Framework for starting a RAMS project in a developing country

Case: SirWay

Tuukka Alavaikko

Haaga-Helia University of Applied Sciences

Bachelor of Business Information Technology

Research-based thesis

2023

Abstract

Author(s) Tuukka Alavaikko
Degree Bachelor of Business Information Technology
Thesis title Framework for starting a RAMS project in a developing country – Case: SirWay
Number of pages and appendix pages 46 + 3

The overall objective of this thesis is to develop a framework for the commissioning company to be used when starting a new Road Asset Management System project in a developing country. Current practices are to be identified and the possible development points will be brought up to the company's attention. This will hopefully be a useful tool for the company in the future and have a positive impact on their future projects.

As the company is growing in the future, special attention should be shown to the project management practices, thus the idea for this thesis. A clear need for the results was identified as multiple projects were starting at the same time and the lack of tools and processes for management of multiple projects simultaneously. The thesis was written between autumn 2022 and spring 2023.

To ensure a structured thesis, it is divided to three parts. In the first part, the objective of the thesis explained. This builds up for the second part being the theoretical framework which defines all the subjects relevant for the thesis, including the details of the commissioning company. In the third, empirical part, the interviews and researcher's observations are analyzed and digested.

The research method for this thesis was selected as qualitative interviews. The interviewees were selected based on the recommendations of the company and the researchers personal connections. All the interviewees are experts of the subject, ensuring that the quality and adequacy of the answers is as high as possible.

The discussion part shows that some parts of the interviews are quite similar as they have been working in similar projects. This shows that similar problems and positive actions were noticed by different personnel, helping to show that they are relevant considerations. This gives confidence for the purpose of the thesis, and it's use for the company in the future.

Keywords
Road Asset Management System, Project Management, Management System, International Development, Interview

Contents

Figures

Tables

Abbreviations

ADB	Asian Development Bank
API	Application Programming Interface
ASSET	An asset represents an economic resource owned or controlled by, for example, a company
CMMI	Capability Maturity Model Integration
CSF	Critical Success Factors
DB	Database
EBRD	European Bank for Reconstruction and Development
ERF	European Road Federation
EU	European Union
FRAMEWORK	A basic structure underlying a system, concept, or text
HAAGA-HELIA	A Finnish University of Applied Sciences
ICT	Information and Communication Technology
IT	Information Technology
IDB	International Development Bank
LRS	Location Referencing System
MENDELEY	A reference management software
RAMS	Road Asset Management System
RAM	Road Asset Management
RUC	Road User Costs
SirWay	A Finnish consultancy company
WB	World Bank

1 Introduction

This chapter will act as an introduction to the world of road asset management and its importance to the public around the world. It highlights the importance of the topic of this thesis and how it can increase the value of not only the client but also in the bigger picture. Better project management generally brings better results, and this increases road quality and therefore better return of investments.

Roads and all the other asset groups related to roads are one of the most valuable assets that public organizations have in their possession and their maintenance requires a significant amount of money and effort from the society. In European Union alone, the value of road assets is over 8 billion euros (The European Road Federation 2018, 3). In society, as we know it, roads are a critical part and everything from public transport, bicyclists and logistics are dependent on roads. Roads are an integral part of our everyday lives and the development of roads, and their maintenance is a critical thing, especially in developing countries where the practices might not be the most sophisticated. (Berg, Deichmann, Liu & Selod 2015, 5)

Because of the social importance of roads and their significant economic value, their maintenance is a very large expense for the road owners. On the other hand, keeping the roads in good condition reduces the road user costs and optimizing the road maintenance also reduces the costs of the road owners and therefore it would be beneficial for all parties. While there are studies and proof of predictive maintenance being cost effective and cheaper than preventive maintenance, it is still quit rarely used in developing countries and in the municipal sector. ((ERF) 2018, 2) A quite recent study from Canada shows that 98 percent of the local municipalities understand the benefits of predictive maintenance but only a fraction has implemented that in their processes (Infrastructure Solutions Inc 2016, 3). There are multiple reasons behind this but some of these include the costly implementation of predictive maintenance processes and needed systems. While it is quite clear that it would be cheaper in the long run, the initial funding can seem a bit costly for the organization and it might hold them back. Also, the institutional change required for such change can prove to be difficult to implement. (Schraven, Hartmann & Dewulf 2011, 62–66)

Road Asset Management Systems have been developed for decades and they are trying to answer the needs of road owners to manage their road assets. These systems are quite widely used especially in developed countries and in organizations that have understood the benefits of implementing data-driven decision making. These systems are meant for the road owners to have a dedicated system for managing the road network and doing systematic maintenance planning. There are different approaches to such systems and some of them are merely a database for storing data of the road networks while more sophisticated systems can do automatic maintenance planning according to certain parameters depending on the data collected. (Panjom, Chayanitivuth, Leepreecha & Rujivorakul 2022, 4) The starting point is to have a place for all the data the road owner decides to collect, from centrelines to different condition data and pictures or even videos. The most developed systems can store data of all the road assets, such as signs, kerbs, and drainage without forgetting bridges and tunnels.

1.1 Research approach

The research approach for this study is based on the case study model. Case study is an excellent tool when the objective is to find the answers to question of “how?” and “why?”. Case study can give valuable information of an organization, its problems, processes, people, and culture specifically in a contemporary context. This gives the opportunity to see the studied subject in its natural environment. (Yin 2009, 4)

For this thesis, qualitative case study research will be applied, as there is a good number of sources available from documentation of past projects, relevant personnel available for interviewing, and own personal experiences of several projects in the past 5 years. The main source of data are the relevant personnel who have worked around the subject for decades. There is some documentation available of other similar projects as well and that will be used to understand the phenomenon in a wider context.

As explained by Ojasalo, Moilanen & Ritalahti (2009, 54), a case study consists of 4 stages. The first stage is the preliminary study or problem, and the following second stage is the orientation to the phenomenon in practice and theory. Third stage focuses on the collection of data from various sources, depending on the phenomenon in question. The fourth and final stage is the proposed development model. This can be seen in Figure 1.1 demonstrating the different phases.

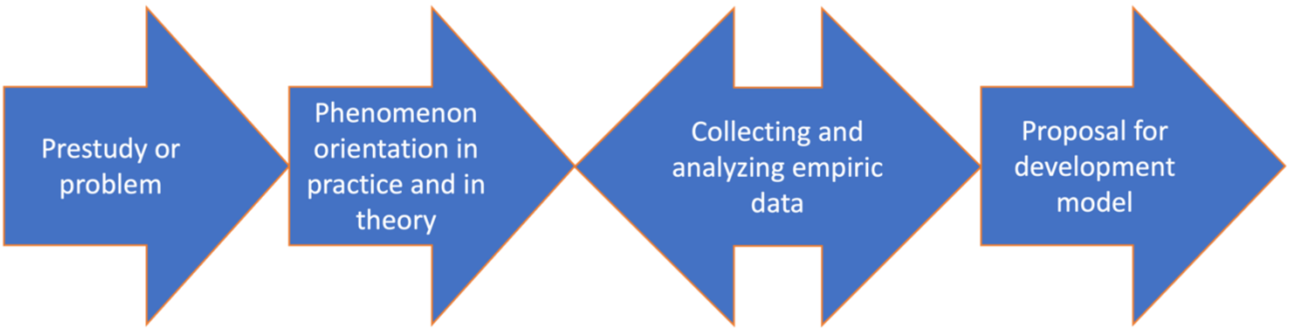


Figure 1.1. Stages of case study (adapted Ojasalo & al. 2009, 54)

1.2 The objective of this thesis

The objective of this thesis is to create a clear roadmap for SirWay when starting new RAMS projects. While very good project management frameworks have been created and they can be adapted to these projects it would be quite beneficial to have a dedicated framework for RAMS projects in developing countries specifically. The focus is especially on the start of the projects as that is probably the single most critical part. The experiences of the company show that the biggest mistakes can be done in the start and eliminating those would be beneficiary. These projects have many individual characteristics that differ a lot from other projects. (Sirvio 2022)

As SirWay and other companies in the industry use a lot of freelance consultants to correspond with the requirements of the projects it can be sometimes difficult to implement the wanted processes for each project. Coherent project implementation across all ongoing projects, which can sometimes be across the globe, is a difficult task to manage. (Sirvio 2022)

The result will be a proposed project framework for typical SirWay project with an emphasis on the beginning of one. With the help of the current employees and their practices there is a good base to start but documentation of these processes is not present. SirWay requested a checklist of the tasks which should be taken care, when starting a project, so that will be created as well as a part of this thesis.

1.3 Structure

To follow a clear structure, this thesis is separated in to two parts, theoretical and empirical part, consisting of total of six chapters. First chapter acts as the introduction to the subject and the goal of the thesis. In the second, the theoretical part, the critical subjects of the thesis are defined to present an understanding of project management theories as a whole. The empirical part combines personal experience with interviews from professionals of the field to deepen the understanding of specific types of projects studied in this thesis. The last two chapters go through the results of the interviews and discusses the overall process.

References in this thesis are made using Mendeley referencing software and using the style: Cite Them Right – Harvard as instructed by Haaga-Helia.

2 Theoretical Framework

With the large area that project management includes, it is crucial to have a good understanding or all the topics affecting it and the relationships between them. Especially IT projects have some characteristics that can differ from traditional project management quite heavily. On top of that, the complexity of international development projects provides a whole new layer. Holistic view to understanding the different stages is therefore important.

The working environment evolves all the time and lately, project style work has increased significantly thus creating a need for frameworks for project management across different industries. Project management in the start was mainly used for construction projects and similar industries but today, project management is needed in almost every field of work so the need for more specific frameworks has increased as well. A lot of project management processes and aspects are quite universal but when going to more detailed level, differences do arise and something that might work in a construction project will not work in an IT project.

Project as a definition can sometimes be used a bit loosely, but it does have some definitive characteristics which are nicely defined by Mäntyneva (2016, 13). A project has at least these attributes:

- It consists of temporary activities, which have been scheduled.
- It has a clear objective.
- The activities advance towards the objective.
- The project has limited resources.
- Project Manager coordinates the different activities.
- There is always risk regarding the completion of the project successfully.
  (Mäntyneva 2016, 13)

There are different types of projects and even though they do share the same characteristics presented above, they do have some differences. Risto Pelin (2011, 31–34) has divided projects in to five different types and this is quite commonly used division:

1. product development projects
2. research projects
3. internal development projects
4. delivery projects
5. investment projects

While these are a good general guideline to different types of projects there is some overlap as well and a project can contain elements of two or even multiple types in some cases. As an example, the projects reviewed in this thesis are delivery projects at their core, but they also include characteristics from product development, research and even investment projects.

2.1 Project management

Traditionally, project management has been seen more through the lens of the “hard” skills and this approach applies to the projects in question of this thesis as well. The so-called iron triangle has been widely used to describe those hard skills which are time, cost & quality. While there have been disagreements of especially the third success criterion, it has been quite established since the 1970s. (Pollack, Helm & Adler 2018)

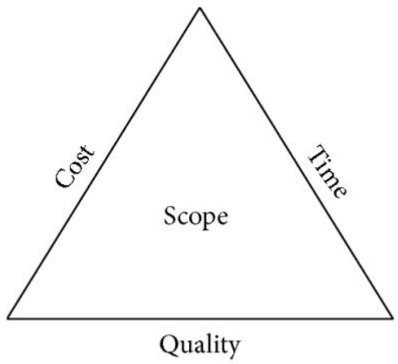


Figure 2.1. Iron Triangle (Leong, Zakuan, Saman, Md Ariff & Tan 2014, 2)

The shift towards a more humane working environment in almost all aspects has affected project management as well. In addition to the iron triangle and the hard skills related to it, there has been an increasing focus towards the soft skills involved with project management. While, traditionally the core competencies have been mainly about the hard skills which can be quite easily measured with academic success or completed projects, it is obvious that this is not enough to successful project implementation which requires more than one people, as it does in 99 percent of the time. (Carvalho & Rabechini Junior 2015)

There is a strong stereotype of difficult IT systems in public organizations, in terms of system usability as well as in implementation and Road Asset Management System projects are no exception. Agile processes in project implementation, which are so typical for IT projects can be quite far off from a traditional project implementation process in the public sector and that can prove to be problematic. With all the bureaucracy involved in public organizations it can easily slow down the development work required for IT projects. If the project implementation doesn’t work out as indented, it compromises the whole project, and the result can be quite far off from the planned. (Panjom & al. 2022, 472–476)

While the success of IT projects, including implementation of RAMS, is quite easily measured by the completion percentage of the requirements set in the start of the project that is not the whole picture. Implementation of RAMS can be successful even though it would never be used but that is quite a short-sighted point of view. When implementing such systems, the technological success is only half the story as it always requires an institutional change as well, to really make sure that the system will be used as indented in the future when the implementing consultant will be gone. (Cartier van Dissel 2018, 2–5)

2.2 Lifecycle of a project

Projects in this thesis's context tend to have quite clear starting and ending points so studying a typical project through its lifecycle is a good way to see the structure of a project. Even though, the starting point of a project is easily defined, the preparation for starting a project can last for years before the actual starting date. Mäntyneva (2016, 17) divides the project lifecycle to 4 phases, which are:

1. Conceptualization
2. Planning
3. Execution
4. Closure

This is not a definitive solution and there are other methods to the project life cycle approach, but they all tend to follow the same principles as the one presented by Mäntyneva (2016, 17). They might be split into more detailed processes, but the core idea stays the same.

Project preparation might start several years before the actual implementation. Every project is unique, and they have their own backgrounds. For each implemented project there are probably multiple projects which never got through the first phase. Length of the preparation can vary significantly depending on the type of the project as well as the industry. For example, a software project in a start-up company made in-house might be prepared in a week but a big infrastructure project in a public organization might take dozens of years to prepare (Mäntyneva 2016, 18).

After the initial decision has been made to go through with the project and it is clear to all stakeholders that how the project will be executed, starts the planning phase. This phase consists of defining the objectives of the project and how comprehensive it will be. One of the key decisions in this phase is about the method of implementing the project. Depending on the organization and the project in question the project will be done in-house or outsourced to an individual or a company outside the ordering organization. The approach to the conceptualization phase can be different depending on what is the role of the company initializing the project. If it's the executor, the project must be sold, and the client decides whether the project is needed. When it's the other way around, the client has the option to choose the best way to move forward with the project execution. (Kinkel, Rieder, Horvat & Jäger 2016, 2–4; Mäntyneva 2016, 18)

Planning has been widely regarded as a critical success factor in a project (Pinto & Slevin 1988; Johnson, Boucher, Conners & Robinson 2001). This emphasizes the importance of this phase and the organization responsible should really take their time in this phase to give the project a better chance of success. It is important to allocate the needed resources, being it time, money, or people, to the project and ensuring that there is enough of each of them for successful project implementation. While it is important to make the project plan as accurate as possible, it should have some flexibility as there is always a possibility that something goes wrong, and delays tend to happen quite often. (Mäntyneva 2016, 19)

The execution phase focuses on the actual execution of the project as it was planned in the previous phase. Should changes be needed to the plan for one reason or another, action will be taken accordingly. There is relatively little research on the theoretical part of the project execution even though it often takes the most time in the project life cycle. As noted by Earnhardt, Marion, and Richardson (2016, 71), studies that approach project execution tend to be retrospective or quite straight forward and don't go much into detail. This might be related to the fact that the execution phase has a considerable number of variables, and the methods differ a lot even inside an industry.

The last phase of the project life cycle is the closure of the project. This is timely when all the project deliverables have been delivered and approved by the client or a third-party responsible of supervising the project. It is very typical for a project to have a final report as the last deliverable, which goes through the project and presents the execution of the project and possible exceptions during the project. The final report is typically conducted by the project manager with the help of other team members. (Mäntyneva 2016, 19–20)

It is important to do the final report with finesse as it can help in the future and assess possible problems which might have occurred during the project. To close a project, the steering group must accept the final report. After the final report, other closing steps will be conducted, such as dismantling the project organization and filing the project after marking it completed. Proper closure of a project is critical as projects which don't get closed, can easily drain time and money of those included. (Mäntyneva 2016)

2.3 Project organization

Each project needs an organization which will be responsible of the successful implementation of the project. The allocated human resources to the project organization are a key to performance of the project organization. This tracks back to the planning phase of the project, where all the resources needed should be identified with enough precision to have a clear understanding of what is needed to successfully finish the project in hand. The structure of the project organization depends on the needs and objectives of the project and what kind of stakeholders are involved.

A typical organizational structure of a project in discussion in this thesis consists of three main stakeholders which are essential for the project. These are:

- Funding institution (World Bank, Asian Development Bank or similar)
- The client (ministry or other administration responsible of the roads)
- The executing body (consultancy company or consortium)

Sometimes the funding institution can be the client itself but that is quite rare. Inside these stakeholders there are dedicated teams which are responsible of the project in hand, and they work in parallel to ensure the fruitful completion of the project. The executing body has a project team consisting of various experts required by the project plan made by the client. The client usually forms a dedicate unit which will be responsible for assisting the consultant to achieve the objective and to take charge of the product after the project is complete.

Mäntyneva (2016, 22–24) has introduced the different parts of a typical project organization and these are usually always present when a project is done. They might not be as clear as presented by Mäntyneva but in one way or another their roles are fulfilled within the organization during the project. The descriptions of the roles are as follows:

- Project Sponsor
- Steering Group
- Project Manager
- Team Member
- Project Secretary
  (Mäntyneva 2016, 22–24)

All these roles have their own responsibilities to take care of to have a successful project. These responsibilities can overlap depending on the project and each organization might divide the responsibilities differently depending on the needs and competencies of the persons involved. (Mäntyneva 2016, 25)

The project sponsor is the one enabling the project and starting the whole process. They will get the required funding and ensuring the required resources are available for the project. They are involved in every step of the project, being it directly or indirectly. As Bryde (2008, 801)defines the project sponsor, “responsible for activities that span across the whole of the project lifecycle”. The project sponsor is also in charge of defining the critical success factors which are used to measure the success of the project, during and after the completion. (Bryde 2008, 801; Mäntyneva 2016, 22)

The project steering group will be set by the project sponsor, and they will work closely with the project team helping them but also overseeing the project progression. The steering group is responsible of the smooth completion of the project, and they should ensure that the project team has all the necessary resources to fulfil the project objectives. They will do the initial scheduling and resourcing in line with the initial plan made by the project sponsor. The steering group can be outsourced as well, if the client does not have the capabilities to oversee a project due it’s complexity or lack of resources. Even if this is the case, the client should have somebody responsible of the project, even if their focus is not full-time on the project. (Urbach & Würz 2012, 2–5; Mäntyneva 2016, 22–23)

The Project Manager is probably the most important individual person in a project and a lot of the project activities go through them as they should be arranging all the tasks of the project. They will make a more detailed schedule of the project during the inception phase and the last details will be discussed with the steering group. (Mäntyneva 2016, 23–25) There might be multiple project managers in a project, depending on the execution type. If the project has a client and a supplier, it is not uncommon that both parties have a project manager. They will work in close liaison and help each other to achieve the goals of the project. (Gasemagha & Kowang 2021)

Reporting during the project is an important task during the project to keep tabs on what’s happening and if the project is staying in schedule. The project manager usually has the responsibility to write these reports with the help of other members in the project team. The project manager usually has a very good understanding of the project as a whole and maybe deeper understanding of some aspect of the project. A good expert, however, does not necessarily transform into a good project manager as the competencies required are quite different. (Liikamaa 2015, 4)

Each project needs team members with various skills for the project completion, depending on the objectives. The required competencies will be defined by the steering group or the project manager or both in co-operation depending on the project. The project team members will be responsible for planning and execution of the tasks they are assigned to. Team members are usually experts of their profession, and they handle their part very well. They might not have any expertise in other areas of the project, and it will be the project manager's task to assign the right people to right tasks. They will report of the progress of their own are to the project manager and keep the project on the right track. (Liikamaa 2015, 2; Mäntyneva 2016, 23; Oh & Choi 2020)

Project secretary is one important role in a project as they ease the work of other positions by handling practical issues. This role is defined by Mäntyneva (2016, 23–24) but it is not widely found in other literature on the matter. The secretary is defined as someone who is responsible of a lot of the practical matters in the project, such as monitoring the schedule, managing the expenses, and organizing meetings during the project. (Mäntyneva 2016, 23–24)

2.4 Maturity level

A key success factor with any project conducted inside or for an organization is the maturity level of the said organization. The maturity level can be assessed with reviewing the used processes of the organization regarding their key business objectives. The better the structured processes and the more systematic approach to the organization's work, the higher the maturity level and chances of successful projects. (Proença & Borbinha 2016)

For this case, a very useful maturity level would be Capability Maturity Model (CMMI) which is developed for software in the beginning. It is possible to adopt it to measure the software processes, software processes or even the organization in general. The six different levels are clear and there are also guidelines on how to improve the level of maturity. In Figure 2.2 the CMMI has been visualised.

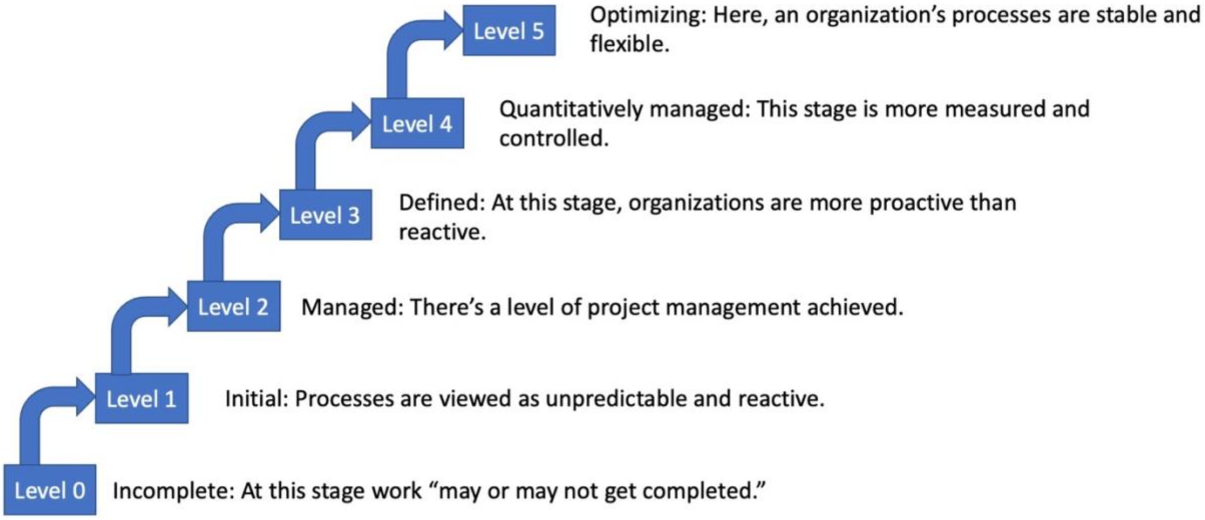


Figure 2.2. Capability Maturity Model Integration (adapted What is CMMI? A model for optimizing development processes s.a.)

A very comprehensive maturity model has been developed and it considers the dimensions of the maturity level as well as the asset management aspects (Volker, der Lei & Ligtvoet 2011). There are seven different asset management dimensions (information management, internal coordination, external coordination, market approach, risk management, processes & roles, and culture & leadership). This model uses originally only five different maturity levels compared to six presented above but for the purpose of this thesis it has been adapted as seen below in Table 2.1.

Table 2.1. Maturity model for infrastructure asset management system (adapted Volker & al. 2011)

	Information management	**Internal coordination**	**External coordination**	**Market approach**	**Risk Management**	**Processes & Roles**	**Culture & Leadership**
Optimized							
Quantitatively managed							
Defined							
Managed							
Initial							

Incomplete							

2.5 Success factors in project management

As it is defined, a project has a clear objective and a timeframe, so it is straightforward to measure the success of a project and defining the success factors of a project is therefore simple. However, there is another dimension when measuring success in projects and that is the success of project management. While these two dimensions have their differences, they do share a lot of similarities and overlap a lot, so it is not easy to make a distinction between them. It does not help that there are multiple models created to measure both project success and project management success. (Project Management Success Factors 2017, 607–608)

The growing complexity of projects and involvement of multiple stakeholders from different points of views to measure the project success has increased the need to broaden the framework to measure project success. The previously mentioned iron triangle is one of the first models which can be used to measure the success of project management. This is a great example on why a project can be successful despite project management being unsuccessful and the opposite. When we are thinking of a project, it has a lot of subsets that form it. Project management is one of those subsets and it can fail even though project itself is successful as it has bigger objectives that might have been met without strong project management. (Project Management Success Factors 2017, 608)

The project management success does often personify to the success of the project manager as they are responsible for a lot of aspects in a project. Besides the traditional iron triangle aspects, there are also other features, such as, human resources, occupational well-being, communication, and risk control to name a few. It is not as straightforward to measure success in project management as it creates intangible benefits in addition to tangible ones. (Project Management Success Factors 2017, 608) Some models have been created to make measuring project management success easier. Creation of these more comprehensive performance measurement systems (PMS) has emerged from the dissatisfaction regarding the more traditional models, as they tend to ignore the soft dimensions of project success. (Bryde 2005, 119)

There has been studies of the critical success factors of implementation of IT systems in general but there more detailed as well which specify the success factors of asset management systems. One comprehensive list has been detailed by Jooste, in 2014 and the prioritised list of the found CSFs has been presented below:

- The continued and sustained commitment from the asset owner senior management in support of the EAM service
- Open and effective communication between the asset owner and service provider
- A focused and continuous improvement process to improve the EAM service through monitoring, analysis and feedback
- Mutual trust and respect between the service provider and asset owner
- The alignment of the asset owner's EAM service requirements with their overall organizational and business strategies
- An adequate training program in place for all EAM service role players, both in the service provider and asset owner teams
- An effective organizational change management program in support of the EAM service
- Proof of operational and financial performance achievements as a result of the EAM service
- The use of a performance measurement system to monitor, control and improve the EAM service
- The integrity of the leadership and delivery team and the set of values to ensure sustainability of the service
- The involvement of knowledgeable and demanding individuals from the client during the design and preparation, rather than individuals who want to abdicate their EAM responsibilities
- Active client participation in reporting, problem solving and improvement relating to the EAM service
- The ability to measure the EAM service quality and value creation

As mentioned, there has been development of project management frameworks to consider all dimensions of project. Many of these have introduced four-levels which are used to measure the project success (Howsawi, Eager, Bagia & Niebecker 2014, 3). Suggested by Shenhar, Levy & Dvir (1997, 9), the four dimensions of project success are: project efficiency, impact on the customer, business success and preparing for the future. While these consider most of the different aspects of project success, there seems to be one important dimension missing from most of the frameworks and that is the context of the project. As mentioned by Howsawi et al. (2014, 4), every project has its own contextual circumstances, and they have a very big impact for the project success and thus it is a level that should be taken into consideration as well.

The complexity of projects reaches the risks as well. Definition of project failure is not something that can be easily determined, and a unified consensus has not been really reached of what is a failed project as discussed earlier. Whilst a definitive explanation to a failed project is practically impossible to reach, there are some aspects which are common for project failure.

At the core, project failure (or success) can be determined with three benchmarks, which were identified by interviewing experienced project managers. The three benchmarks found, were as follows:

1. The implementation process
2. The perceived value of the project
3. Client satisfaction with the delivered project
   (Hefer 1990, 270)

Each of these benchmarks can be inspected from various perspectives and they have their own qualities which affect the measurement.

The implementation process of the project itself is usually internally measured, with the idea of measuring the performance of the team. This includes the three sides of the iron triangle: cost, time, and quality. In addition, the soft aspects success are to be measured as well, like the relationship within the team and the client. Everything is important and depending on the view, it can be deemed successful in terms of the deliverables, but it might be so, that the team members did not feel valued during the project. This increases the complexity even more. (Hefer 1990, 270)

The second benchmark is the perceived quality of the project, including the team members view of the project deliverables. It measures the perceived quality of the project from the perceptive of the project team members. (Hefer 1990, 270) With certain types of public projects, the end user can be different from the client and their perception of the project success or failure can differ a lot as well and it might be realized way after the project finishes. That is an important factor which should be considered as well.

The third and final aspect of the project performance is the client’s assessment of the project. This is an external measure which does not involve the project team and one might argue that it is also the most important one in terms of business. This can differ even drastically from the assessment of the project team as the perspective is totally different. (Hefer 1990, 270)

The cost of failed projects is tremendous, and the return of investment should be on a much higher level. According to MacManus and Wood-Harper (2008, 1), the value of failed projects in EU alone was 142 billion euros in 2004. Added to the fact that IT projects are more prone to error than traditional projects, as stated above, it is a concerning figure.

2.6 IT projects

IT projects have some aspects in which they differ from other projects in terms of completion and management. Information Technology is used to try to help the organization with their daily tasks related to almost all aspects. IT projects consist of all the related settings, and it is not limited to just the software. Also, the hardware, data, processes, and people are important parts in IT projects. (March & Smith 1995, 251–255)

The thing that makes IT projects more complex compared to traditional engineering projects, is the software aspect. That aspect is relatively new, and it includes a lot of quirks that are not present in other projects. IT projects are quite often poorly defined and under heavy time pressure and that leads to a higher failure percentage. This is especially true with IT projects in the public sector as the processes for project implementation are heavy and not very flexible. The understanding of the complexity of IT projects in a public organization can also be at a lower level that with the private sector. As the technological process in IT so rapid, it affects the expertise. The newest trends for the best execution and technological practices change often and it might affect the success rate quite heavily. (Ashraf, Khattak & Mohsin 2010, 5)

A big problem with RAMS projects and international development projects dealing with IT development in general is the institutional change required. The software itself might be delivered but it might be so that it won’t be used in the future and the client goes back to their old habits of daily tasks. The project can be deemed successful in the short run, and it can be finished but the problems might arise, and it can be questioned if the project really achieved anything? The reasons can be any number of things, starting from the lack of commitment from the top to change resistance or simple technological knowledge. Therefore, it is so critical to understand the current situation so that it can be assessed properly during the project. (Ashraf & al. 2010, 5–6)

2.7 Project management in international development projects

As SirWay mostly works in international development projects (IDP), it is important to see if the project management practices differ in any way from more traditional approaches. As traditional project management frameworks and studies focus more to internal development project or to projects with a more straightforward client-server relationship, it is important to understand the key differences with these types of projects.

International Development projects are projects, which are planned and implement by international organizations, such as development banks or Governmental and Non-Governmental organizations. As there are some key differences compared to traditional projects, the approach must be different as well without forgetting the implementation.

Youker has defined IDP:s as “medium to large size public projects and/or programs in all sectors of developing countries”. (Youker 2003)

2.8 Structure of international development projects

The international development projects that SirWay participates in, are very often funded by an external party, often an international development bank, such as Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD) or the World Bank (WB) to name a few. This creates a new layer to the project and introduces a new stakeholder as well. When compared to a more traditional project which is done in-house for example, there are a lot more moving parts in an international development project, thus making the project management more complicated. As stated by Lavagnon, Diallo and Thuillier (2010, 63): “Their environment is undoubtedly unique.”

With the large number of stakeholders present in IDPs, it requires a clear picture of who is responsible to who and what is the structure of the project in hand. As an example, a recent project of SirWay has been used which had a big number of stakeholders even by the standards of an IDP.

The stakeholders are as follows:

- IDB #1
- IDB #2
- Ministry
- Project Implementation Unit
- Project Implementation Unit which was responsible for specific contracts
- Organization responsible of the road maintenance
- The consulting company

These are the stakeholders which are present during the project and who’s input will be needed during the project life cycle. This doesn’t consider, for example, the road users who will be the beneficiary group of a successful project.

Figure 2.3 shows the relationships of the different stakeholders in an example SirWay project and how information should be moving between them. It is important to realize that while the consulting company is not necessarily directly in contact with the funding agency, they are ultimately the organization responsible for the project success. (Magassouba, Tambi, Alkhlaifat & Abdullah 2019, 1113–1115)

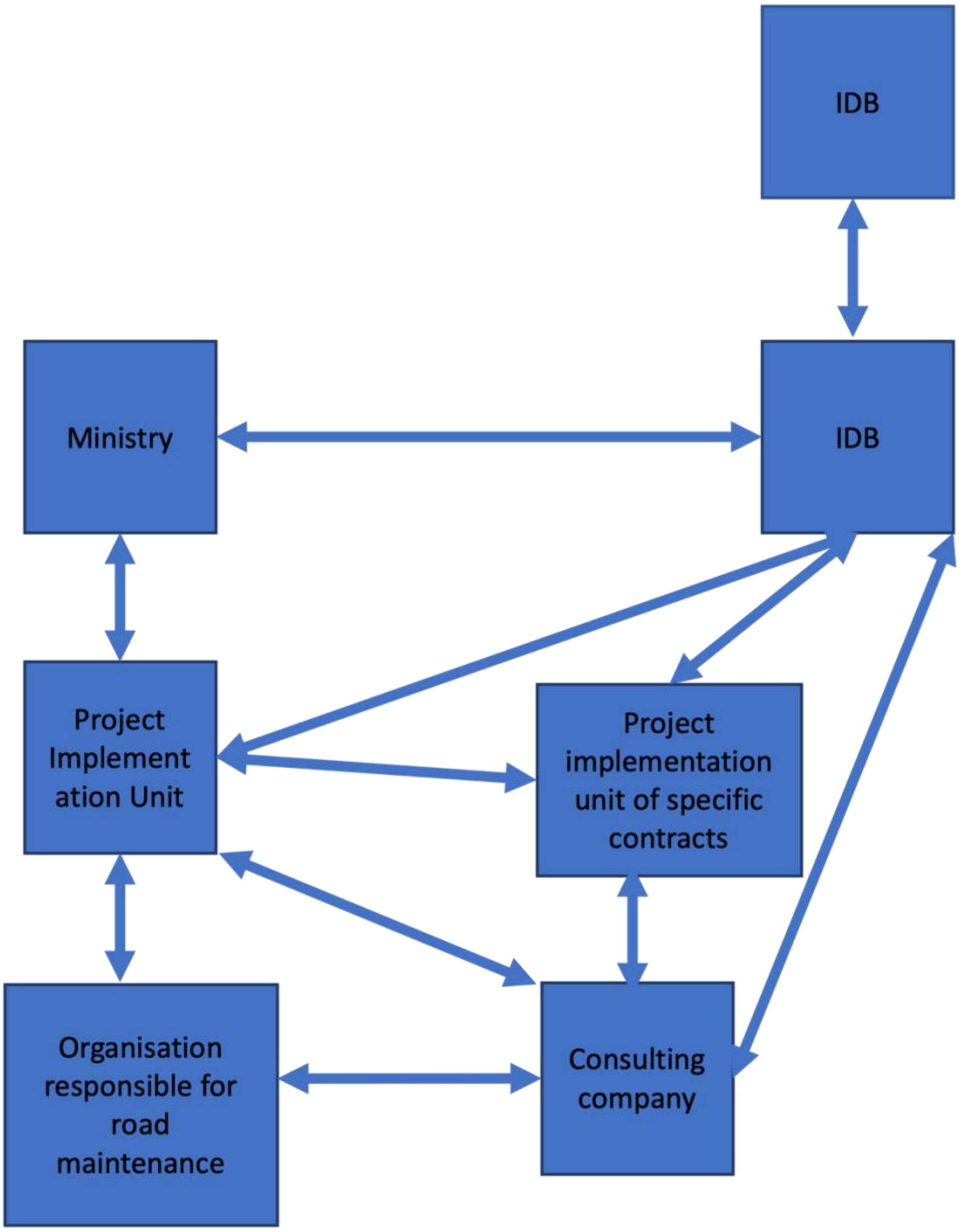


Figure 2.3. Example of project stakeholders in a SirWay project

IDB:s have other aspects apart from the structural differences that make them different and difficult in the world of projects. As mentioned, the financing agency is the in charge of identification of the project, so the initiation to a project comes usually from them. The identification of all the relevant and benefitting organizations locally can be very difficult as the processes can vary a lot in different countries. On top of that the possible distance, lack of communication means, and volume of projects can easily lead to a lot of problems when the project starts, and the complexity of the project can multiply. (Youker 2003)

One problem that is quite often present with IDP:s, especially those with an IT aspect, is that the terms of reference are not precise enough. They seem to be often done by copy-past method which doesn't take the country's context into account. They are often generic and possibly applicable in a developing country's conditions but trying to adapt the same in another country can prove to be very hard.

Due to the nature of these projects, it is necessary to have public procurement and that always narrows the options on how to implement the projects and write the specifications. However, it is quite clear that a better local knowledge would be beneficiary, or alternatively there could be more room for changes after the project has been awarded so the local context can be taken into consideration.

2.9 RAMS project difficulties (IDP context)

In regards of RAMS projects, there has been noticeable lack of consideration of the country's situation and starting point. This is related to the mentioned struggle of identification of all the beneficiaries and understanding the situation (Youker 2003). This might create problems during the project, if the contract has items which are clearly not ideal for the client organization but for one reason or another, the client wants to include them anyway. In many cases however, the implementing organization can suggest better approaches and the contract items can be altered. Once again, the problem of multiple stakeholders is present, and the changes can be hard to push through all the deciding instances.

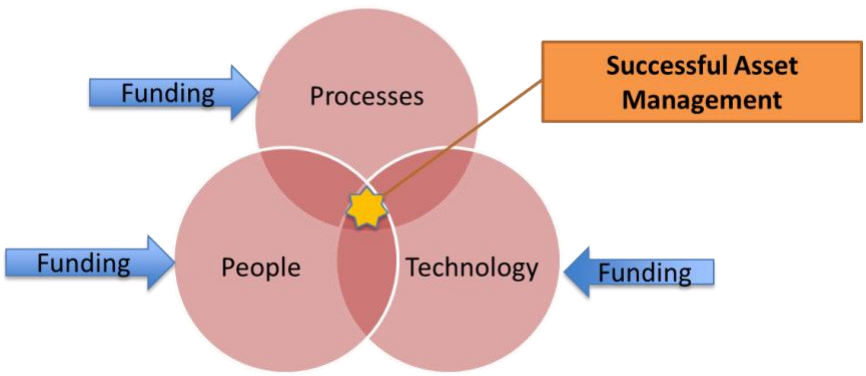


Figure 2.4. Successful Road Asset Management

A major problem is the software development inside the project. As it is just one part of the whole project, it should be treated as a one instance of a big project, but this can prove to be difficult as the management of software development can differ significantly from traditional International Development projects, focusing on consultancy.

The core issue is often the lack of knowledge of required competences, time and person-hours required to develop a fully scaled Road Asset Management System. The allocation of time between the software development and other tasks can often be unbalanced, which leads to not as good software, and in the worst-case scenario, to a failure of the whole project.

As RAMS is often a very complicated system with a large amount of data to be inserted, the modification of such software is often cumbersome. As the requirements are often very broad and each project has their own specifications without real synergy whatsoever, it makes the development hard to monitor. There can be a situation where the same company has two big projects at the same time with essentially the same end goal, but the system specifications are widely different. This means that the same work is essentially done duplicated which can burden the company significantly.

3 Project management in SirWay Ltd.

SirWay Ltd is a consultancy company which was founded in Helsinki in 2002. The company has also been registered to St. Lucia and Tanzania. At first, the focus was to provide consultancy services inside the road management industry in an international context. For the last 10 years, the company has shifted more into an IT company developing Road Asset Management Systems in developing countries funded by international development banks. While these more traditional consultancy projects are still done by the company, most of them do include an aspect of RAMS development or at the very least road asset management consulting.

Figure 3.1. Organizational chart of SirWay Ltd.

3.1 The market

For its whole existence, SirWay has been working in an international environment and most of their business happens outside the borders of Finland. The amount of project in Finland, has however been increasing during the last few years with new market rising from the municipal sector of Finland and possibly other countries as well. A typical project of SirWay involves developing a Road Asset Management System and relevant consultancy in a developing nation. The client is usually a ministry or road agency, and the projects are typically funded by big development banks such as the World Bank or Asian Development Bank. The typical project lasts for minimum 12 months and that makes the management of multiple projects simultaneously challenging. (Sirvio 2022)

When starting a new project in a new country, it requires a lot of effort to have a successful start and in the long run a successful completion of the project. With a lot of arrangements needed regarding the client and project specific tasks, without even mentioning the practical preparations required, it there is a lot of aspects that need to be taken care of in the early stages of a project. A typical project of SirWay starts in a developing country after a long and uncertain bidding process which can take over a year or even longer in the worst-case scenario as seen in Figure 3.2. (Sirvio 2022)

Figure 3.2. Bidding process of a SirWay project

Depending on the project, SirWay might have a local company as support which does help with the practical matters regarding the project management. Without the support from a local company, somebody from the company usually goes to the country where the project starts. It is important, that the team leader is not the one responsible of matters like housing or office search as it is critical in the start of a project to have a good focus on the actual task at hand. (Sirvio 2022)

3.2 Current project management processes

Now, project management is not done in a systematic manner at SirWay. The project management is often done by the project manager / team leader, and each might have their own approaches to project management depending on their preferred approaches. This proves to be a problem if the project manager is somebody outside of the organization, thus the project management processes might not be coherent across the board. This makes it hard for the home base to supervise the project progress and puts the project completion at risk. (Sirvio 2022)

As SirWay is quite a small company, the burden of project management often falls on the same people that are doing the project as well and that can easily double the workload of an individual, who should be concentrating on the actual work in the project. While these kinds of issues cannot be completely removed without recruiting new people to handle specific matters, the workload can be eased by having documented processed which are easily followed rather than working on one's memory and trusting an individual to do all the decisions. This is the goal of this thesis as well, to have clearly documented and organized plan for starting a project and how it should be managed and by whom. (Sirvio 2022)

4 Empirical part

In this chapter the focus is on practical examples and observations conducted by interviews of professionals with expertise on the matter. With multiple persons all having experience in the sector it is possible to obtain a clear idea of the challenges of these projects, and on the other hand, the good practices which should be kept in mind. As it is defined, empirical knowledge is meant when collecting experiences as they occur with no previous hypothesis or ideas on the matter. (Patten & Galvan 2020, 6)

To find the answers to this thesis's research questions it was quite clear that qualitative approach to the data collection was to be selected, opposed to quantitative research. It would not be beneficial to try to adopt quantitative methods as they would need high volumes of data which is not possible for this kind of study. As qualitative research is more about the context and individual perspective, it is better suited for this thesis. (Patten & Galvan 2020, 32)

Qualitative research has its critics as it can be argued that the method is not scientific enough and the results might be biased. Mentions of the lack of generalization of the findings is also one problem as there are not many subjects. While this is true to some extent, the results of the interviews gives more elaborated answers which is what this thesis is trying to find. Simple and short answers would not be beneficial and would provide little to no value in this topic. It is also good to remember the difference between real life and models or frameworks. Generalization is a good method but when studying a very specific subject with small amounts of previous data, qualitative research can give better results. It is possible to obtain a lot of information from limited number of interviews, if the questions are planned accordingly. (Patten & Galvan 2020)

Table 4.1. Features of Qualitative and Quantitative Research (adapted Miles & Huberman 1994)

Qualitative research	**Quantitative research**
The aim is a complete, detailed description.	The aim is to classify features, count the, and construct statistical models in an attempt to explain what is observed.
Researcher may only know roughly in advance what they are looking for.	Researcher knows clearly in advance what they are looking for.
Recommended during earlier phases of research projects.	Recommended during latter phases of research projects.

The design comes together as the study unfolds.	All aspects of the study are carefully designed before data is collected.
Researcher is the data gatherer themselves.	Tools and equipment used to collect numerical data.
Data is in words, pictures, and objects.	Data is numbers and statistics.
Subjective – individuals' interpretation of events is crucial.	Objective: seeks precise measurement & analysis of target concepts.
Data is "richer", time consuming and not as easy to generalize.	More efficient and is able to test hypotheses but lacks the contextual aspect.
Researcher tends to become subjectively immersed in the subject matter.	Researcher tends to remain objectively separated from the subject matter.

As the researcher has experience with multiple projects on the subject, the examples are divided to two parts, with the first being the personal observations and the second, the actual interviews of team leaders and project managers.

4.1 Researchers' observation

This chapter focuses on the researcher's own observations during their time and experiences with projects of similar nature. There are total of three projects where the researcher has been part of from the start with enough knowledge to reflect on what was done in each three. The researcher had different roles on each project ranging from assisting the team leader and other staff to being an expert in a project themselves with clear responsibilities and influence on the project's implementation.

While the researcher cannot be considered an experienced person as a project manager, he does have a considerable amount of knowledge of these types of projects. Nevertheless, the observations should not be considered with the same level of experience as the ones conducted by the interviews.

Table 4.2 Researcher's example projects

Project	Roles	Project type	Project completed

Project 1	Proposal preparation, assistant to the team, testing	Software Development and data collection + institutional capacity	Yes
Project 2	Proposal preparation, DB development, testing, data analysis	Software development	Terminated
Project 3	Proposal preparation, client relations, data collection, data analysis, training	Software development and data collection	Ongoing

4.1.1 Beginning of the projects

Two of the three projects in question started with multiple persons travelling on-site to meet the client and kick-off the project. Due to Covid-19, it was not possible to travel to the country of project 2, which proved later to be a big issue with the project, among other reasons. The importance of showing dedication and interest in the project by travelling on site cannot be overestimated, even when the work could theoretically be completed remotely. When trying to implement organisation-wide change, it is very hard to achieve by remote connection and video conferences.

In addition to ensuring the client of the commitment to the project, being physically on site, provides additional benefits with the actual workload. As all three projects required working in unison with the client's staff and often also training them, it was an added benefit to work on-site at the beginning. The earlier the personnel of the client can be included to the project, the easier the rest of the project usually is. Training is often interpreted as a workshops and classroom training but from the researcher's point of view it was much more efficient if the personnel were with the consultant from day one and learning from the get-go. This was clearly presented in projects 1 and 3 as the progress was notably smoother all around.

Being on-site also gives the consultant a lot of insight to the client's dedication to the project provides the possibility to try affect the view of the client when it is not so enthusiastic. The local context is also important as countries vary drastically geographically, culturally, and numerous other ways. This helps the consultant to plan the rest of the projects more detailed.

All three of the projects started with an Inception Report, with the aim to draw a clear picture of the current situation in the project's context. This requires gathering data from various sources, including people in the organization as well as previous reports and other data, such as road photos or condition data. In projects 1 and 3 there was some reports available and some very basic data which was easily obtained from the client on the first visit. In project 2, there was more useful data but gathering it was hard as there was no site visit and there was little willingness from the client's side to assist, making the whole project ever-so hard.

4.1.2 Organization's maturity level

In each of the projects, it was expected that the maturity level regarding the road asset management and maintenance processes would not be on a high level, there would be no point of such a project. However, the project's success is often highly dependent of the client's interest and desire to gain knowledge and tools from the consultant, making the culture of the organization quite valuable for the success of the project.

There were notable differences between the maturity levels in each three projects and it was quite a clear indicator on how the project will go forward. Project 1 had clear vision of the project's goals and they were eager to learn and embraced the project. There were small things, such as having an office inside the client's premises and a dedicated team at the start of the project that made the project's implementation notably smoother.

It was very clear from the beginning that the organization of the client in project 2 did not have an adequate maturity level for the project. While this itself does not mean a project failure, combined with the inclusion of a supervising consultant, it made the project impossible in the end. There was no clear communication channel with the client and the consultant which made the possibility to implement organizational change borderline impossible.

4.1.3 Project team

Each project had quite a different team composition even though the ultimate goal was essentially the same: to have a working road asset management system and asset management processes. Also, the competences inside the teams were similar across the board but they were just divided differently. These are some of the reasons for the differences:

- Different budgets
- Different road assets to be managed
- COTS vs development of the software
- Complexity of the system
- Amount of data collection

In minimum the project team was comprised of four key-experts and three non-key experts in project 3. Project 2 had the largest number of key-experts, 11, with additional support staff of three. While it came clear during all three projects that there was no need for the whole project team to be on-site, there should be a core team being in contact with the client. The composition of the core-team depends on the project but at least the team leader should be included.

4.1.4 Risks in the projects

While some of the problems were already highlighted in the previous chapters, in this chapter a more detailed look will be taken. In the start, all the projects have similar risks which are hard to eliminate before the project has started. These include but are not limited to the following:

- Co-operation of the client
- Following the payment schedule
- Personal issues with project team
- Logistical challenges
- Challenges with the country’s bureaucracy
- The situation not properly described in the request for proposal

In one form or another, some of these problems come up in every project but they are part of the work and requires flexibility and patience from the supplier’s side. Some of them cannot be controlled but proactive take on the project in the start goes a long way.

4.1.5 Measures to be taken in the beginning

The researcher has gathered a list of measures which will be helpful in the beginning of the project and guide the project in the right direction. These are personal observations from the projects one, two and three which had a positive impact on the next steps of the project. The list is not in a particular order.

- At least two people travelling on site
- A good local partner
- A proper plan for the first visit
    - Current situation
    - Identifying the relevant personnel
- Establishing clear communication channels with the client
- Documentation of all the steps taken
- Establishing templates for all the material prepared in the project
- Sorting out the practical issues such as housing, office etc.
- Clarifying the schedule of the project and all the tasks associated

- Making sure that all questions about the TOR are raised in the beginning to avoid confusion later in the project
- ICT related questions, server for the system, and computers of the staff
- Data transfer

The things listed above are general issues that are present in every project. However, there are issues related to RAMS which are more precise to this specific type of a project. These matters gathered from researcher’s experience are listed below in a non-particular order:

- Does the client have road centrelines?
- How many kilometres of roads?
- Are the roads classified?
- Does the client have a Location Referencing System in place?
- What data the client has collected?
- What data collection equipment has been used?
- Is there a RAMS unit in place?
- How is the maintenance of roads done at the moment?
- What are the typical defects on the road network?
- Does the client have a server to host the system?
- Is the maintenance done in-house or contracted to private companies?
- How are the roads financed?
- Types of vehicles in the country?
- Does the client know maintenance unit costs of typical works?

These are typical questions which need answering at the beginning of the project. While the RAMS is similar from country to country, the data it uses can differ a lot between them. That means, there is always a need to modify the system for the local context in numerous ways. Hence, a lot of questions and clarifications are needed in the start to better accommodate the needs of the client.

One thing that the researcher also had noticed during the projects that the documentation of project management methods was lacking. While a lot of documentation was created during all of the projects, they were related to the objectives of the project rather than the project management on a general level.

While this doesn’t necessarily affect the project in question, it would be beneficial for the implementing company (SirWay) in question. A centralised list of successful and unsuccessful aspects of each implemented project could be created to have a reference point in the future. As an example, there could be a problem which was solved in a project and then the same thing happens in a future project. With the list, the problems could be solved easier in the future, if it had been forgotten or if the project team is different from the first time. This ties to the overall need of more systematic project management but it is an important aspect on its own.

4.2 Interviews

Interview is a method of data collection, used often in qualitative research. The main goal is to gather data which is not possible to collect via questionnaires or other data collection methods. They often offer a more detailed answers from the subjects of data collection. However, interviews require a lot of resources, and they are quite labor-intensive thus they are seldom used with quantitative research when the goal is to gather a lot of data. It is crucial for that the personnel chosen for interview are carefully selected so that the subject of the interview stays in focus, and they subjects have enough knowledge of the theme of the interview. Another important aspect is the planning of the interview and careful selection of the questions. The questions should not sway from the theme but at the same time cover the whole topic. (Flick, Kardoff & Steinke 2004)

There are several different variants of interviews, but they are often divided to three main forms of interviews:

- Structured
- Semi-structured
- Unstructured

The choose of the variant depends on the goals of the interview. For example, the structured interview is the most standardized. It uses a set of fixed questions which are the same for all the interviewees. In unstructured interview there is not even a topic prepared in advance which allows the interviewees to speak in-depth without any boundaries set by the interviewer. The one in the middle, semi-structured, is often described as qualitative research interview. It follows the pre-set topic but allows for elaboration of the questions, allowing the interviewee to give more in-depth answers. (Saunders, Lewis & Thornhill 2019)

For the interviews used in this thesis, the semi-structured variant was selected. This type allows the participant to express themselves quite freely but keeping the topic of the interview in the hands of the interviewer. The interviews (four in total) took place between November 2022 and March 2023, and they were done in person. To keep the interview more like a conversation there was no recordings, allowing the interviewees to feel relaxed in the situation. Notes were taken of the sessions to ensure the most important parts were captured.

The expected outcome of the interviews was to gather the most typical mistakes made in the RAMS projects the interviewees had taken part of, as well as the things or actions most likely to allow for the project be successful. It was expected that while the answers would have a lot of similarities, some notable differences would be found. The interviews are presented by topics and the most notable answers from the interviews are considered.

4.2.1 Proposal Phase

One notable thing that all the interviewees mentioned as an important point for a successful project was the proposal itself. While it was highlighted that a lot of things might change between the proposal preparation and the project start, it is still a very important phase, and a good proposal and plan can help a lot in the start of the project. If the project deliverables, finances, schedule, and resources have been accurately identified in the proposal phase, it makes the project beginning smoother as a lot of aspects have been already considered.

It is possible to see already in the proposal stage if the requirements are too much in the indicated timeframe or if the overall idea of RAMS is too complex. As an example, one interviewee gave an example that sometimes the requirements are far too compound for the particular country's context. If the level of knowledge within the client's organisation is low, there is no point of starting with difficult data collection methods and with a system that is hard to use. These kinds of problems should already be mentioned in the proposal so that the client and funding organization know that the proposal has been made with piety and it will be easier to make changes to requirements when the proposal is won. If concerns are mentioned half-way through the project, it is challenging to make changes.

A point was also raised that if the requirements of the project are clearly too detailed and not something that can be expected to be completed in the indicated timeframe, it might be the best solution to not prepare the proposal at all. This is of course, a drastic measure but this is something that has happened in the past. Usually, the reason is an unrealistic budget compared to the workload.

4.2.2 Contract negotiations

Same matter of voicing the concerns early was mentioned when discussed the contract negotiations with another interviewee. This was mainly regarding the payment schedule and trying to ensure that is in balance with the workload and that the money flow is continuous. It was mentioned that the payment schedule is often quite focused to the project end which is not ideal for the consultant.

Preparation for the contract negotiations was also mentioned as an important aspect and any changes voiced out in the proposal or others which might have come up later should be mentioned to have a higher probability to go through. It also gives a good look towards the client showing that the consultant has done their homework and are keen to make the project successful.

4.2.3 Project start

When the project starts, all of the interviewees were on the same page that a presence is important at the client's premises. The team leader should be among the first on the project and with them at least one other expert. If there is a local partner included, it makes it easier to show strength in numbers as well as dedication.

It was also mentioned that practical issues should be taken care at the start, including the housing, office space, visas, and person responsible for them. This might mean a local secretary or somebody from the consultant's backstaff. The interviewees brought up that arranging these practical issues as a team member were tedious and were interfering with the actual project work, hence the importance. This added to the criticality of the project start makes it crucial for such matters to be taken care of carefully.

In the start it is important to get an accurate idea of the organization's starting level to plan for the rest of the project. Identifying the personnel who will be working with road asset management after the project inside the client's organization is also important and incorporating them from the beginning to the project work was raised as an important aspect by the interviewees. This also helps with the training as it is easier to learn hands on rather than relying solely on workshops and presentations.

A lot of the same, more detailed issues were raised in the interviews which the researcher presented themselves in the previous chapter. One of the most important things mentioned by the interviewees was the situation with road centrelines and if they existed. As this is important for the data collection, the system itself, and if it is not present, it will take a lot of time to establish one, depending on the size of the road network. It is one of the matters that should be started as soon as possible, and it can be incorporated to the data collection plan.

Another important thing which should be clarified in the beginning is the IT related questions, such as where the data will be stored and how the system should be hosted. This is critical aspect as it has a big impact on the system development, and it should be taken care of before development can begin. One of the interviewees brought this up as recently there had been project where the server installation and preparation took a massive chunk of the projects time, making the possibility to complete the project in time impossible. This highlights the importance of taking care of even smaller matters as early as possible as they can, in the worst-case scenario, inflate to a snowball effect compromising the whole project.

4.2.4 Third-party supervisors

An interesting point was raised from the interviewees regarding third-party supervisors of projects. It was mentioned that almost exclusively, inclusion of a third-party supervisor had introduced problems to the project. However, this was not the case when the supervisor was an individual rather than a company. When the matter was further discussed, many ideas were raised on the possible reasons and the overall problematic nature of such arrangement.

There had been times where the supervising consultant was corrupted, demanding money on every possible occasion as it was their decision if milestones would be approved. This is a big problem and hard to tackle without compromising the project.

One problem with supervising consultants is their understanding of the project goals and what the client really needs. As they are not the main beneficiaries, their motivation to ensure a successful project might not be on the best possible level. A problem, mainly with software projects is also the different natures of software development and traditional consulting or engineering projects. One occasion was mentioned where the supervising consultant appeared to not have prior knowledge of software development, leading to micromanagement and unreasonable requirements.

Inclusion of supervising entity can also lead to the exclusion of the main beneficiary from the project pipeline. This is very problematic as developing sustainable software and trying to raise the bar of road asset management, the client should be included from the start of the project to ensure that the needs of the users are thought of and that all the info flows smoothly. It is a big risk that the system ends up on the shelf if the users don’t understand the reasons why it is used and how, making the efforts of the project waste of time for all parties.

4.2.5 Organisational maturity

Organisational maturity was highlighted as one important aspect which has a lot of effect on the implementation of the project. While this is an aspect that the consultant doesn’t have many possibilities to affect, it is still important to assess the current situation and react accordingly during the project. As an example, if the organisation’s maturity level is low, the project probably will need extra attention and the consultant should stay on top of things at all times. The client cannot be trusted to be proactive, and double-checking is to be expected. In these kinds of projects, the importance of local presence is highlighted.

On the other end of the spectrum are clients whose organisational maturity level is on a high level, making it easier to manage the project. It has an effect on all the work, allowing co-operation to flourish and allowing the consultant to focus on the task at hand, rather than unimportant matters.

Proactive clients can be involved for the whole project duration to assist the consultant's team. This helps especially with the system development as the development team gets valuable insight from the client, allowing the tool to be developed according to not only by the technical specifications but also according to the clients' preferences creating a system that is suitable for the user's workflow.

4.2.6 Project team

The project team is naturally an important aspect of the project management and overall success of each project. In international development projects the project team is often defined by the client or the funder, but the bidder does have the possibility to include extra expertise if they deem it necessary. It was noted by the interviewees that the overall competencies of the project team are not always defined according to the objectives of the project. Therefore, it is important to identify the needed expertise in the proposal phase to avoid costly surprises during the project.

A good team was uniformly mentioned as one of the most critical success factors of a project. While it doesn't delete the problems from the client's side or unclear terms of reference, it does make tackling the problems easier. While the competencies were an important part according to the interviewees, the capability to efficient co-operation in a team was something which should not be overlooked. The interviewees also felt that working with a team that they had worked with before was beneficial as it allows them to be more prepared for surprises as they have a better understanding of the team members skills and way of working.

4.3 Analysis of the interviews

As the interviews were conducted face-to-face it allowed for some analysing to be done already during the interviews. This was made possible by choosing the semi-structured interview as it allows to have more in-depth answers from each topic. This also means that each interview is somewhat different, and each interviewee influenced the interview by their points of view.

Like it was predicted, a lot of the aspects brought up by the interviewees were overlapping but diversion was also clear. Some of the overlapping could be influenced by the fact that the interviewees had worked a lot in the same projects making their experiences similar. However, it was interesting to hear different points of views from same projects and their respective lessons learned, in some cases.

While the idea was to divide the answers between certain topics it came clear during the interviews that the complexity and interconnectedness of the topics made it nearly impossible. A lot of the examples given by the interviewees were connected to multiple themes discussed in the interviews. One possibility to tackle this could be to prepare the interviewees in advance by sending them a draft plan of the interview, allowing them to prepare better. It also creates a possibility for further research, focusing on specific matter, for example.

5 Results of the interviewees

The results gathered from this thesis proved to be a good basis for making a framework for SirWay to be used in project management in the future. As the idea was to create a kind of a checklist for the company to use as a basis in the future on their upcoming projects. This would ease up the project management and prepare the company for the possibility of multiple projects starts simultaneously. As the company is trying to grow in the near future, this is part of the preparation for that possibility.

Even though the results from the thesis provide a good starting point for the framework, the company can freely update it accordingly. It has been put together with the idea of it being as universal as possible, trying to identify things that are present in as many projects as possible. On top of this, SirWay can modify it according to individual projects to match their unique characteristics. For clarification, this list is to be used when the project is won, and the company is invited to contract negotiations.

Below in Table 5.1 are the gathered checklist of the required actions when starting a RAMS project. This table consists of actions that are only applicable for RAMS projects but also utilises more universal project management actions such as number 11: “Understanding the current situation and practices in the organisation”. This makes it easier to also use the same checklist for other projects where system development is not an item. The same list was also imported to Notion, which is a tool that the company uses for storing data and keeping track of their current projects and other important company information.

Table 5.1 Checklist for RAMS project start

No.	Action	Action group	Responsible person	Deadline	Status
1	Clarification of TOR items from the client if unclear	Contract negotiation			
2	Ensuring that the payment posts are acceptable (cash flow)	Contract negotiation			
3	Working out the details of procurement (if any)	Contract negotiation			
4	Road maintenance financing?	Current situation			
5	Road classification?	Current situation			
6	Current data collection equipment if any?	Current situation			

7	Typical defects of the road network?	Current situation			
8	Vehicle types?	Current situation			
9	Current maintenance practices?	Current situation			
10	Identifying the most important personnel inside the organisation	Institutional development			
11	Understanding the current situation and practices in the organisation	Institutional development			
12	What kind of IT skills the organisation possesess?	Institutional development			
13	Understanding the organisational structure of the client	Institutional development			
14	Pre-training assessment / current skills inside the organisation?	Institutional development			
15	Arrangment of payment guarantees if needed	Project management			
16	Finacing and cash flow planning for the project	Project management			
17	Arranging starting meeting	Project management			
18	Creation of a more detailed project implementation plan	Project management			
19	Ensuring the project team is available and ready	Project management			
20	Getting the critical contact information from the client	Project management			
21	Local office?	Project management			
22	Making sure that all the required resources are in place for the project start	Project management			
23	First visit and the objectives	Project management			
24	Secretary?	Project management			

25	Driver?	Project management			
26	Tentative planning of the team members visit to the country	Project management			
27	Templates for official communication in the project	Project management			
28	Data collection planning, what is collected, when, how and by whom?	Project management			
29	Planning the flow of information across the stakeholders	Project management			
30	Accommodation questions	Project management			
31	Does the client have a server which could be used?	System development			
32	Does the client have road centrelines?	System development			
33	Condition data of roads?	System development			
34	Photos / Videos of the road networks?	System development			
35	Any data of bridges?	System development			
36	Data of other road assets, such as drainage?	System development			
37	Road Maintenance Unit Costs?	System development			
38	Planning the data flow during the project, from data collection to the database	System development			
39	Planning of the data model of the system	System development			
40	Identification of the new development of SirWay RAMS according to the ToR	System development			

The table shows that there are a lot of different things to be considered when starting a project and a systematic approach for taking care of such would be useful in the future. The types of actions were divided to five different groups to help with identification of the responsible person and when the action should be assessed.

The actions are quite different, and their scope differs a bit as some are simple actions without much depth while some are more complex ensembles which might require co-operation from multiple people. They can be unwrapped according to the specifications of the project in question when the time comes. The idea was to create a checklist which could be utilized easily on project start and this was achieved.

6 Discussion

The overall objective of the thesis was to find the aspects that have the most importance when starting a RAMS project in positive as well as in negative context, especially in SirWay's context. The incentive to the research came from the current challenges of project management with SirWay's projects and how the hurdles could be avoided.

The result was a list with points gathered from the interviews and the researcher's personal observation. The list is to be used as a kind of a checklist when starting a new RAMS project, to make the project beginning easier and having a systematic way to make sure all the important information is to be collected.

6.1 Thesis process

The thesis process started with a totally different topic which came up during the research report course during the spring of 2022. The first report was also related to the working environment of the researcher. However, after the summer an interesting opportunity was presented, and it was sparked the interest as it felt like it would be more useful to the company.

While the overall objective of the thesis was relatively clear from the beginning, a lot of the details were sharpened on the go as the bigger picture became more evident. During the thesis process, the initial ambiguity faded away and discussions with the commissioning company were helpful to narrow down the scope and understanding the needs for the thesis.

The initial idea was to study project management of RAMS projects in general but that was deemed to be too broad as a subject for this thesis. It was agreed that the beginning is the most crucial part for the project success and also the one that could be improved with little resources inside the company. Hence, the thesis was narrowed down to focus on the start of RAMS projects.

When gathering theoretical background, it came quickly clear that research on the subject was quite limited in terms of the detailed scope of the thesis. However, project management in general is a widely studied subject which allowed the researcher to adapt findings from those studies to this research. A good number of studies related to the benefits of RAMS in various contexts had been done which was a positive finding.

In hindsight it feels like the overall process was successful and the chosen methods were correct. Perhaps more people could have been interviewed to have a more variation in the answers. Also, the schedule could have been tighter, and the thesis could have been done faster to keep the writing process more coherent. On the other hand, as the subject was so close to the current work tasks it had more time to mature, and more ideas related to the thesis came up all the time which probably had a positive impact for the final result.

Other theses from the website https://www.theseus.fi/, helped a lot when the writing process was in the beginning, especially on how to structure and to what matters the thesis should focus on. Discussion with other people who had finished their thesis or were in the same situation as me, also helped a lot with the writing process.

6.2 Restrictions

There were some limitations to the literature available as there were practically none related to the exact subject of the thesis. This required the researcher to adapt their findings and discuss with experts on the matter to adjust the gathered information. This feat required a bit more work from the researcher but also forced him to dive deeper into the world of the subject which gave him more extensive knowledge of the subject as not everything was offered on a silver platter.

The niche topic of the thesis required the researcher to have a lot of prior knowledge on the subject to write a comprehensive thesis. Without contacts who had a lot of experience with the topic, it would have been very difficult to gather Information on the different aspects of the research topic.

6.3 Future research

The lack of systematic project management and tools to allow such actions was brought up as a problem from the interviewees so it is a subject which has interest from people working daily on the matter. This suggests that further researcher could be useful in the future and there are ways on how the topic of this thesis could be researched further. The continuing digitalization of our lives creates new tools at a rapid pace and studying said tools and their usefulness would make for an interesting topic.

One problem which came up was the lack of agile thinking inside the client organizations, making it difficult to include such methods inside to the consultant’s processes. An interesting research topic would be the client organizations project management in development projects funded by development banks. This would give a lot of insight to the client’s processes providing valuable information.

As there were only four interviewees in addition to the researchers observations, it could be beneficial to broaden the number of interviewees to have more variation to the answers and ideas from a larger pool of projects as well. More range to the projects could also be added, to include other than RAMS project as well to see if the problems are any different.

6.4 Final words

While the thesis journey was quite lengthy, the motivation stayed high for the whole process and finalizing the thesis was a rewarding experience. While this was the first report of this magnitude the overall feeling is that it went quite well, and no major problems were present. Keeping the scope and not straying away was the most challenging part but in the end feels like it was achieved relatively well, and the thesis kept its focus.

It was a two-bladed sword having a full-time job at the same time. It helped as it was related to the thesis quite closely but of course focusing on the thesis would probably be easier without work on the side. The most important take is the importance of planning and that could have given a bit more control for the process. Overall, however the process was a success, and I can proudly say that I’m happy with the result.

References

Ashraf, J., Khattak, N. & Mohsin, A. 2010. Why do public sector IT projects fail.

Berg, C.N., Deichmann, U., Liu, Y. & Selod, H. 2015. Transport Policies and Development. pp. 45.

Bryde, D. 2008. Perceptions of the impact of project sponsorship practices. International Journal of Project Management, 26, pp. 800–809. URL: https://doi.org/10.1016/j.ijproman.2007.12.001.

Bryde, D.J. 2005. Methods for Managing Different Perspectives of Project Success. British Journal of Management, 16, 2, pp. 119–131. URL: https://doi.org/https://doi.org/10.1111/j.1467-8551.2005.00438.x.

Cartier van Dissel, S. 2018. Compendium of Best Practices in Road Asset Management. Manila, Philippines. URL: https://doi.org/10.22617/TCS179047-2.

Carvalho, M.M. de & Rabechini Junior, R. 2015. Impact of risk management on project performance: the importance of soft skills. International Journal of Production Research, 53, 2, pp. 321–340. URL: https://doi.org/10.1080/00207543.2014.919423.

(ERF), T.E.U.F. 2018. Road Asset Management; An erf position paper for maintaining and improving a sustainable and efficient road network.

Flick, U., Kardoff, E. von & Steinke, I. 2004. A Companion to Qualitative Research. SAGE.

Gasemagha, A.A. & Kowang, T.O. 2021. Project Manager Role in Project Management Success. International Journal of Academic Research in Business and Social Sciences, 11, 3, pp. Pages 1345–1355. URL: https://doi.org/10.6007/IJARBSS/v11-i3/9230.

Hefer, A. 1990. The causes of project failure. IEEE Transactions on Engineering Management, pp. 269–276.

Howsawi, E., Eager, D., Bagia, R. & Niebecker, K. 2014. The four-level project success framework: application and assessment. Organizational Project Management, 1, 1, pp. 1–15. URL: https://doi.org/10.5130/opm.v1i1.3865.

Infrastructure Solutions Inc 2016. Preventive Maintenance State-of-Practice and Benefit Perceptions among Canadian Municipalities.

Johnson, J., Boucher, K., Conners, K. & Robinson, J. 2001. Collaborating on Project Success. Software Magazine.

Jooste, J.L. 2014. A Critical Success Factor Model for Asset Management Services. URL: http://scholar.sun.ac.za.

Kinkel, S., Rieder, B., Horvat, D. & Jäger, A. 2016. The effects of in-house manufacturing and outsourcing on companies' profits and productivity.

Lavagnon, A.I., Diallo, A. & Thuillier, D. 2010. Project management in the international development industry: The project coordinator's perspective. International Journal of Managing Projects in Business, pp. 61–93.

Leong, T., Zakuan, N., Saman, M., Md Ariff, M.S. & Tan, C. 2014. Using Project Performance to Measure Effectiveness of Quality Management System Maintenance and Practices in Construction Industry. The Scientific World Journal, 2014, pp. 591361. URL: https://doi.org/10.1155/2014/591361.

Liikamaa, K. 2015. Developing a Project Manager's Competencies: A Collective View of the Most Important Competencies. Procedia Manufacturing, 3, pp. 681–687. URL: https://doi.org/10.1016/j.promfg.2015.07.305.

Magassouba, S., Tambi, A., Alkhlaifat, B. & Abdullah, A. 2019. Influence of Stakeholders Involvement on Development Project Performance in Guinea. 9, pp. 1111–1120. URL: https://doi.org/10.6007/IJARBSS/v9-i1/5513.

Mäntyneva, M. 2016. Hallittu projekti - Jäntevästä suunnittelusta menestykselliseen toteutukseen. Kauppakamari.

March, S.T. & Smith, G.F. 1995. Design and natural science research on information technology.

Marion, J.W., Richardson, T. & Earnhardt, M. 2016. Project Execution: A Research Agenda to Explore the Phenomenon. pp. 7. URL: https://core.ac.uk/download/pdf/286703276.pdf. Accessed: 19 October 2022.

McManus, J. & Wood-Harper, T. 2008. A study in project failure.

Miles, M.B. & Huberman, A.M. 1994. Qualitative data analysis: An expanded sourcebook, 2nd ed. Sage Publications, Inc. Thousand Oaks, CA, US.

Oh, M. & Choi, S. 2020. The Competence of Project Team Members and Success Factors with Open Innovation. Journal of Open Innovation: Technology, Market, and Complexity, 6, 3, pp. 51. URL: https://doi.org/10.3390/joitmc6030051.

Ojasalo, K., Moilanen, T. & Ritalahti, J. 2009. Kehittämistyön menetelmät: uudenlaista osaamista liiketoimintaan. WSOYpro. Helsinki.

Panjom, K., Chayanitivuth, C., Leepreecha, N. & Rujivorakul, V. 2022. Asset Management System with Digital Technology: A Case Study of Government Agencies. URL: https://doi.org/10.1109/ECTIDAMTNCON53731.2022.9720329.

Patten, M.L. & Galvan, M.C. 2020. Proposing Empirical Research: A Guide to the Fundamentals.

Pelin, R. 2011. Projektihallinnan käsikirja.

Pinto, J. & Slevin, D. 1988. Critical Success Factors Across the Project Life Cycle. Project Management Journal, 19, pp. 67.

Pollack, J., Helm, J. & Adler, D. 2018. What is the Iron Triangle, and how has it changed? International Journal of Managing Projects in Business, 11. URL: https://doi.org/10.1108/IJMPB-09-2017-0107.

Proença, D. & Borbinha, J. 2016. Maturity Models for Information Systems - A State of the Art. Procedia Computer Science, 100, pp. 1042–1049. URL: https://doi.org/https://doi.org/10.1016/j.procs.2016.09.279.

Project Management Success Factors 2017. Procedia Engineering, 196, pp. 607–615. URL: https://doi.org/10.1016/j.proeng.2017.08.048.

Saunders, M.N.K., Lewis, P. & Thornhill, A. 2019. Research Methods for business students. Pearson.

Schraven, D., Hartmann, A. & Dewulf, G. 2011. Effectiveness of infrastructure asset management: Challenges for public agencies. Built Environment Project and Asset Management, 1, pp. 61–74. URL: https://doi.org/10.1108/20441241111143786.

Shenhar, A., Levy, O. & Dvir, D. 1997. Mapping the dimensions of project success. Project Management Journal, 28, 2, pp. 5–13.

Sirvio, K. 2022. Management practices in SirWay projects.

The European Road Federation 2018. Road Asset Management; An erf position paper for maintaining and improving a sustainable and efficient road network.

Urbach, N. & Würz, T. 2012. How to Steer the IT Outsourcing Provider: Development and Validation of a Reference Framework of IT Outsourcing Steering Processes. Business & Information Systems Engineering, 4, pp. 247–259. URL: https://doi.org/10.2139/ssrn.2065389.

Volker, L., der Lei, T.E. & Ligtvoet, A. 2011. Developing a maturity model for infrastructural asset management systems.

What is CMMI? A model for optimizing development processes s.a. CIO. URL: https://www.cio.com/article/274530/process-improvement-capability-maturity-model-integration-cmmi-definition-and-solutions.html.

Yin, R.K. 2009. Case Study Research: Design and Methods. SAGE.

Youker, R. 2003. The nature of international development projects. Project Management Institute. North America, Baltimore, MD. Newtown Square.

Annexes

Appendix 1. Interviewees

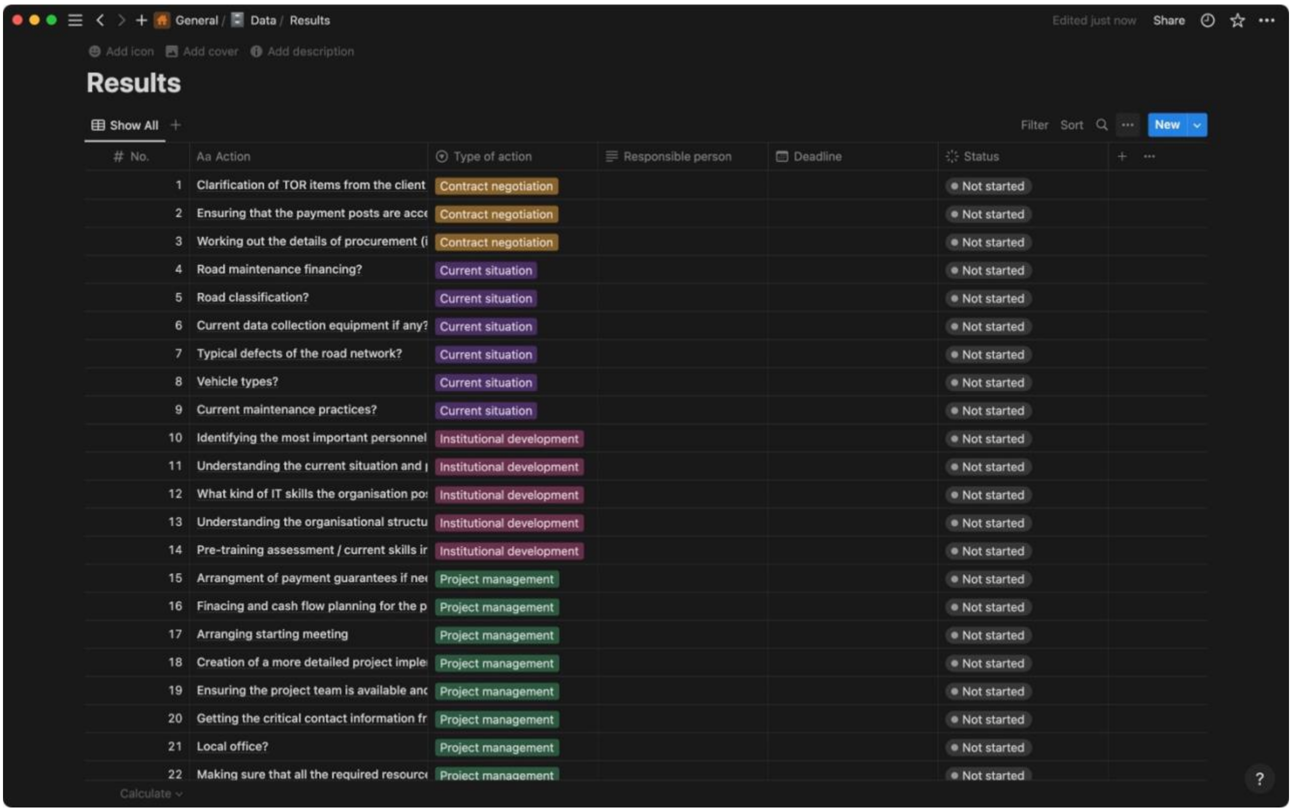
Interviewee No.	Position	Years in RAMS project
1	Team Leader / Road Asset Management Expert	23
2	Transport Economist / Road Asset Management Expert	19
3	Team Leader / Institutional Expert	25
4	Road Asset Management System Expert / Backend Developer	10

Appendix 2. Interview questions

No.	Question	Intention for question
1	How much experience do you have in RAMS projects and in what countries?	Understanding the background of the interviewee, reason for the interview
2	Could you tell me more about your typical tasks in a RAMS project, especially in the beginning?	Facilitating the conversation, understanding the interviewees responsibilities / expertise
3	How did you end up in the profession?	More background info of the interviewee
4	How many different clients have you had?	Establishing experience
5	How many different consortium leaders have you had in these projects?	Learning more on the interviewees background

6	How do you see / define a successful project?	Aligning with the interviewee to the same page
7	What do you see as the biggest risks for a project's success? Examples of the different aspects were given: 1. Proposal phase 2. Negotiations 3. Project start 4. Supervisors 5. Organisational maturity 6. Project objective 7. Project team	Real life examples, interview flow and discussion on different topics
8	Important measures to be taken in the beginning to tackle said risks	Answers to tackling the biggest problems from expert's point of view
9	Would you like to highlight anything else related to the matter which could be seen important	Finding points that might have been missed

Appendix 3. Results in Notion



General / Data / Results

Edited just now Share

Add icon Add cover Add description

Results

Show All

Filter Sort New

No.	Action	Type of action	Responsible person	Deadline	Status
1	Clarification of TOR items from the client	Contract negotiation			Not started
2	Ensuring that the payment posts are acce	Contract negotiation			Not started
3	Working out the details of procurement (i	Contract negotiation			Not started
4	Road maintenance financing?	Current situation			Not started
5	Road classification?	Current situation			Not started
6	Current data collection equipment if any?	Current situation			Not started
7	Typical defects of the road network?	Current situation			Not started
8	Vehicle types?	Current situation			Not started
9	Current maintenance practices?	Current situation			Not started
10	Identifying the most important personnel	Institutional development			Not started
11	Understanding the current situation and p	Institutional development			Not started
12	What kind of IT skills the organisation pos	Institutional development			Not started
13	Understanding the organisational structu	Institutional development			Not started
14	Pre-training assessment / current skills ir	Institutional development			Not started
15	Arrangment of payment guarantees if nee	Project management			Not started
16	Financing and cash flow planning for the p	Project management			Not started
17	Arranging starting meeting	Project management			Not started
18	Creation of a more detailed project imple	Project management			Not started
19	Ensuring the project team is available anc	Project management			Not started
20	Getting the critical contact information fr	Project management			Not started
21	Local office?	Project management			Not started
22	Making sure that all the required resource	Project management			Not started

Calculate