy to retrieval. The visualization is the only measure on "system level", that can be measured at the moment and thus it should be. It influences the "Intent to Use" and the "User Satisfaction" and hence it is an important factor for this evaluation.

But in the measures of Maier a specific term, named "orientation/quality of visualizing context and structure", is introduced that is probably more accurate for this topic. Hence this success factor will be replace by it. Another point for Jennex and Olfman is, whether "Work processes are designed that incorporate knowledge capture and use" or not. As the current system is freshly installed such kind of processes will probably not be there. Furthermore these processes could be researched better by analysing some process descriptions.

According to their research the success factors "Learning Organization" and "Security/protection of knowledge" not covered by their model. And currently the agencies are in the very beginning and thus the "Learning organization" is only a long time goal. Currently they are focused to preserve the knowledge they have. Further knowledge that is stored in the maps is not classified and hence the protection and security is not important yet.

This was the final success factor identified by Jennex and Olfman. The research showed that only a few factors are important for this evaluation. A list of the remaining factors can be found at the end of this section. But first the measures that are suggested by Maier are introduced.
Measures of Maier

In his ”guideline” Maier divides the knowledge management system into three groups: the integrative KMS, the interactive KMS and the intersection of both. In this context integrative means a form of knowledge management that focuses on the codification of knowledge, its search and retrieval, and the handling of knowledge resources. The opposite to this -the interactive approach - focuses on the communication of the participants by providing communication tools and shared space for communities. Hence the mixture of both is a more comprehensive method that provides highly contextual knowledge and space to communicate as well. The observed system does not offer any shared work or storage spaces and serves more as a tool to find the right person for a specific question/task. Hence, following the definitions the current system at the researched office is an integrative system.

For each category an own pool of measures is offered, that can be used to describe the quality. These measures can be found in table 3.2, 3.3 and 3.4.

Maier assumes that the system is digital. Because of this, several things, especially in the category of System Quality, are not important for the current KMS of the public agency. These measures are meant in a technical sense and it is hard to adapted them for the current system. But for future research, when a first digital implementation is introduced, they might be useful. Only the measure ”orientation/quality of visualizing context and structure” could be interesting, whether the general system of representation is acceptable for the users.

At a first glance the construct of knowledge quality to offers several areas of interest. The quality of knowledge, meta-knowledge, knowledge structure and the confidence in the knowledge are interesting fields, but they are not meant in the way, that they should be evaluated by the users of the system. The evaluation here focuses on analysing the documents and construction plans of the KMS, that was developed before. ”Context correspondence”, in this case, means to find out whether the users and the creator of the maps see the illustrated issue in the same way or not. Because this has a specific
<table>
<thead>
<tr>
<th>System Quality</th>
<th>Knowledge Quality</th>
<th>Knowledge Service Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• efficiency of support for the publication of knowledge</td>
<td>• quality of the content of knowledge elements</td>
<td>• quality of support of knowledge publication</td>
</tr>
<tr>
<td>• orientation/quality of visualizing context and structure</td>
<td>• quality of context correspondence</td>
<td>• quality of refining/repackaging knowledge</td>
</tr>
<tr>
<td>• quality of the presentation of search results</td>
<td>• quality of knowledge structure and linking</td>
<td>• quality of support of knowledge search</td>
</tr>
<tr>
<td>• quality of the design of feedback about contents</td>
<td>• confidence in knowledge elements</td>
<td>• quality of distribution of knowledge elements</td>
</tr>
<tr>
<td>• integration of knowledge sources</td>
<td>• completeness/ sufficiency of knowledge base</td>
<td>• quality of maintenance of knowledge base</td>
</tr>
<tr>
<td>• quality of the support for dynamics of contents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• quality of search engine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2.2: Measures for System Quality, Knowledge Quality and Knowledge Services in integrative KMS according to [Mai07]
impact on the usability of the maps it is probably important to ask during the survey. In contrast to this the structure and linking of the knowledge are hard to rate as long as there are no links between the maps. The quality of the general structure can be discussed in the point of visualization.

Services are crucial for knowledge management systems and therefore it is important to find out if they were implemented in a usable way and if that is not the case, what should be improve in future projects. Because the knowledge maps offer only a few services for the users, the service level is very low at the moment but probably increased in future developments. Mostly it is a form of visualization and its structure - hopefully - allows the user to search and retrieval knowledge in a easier way. But this service is not offered by the system and hence they should not be considered. In the current state, they are not prepared for updating or publication of new knowledge from the user side. The effort for maintenance is probably hard to define and hence it seems to be unrealistic to measure the quality of maintenance. But still the ways to refine and repackage the knowledge are interesting. Especially to see, if the first refinement was sufficient.

The second level, the "use" level, is determined by the "System Use" and the "User Satisfaction". The measures, suggested by Maier can be seen in table 3.2

As before, the question for knowledge publication is not relevant for current KMS as well as the maintenance or horizontal and vertical integration of it. But of course it will be used for search and retrieval, even if there are no tools for it.

User satisfaction shows how well the system fits into the participants expectations and their daily routines. This includes the system as well as the knowledge that is represented by the system and the way how it is presented. The satisfaction with the search engine will be cancelled because of the lack of a real search tool. The same applies on the publishing instruments and procedures.

Last but not least comes the impact level where the results for each person, the different groups and the whole organization should be evaluated. The measures for this can be
<table>
<thead>
<tr>
<th>System Use</th>
<th>User Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• use for knowledge publication</td>
<td>• satisfaction with the publishing instruments and procedures</td>
</tr>
<tr>
<td>• use for knowledge-search and retrieval</td>
<td>• satisfaction with knowledge search functions</td>
</tr>
<tr>
<td>• use for knowledge distribution</td>
<td>• knowledge satisfaction</td>
</tr>
<tr>
<td>• use in support of maintaining quality of knowledge elements and structure</td>
<td>• satisfaction with knowledge elements presented in KMS</td>
</tr>
<tr>
<td>• use in support of horizontal/vertical integration</td>
<td></td>
</tr>
<tr>
<td>• use in support of feedback to knowledge elements</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.3: Measures for System Use and User Satisfaction in integrative KMS according to [Mai07]
<table>
<thead>
<tr>
<th>Impact on Individuals</th>
<th>Impact on Collectives of People</th>
<th>Impact on the Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>• impact on participants’ capabilities to publish knowledge elements</td>
<td>• impact on contextualization of knowledge elements</td>
<td>• additional profits through selling access to the KMS</td>
</tr>
<tr>
<td>• impact on participants’ capabilities to access knowledge elements</td>
<td>• impact on confidence in knowledge elements</td>
<td>• impact on visibility of knowledge structures</td>
</tr>
<tr>
<td>• impact on actual access(es) to knowledge elements</td>
<td></td>
<td>• impact on costs of access to organization-external knowledge services</td>
</tr>
<tr>
<td>• impact on feeling of &quot;information overload&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2.4: Measures for the impact on individuals, groups of users and the whole organization in integrative KMS according to [Mai07]
On the individual level it is important to see if they are able to understand the knowledge maps and how they are able to access them. Furthermore, the actual experienced value of the system should be considered and whether they feel something like an "information overflow". For the current system this means especially to see if the current maps are too overloaded with facts. As mentioned before the publishing of knowledge is not important yet and is not part of this survey.

Each person has its own peer groups, so in the next step is to find out what the groups actually think about the maps. The most important questions for this are concerning the "contextualization" and the "confidence" of knowledge elements. Do the participants expect to become more confident with the knowledge and is the shared context more established? Of course this is no question for users who are long time in their field, but the newcomer may benefit from these results.

On the highest level, the organizational impact, general things are important. Because it is an public agency it is probably not important to sell access to the maps, but maybe they will have an impact on internal and external costs. Besides this the KMS can influence the transparency in the organization.

**Extractions from other models and conclusion**

This was the last category in Maiers model. But in the other approaches, for example the one of DeLone/McLean, several other measures and success factors are introduced. Most of these overlap with the measures of Maier or Jennex/Olfman, so they are not described in detail here. One of these interesting success factors for E-commerce is the "cost saving" in the category of net benefit, identified by DeLone and McLean.\cite{DM02}

Because the observed agency is not in the business sector but part of the public services, selling access will not be an option. But in the best case the maps enable the users to find the right contact faster and be more productive. The classification for this success factor is more complicated, because the net benefit does not exist in the model of Maier
and the individual person as well as the organization can be aimed for this measure. The easiest way is to place it in both categories.

In this section, the following 17 measurements were identified to be relevant for the evaluation. To get a good overview they are numbered and organized on three levels. The first one consists of the three levels of Maier (system & service, use and impact), before the second one describes their position in the concepts of Jennex and Olfman. The development of questions to cover all these issues is the topic of the next section before the next chapter will be about the analysis of the discussion and the survey.

System and service level:
- System quality
  - M1.1: orientation/quality of visualizing context and structure
- Knowledge quality
  - M2.1: confidence in knowledge elements
  - M2.2: completeness/sufficiency of knowledge base
- Service quality
  - M3.1: quality of refining/repackaging knowledge

Use level:
- Perceived Benefit/Intent to Use
  - M4.1: motivation and commitment of users including incentives and training
  - M4.2: an organizational culture that supports learning and the sharing and use of knowledge
  - M4.3: senior Management support including allocation of resources, leadership, and providing training
- System Use/User Satisfaction
  - M5.1: use for knowledge-search and retrieval
  - M5.2: knowledge satisfaction
  - M5.3: satisfaction with knowledge elements presented in KMS
Impact level:

- Impact on individuals
  - M6.1: impact on participants’ capabilities to access knowledge elements
  - M6.2: impact on feeling of "information overload"
  - M6.3: impact on time cost

- Impact on collectives of people
  - M7.1: impact on contextualization of knowledge elements
  - M7.2: impact on confidence in knowledge elements

- Impact on organization
  - M8.1: impact on visibility of knowledge structures
  - M8.2: impact on time cost

2.3 Development of the Survey

In the previous section different measures were identified, to give ideas for the construction for the following questionnaire. The questionnaire is used to validate or falsify the results of the discussion after the presentation of the maps. These results and the results of the survey can be found in the next chapter.

The survey should be spread among several people, that are all introduced into the project. In the first place the participants should have done this questionnaire subsequent to the presentation of the maps by Mr. Hengl. The idea was to give them the chance to say what they really think, after the discussion. But due to the advanced time, it was not possible to do so. Hence it was asked to put this questionnaire into an online survey and send it via E-Mail to the participants.

The target group of this survey were about eleven people who participated in the presentation and discussion. This leads to a problem in the definition what type of inquiry this survey is. On the one hand it is an online survey and because of that very inflexible. On the other side most of the answers are hard to operationalize, like in an qualitative
interview. Besides, even if the general structure of the interview is static several free fields are part of it. And last but not least it cannot be determined if the group is representative for the whole personnel, because no data about the social structure of the agencies in Rostock is given. But the determination of the researched group is crucial for a quantitative research. Because of all these problems it was decided to see the survey as a qualitative inquiry. Probably this decision affects the results just in a minor way, but in the end it should be considered as possible source for shortcomings.

A procedure model, suggested by Mayer can be found in figure 3.6.

The model starts with the definition of a sample. A specific group should participate
in the interview. In this evaluation this group is determined by the people who are involved in the project and have seen the presentation of Mr. Hengl. 11 employees from the agency took place in the presentation and the following discussion. Exactly these people are the core group. Because the survey is online, it is possible, that others submit content or that a single person completes the survey a second time. These problems are going to be researched in the reasons for shortcomings, too.

The sensitizing concept is described as the foundation for the survey. Its task is to take a comprehensive look at the circumstances of the participant and see what influences them regarding the subject of the study. As already known the participants in this case are employees in a public agency, with no experience in the use of knowledge management systems. The measures that may concern them regarding the introduction of a KMS were already presented in the section before. Hence, based on this, the development of a questionnaire can start.

In the following part the questions that were developed are described and reasoned. To get a better overview about the topic, each question gets an identifier in form of "Q1", "Q2", etc.:

For the beginning the survey should start with some basic questions, about the answering person. The first questions are about the current position in the agency (Q1) and the time the person was in their position (Q2). These information are used to see how much experience the person has and weight their answer according to this experience in their field.

To increase the quality of the survey it is important to give the employees the chance to add content. Hence several questions have an open field, when it is possible to add some own ideas. The first question concerning the maps is "What services of the knowledge maps will you probably use?" (Q3) with several options given, but an open field, too. Right before this question each knowledge map is introduced once again, because the participants have the chance to answer within a frame of two weeks. Because it is possible, that they forgot several things of the presentation, this should
remind them about the different maps. The following question is "Did you find mistakes in the maps?" (Q4). On the one side the answer to this question can be used to find out how good the quality of the knowledge is and on the other side it also tells something about the trust in the maps and their completeness. The follow-up question deals with the general opinion about the knowledge maps. The participants are asked to remember the maps and should decide, if they are satisfied with the results in or not (Q5).

After this, the participants are asked several questions for each map. First they had to answer what would motivate them to use the knowledge application map in the future. (Q6) In the discussion several days before this survey went online, it was already discussed that some motivators, as monetary incentives or additional employees for knowledge management are unrealistic, hence the given incentives are just "training" to use the knowledge maps in a right way and the "integration of the maps into the work processes". But to be open for suggestions a free field was added, too. Then the map should be evaluated in the fields of complexity, appearance and intelligibility (Q7) to find the weaknesses of the map and to see if the map visualizes the context of the employees. Exact the same question are asked in the following for the knowledge asset maps (Q8) and Q9). Asking the question for each map separately has the advantage, that the employees probably set them into relation and show which map fits better into their context.

After this the survey focuses on the (expected) benefits. First the employees are asked to tell how much time they use per week to find knowledge sources (Q10). After this they should assess how much of this time will probably saved by the use of the knowledge maps (Q11). This combination allows to infer how necessary it is to develop knowledge maps that focus on the "know-who".

With Q12 and Q13 the expected influence for the individual and the whole agency is queried to see if the users see the project as important or not, on the personal level as well as on the organization level.

In the final two questions the participants have the opportunity to give direct feedback,
what they would like to change in the map (Q14) and to give their general opinion, whether they think, that the effort that is necessary to create those maps is justified by the expected benefit (Q15). Those questions help to evaluate the will of the employees to help with the creation of the knowledge maps. A group that supports the thesis, that the tools are worth the effort is probably more supportive, when they are asked to help with it. The second last question gives the users the chance to finally list all the things that should be changed until the release of the map.

The result of this chapter is a guideline, consisting of 15 question, summarized in the follow list. These questions got translated into German and reviewed by the leaders of this project (see attachment A).

**Survey Questions:**

1. What is your current position in the agency?
   - Subject area manager
   - Clerk
   - _____________

2. How long are you in your current position?
   - less than 5 years
   - 5 till 10 years
   - 10 till 15 years
   - More than 15
3. What services of the knowledge maps will you probably use?
   - Search for the right contact
   - Get an overview about concerned groups
   - Evaluation of the own abilities
   - ____________
   - nothing of the above

4. Did you found any mistakes in the maps?
   - No
   - Yes → ____________

5. Please remember the presented maps. How satisfied were you with the results when you saw them for the first time?
   - satisfied ← 1 - 2 - 3 - 4 - 5 → unsatisfied

6. What would motivate you to use the knowledge application map in your daily work flow?
   - training
   - integration of the map into the processes
   - ____________

7. What do you think about the design of the knowledge application map?
   - complex structure ← 1 - 2 - 3 - 4 - 5 → easy structure
   - appealing ← 1 - 2 - 3 - 4 - 5 → not appealing
   - understandable ← 1 - 2 - 3 - 4 - 5 → opaque
8. What would motivate you to use the knowledge asset map in your daily work flow?

- training
- integration of the map into the processes
- __________

9. What do you think about the design of the knowledge asset map?

- complex structure ←1 - 2 - 3 - 4 - 5→ easy structure
- appealing ←1 - 2 - 3 - 4 - 5→ not appealing
- understandable ←1 - 2 - 3 - 4 - 5→ opaque

10. How much time do you spend to search for knowledge sources per week?

- no ←1 - 2 - 3 - 4 - 5→ more than two hours

11. How much time saving do you expect from the use of this knowledge maps?

- no ←1 - 2 - 3 - 4 - 5→ more than two hours

12. How strong, do you think, will be the influence of the maps concerning your work?

- no ←1 - 2 - 3 - 4 - 5→ very strong

13. Do you see the knowledge maps as a profit for your agency?

- yes, absolutely ←1 - 2 - 3 - 4 - 5→ no, not at all

14. What should be changed to improve the knowledge maps?

- __________
15. Do you think that the expected benefit justifies the necessary effort to compose these maps?

- yes
- no
- not assessable

The following table shows the coverage between requirements, identified in the section before, and the questions above. Of course the general questions do not cover anything specific, but help to categorise the results. Furthermore several measurements are covered more than once. On the one side this helps to illuminate the different aspects of the point and on the other side several overlaps are not avoidable. The questionnaire was tested by the author and Mrs. Ulrike Borchardt as his advisor. This covers the "Pretests" as recommend by Mayer. In the following chapter the execution and the results of this survey are discussed and the final analysis of this topic will be made, including several suggestions for further development in the final chapter.
<table>
<thead>
<tr>
<th>Question No.</th>
<th>Requirements that are covered by the question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>-</td>
</tr>
<tr>
<td>Q2</td>
<td>-</td>
</tr>
<tr>
<td>Q3</td>
<td>M5.1</td>
</tr>
<tr>
<td>Q4</td>
<td>M2.1, M2.2, M3.1</td>
</tr>
<tr>
<td>Q5</td>
<td>M1.1, M4.1, M5.2, M5.3</td>
</tr>
<tr>
<td>Q6</td>
<td>M4.1, M4.2, M4.3</td>
</tr>
<tr>
<td>Q7</td>
<td>M1.1, M2.1, M3.1, M4.1, M5.2, M5.3, M6.2, M8.1</td>
</tr>
<tr>
<td>Q8</td>
<td>M4.1, M4.2, M4.3</td>
</tr>
<tr>
<td>Q9</td>
<td>M1.1, M2.1, M3.1, M4.1, M5.2, M5.3, M6.2, M8.1</td>
</tr>
<tr>
<td>Q10</td>
<td>M6.1, M6.3</td>
</tr>
<tr>
<td>Q11</td>
<td>M6.1, M6.3</td>
</tr>
<tr>
<td>Q12</td>
<td>M7.1, M8.1 -</td>
</tr>
<tr>
<td>Q13</td>
<td>M8.1, M8.2,</td>
</tr>
<tr>
<td>Q14</td>
<td>M8.2</td>
</tr>
<tr>
<td>Q15</td>
<td>R8.2</td>
</tr>
</tbody>
</table>

Table 2.5: Coverage of the identified requirements by the questions of the survey
3 Results and Analysis

In the first chapter the fundamentals of knowledge management, maps and the current situation in the agency were introduced. Based on this information the second chapter dealt with the evaluation process and the development of a questionnaire for the survey, the second step of the evaluation. These questions base mostly on scientific roots and besides the results of the first step of evaluation: the open discussion after the presentation of the maps.

This chapter now is about both: The results of the discussion and the survey. Based on that a comprehensive analysis was conducted in the of this chapter. The next chapter is about the drawing of conclusions and the formulation of future steps and suggestions.

3.1 Results of the Discussion

One of Mr. Hengl’s tasks in his master thesis was the development of two knowledge maps. The results were the knowledge application and the knowledge asset map, presented in chapter 1. To introduce those maps to the employees of the agencies a meeting was planned. But not only Mr. Hengl was there as external. He was accompanied by Mr. Schröder, Mrs. Borchardt and Mr. Melinat. Mr. Schröder, who is manager of the project ”Wissensmanagement in Mecklenburg-Vorpommern” (knowledge management in Mecklenburg-Hither Pomerania) and was there to see the current state and answer upcoming questions for the further development of the project. Mrs. Borchardt came to answer scientific questions beyond the topic of Mr. Hengl and to start in cooperation
with Mr. Melinat the evaluation of the project. After the presentation, the participants of the project started a discussion that should be seen as first part of the evaluation. To log the impressions, opinions, fears and hopes of the discussion Mrs. Borchardt wrote live minutes. Mr. Melinat again decided to create memory minutes after the discussion. Both protocols can be found in the appendix B.

The first impression was that the participants of the meeting were very active in the discussion. 3 of 11 participants stated that they read the thesis of Mr. Hengl and 4 others said they read at least a part of it. They were free to discuss several things, as the implementation of knowledge management and problems in the own organization culture. One of these problems is, that the management and colleagues have trouble to accept mistakes of each other. Through this the people tend to hide their own mistakes and do not see them as a chance for themselves or others to learn from it.

Furthermore the knowledge of the more experienced agents is often unused and currently there are no processes to preserve it. This is one the most important case for knowledge management. Because in the next few years a major part of these skilled employees is going to retire. Hence it is important to save as much knowledge as possible for the time they are still there.

According to the participants of the discussion it was very helpful for them to get the opinion from outside the agency. But still they have fears about the knowledge maps, too.

On of them is that all the knowledge that is collected by the agency could be used to substitute them. Especially people who are out of action (because of injuries, maternity protection, etc.) can be victims of this.

Several people apprehend that the additional time, that is needed to update and run the KMS, will not be considered as part of their job and thus their work load increases. The knowledge asset map brought up the question how to implement such a map while keeping the principles of data protection and privacy. Of course this refers to the apprehension of substitution and the problems in the organizational culture.
The maps were discussed controversial. On the one hand people said that the knowledge application map was complex and hard to understand. On the other hand they seem to be too schematic and not detailed enough. Probably the visualization does not meet the needs of all the participants. A redesign of this map could be necessary.

An important point in the discussion was the process of keeping the map up to date. During this part it was stated, that the knowledge management must be a side product of the usual work and should be anchored in the processes. Otherwise the maps would fail.

But before this can happen it is important to capture all the processes and then link all process oriented knowledge to them. In this point everyone agreed.

Furthermore it was suggested to extend the phone list that is already implemented in the agency. A future list could show the abilities and competences of the employees to them. This can serve as initial point for a knowledge source map or the further development of the knowledge asset map.

Several pieces information were given during this discussion. The knowledge maps are seen very different from each point of view. Some saw them as an opportunity to compensate the future problems. Others think that the maps do not work until the processes are defined. And there are still several fears about data protection, privacy and job security.

But of course there are certain reasons for eventual shortcomings in this analysis, too. For example just a little is known about the internal peer groups and the informal hierarchy between the agents. Hence the opinion of a specific person may bias the answers given by others. Furthermore the social background of the group members was not clearly examined. Because of this it was not possible to see if they are representative for all employees in the agencies or if they are all part of a specific group, that has completely different goals and needs than the rest of the agents. Several these problems could have been solved by a more planed form of discussion. But on the other side this would have decreased the time even more and the open atmosphere could have been destroy. To
counter this dilemma the survey was created, as mentioned in the chapter before. Hence the main task of this survey was to verify the results of the discussion or falsify them. But because the participants asked for an online survey, that went online 6 days later, an additional chance occurred: The chance to see how the employees thought about the knowledge maps with a little detachment to the topic. The results of this survey can be found in the following section.

3.2 Results of the Survey

Eleven people from the agencies participated in the discussion about the knowledge maps and every participant had to sign in with the name, the institution and an e-mail address. On Wednesday, the 17th of July the survey went online and an invitation mail was sent to the employees, where the end of the survey was set to Friday, the 26th. The employees were also asked to share this survey with others to get as many answers as possible. Because of several replies that asked for some more time, because some colleagues of the recipients were on holiday and they would like to share it, the time duration was prolonged till Monday, the 29th of July.

In this time twelve people participated in the survey. Out of those twelve people two gave no answer to any question and one person answered only the first two questions about their position and the time they are in this position. In the end eight people submitted usable results. The following contingency table provides information about the distribution of positions and the time a person worked in this job.

Basing on their experience their clerk are subdivide by the time they were in the their position before. In the end this leads to a number of 6 groups: The ABC, the XYZ, the Subject Area Management(SAM), the newer Clerks(Clk5), the more experienced Employees(Clk10) and the very experienced Clerks(Clk15).

The first task concerning knowledge maps was to hypothesize what services of the knowledge maps will be used by the employees, when they are implemented. For most of the
people who are working in the core processes of the agency, it was important to use
them in search for contacts and to keep an overview about the different subject areas.
”Comparison with others” seems to be only interesting for the Clerks, but not for the
management. But even here only 60% of the participants see it as a potential service they would probably use. For the XYZ it could be useful for needs assessment and analysis for personnel development. Other answers were ”to get an overview about the process steps” and ”for the introduction of new employees”.

One of the participants found a mistake in the maps. According to their statement the statutory basis in Hengls model applies mostly to cases of event management, but some people, who are working in the same process, use other legal standards. This has to be evaluated and if that is the case this bug must be fixed before the employees going to work with it. Any further mistakes were not submitted in the survey.

After this, the maps themselves should be evaluated by their future users. The general opinion about them was very positive, with a single person who was unsatisfied by the results. Then each map was evaluated separately in the categories complexity, appearance and intelligibility, starting with the knowledge application map. The complexity of this map was assessed very different among the participants. On the one side the more experienced group of clerks(Clk15) rated it as complex, while the employees(Clk10), with a maximum of 10 years experience in their position, think exactly the opposite

Table 3.1: Distribution of participants in the categories position and time in this position

<table>
<thead>
<tr>
<th>Position</th>
<th>Time in Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 5 years</td>
</tr>
<tr>
<td>Clerk</td>
<td>1</td>
</tr>
<tr>
<td>Subject Area Management</td>
<td>-</td>
</tr>
<tr>
<td>ABC</td>
<td>1</td>
</tr>
<tr>
<td>XYZ</td>
<td>1</td>
</tr>
</tbody>
</table>
way. The opinions of people with less skill differ in the same way. Probably other factors determine the perception of the map and not the age or the position. But these answer reveal something else, too: The importance to develop a map according to the context of the employees. Presumable reasons for this bias are described in the end of this section. Against this picture, everyone stated that they understand the map good or very good. In case of appearance the opinions are quite similar, too. Only one person thinks that the map is not appealing, all others state that they are pleased with the design. Even if there were several differences in the answers before, all people state that they understand the map. A conflict to the things stated before. A person who says, that the structure of the map is complex and the appearance is not appropriated, it would be expected to say, that the intelligibility is low, too. Actually the opposite was stated. Reasons for this and other shortcomings going to be examined in the end of the section.

After this, it was asked what would motivate the people to use the maps. Most of them agreed that courses or trainings would support them. But the support for this idea is far stronger among the management(3 out of 3) than among the clerks(2/5). The opposite applies on the anchoring of the knowledge map in the processes, where a majority of the clerks(3/5) and a minority of the management(1/3) is supporting the idea. Further suggestions were the visualization of processes, initial training for new agents and to use it not only in the core processes, but also in the support processes, as staff appraisal.

With this question, the part about knowledge application maps was closed and the section about knowledge asset maps started. The questions were the same as in the part before. Again the employees had the chance to evaluate the map in the categories of complexity, visualization and intelligibility.

In comparison with the knowledge application map the asset map is seen less complex. Probably the tabularly form fits more in their mind set, than an abstract map. This have to be considered for the development of future maps. The appearance is slightly better and the intelligibility has been the same.
For this map a majority of the clerks support the idea of trainings, but none of the management. The connection towards processes is important to all participants. The person from the XYZ sees an opportunity to analyse the future personnel requirement, while one clerk would like to see, that recruits get trained with this map and the system would be developed further to a research system. This probably means a search engine with various methods to search for knowledge, for example with the age, tag words, authors, etc.

In the last part the potential and the expected impact of knowledge maps should be evaluated. To accomplish this, it was asked to say how much time the people need per week to search for knowledge sources, e.g. documents or contacts, and how much time they hope to save with the new tools. The results show that most of the employees need about one or two hours per week for this. But there are others too, who do not use any time for this or at least just a couple of minutes. But in the questions about the potential time savings, the participants are divided into two groups. On the one side are the people with less experience (5 years or less in their job) and the people with more experience (10 years or more). The first group anticipates that a major part of the time could be saved by the tool, while the other group is far more pessimistic with low till medium expectations.

But only one person states that the knowledge maps will have a low influence on their work in general. The others expect a strong influence for their own work by the maps. And they strongly tend to agree that the knowledge maps are a benefit for their agencies when they are implemented.

Close to the end, the agents had the chance to suggest further improvements and they did. These ideas aimed at various levels. They submitted general suggestion, as the wish to let the users update and maintain the knowledge maps. It hoped, that this increases the intelligibility through collaborative work in the agency. Other participants are more concerned about the functionality of the maps: One of them asked for detailed maps in each subject area. And a detailed recommendation were made, too. One person
suggested to add two more circles in the middle. One for "knowledge" and one for "abilities".

All these changes should be considered, but it is more important to find out what the employees meant by their suggestions. The last wish for example, that suggested to have three inner circles in the knowledge application map. According to their statement these would be "knowledge", "abilities" and "competences". Maybe the agent meant to have one circle for explicit knowledge, one for tacit knowledge and one for the permissions or the position a user must have to fulfil a task. But maybe the employee meant something completely different. Hence further investigations seem to be necessary.

In the final question the employees had to say if they think that the estimated benefit justifies all the effort. The first impression in discussion conveyed the impression that a majority would agree to this, but now they had the chance to commit their true thoughts. And indeed, no one negated the statement. Hence the impressions from the discussion are considered as validate. But of course this cannot be proved. This form of evaluation has several possible reasons for shortcomings. The form of an online survey is usually not the best way to get information of a small group of people. Usually they are used for quantitative inquiries, where the opinion of individuals is less important. For this evaluation a survey right after the discussion or personal interview probably would have been a better choice. Another reason for shortcomings could be, that there was not much experience in the team for the creation of surveys. The reason why the intelligibility for both maps is about the same, could be because the participants considered this question as a challenge and they thought that a low rating in this point could would mean, that they are not capable to use these tools. This reasoning may lead to a form of reactants. of course afterwards it is hard to validate or falsify this, but it should be kept in mind that, especially this answer does not match with finding about the complexity. An higher complexity should probably lead o less intelligibility. Of course there are possible other reason, too. Maybe the participants have a different point of view towards the terms complexity and intelligibility.
Or a typical statistical bias has influenced this. For example the statistical mortality. It shows, that a positive rating of something with a non-mandatory survey is often reasoned by the fact, that people who do not like the subject do not participate in the inquiry. Hence the collected opinions do not display the opinion of the whole population, but only of the supporters. In this survey this would mean that critics did not participate in the discussion nor the survey. Thus the quality of future researches would increase, when the researchers ask the agents that do not participate in the KM project, too. Of course there are plenty of reason for shortcomings. But in the end this survey is probably trustworthy. Several mistakes were done, but the survey shows impressions that could be seen in the discussion and hence it can be seen as trustworthy.

3.3 Analysis

In the previous chapter, a table was developed that set the questions into relations with the interesting measurements researched before. This final analysis now shows whether those measurements can be evaluated by the results of survey and the discussion or not. The first category in the model of Jennex and Olfman is the "System Quality". In section 3.2 one measure was found that was interesting and possible to evaluate in this survey: The orientation/quality of visualizing context and structure (M1.1). In general the appearance of the maps was fine. But the discussion showed that the opinions about each map are different. While everyone understood the knowledge asset map very easily, it seemed to be harder for the employees to become familiar the concept of the knowledge application map. The survey underlines this impression, that the application map is seen as more complex. Nevertheless is has no effect on the intelligibility. But it is still possible that the complexity has a negative effect for the use, especially in the beginning, or the intend to use the system.

"Knowledge Quality" should be measured by "confidence in knowledge elements" (M2.1)
and the "completeness/sufficiency of knowledge base" (M2.2). One participant of the survey stated that he or she found a mistake within the legal basis. The high intelligibility shows, that there are just minor problems in understanding the maps. Thus the confidence in the maps is very high. On the other side it was criticized that the maps are not detailed enough for the regular employees. The discussion revealed that the current maps are only helpful for the management and recruits, because they - especially the knowledge application map - are not detailed enough yet. A stronger connection towards the processes was requested, too. The trust in the maps can probably be used to reduce prejudices against new technologies. Even if only this group of participants share this trust, they might influence others. But yet the problems may hinder this process, because they reduce the perceived benefit for the users.

As mentioned before there are currently only very basic knowledge services in these maps. Nevertheless one measure was identified to state their quality. The "refining/repacking" (M3.1) process in the beginning was successful as the good results in intelligibility show. Currently there is no way to refine them any further, but the discussion and the survey show that the employees see the importance of regular updates in the maps. In the long run, the low service level will reduce the intent to use the tools because they offer no simplification of any processes to the users. Hence a rise of this level is crucial for further success.

The use level has just two categories, but these are, according to Jennex and Olfman, the most important ones for this kind of evaluation. One of them is the "Perceived Benefit/Intend to Use"-Concept, that has 3 measurements. The impression in the discussion was, that the "motivation and commitment of users including incentives and training" (M4.1) is very high. Several people were active and asked for more information concerning the maps. But usually it needs several weeks or months to see the positive results of knowledge management. Thus the employees got asked what kind of motivation they would like. One result was that there are no universal triggers that would motivate all of them. The strongest agreement came for the anchoring of the
knowledge maps into the processes. Additionally several people supported the idea of trainings, especially for the use of the knowledge application map. Monetary incentives were excluded right from the beginning, because the discussion already showed, that there is no scope for a bonus in the public service. Besides, the advantage of monetary incentives is highly doubted. [Nor11][Ner95] Furthermore the discussion showed that the current culture in the agencies induces the people to hide their mistakes. (M4.2) This culture has to be changed to activate people for sharing their new knowledge, even if it based on a previous mistake. This change must start in the upper management. (M4.3) They have to act as a model for their co-workers. A new culture is not just activated. It must be transported, via trainings, discussions and all other resources that are needed. In the end it can be stated, that the "Intend to Use" is high at the moment, but this can change very fast, if the management does not offer enough support or no system for motivation is developed.

The "Use" itself and the "User Satisfaction" were hard to measured as long the system was not in use yet. Nevertheless the first and second impressions offered information, that are useful for further developments. One measurement for this category was the "knowledge satisfaction" (M5.2). The discussion showed, that the knowledge application map was not detailed enough for the typical use case of the employees. Some more knowledge should be integrated in this without losing its intelligibility. A technical solution for this can be to simplify the view for higher levels. On the current (non-digitalised) level this can only be reached by new maps for each department. Thus, it would probably mean to much effort for the moment. But for future developments this has to be considered. The general presentation of the knowledge elements is fine, according to the opinion of the discussion and the survey. As already mentioned the concept of the knowledge application map could be changed, because several people think that it is too complex. (M5.3) Or maybe the suggestion of one participant in the survey should be followed. The person recommend to replace the second circle by three others for tacit knowledge(abilities), explicit knowledge and competences. Beside the
design it is important to see if the employees can work with the maps. At least the search and retrieval should be easy, especially because there is no technological barrier for them. (M5.1.) This can help in an early stage of implementation. But later these maps should be replaced by a comprehensive system, otherwise the disadvantages will outweigh the benefits of the low entrance barrier.

In the model of Jennex and Olfman the impact level is determined by the net benefit, that includes all possible groups of stakeholders. For the concrete evaluation these groups are divided in the three groups ”individuals”, “groups” and ”organization” as suggested by Maier. Of course it is not possible to evaluate any real impact, because the maps are not implemented yet. Thus it should be seen as the ”expected impact”.

Probably the participants ”capabilities to access knowledge elements” (M6.1) raises through the maps. Most of the people feel capable to use the maps and hence it should improve this. And as shown, especially the participants with less experience in their subject area expect a positive ”impact on their time costs” (M6.3). But what is about the ”information overflow” (M6.2)? Eppler and Mengis identified five causes for information overload, one of them is the technology. [EM04] Especially the wish for more detailed view in the knowledge application map and the complex structure of it can result in a feeling of overflow for several participants. But in the current phase it is no problem yet.

For the group level only the ”contextualization on” (M7.1)- and ”confidence in knowledge elements” (M7.2) were meant to be measured. The observed group is already very confident in the knowledge elements presented by the maps. But the knowledge maps do not only aim for the people who are already in the groups, but also at the recruits of them. During the discussion as well as in the survey several people focus on the use of the map for the new ones. And exactly this is one of the main advantages of knowledge maps and a main goal of the project this thesis bases on. [Epp02] The contextualization can help the employees to find experts faster and to become familiar with their position. And with the contextualization the confidence in those knowledge elements rises, too.
Because they are the group with the most (perceived) benefits, they probably support the development of the system the most, when they are integrated into the agency.

But not only groups and individuals benefit from the maps. The whole organization can profit from time savings (M8.2) and more transparency (M8.1). The expected time savings of the individuals already showed, that there is a fair amount of time expected to save through the knowledge maps. And as several people stated that a typical use case for them would be to get an overview about the other participants in their processes, the maps are going to increase the general transparency, if the processes are defined.

In general many participants argued that before the knowledge maps should be integrated, the processes of the agencies should be defined and registered. Otherwise maps like the knowledge application map, where the knowledge is connected to the process steps, would be hard to integrate, because everyone has another sight towards the processes.

The knowledge asset map was seen less complicated. But it is important for the quality of this map to defined a process to evaluate the statements, because competences change and the currently the competences are assessed by the employees themselves. Hence there is no objective authority who validates these statements.

In the next and final chapter the results of this analysis are used to assemble concrete options and hints for the future of knowledge management in the agencies of Rostock and Mecklenburg-Hither Pomerania.
4 Résumé

The task for this bachelor thesis was to conduct an evaluation for knowledge maps in the public agencies of Rostock. After fundamentals were composed and the right theoretical reference model was found, the evaluation process started with a discussion among the future users of these maps and the creator of the prototypes. Based on the results of this discussion and the identified measurements of the reference model, a comprehensive survey was developed, sent to the participants of the discussion and finally the results got analysed.

This final chapter now deals with the consequences of this analysis and suggests how the knowledge management for agencies in Mecklenburg-Hither Pomerania can be integrated in the future and what should be done before.

Beyond that the research questions, developed in the motivation, are answered as a final conclusion.

4.1 Suggestions and Prospects

The evaluation of knowledge maps in the agencies of Rostock revealed that there are several chances as well as certain risks in the future of knowledge management in the public service.

In the coming years a major part of the employees is going to retire. This means an high risk to lose precious knowledge sources, in form of experienced experts, and this will probably lead to a decrease of quality in consulting, service and capability. The
identification of the crucial knowledge, its extraction and preservation of its sources are important tasks for the coming years. Knowledge maps can be one tool to reach all this. The employees of the agencies see the problems, as the evaluation shows, and are willing to do something against it. This is a good sign, because for the implementation of a KMS it is important to motivate the future users. But of course motivation is not enough. Beside this, it needs a knowledge strategy, the identification of knowledge resources and a plan how to implement the knowledge management system. [...]

The first step of Epplers implementation model for knowledge maps is the identification of knowledge intensive processes. [...] But even the general processes are not defined yet, not to mention the knowledge intensive processes. Thus the first step to implement knowledge maps must include the definition of at least all the core processes in the agencies. Maybe in form of a comprehensive enterprise modelling. This is supported by the participants of the discussion and the survey, too.

Of course there are other forms of knowledge management systems and other way to integrate them. For example the model of O’Dell and Grayson, that implements a knowledge management system in a single department and then scales up to other department until finally the whole agency is part of the knowledge management. This can be an option to implement the knowledge management in a single agency very fast, but depends highly on the motivation of this agency. Furthermore this strategy excludes several use cases in the beginning, like the search for knowledge in other departments. These models are only examples, of course. But all of them benefit from a appropriate process management. But no matter what model is used, an important task in the beginning is the development of a strategy. Part of this is a comprehensive analysis for the knowledge need and supply of the agents. Based on this analysis, knowledge goals should be identified. Then, with this a knowledge management system can be developed and implemented.

During the development it is crucial to communicate with the end-user. As seen in this evaluation, knowledge maps offer a possible solution that is intelligible enough for users
and offers an appropriated way to integrate new agents.

An important task for the developers will be the capture of the employees context and to develop a tool that fits into this. The knowledge asset map already seems to achieve that, but the knowledge application map does not completely. Several people had problems with its complexity. Of course they were able to understand the map. But the first contact with such a map should be as easy as possible, because a main benefit of these map is that they are intuitive for the users and have a low entrance level. Further research among the agents can help to identify this context.

In the phase of implementation, it will be crucial to keep the agents motivated and finding a way to integrate the maintenance and extension of the KMS into the daily routine. Otherwise the tool will be interesting for a short time and after this, the updating slows down. This should be prevented.

The initial situation for future knowledge management is good. For one thing the group of participants is very motivated, has a good opinion about knowledge management and is willing to proceed in this field. For another thing they are aware of the future problems and sensitized now for the concerns of knowledge management. The typical fears, as the lose of power and to be replaced, are there, but they did not dominate the discussion nor the survey. This good initial situation should not be forfeited through an overhasty implementation of an inexpedient tool.
4.2 Final Thoughts about the Evaluation

In the beginning three questions were posed:

1. What is the benefit in the use of knowledge maps for the issue of knowledge preservation?

2. Is there already a reference model for the evaluation of knowledge management systems and if there are several alternatives, which of them is the best fitting?

3. How should the evaluation be constructed to achieve as much response as possible?

The first question can be answered was already answered in the first chapter. At least in theory, the maps have a very low entrance level and visualize the context of the user group. This research shows that especially the knowledge asset map meets exactly this context. And even if the application map was seen as more complex, it was still intelligible for the users. Another advantage of the knowledge maps is that the internal context got codified for the first time. Especially new agents can learn the context with this and integrate themselves better into the group. But of course the visualized context stays not forever. It is changing through the arriving of new people, the retirement of experienced users and effects from outside (new policies, legal standards, etc.). A living community needs to evaluate this context and change it, if it is necessary.

The theoretical basis for this evaluation was provided by the "Knowledge Management System Success Model" of Jennex and Olfman. It provided help for the construction and interpretation of the survey and a reference to empirical researched success factors. Especially the connection towards the "Knowledge Management System Success Model" of Maier offered a wide range of measurements that could be researched during the evaluation process.

A permanent problem was to get a critical mass of participants for the evaluation. In the first place it was surprising how many people participated in the presentation of knowledge maps and the following discussion. The estimated number of participants
was higher than expected. This finds expression in the quality of the discussion, too. In
the first place, the idea was to do the survey right after the discussion. But because there
was not enough time in the end, it was decided to put it an online survey. This offered
the chance to adapt the survey, after the discussion brought up some new questions and
impressions. Furthermore others, who did not participate in the presentation, had a
chance to give feedback about the maps, too. But probably this reduced the quality of
the survey. [VSJ06] If the survey would have been conducted right after the discussion, 11
usable response could have been used. The online survey had 12 participants, but only 8
usable responses. A lose about 18%. Furthermore the participants would have been able
to ask directly if they did not understand a specific question. Another approach could
have been to combine both methods, the questionnaire on paper and the online survey.
The questionnaire could have been used to validate the impressions of the discussion
and then, several days after this discussion, the online survey could have started basing
on the results of the discussion and survey. The first survey would have offer an high
quality of results and the second one would have given everyone else the opportunity to
participate.

But in the end the contribution towards the evaluation was satisfying. The most ur-
gent questions got answered, a basis for future research was formed and it was shown
that knowledge maps offer a fair opportunity for future knowledge management in the
agencies of Mecklenburg Hither Pomerania.
Bibliography


5 Appendix
APPENDIX A

Willkommen
Sehr geehrte Mitarbeiterinnen und Mitarbeiter der Stadt Rostock,

1. Was ist ihre aktuelle Position in der Behörde?

2. Wie lange sind sie schon in dieser Position?

   □ unter 5 Jahre   □ 5-10 Jahre   □ 10 - 15 Jahre   □ über 15 Jahre
Auf den folgenden Seiten werden die Karten, die sie bereits am Donnerstag sahen, noch einmal kurz beschrieben und ihr Verwendungszweck erläutert.

Abbildung 2.1: Bei dieser Karte handelt es sich um eine Wissensanwendungskarte. Im inneren (schwarzen) Kreis sind die fünf groben Prozessschritte erklärt, die nötig sind um eine Veranstaltung in Rostock zu absolvieren. Der zweite Kreis beschäftigt sich mit den notwendigen Kompetenzen, die im besonderen gefordert sind, um die Aufgabe zu bewältigen. Im äußersten Kreis geht es dann schließlich um die Werkzeuge, die für die Durchführung genutzt werden können.

3. Welche Dienste der Wissenskarten sind für sie interessant?
   - [ ] Suche nach dem richtigen Ansprechpartner
   - [ ] Überblick über beteiligte Gruppen erhalten

4. Sehen sie aktuell Fehler? Wenn ja, welche?
   - [ ] Ja
   - [ ] Nein

5. Rufen sie sich die Karten, die in der Präsentation vorgestellt wurden, ins Gedächtnis. Wie zufrieden waren sie mit dem Ergebnis?
   - [ ] Sehr gut
   - [ ] Gut
   - [ ] Befriedigend
   - [ ] Ausreichend
   - [ ] Mangelhaft
6. Was würde sie motivieren diese Karte zur Anwendung zu bringen?

☐ Lehrgänge
☐ Verankerung in der alltäglichen Arbeit
☐ [optional]

7. Wie bewerten sie die Karte in Hinsicht auf Komplexität, Darstellung und Nachvollziehbarkeit?

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Abbildung 5.1: Die Wissensanwendungskarte
Abbildung 7.1: Die Wissensbestandskarte

8. Was würde sie motivieren diese Karte zur Anwendung zu bringen?
- [ ] Lehrgänge
- [ ] Verankerung in der alltäglichen Arbeit
- [ ]
- [ ]
- [ ]

9. Wie bewerten sie die Karte in Hinsicht auf Komplexität, Darstellung und Nachvollziehbarkeit?

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10. Wie viel ihrer wöchentlichen Arbeitszeit setzen sie für gewöhnlich ein um Wissensquellen (bestimmte Dokumente, Experten, etc.) zu finden?

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11. Wie viel ihrer Arbeitszeit kann Ihrer Meinung nach durch den Einsatz der Karten wöchentlich gespart werden?

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<td>gar keine</td>
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12. Wie sehr, glauben sie, werden die Wissenskarten ihre Arbeit beeinflussen?

| sehr stark | gar nicht |

13. Sehen sie die Wissenskarten als einen Gewinn für die Behörde?

| ja, auf jedenfall ein Gewinn | nein, definitiv kein Gewinn |

14. Wie müssten die Karten noch verbessert werden, damit sie sie optimal nutzen könnten?

15. Sehen sie die Erarbeitung von Wissenskarten und/oder anderen Wissensmanagement-Werkzeugen im Verhältnis zum einhergehenden Aufwand als sinnvoll an?

| ja | nein | nicht abschätbar |
APPENDIX B

Gedankenprotokoll Behördenbesprechung 11.07.2013

Eindrücke

• Leute waren sehr interessiert
• offene Diskussion
• im Allgemeinen positive Stimmung

Meinungen

• Karten sind zum Teil sehr schwer verständlich
• präsentierte Karten für die einzelnen Bereiche zu undetailliert, daher nur für das obere Management sinnvoll
• Wissensmanagement muss „Abfallprodukt“ der eigentlich Arbeit sein
• Perspektive von außen ist hilfreich
• Vor dem Wissensmanagement müssen die Prozesse festgesetzt werden
• Stelle fürs Wissensmanagement steht wahrscheinlich aus Kostengründen nicht zur Debatte

Ängste

• Ersetzen von Mitarbeitern, die längere Zeit ausfallen (Mutterschaft, Krankheit, etc.)
• Was macht man, wenn Leute nicht mitziehen? Nach den ersten zwei Durchläufen werden (hoffentlich) Vorteile deutlich und der Widerstand schwindet.
• Datenschutzproblematik, insbesondere bei den Wissensbestandskarten
• zuviel Work Load für den einzelnen

Wünsche

• Vorgesetzte müssen den zusätzlichen Work Load anerkennen
• Organisationskultur sollte mehr Fehlertoleranz zulassen
• Prozesse klarer definieren
• Prozesskarte erstellen
• Telefonliste ausbauen
Mitschriften Ulrike Borchardt  
(digitalisiert und redaktionell überarbeitet von peter Melinat)

- Wer hat die Masterarbeit von Herrn Hengl gelesen?
  - 3/11 ganz
  - 4 teilweise

- Expertenverzeichnis
  - weitere Ansatzpunkte werden hier gesehen
  - Frage inwiefern reichbarkeit sichergestellt werden kann
  - Akten sind derzeit nur in Papierform vorhanden

- Wissensprofile
  - Im Human Resource Management existieren Stellenprofile und Beschreibungen der Tätigkeiten

- Grünamt
  - Abzudeckende Bereich für Wissensmanagement:
    - Zwischenamtlöliche Prozesse
    - Ausfälle abdecken
  - Guter Überblick/ Verortung der Kompetenzen

- Frau Bady:
  - Wissensmanagement ist sehr komplex
  - Zeitaufwand ist mehr als nur der Initiale
  - Granularität der Karten okay
  - WM gehört nicht zu den Aufgaben wofür sie bezahlt wird → schwierig im Job unterzubringen
  - bevor es intern genutzt werden kann muss die Prozessmodellierung durch sein

- Pflege des Ganzen sehr aufwändig

- Rechtsamt
  - Diskussion inwiefern soziale Kompetenz Wissen ist

- Karstorf
  - Sehr umfangreich → zum Teil zu umfangreich (internalisiertes Wissen)
  - Um Lücke durch Verruheständlerung kleinzu halten: Mentoring-Programme
  - weiter Programme kommen
○ Viele Wissensfragmente bestehen heute schon, müssen nur an Prozesse gehaftet werden

○ Welches Wissen will ich abarbeiten?
  ▪ Neuheiten
  ▪ Sachen die bald vergessen werden könnten

○ Ständiges Vordenken kaum möglich
  ▪ Eventualitten abdecken
  ▪ Ad hoc-Anpassungen

○ Probleme in der Organisationskultur
  ▪ Fehler akzeptieren
  ▪ Nützen der Alten für Junge
  ▪ Vernichtung von Wissen
Eidesstattliche Versicherung


Rostock, December 16, 2013

Unterschrift