BACHELOR THESIS

Optimizing feasibility studies: Based on a Grounded Theory type comparison of feasibility design research

Marcella Claase

Abstract
This paper presents a general method for developing and optimizing feasibility type studies. Through a Grounded Theory method we compared variously published feasibility design research. A six-stage Feasibility Study Design Method was developed. In this paper we provide clarity on the development process of feasibility studies through the use of ten different tables and eleven figures. The aim of the current research is to provide a roadmap for both researchers and practitioners needing to optimize and develop feasibility studies.

Keywords: feasibility study; feasibility studies; method; feasibility study method; feasibility study design; grounded theory; literature review; feasibility study optimization

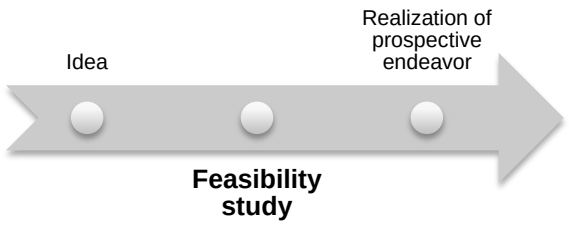

Figure 1: The basics of an endeavor's developmental process

Introduction

Feasibility studies are a widely dispersed research tool. Unfortunately, general standards, requirements, or guides on feasibility study design are missing (Palvia and Palvia, 1988; Kingston, 2004; Bowen et al., 2009). The aim of any feasibility study is to examine and/or evaluate the possible future success or failure of prospective endeavors (Palvia and Palvia, 1988; Brockman, 2008; Bowen et al., 2009). We define an endeavor as any future project or organization that is studied for its prospective feasibility.

The current research focuses on the design of feasibility studies. Therefore, we will not address the question of the necessity or use of feasibility studies.

To the best of our knowledge, to date, no one has articulated a general feasibility study design method. With the current research we aim to fill this gap. We present the Feasibility Study Design Method (FSDM), a systematic method on deductively developing feasibility type studies. The FSDM intends to clarify the process of feasibility study development for both researchers as well as practitioners. The

method consists of six stages, (0) Determine the prerequisites, (1) Identify target audience's information needs, (2) Specify the properties of the endeavor, (3) Determine the requirements for feasibility study reporting, (4) Search for relevant information and (5) Present feasibility study results.

The FSDM can be used as a roadmap, making the process of performing a feasibility study more structured, thereby potentially optimizing its outcome. There are three clear advantages for using our method. If the FSDM is being applied, the researcher is likely to (1) provide more transparency, (2) save time and (3) make sure that all necessary topics are addressed.
By documenting every stage in detail and translating this into the presentation of the feasibility study, the entire process becomes transparent for all parties involved. Due to the iterative nature of the FSDM, time is saved when initially specified endeavors turn out to be not feasible. The feedback loops of the FSDM ensure clear and quick revisions. Time is also saved because of the standardized nature of the FSDM. By being able to rely on a standard method, start-up times are minimized. The same standardization ensures that all necessary topics will be addressed or at least considered by the researcher.

This article is structured as follows. First we introduce feasibility studies within the knowledge management field. Next, we summarize the methodology used and explain the literature search. Then we present our findings. Based on the literature sample and our findings, a six-stage feasibility study design method is developed. In the last section the limitations of our research, our contribution to the academic field and points of interests for further research concerning feasibility design research are discussed.

Feasibility Studies as a From within Knowledge Management

The knowledge management field focuses on ways to create, identify, distribute, represent, and enable adoption of knowledge (Nonaka, 1991; Staab et al., 2000; Lehaney et al., 2004; Suministrado, 2004; Nonaka and von Krogh, 2009). To understand the concept of knowledge it is important to identify the distinction between data, information and knowledge. Figure 2 delineates the development of data into knowledge within the field of knowledge management.

Figure 2: Development of data into knowledge within the knowledge management field

According to Suministrado (2004), data are trivial and meaningless outputs from any effort. Outputs transform into information when relevance or a goal is given to the data. Only when information is being used for decision making of any kind, it becomes knowledge (Suministrado, 2004). Nonaka (1991) divides the aspect of knowledge in two types; tacit and explicit knowledge. Tacit knowledge consists of the practical experiences, the 'know-how', cognitive experiences, mental models and beliefs, of a person. Tacit knowledge is highly personal, hard to standardize and therefore difficult to articulate. Explicit knowledge on the other hand is fixed and systematic. It can easily be articulated and shared. Ideas and insights on new and potentially successful endeavors can arise within both types of knowledge (Nonaka, 1991; Suministrado, 2004; Nonaka and von Krogh, 2009).

Feasibility studies are intended to provide knowledge. Based on this knowledge, the eventual go/no go decision is made. The FSDM demonstrates how to systematically transform an idea for a prospective endeavor, through the stages of data collecting and information identifying into knowledge on which a feasibility decision about the potential success or failure of the prospective endeavor can be based. These properties of the feasibility design process fit seamlessly in the knowledge management field.

In 1991, Nonaka already stressed the strategic importance of decision making on the subject of developing, supporting or proceeding with an endeavor within the field of knowledge management. Within this field, feasibility studies are regarded a necessity in several methodologies (Staab et al., 2000; Lehaney et al., 2004; Moradi et al., 2009; Zilli et al., 2009). Nevertheless, feasibility studies are not yet recognized as a separate applied type of methodology.

We concur with Nonaka (1991) that the creation this type of knowledge is not limited to the field of knowledge management and can take place in every other research field. We emphasize the prospective applicability of the Feasibility Study Design Method in a great

many of research fields. Due to the systematical approach the FSDM will support the managing process of creating knowledge with a focus on the feasibility determination of any endeavor.

Method

The current research is a literature review of feasibility study design research. We used the Grounded Theory Literature Review Method by Wolfswinkel et al. (in press). This literature method is applicable for our research because of the rigorous manner in which it allows the researcher to review a chunk of academic research within clear set boundaries. It allows the researcher to search, select and analyze the literature in a structured and inductive manner. The Grounded Theory inspired approach enabled us to make sense of the diverse set of articles spread over various fields.
The GTLRM consists of five systematic stages, to completely and thoroughly review the literature in the chosen niche of the academic field. These stages are noted in table 1.

Stage	Task
1. DEFINE	
1.1	Define the criteria for inclusion/exclusion
1.2	Identify the fields of research
1.3	Determine the appropriate sources
1.4	Decide on the specific search terms
2. SEARCH	
2.1	Search
3. SELECT	
3.1	Refine the sample
4. ANALYZE	
4.1	Open coding
4.2	Axial coding
4.3	Selective coding
5. PRESENT	
5.1	Refinement and structure the content
5.2	Structure the article

Table 1 Five-stage Grounded Theory Literature Review Method by Wolfswinkel et al. (in press)

We will now briefly address the five stages of the method.

The first stage is to define the scope of the review as well as the criteria for inclusion and exclusion from the data set. This step also includes defining sampling criteria (timeframe, restricted journals or languages) which does not have to be related to the actual content of the research. Our scope is set to include papers on feasibility study design. After that, the fields of research are defined. Fields of research address different disciplines for instance the knowledge management field or health industries. As mentioned before, we did not limit our research to any research field. The GTLRM aids us in comparing the information from the different research fields, through the analyzing process. Furthermore, the appropriate sources need to be determined for the scope. These sources are outlets such as Scopus or Web of Science. The last part of the Define stage is selecting and determining specific search terms. These search terms need to be documented. This way the researcher can always retrace his/her steps and transparency to the reader can be provided. An overview of the search terms used in our research is provided in appendix A.

The second stage comprises the actual searching of academic literature. Due to the inductive nature of the search, synonyms or search terms which were initially not included may become apparent and included as the search proceeds. When a new search term arises or the scope must be adjusted, another iteration of the search might be necessary. Because of this, it is important to document all search terms, sources of the search and results of the search, making the search process replicable. Finally, this stage results in a sample of the selected literature. The next chapter provides clarity on the search and selection process of the literature used in our research.

Stage three involves the selection and refinement of the sample of academic literature. Duplicate work in the sample needs to be filtered out. Further selection is based on reading the titles, abstracts and/or full texts of the remaining papers. After this, the reviewer engages into the process of performing forward and backwards citations to check whether new articles come up. This process of filtering out duplicates, refining the sample based on title, abstract and full text and checking for forward and backward citations is iterative. The process needs to be repeated until no new articles arise and the literature sample is saturated. To structure the process of selection researchers can make use of simple tables which clearly explicate the reasons for choosing certain articles. This way reasons for inclusion or exclusion are accessible later on in the process.

Stage four consists of the actual analyzing of the papers. This is achieved through the use of open, axial and selective coding. To analyze the papers, researchers should randomly pick a paper and highlight anything that seems relevant in the texts giving the scope and research question of the review. These highlighted areas are called excerpts. Based on open coding, insights that researchers obtain from the excerpts can be transformed or incorporated into concepts, categories and properties of categories. Concepts represent the knowledge, hence not the information, from the excerpts and in turn the articles they originated from. Excerpts and concepts can be categorized. These categories can have properties and sub-categories, which differentiates the categories from the concepts.
There may appear interrelations between the excerpts, concepts, categories and their sub-categories. Through the use of axial coding these interrelations are identified and perhaps transformed into higher-order categories. Furthermore, selective coding is used to discover relations between these main categories. Based on the concepts, sub-categories, properties and categories, the researcher can engage in comparative analysis. With comparative analysis, the researcher continuously relates and compares the categorizations with each other in an effort to uncover hidden relationships and develop potential explanations or design features. These analytical steps allowed us to synthesize the disperse data regarding feasibility design research into a set of higher level concepts and categories. Using comparative analysis these concepts and categories were gradually transformed into our Feasibility Study Design Method. The precise transformation is stated in the chapter 'the Feasibility Study Design Method'.
Wolfswinkel et al. (in press) emphasize the importance of documenting all the choices made within the coding process. One can make use of color-coding to identify which excerpts belong to which papers.
Stage five is presenting the findings of the literature review. This can be done by the use of textual, graphical or communication means to review the steps taken, papers read or concepts derived. To provide clear statements on the research process and our findings we used eleven different figures and ten different tables within the current research.

Feasibility literature selection

In order to uncover relevant information for inclusion in our research, we conducted a systematic search for feasibility study design research. The scope of our literature review is set to only include international articles from international peer reviewed conference proceedings and peer reviewed journal articles. We used two academic databases (Scopus and Web of Science) and one academic search engine (Google Scholar) to cover a vast amount of research fields.
The search terms used were systematically selected and designed, based on capturing the entire process of designing feasibility studies. To enhance the likelihood of being efficacious each search term was combined with either 'feasibility study' or 'feasibility studies'. An overview of the search terms is presented in appendix A.
After selecting our search terms, we selected the desired search options within the databases. To acquire the mostly relevant hits the search option 'article title, abstract and keywords' was used in Scopus, while the search option 'title, topic' was used in Web of Science. Google Scholar however, did not allow us to choose a similar search option. To narrow down our search in Google Scholar we put the search terms in between quotation marks. Since it is not realistic to go through millions of hits we adjusted search entries at some instances to decrease the number of hits.
This search resulted in a total number of 54 potentially interesting articles. By excluding duplicates, removing papers beyond our scope, reading the full texts and ultimately doing forward and backward citations, we cut down the sample to 12 highly relevant articles. Figure 3 shows a graphical representation of the elimination procedure.

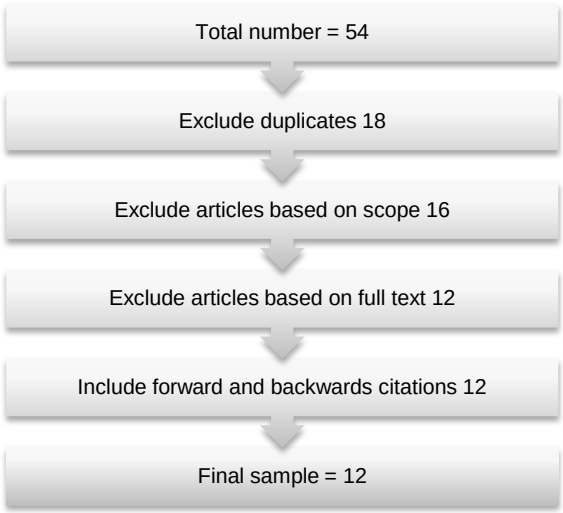

Figure 3: Representation of the used feasibility study design research selection process

An overview of the articles used in the literature sample can be found in appendix B.

Our final sample consists of 12 different articles. These articles are distributed over five different fields: (1) Health, (2) Information systems (IS), (3) Mining, (4) Agriculture and (5) Hydrocarbon Processing (HP). Figure 4 gives a representation of the number of papers per field.

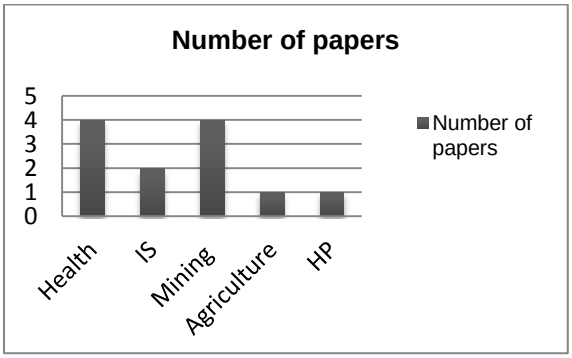

Figure 4: Distribution of the papers used in our literature review among the different research fields (n=12)

Definition of feasibility study

The definition of feasibility studies slightly differs between the five different fields of research. These differences can be explained due to the different focus and interests among the different research fields. Next to the differences, three main commonalities in defining feasibility studies throughout the different fields could be identified: (1) Feasibility studies are performed before commencing with an endeavor; (2) Feasibility studies are designed to answer the 'Go/No Go' question (whether or not to proceed with an endeavor); and (3) Feasibility studies provide insight in the probable success or failure of a prospective endeavor.

Stakeholder roles of feasibility study development

Within the development process of feasibility studies two stakeholder roles are identified, (1) the commissioner and (2) the researcher. Figure 5 provides an overview of these different stakeholder roles and its purpose within the feasibility study development process.

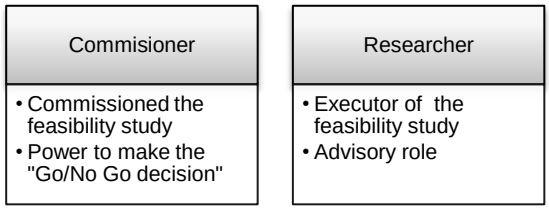

Figure 5: Stakeholder roles and their purposes in the development process of any feasibility study

We define the person or authority who orders the feasibility study as the commissioner. The power to make Go/No Go decisions within the development process of the feasibility study lies with this commissioner. The commissioner can pull the plug on the feasibility study at any given time. The final decision on the proceeding of the proposed endeavor, based on the feasibility study results, is made by the commissioner.

The person or authority who executes the feasibility study is called the researcher. The researcher can aid the commissioner in the final decision making process based on the results of the feasibility study. However, the researcher does not have the power make any Go/No Go decisions on the feasibility study or on feasibility of the proposed endeavor. The role of the researcher with respect to the commissioner is mainly an advisory one. Notice that the distinction commissioner/researcher is based on roles and not on persons. This implies the possibility for the commissioner and the researcher to be one and the same person.

The Feasibility Study Design Method

Let us now explain the development of the six-stage approach for designing feasibility studies using the GTLRM. From the literature sample the following six main categories were derived, (1) Audience, (2) Goal of the feasibility study, (3) Quality measures of the prospective endeavor, (4) Requirements for feasibility study reporting, and (5) Present feasibility study results. We also derived the concept Search. As mentioned before, categories are groups of concepts (Wolfswinkel et al., in press). Appendix C provides an overview on the emergence of the categories, their concepts and sub-concepts from the individual papers.

The five main categories and one concept were then rearranged into prerequisite knowledge for feasibility study development and the separate stages of the FSDM. The category 'Audience' was first adjusted to fit the

needs of the FSDM, before it was rearranged into both the prerequisites and stage 1. 'Audience' split into the categories 'target audience of the feasibility study', which is identified as prerequisite knowledge for feasibility study design and 'target audience's information needs', which defines the first stage of the FSDM. The category 'Goal of the feasibility study' was also identified as prerequisite knowledge for feasibility study development. The second, third and fifth stage of the FSDM were identified with use of the categories 'Properties of the prospective endeavor', 'The requirements for feasibility study reporting' and 'presenting the feasibility study results' respectively. Stage four is formed by the concept 'Search'

The Feasibility Study Design Method is specifically developed to be applicable in multiple research fields. As a consequence, field specific deviations from the method are likely to occur. We advise researchers to employ the FSDM as a roadmap for designing field specific feasibility studies. In order to enhance the transparency of the feasibility study we strongly recommend documenting every step the researcher makes. Aside from documenting every step it is vital to document any deviations from the FSDM that were made during the development process of the feasibility study. Detailed documenting will help understand the logic of earlier decisions made by the researcher in a later stage (Wolfswinkel et al., in press).

The Feasibility Study Design Method should be used in an iterative fashion, through the use of feedback loops. Feedback loops allow the researcher to return to earlier stages in the feasibility design method. This is useful if the proposed endeavor does not seem feasible or does not meet the proposed requirements set by the commissioner. These loops enable the researcher to alter previous decisions. By altering previous decisions of the proposed endeavor, the probability of feasibility might increase. If the researcher alters the decisions made in a certain stage, the whole process is to be continued from that stage on, to either stage 5 or the moment the proposed endeavor again seems to be not feasible. The researcher should repeat this process until (1) the proposed endeavor seems feasible and satisfies all the requirements set by the commissioner or (2) the proposed endeavor is not feasible despite all the alterations the researcher could make within the boundaries set by the commissioner. It is highly recommended that all the alterations made by the researcher are documented. This will help the researcher or clarify the decisions made during the process to the commissioner when the go/no go decision is about to be made. Figure 6 represents the feasibility study design method with the feedback loops within the method.

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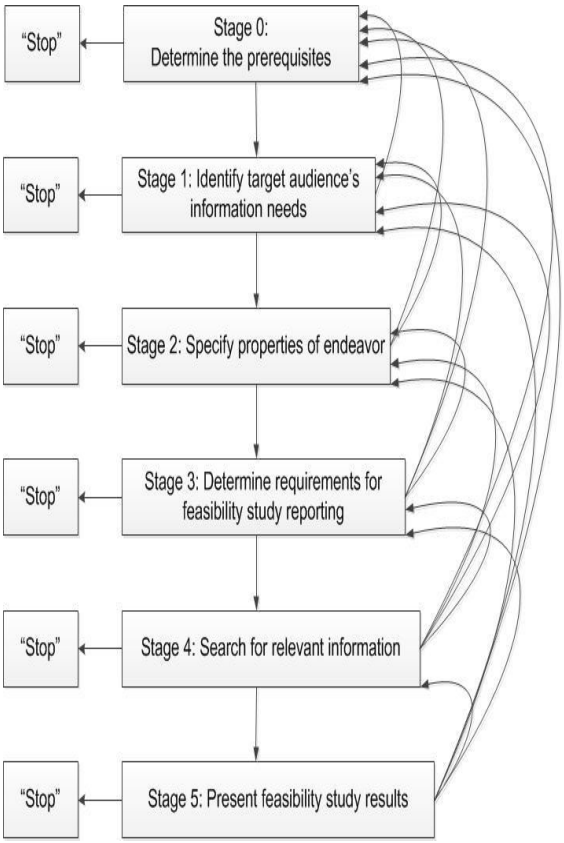

Figure 6: Feasibility Study Design Method, to be used in an iterative fashion

Stage 0: Determine the prerequisites of the feasibility study

Before commencing with the process of developing the feasibility study, a number of questions must first be answered; '*What* is the research topic of which we want to test the feasibility?*',* '*why* is the feasibility study being conducted?' and '*for whom* is the feasibility study designed?'

These questions form the prerequisites for the feasibility study. Without this knowledge it is not possible to design an efficacious feasibility study (Mortimer, 1968; Vancas, 2003; Cooper and Ebin, 2004; Brockman, 2008; Bowen et al., 2009; Ries, 2012). Figure 7 presents an overview of the prerequisites of a feasibility study. Usually the commissioner of the feasibility study determines these prerequisites, although it is possible that the researcher needs to refine the prerequisites

further, in order to create the most efficacious feasibility study.

Figure 7: Prerequisites for developing a feasibility study

0.1 Specify endeavor

When engaging in the process of designing any feasibility study, it is vital to start the process with defining the endeavor in question. (Mortimer, 1968; Vancas, 2003; Cooper and Ebin, 2004; Brockman, 2008; Ries, 2012) It is essential to set a scope of the endeavor and its stakeholders in order to provide clarity on the main topic of the feasibility study (Vancas, 2003). Vague and/or overly broad or narrow limits to the scope, will affect the results of the feasibility study in a negative manner (Brockman, 2008). Figure 8 provides a visual representation of the process of specifying an endeavor.

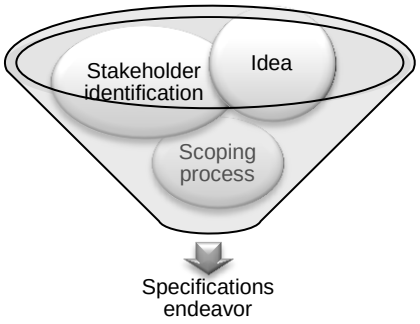

Figure 8: Visual representation of the process specifications an endeavor

0.2 Identify goal of feasibility study

Next to the specifications of the future endeavor, the goal of the feasibility study itself should be identified. Identifying the goal of the feasibility study is important as each goal requires an appropriate and logical approach to the feasibility study reporting. Therefore, it is recommended to identify the goal in an early stage of the feasibility study development process (Cooper and Ebin, 2004). Research directions aid the researcher in evaluating and prioritizing the pieces of information of the feasibility study report. They greatly enhance the possibility of the feasibility study being satisfactory (Bowen et al., 2009.). Within the sample, ten different types of goals to a feasibility study emerged. An overview of the goals is given in Figure 9. Table C.1 in appendix C provides an overview of the goals and the associated articles from the sample these goals originated from. It is possible for a feasibility study to pursue multiple goals at the same time. If this is the case, it is advisable to identify the main goal as this will influence the structure of the feasibility study report.

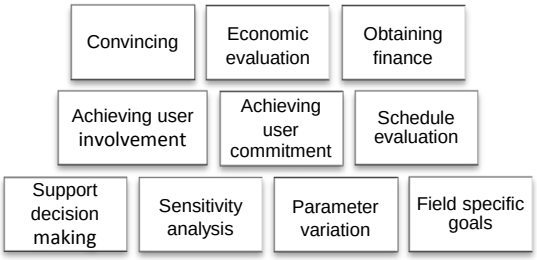

Figure 9: Overview of the different goals of a feasibility study

We will now briefly address each type of goal. 'Convincing' refers to using the feasibility study to convince other parties of the need for the endeavor (Palvia and Palvia, 1988; Bowen et al., 2009). 'Economic evaluation' is an application of the feasibility study to use the outcome of the feasibility study to prove the endeavor is economically and financially feasible (Nell and Burks, 1999; Vancas, 2003; Cooper and Ebin, 2004; Evans, 2008; Ries, 2012). The goal 'obtaining finance' is quite obvious and usually used when the target audience is either an investor or lender (Nell and Burks, 1999; Vancas, 2003; Cooper and Ebin, 2004; Ries, 2012). There are occasions in which a feasibility study is used to achieve early involvement from users who are likely to eventually work with the proposed future endeavor. Involvement in an early stage of the development process of the endeavor will enhance the willingness of the users to work proposed endeavor in the future (Palvia and Palvia, 1988; Haramis, 1992; Kingston, 2004; Evans, 2008; Arain et al., 2010). User willingness can also be enhanced by focusing on achieving or enhancing user commitment for the proposed future endeavor. Without commitment from the users the endeavor is very likely to fail (Mortimer, 1968; Palvia and Palvia, 1988; Haramis, 1992; Kingston, 2004; Arain et al., 2010). When developing large, long term endeavors, costs may be bypassed in importance by time. Schedule overruns in these endeavors are extremely costly. With schedule evaluation, time bottlenecks are being pointed out and major time risks are

identified (Evans, 2008). It is possible that a proposed future endeavor is so complex, that commissioners need the feasibility study to identify the different decisions that can be made in the process of developing the future endeavor and their consequences. This type of goal is more common with long term and/or complex endeavor, then short term and/ or simple endeavors (Nell and Burks, 1999; Cooper and Ebin, 2004; Bowen et al., 2009; Vancas, 2010; Ries, 2012). To investigate what will happen to the proposed future endeavor and its feasibility, when dependence factors are constrained, a sensitivity analysis should be the goal of the feasibility study (Nell and Burks, 1999; Kingston, 2004, Cooper and Ebin, 2004; Bowen et al., 2009; Vancas, 2010). To understand how and how much the endeavor will react to changes in its environment, the focus of the feasibility study should be on parameter variation (Nell and Burks, 1999; Kingston, 2004, Evans, 2008; Bowen et al., 2009; Arain et al., 2010). Next to the before mentioned goals, it is possible that the commissioner or the researcher needs the feasibility study for a field specific purpose. Because of the generic nature of the FSDM, we will not specifically address all the field specific goals that can emerge when designing a feasibility study.

0.3 Specify target audience of the feasibility study

The third and last prerequisite the researcher should define before developing the feasibility study itself, concerns the specifying of the target audience. The main question hereby is 'For *who* is the feasibility study designed?' Each audience has its own specific interest needs and requires a different level of effort and even different feasibility report content (Palvia and Palvia, 1988; Cooper and Ebin, 2004). Determining which audience the feasibility study should address will thus save time, money and effort as non-important issues to that type of audience do not have to be addressed.

We distinguish six different types of audience for any feasibility study; (1) Self, (2) User, (3) Management, (4) Lender, (5) Investor, (6) Field specific audience (Mortimer, 1968; Palvia and Palvia, 1988; Haramis, 1992; Nell and Burks, 1999; Vancas, 2003; Cooper and Ebin, 2004; Kingston, 2004; Brockman, 2008; Evans, 2008; Bowen et al., 2009; Arain et al., 2010; Ries, 2012). Table C.2 in appendix C provides an overview of the types of audience we identified, and the belonging articles from the sample these types of audience originated from. Table 2 provides a short overview of the different types of audience.

Types of audience of feasibility studies
• Self
• User
• Management
• Lender
• Investor
• Field specific audience

Table 2: Types of audience of feasibility studies

When all the prerequisites are clear to the researcher he/she can engage in the actual process of developing the feasibility study.

Stage 1: Identify the target audience information needs

In order to design an appropriate feasibility study, the information needs of the audience, with respect to feasibility studies, must first be identified (Palvia and Palvia, 1988; Cooper and Ebin, 2004; Brockman, 2008). Information needs represent the topics of information that at least should be addressed within the feasibility study. Brockman (2008) states that a feasibility study is merely successful when it achieves the information needs envisioned by the target audience. We will now briefly explain the different information needs of the different types of audiences.

If you are your own audience, emphasize is placed on collecting information about implementing and working with the envisioned endeavor. Important parameters should be estimated and a sensitivity analysis may be carried out (Arain et al., 2010). As mentioned before, it is possible that the users of the prospective endeavor are the targeted audience of the feasibility study. It is vital to keep in mind that these users should be willing to participate in the endeavor. If they are not willing to participate in the future endeavor, the endeavor will fail (Palvia and Palvia, 1988; Haramis, 1992; Kingston, 2004; Bowen et al., 2009; Arain et al., 2010). Based on the sample, users in general deem the following nine pieces of information important in a feasibility study. (In order of importance) operational factors, meet requirements, impact on organization, impact on primary users, economic factors, management support, technical factors, security concerns and legal concerns. These topics should be adequately addressed in the feasibility study. An in depth explanation of the topics is provided in stage 3 on the practical requirements of feasibility study reporting. Field specific needs of users

may also be taken into account (Palvia and Palvia, 1988; Bowen et al., 2009).
Managers have similar information needs as users. However, the importance of the individual terms is slightly different. Table 3 shows a comparison of the information needs of users and managers. Managers would like information on (in order of importance) operational factors, meet requirements, impact on organization, economic factors, stakeholder factors, management support, technical factors, security concerns and legal concerns. Field specific needs of managers may also need to be addressed (Palvia and Palvia, 1988; Haramis, 1992; Kingston, 2004). It is also possible that it is desirable for the feasibility study report to serve as a guide for managers in managing the process of developing the prospective endeavor (Mortimer, 1968)

Importance factor	Users	Managers
1	Operational factors	Operational factors
2	Meet requirements of users	Meet requirements of managers
3	Impact on organization	Impact on organization
4	Impact on primary users	Economic factors
5	Economic factors	Stakeholder factors
6	Management support	Management support
7	Technical factors	Technical factors
8	Security concerns	Security concerns
9	Legal concerns	Legal concerns

Table 3: Overview of the information needs of users and managers in order of importance

When it comes to finance, there are two important types of audience, the lenders and the investors. Lenders are people or authorities, such as banks, who provide secure or unsecure loans for the development of the prospective endeavor (Cooper and Ebin, 2004). They expect with the help of the feasibility study to gain an understanding of the financial and technical performance of the prospective endeavor (Cooper and Ebin, 2004). They focus on focus on the payback period of the loan (Nell and Burks, 1999). However, organizational skills and past financial performance of the commissioner or the organization he/she represents should not be forgotten (Ries, 2012). Investors allocate equity with the expectation of financial return. (Cooper and Ebin, 2004) Investor' information needs are quite similar to that of lenders. Investors also want insight in the financial and technical performance of the prospective endeavor (Cooper and Ebin, 2004). They too value information on the organizational skills and past financial performance of the commissioner or the organization he/she represents (Ries, 2012). However, instead of focusing on payback period, the main focus of investors is on the expected return on investment (Nell and Burks, 1999; Evans, 2004). Since this is a general distribution of audience and their needs for information, based on our feasibility research sample, it is possible that the target audience is none of the above. When this is the case field specific criteria might hold (Vancas, 2003; Kingston, 2004).
Figure 10 provides a brief representation of the most important information needs of the different types of audience.

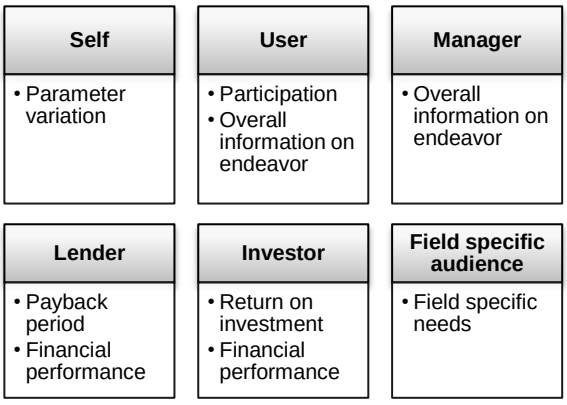

Figure 10: Summary on most important information needs of the different audiences.

Although it is vital that the feasibility study meets the presented information needs of the audience (Brockman, 2004), addressing only these information needs in the feasibility study is not enough present a decent feasibility study. Field specific or even endeavor specific needs may arise when investigating the target audience and should always be taken into account (Mortimer, 1968; Nell and Burks, 1999; Brockman, 2004). The next stage in developing the feasibility study is to specify the quality measures of the prospective endeavor.

Stage 2: Specify the quality measures of the prospective endeavor

While determining the quality measures of the prospective endeavor, the main question is '*What* should the future endeavor entail?'.

There are numerous different quality measures. Within our sample nine quality measures originated specifically for feasibility studies. Table C.3 in appendix C provides an overview of the quality measures identified, and the belonging papers from the sample these concepts originated from.
Figure 11 presents an overview of the nine identified quality measures. Subsequently, we will explain these measures.

Figure 11: Overview of different quality measures of the prospective endeavor.

The quality measure 'acceptability' measures the extent to which the future endeavor is positively regarded by all parties involved (Palvia and Palvia, 1988; Haramis, 1992; Cooper and Ebin, 2004; Kingston, 2004, Bowen et al, 2009). 'Demand' on the other hand, measures the need for the endeavor within the respective fields (Haramis, 1992; Kingston, 2004; Bowen et al., 2009). If a sufficient market demand for the endeavor cannot be obtained, the endeavor will not be feasible (Brockman, 2008). The measure 'Implementation' is about the extent to which the endeavor can be realized in an unstable environment (Cooper and Ebin, 2004; Kingston, 2004; Bowen et al., 2009; Ries, 2012). 'Practicality' refers to the quality measure indicating whether or not the endeavor can be realized, to what extent and the factors this depends on (Haramis, 1992; Vancas, 2003; Cooper and Ebin, 2004; Kingston, 2004; Brockman, 2008; Bowen et al., 2009; Arain et al., 2010). Whereas, 'Adaptability' measures the ability of the endeavor to function in a different environment (Vancas, 2003; Bowen et al., 2009). 'Integration' focuses on the extent to which an endeavor can be integrated into some other (new) endeavor and/or environment (Bowen et al., 2009, Ries, 2012)
The quality measure 'Expendability' assesses the degree to which the proposed endeavor is feasible for a bigger or different group of users (Bowen et al., 2009)
'Generalizability' is a measure to examine the degree to which an endeavor can be generalized to a different setting (Haramis, 1992; Kingston, 2004; Bowen et al., 2009; Arain et al., 2010).
Obviously here as elsewhere, one size does not fit all. It can occur that none or more than one quality measure is desired. As explained before, the FSDM allows for flexibility in the choices the researcher has to make. As long as deviations are well argued and documented, the researcher should not hesitate to deviate from the proposed concepts.

After ensuring the prerequisites for the feasibility study, identifying the information needs of the target audience and determining the quality measures of the prospective endeavor it is time to analyze and determine the actual requirements for feasibility study reporting.

Stage 3: Determine requirements for feasibility study reporting

As mentioned before, the researcher should prioritize the information reported in the feasibility study to adequately meet the needs of the target audience and/or the commissioner. The central question at this stage is '*What topics of information* should be addressed in the feasibility study?' Within the sample, seven prime topics of information within feasibility study reporting are identified: (1) The stakeholders, (2) Overview of the prospective endeavor, (3) Field specific factors, (4) Operational factors, (5) Financial factors, (6) Legal concerns and (7) Testing (Mortimer, 1968; Palvia and Palvia, 1988; Haramis, 1992; Nell and Burks, 1999; Vancas, 2003; Cooper and Ebin, 2004; Evans, 2004; Kingston, 2004; Brockman, 2008; Bowen et al., 2009, Arain et al., 2010, Ries, 2012). In order to create an efficacious feasibility study these topics should at least be covered. The extent to which the topics should be covered depends on the target audience and their information needs, the goal of the feasibility study, the quality measures of the prospective endeavor and of course the wishes of the commissioner Improper or missing information will have a negative effect on the reliability of the results and conclusions of the feasibility study (Brockman, 2008). This will influence the outcome of the go/no go decision. In turn, this will impact the strategic decisions made by the organization and allows for an unwanted chain reaction (Nonaka, 1991).

Within each of these prime topics, several subtopics are identified. These subtopics will support the researcher in determining which practical information to include in the feasibility study. The biggest threat to feasibility study reporting is that major issues are being overlooked or not adequately addressed (Cooper and Ebin, 2004). Therefore, researchers should be extra careful when determining the requirements on the content needed for their feasibility study report. We will now address each topic separately.

3.1 Stakeholders

The first topic considers the stakeholders of the prospective endeavor. Who are its primary, secondary and perhaps field specific (such as managers) users? Addressing the users of the prospective endeavor is a crucial part in the feasibility study. If it is not clear who the eventual users are, the whole prospective endeavor will be in jeopardy. Without the willingness, commitment or support of the eventual users the endeavor is very likely to fail (Palvia and Palvia, 1988). Stakeholders can also involve third party organizations. These organizations have a certain interest in the future endeavor, for example through ancillary services (Brockman, 2008). If there is not enough equity within the commissioner's organization it is possible to attract lenders or investors. These should not be forgotten in the stakeholder analysis, as they expect in a later stage, a certain return from the prospective endeavor (Cooper and Ebin, 2004).
Table 4 provides an overview of the topics to address within the topic stakeholder.

Stakeholders
Users (primary)
Users (secondary)
Users (field specific)
Third party organizations
Lender
Investor

Table 4: overview on the topic 'stakeholders'

3.2 Overview of the endeavor

The next prime topic that should be addressed, is establishing an overview of the prospective endeavor. They key issues that have to be addressed within this topic are; defining the scope and/or boundaries of the prospective endeavor and delineating its organizational structure (Brockman, 2008; Ries, 2012). Additional field specific information about the prospective endeavor may be included. Table 5 proposed a brief summary of this topic.

Overview of the endeavor
Scope
Organizational structure
Field specific information

Table 5: overview on the topic 'overview of the endeavor'

3.3 Field specific factors

In addition to the field specific information on the prospective endeavor, in topic number three an analysis of field specific factors is made, outlined in table 6. These are not applicable for every endeavor, still the researcher should consider each of the proposed topics. These topics include the technical factors of the endeavor, possible security concerns, field specific attributes of the endeavor, the environment of the endeavor in an abstract manner and other field specific factors which can be of influence on the feasibility of the prospective endeavor. When defining the abstract environment it is essential to carry out a market and competition analysis (Mortimer, 1968; Cooper and Ebin, 2004; Brockman, 2008). Subjects to consider are Market entry within a market analysis and determination of the number of competitor, who provide the same or similar endeavors in the area within the competitors analysis (Cooper and Ebin, 2004). Other influences in the environment of the prospective endeavor can hold field specific third party impact on the endeavor, for example through insurance companies (Brockman, 2008). And field specific partnerships or agreements (Brockman, 2008; Ries, 2012).

Field specific factors
Technical factors
Security concerns
Field specific attributes of endeavor
Environment of endeavor
Market analysis
Market entry
Competition analysis
Determination number of competitors providing the same or similar endeavors in the area
Field specific third party impact on endeavor
Field specific partnerships and/or agreements
Other

Table 6: overview on the topic 'field specific factors'

3.4 Operational factors

Prime topic number 4 addressed the operational factors of the prospective endeavor. Subjects to consider are; labor,

time, planning, business benefits and deficits, an equipment list, a physical environment analysis, infrastructure, logistics, administration and overhead and field specific operational factors. When the operational factors of the proposed endeavor are constrained, the actual operating of the eventual endeavor is in jeopardy.

The subject of labor includes all aspects of labor needed to develop and operate the prospective endeavor. This could include the amount, type and duration of labor (Haramis, 1992; Vancas, 2003; Kingston, 2004; Ries, 2012). As mentioned before, time may be even more important than money in some endeavors (Evans, 2008). Therefore, a precise estimation of the time and overall planning of the development and operational phase of the prospective endeavor is recommended (Evans, 2008; Ries, 2012). The subject of business benefits and deficits is particularly applicable when the endeavor is realized within an organization. Business benefits and deficits are about the benefits and/or deficits for the organization as a whole when the endeavor is being operated (Palvia and Palvia, 1988; Haramis, 1992; Kingston, 2004; Bowen et al, 2009) In order to evaluate the equipment necessary for operating the prospective endeavor, an equipment list should be designed (Mortimer, 1968; Brockman, 2008). Next to the before mentioned abstract environment, it is advised that the researcher develops an analysis of the physical environment of the prospective endeavor. Topics to include are the size of the property, transport from and to the property, access to utilities and other field specific needs (Mortimer, 1968; Nell and Burks, 1999; Cooper and Ebin, 2004; Ries, 2012). Beside the actual transport from and to the property, the infrastructure and logistic plan of the prospective endeavor should be defined (Palvia and Palvia, 1988; Haramis, 1992; Nell and Burks, 1999; Vancas, 2003). The development and operating of a new endeavor implies new, extra or other proceedings for the administration and overhead department (Nell and Burks, 1999). Therefore, these proceedings should be taken into consideration.

Operational factors
Labor
Time
Planning
Business benefits
Tangible
Intangible
Business deficits
Tangible
Intangible
Equipment list
Physical environment analysis
Size
Transport
Access to utilities
Field specific needs
Infrastructure
Logistics
Administration and overhead
Field specific operational factors

Table 7: Overview on the topic 'operational factors'

3.5 Financial factors

Generally, the topic with the highest impact on the feasibility of the prospective endeavor is the financial factors. Firstly, if possible, it is advised to provide an overview of the past or current financial performance of the organization, as this will help win deciding if the organization is ready to take on the new endeavor (Ries, 2012). Topics to address within this overview are; cash flows, capital costs (if applicable), operating costs, other field specific costs, depreciation rates, taxes, field specific revenues, a balance sheet, the current net present value and a revenue statement (Mortimer, 1968; Haramis, 1992; Nell and Burks, 1999; Vancas, 2003; Cooper and Ebin, 2004; Kingston, 2004; Brockman, 2008; Evans, 2008; Ries, 2012). More interesting are the expected costs and revenues the prospective endeavor will bring. To be accurate enough to support feasibility decision making, cost estimates should have a 15% marge (Palvia and Palvia, 1988; Nell and Burks, 1999; Vancas, 2003; Evans, 2008; Ries, 2012). When considering costs it is necessary to make a distinction between direct and indirect costs, field specific direct costs and field specific indirect costs and fixed and variable costs (Nell and Burks; Vancas, 2003; Brockman, 2008; Ries, 2012). This way it is more clear for the researcher which costs to alter, when the prospective endeavor seems to be not feasible. The use of feedback loops is highly recommended to create a financial solid and feasible endeavor. Expected costs to notify are; cash flows; startup costs; capital costs within a certain timeframe (if applicable);

operating costs within the same timeframe as the capital costs, other field specific costs, depreciation, taxes, field specific revenues, contingencies, a balance sheet, the net present value, the internal rate of return, the return on investment, a break-even analysis, a revenue statement, a cost/benefit analysis and the financing requirements needed to obtain the expected amount of equity. As most of the requirements within the topic 'financial factors' speak for themselves, we will just explain the contents of a balance sheet and the term 'financing requirements'. A balance sheet exists of the debt, equity, gifts and loan of the prospective endeavor (Nell and Burks, 1999; Vancas, 2003; Ries, 2012). Financing requirements are the loans, investments or gifts (hence, acquired from the lender(s) or investor(s) or others) which are needed to cover the gap between expected costs and expected revenues the commissioner or his/her organization cannot cover with the use of their own equity. Subject of the financing requirements concern the expected financing needs, the interest rates and other field specific terms, conditions and/or covenants (Cooper and Ebin, 2004; Brockman, 2008).

Financial factors
1. *Past/ current (if applicable)*
Cash flows
Capital costs within timeframe (if applicable)
Operating costs within timeframe
Direct costs
Fixed
Variable
Indirect costs
Fixed
Variable
Field specific direct costs
Fixed
Variable
Field specific indirect costs
Fixed
Variable
Other field specific costs
Fixed
Variable
Depreciation
Taxes
Field specific revenues
Balance sheet
Debt
Equity
Gift
Loan
Current net present value
Revenue statement
2. *Expected costs*
Cost estimates (< 15% marge)
Cash flows
Startup costs
Direct costs
Fixed
Variable
Indirect costs
Fixed
Variable
Field specific direct costs
Fixed
Variable
Field specific indirect costs
Fixed
Variable
Capital costs within timeframe (if applicable)
Operating costs within timeframe
Direct costs
Fixed
Variable
Indirect costs
Fixed
Variable
Field specific direct costs
Fixed
Variable
Field specific indirect costs
Fixed
Variable
Other field specific costs
Fixed
Variable
Depreciation
Taxes
Field specific revenues
Contingencies (on field specific %)
Balance sheet
Debt
Equity
Gift
Loan
Net present value
Internal rate of return
Return on investment
Break-even analysis
Revenue statement
Cost/benefit analysis
Financing requirements
Expected financing needs
Interest rates
Field specific terms, conditions and/or covenants

Table 8: Overview on the topic 'financial factors'

3.6 Legal concerns

Next to the field specific, operation and financial factors there is another prime topic which has a substantial influence on the feasibility of the prospective endeavor. This topic considers the legal concerns. The legislative and regulation influences of the government on a prospective endeavor are fixed. If the legal standards cannot be met the prospective endeavor is not feasible (Mortimer, 1968). Legal concerns are an especially important topic if the prospective endeavor covers a large and long term project. With such project permissions and/or permits are often required. It is not uncommon that the process of obtaining these permissions and/or permits is very long. To make sure the development of the prospective endeavor will adhere to the proposed schedule; these timely bottlenecks should be identified (Nell and Burks, 1999; Vancas, 2003; Cooper and Ebin, 2004). An overview of permissions and/or permits, with a timetable, the types and names, the costs, critical issues and the likely outcome of the application for these permissions and/or permits is regarded as highly usable. This overview provides an immediate insight in the feasibility of the endeavor as without the permits and/or permissions the endeavor is not allowed to be put into progress (Vancas, 2003; Cooper and Ebin, 2004). Next to the permits and/or permissions, the current legislation, regulation and even other forms of governance should be considered, as they influence the possible feasibility of the endeavor. The researcher can even include a legislative and regulation outlook for the most important legislations and regulations on the feasibility of the prospective endeavor (Cooper and Ebin, 2004; Brockman, 2008). The next four topics within the topic of legal concerns are insurance, ownership, royalties and environmental concerns. It is up to the researcher conducting the feasibility study to address the above topics to his/her insight.

Legal concerns
Overview of permissions and permits
Types and names of permissions and permits
Critical issues
Timetable
Cost
Likely outcome of application
Current legislation
Legislative outlook
Current regulation
Regulation outlook
Governance
Insurance
Ownership
Royalties
Environmental concerns

Table 9: Overview on the topic 'legal concerns'

3.7 Testing

The last prime topic the feasibility study should address is the part in which the prospective endeavor is tested to different circumstances and fluctuations in important parameters. Parameters that definitely should be addressed are; the prospective endeavor itself, the risk factors, political factors, environmental factors, market influences and field specific factors (Mortimer, 1968; Haramis, 1992; Nell and Burks, 1999; Vancas, 2003; Kingston, 2004; Evans, 2008; Bowen et al., 2009; Arain et al., 2010)

Testing
Risk factors
Political factors
Environmental factors
Market influences
Field specific testing

Table 10: Overview on the topic 'testing'

After selecting and describing all the topics the researcher wants to address, the next stage of the FSDM involves the search for suitable pieces of information.

Stage 4: Search for relevant information until information saturation is reached

When searching for information the researcher can uncover unexpected, but highly relevant topics, other than the ones he/she has pre-defined in stage 3. This is why the search for information has an iterative nature. The researcher is supposed to continually go back and forth, when new topics emerge. This may even lead to revisiting the earlier stages 0, 1, 2 and 3, to devise an even more feasible endeavor (Evans, 2008).

Stage 5: Present feasibility study results

In stage 5 the researcher engages in the process of analyzing, structuring and representing the information obtained in the stages 0, 1, 2, 3 and 4. It is important make use of the earlier mentioned feedback loops throughout stage 5. Figure 6 represents the Feasibility Study Design Method with the feedback loops. Through the use of the feedback loops the researcher can engage in iteration when the prospective endeavor seems not feasible. If this is the case the researcher can use the feedback loops to return to an earlier stage and alter previous decisions. This might enhance the feasibility of the prospective endeavor. The researcher continues the iterative process until either the prospective endeavor seems feasible or the prospective endeavor seems not feasible, despite all the alterations the researcher has made within the boundaries set by the commissioner. Based on this knowledge the commissioner will make the go/no go decision on the prospective endeavor. The iterative nature of the FSDM saves the researcher time if the prospective endeavor seems not feasible. Due to the use of feedback loops the researcher need only to adjust a couple of parameters to be able to test the feasibility of the prospective endeavor again, instead of developing a whole new feasibility study.

The literature in the sample does not provide much information about the presentation of the feasibility study. Mortimer (1986), Haramis (1992) and Nell and Burks (1999) and Ries (2012) propose to write a report, while Palvia and Palvia (1988) are proponents of a formal presentation on the results of the feasibility study. Palvia and Palvia (1988) stress the possibility to provide immediate clarification on the decisions made within the feasibility study and the results when the feasibility study results are presented by the researcher to the audience instead of written down in a report. They do suggest further research on presenting feasibility studies to the commissioner and an audience. Haramis (1992) states that the introduction of a feasibility report must consist of; the endeavor title and scope, the endeavor development team members, the reason the endeavor is founded, a brief summary and a determination of the boundaries set by the commissioner. Note that Haramis (1992) has his roots in the IS research field. Table C.5 in Appendix C provides an overview on the extraction of the different concepts from the sample.

Conclusion

We have presented a stage-by-stage method for systematically designing feasibility studies. Our method is intended as a roadmap for researchers who want to develop or optimize feasibility studies, as well as a state of the art description of current academic knowledge regarding feasibility study design.

The systematic approach of the FSDM allows for a more transparent feasibility study design process and ensures that no topics or issues are overlooked by the researcher. The generic nature of the FSDM makes it useable in most research fields as is. Due to the standardization of the feasibility study method, it saves the researcher start-up time. Moreover, if the prospective endeavor turns out to be not feasible, the iterative nature of our method ensures that, the researcher only has to alter only a few parameters in previous stages, instead of performing an entire new feasibility study.

The limitations of the current research include the generic nature of the FSDM and the sparse data regarding presenting feasibility studies. When applying this method in a specific research field, a lot of field-specific steps and/or content need to be added.

Although the topic of feasibility study design research was already addressed in the seventies (Mortimer, 1968), a lot of questions about feasibility study design go unaddressed. To the best of our knowledge, to date, no published paper has addressed the question of the necessity of the feasibility study. Reasons and requirements for the need to conduct feasibility studies are still unclear. Since developing feasibility studies is quite an investment in both time and money (Evans, 2008), we encourage future research to address this question.

By making use of our method attempts to classify feasibility studies, to provide clarity on the quality of the studies, can be made. We encourage (aspiring) researchers to use our systematic approach as a roadmap for designing additional and perhaps field-specific feasibility study design guides. With the current research we present a starting point for structuring feasibility study design.

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Appendix A

Overview of the search terms used in this study

Search terms used in the literature review underlying the new FSDM	
Designing feasibility study	Designing feasibility studies
Feasibility study design	Feasibility studies design
Requirements feasibility study	Requirements feasibility studies
Conditions feasibility study	Conditions feasibility studies
Criterions feasibility study	Criterions feasibility studies
Implementing feasibility study	Implementing feasibility studies
Demands feasibility study	Demands feasibility studies
Measurements feasibility study	Measurements feasibility studies
Criteria feasibility study	Criteria feasibility studies
Criteria performing feasibility study	Criteria performing feasibility studies
Developing feasibility study	Developing feasibility studies
Characteristics feasibility study	Characteristics feasibility studies
What is a feasibility study	What are feasibility studies
Feasibility study contents	Feasibility studies contents
Analyzing feasibility study	Analyzing feasibility studies
Conducting feasibility study	Conducting feasibility studies
Development feasibility study	Development feasibility studies
Performing feasibility study	Performing feasibility studies

Appendix B

Overview of the number, author and title of the papers in the literature sample

#	Author	Title
1	Bowen, D.J. et al. (2009)	How we design feasibility studies
2	Palvia, P. and Palvia, S. (1988)	The feasibility study in information systems: An analysis of criteria and contents
3	Nell, L. and Burks, S. (1999)	The Bateman approach towards achieving economic and financial requirements for feasibility studies
4	Haramis, G.E. (1992)	Implementing a feasibility study "A procedural approach"
5	Arain, M. et al. (2010)	What is a pilot or feasibility study? A review of current practice and editorial policy
6	Kingston, J.(2004)	Conducting feasibility studies for knowledge based systems
7	Ries, P. (2012)	Feasibility studies: Why and what should they entail?
8	Vancas, M.F. (2003)	Feasibility studies: Just how good are they?
9a	Cooper, H.W. and Ebin, L.A. (2004)	What to look for in a project feasibility study – Part 1
9b	Cooper, H.W. and Ebin, L.A. (2004)	What to look for in a project feasibility study – Part 2
10	Brockman, K. (2008)	How to perform a feasibility study and market analysis to determine if an ancillary service makes sense
11	Mortimer, J.M. (1968)	Feasibility study and preliminary design
12	Evans, D. (2008)	Analyzing the risk of bankable feasibility studies in today's mining super cycle

Appendix C

Identify the goal of the feasibility study

	Health	IS	Mining	Agriculture	HP
Convincing	1	2			
Economic evaluation			3, 8, 12	7	9
Obtaining finance			3, 8,	7	9
Achieving user involvement	5, 6	2, 4	12		
Achieving user commitment	5, 6	2, 4	11		
Schedule certainty			12		
Decision making	1		3, 8,	7	9
Sensitivity analysis	1, 6		3, 8,		9
Parameter variation	1, 5, 6		3, 12		
Field specific goal	10	2	3, 8		

Table C.1: Overview of the different goals of any feasibility study. These emerged from our literature sample using the GTLRM. The numbers in the table correspond with the number of the article as presented in appendix B.

Types of audience

	Health	IS	Mining	Agriculture	HP
Self	1,5, 6	2, 4	3, 8, 11	7	9
User	1, 6, 10	2, 4		7	
Management	6, 10	2, 4	11		9
Lender	10		3, 8, 12	7	9
Investor	10		3, 11	7	9
Other (field specific)	6, 10		8		9

Table C.2: Overview of the different types of audience of the prospective endeavor. These types of audience emerged from literature sample using the GTLRM. The numbers in the table correspond with the numbers of the articles as presented in appendix B.

Quality measures of the prospective endeavor

	Health	IS	Mining	Agriculture	HP
Acceptability	1, 6	2, 4			9
Demand	1, 6, 10	4			9
Implementation	1, 6			7	9
Practicality	1, 5, 6, 10	4	3, 8,		9
Adaptability	1		8		
Integration	1			7	
Expandability	1, 5, 6	4			

Table C.3: Overview of the different quality measures that emerged from our literature sample using the GTLRM. The numbers in the table correspond with the numbers of the articles as presented in appendix B.

Requirements for feasibility study reporting

Stakeholders

	Health	IS	Mining	Agriculture	HP
Stakeholders	1, 5, 6, 10	2, 4	3, 8, 12	7	9
Users (primary)	1, 5, 6, 10	2, 4	3, 8, 12	7	9
Users (secondary)	5, 10	2, 4	8, 12	7	9
Users (field specific)	1, 6	4			
Third party organizations	10		3		
Bank	1		3	7	9
Investor			3		9

Overview of the endeavor

	Health	IS	Mining	Agriculture	HP
Endeavor information	1, 5, 6, 10	2, 4,	3, 8, 11, 12	7	9
Scope	10		8,		
Organizational structure	10				
Field specific information					

Field specific factors

	Health	IS	Mining	Agriculture	HP
Field specific factors	1, 5, 6	2, 4	3, 8	7	
Technical factors	10	2	3, 8	7	
Security concerns		2			
Field specific attributes of endeavor	1, 5, 6, 10	2, 4	3, 8, 11, 12,	7	9
Environment of endeavor	1, 6	2	3, 8	7	9
Market analysis	10		11		9
Market entry					9
Competition analysis	10		11		9
Determination number of competitors providing the same or similar endeavors in the area	10		11		9
Field specific third party impact on endeavor	10			7	9
Field specific partnerships and/or agreements	10			7	
Other			3, 8	7	

Operational factors

	Health	IS	Mining	Agriculture	HP
Operational factors	1, 5, 6	2, 4	3, 8	7	
Business benefits	1, 6	2, 4			
Tangible	6	2, 4			
Intangible	6	2, 4			
Business deficits		4			
Tangible		4			
Intangible		4			
Equipment list	10		11		
Physical environment analysis			3, 8, 11	7	
Size			3, 11		9
Transport			3, 11	7	9
Access to utilities			3, 11		9
Field specific needs			3, 11	7	9
Infrastructure		2, 4	3, 8		
Logistics			3, 8		
Administration and Overhead			3		
Labor	6	4	8	7	
Time				7	
Planning	6		8	7	
Field specific operational factors			8	7	

Financial factors

	Health	IS	Mining	Agriculture	HP
Financial factors	1, 6	2, 4	3, 8	7	
Past/ current (if applicable				7	
Cash flows			3, 8	7	
Capital costs within timeframe (if applicable)	10		12,		9
Operating costs within timeframe	6	4	3, 8		
Direct costs	6, 10	4	3		
Fixed	10				
Variable	10				
Indirect costs	6, 10	4	3		
Fixed	10				
Variable	10				
Field specific direct costs	6, 10	4	3		
Fixed	10				
Variable	10				
Field specific indirect costs	6, 10	4	3		
Fixed	10				
Variable	10				
Other field specific costs					9
Fixed	10				9
Variable	10				9
Depreciation				7	

Taxes	10		3		9
Field specific revenues					9
Balance sheet			3, 8, 11,	7	
Debt			3, 8,		
Equity			3, 8,		
Gift			3, 8,		
Loan			3, 8,	7	
Current net present value			12		
Revenue statement	10				9
Expected costs	1	2, 4	3	7	
Cost estimates (< 15% marge)		2	3, 8, 12	7	
Cash flows			3, 8	7	9
Startup costs		2	3, 8	7	9
Direct costs			3, 8	7	
Fixed	10				
Variable	10				
Indirect costs			3, 8	7	
Fixed	10				
Variable	10				
Field specific direct costs		2	3, 8	7	
Fixed	10				
Variable	10				
Field specific indirect costs			3, 8	7	
Fixed	10				
Variable	10				
Capital costs within timeframe (if applicable)	10		12,		9
Operating costs within timeframe	6	4	3, 8, 11,		
Direct costs	6, 10	4	3		
Fixed	10				
Variable	10				
Indirect costs	6, 10	4	3		
Fixed	10				
Variable	10				
Field specific direct costs	6, 10	4	3		
Fixed	10				
Variable	10				
Field specific indirect costs	6, 10	4	3		
Fixed	10				
Variable	10				
Other Field Specific costs					9
Fixed	10				9
Variable	10				9
Depreciation				7	
Taxes	10		3		9
Field specific revenues					9
Contingencies (on field specific %)			3, 11		
Balance sheet			3, 8	7	
Debt			3, 8		

Equity			3, 8		
Gift			3, 8		
Loan			3, 8	7	
Net present value			12		
Internal rate of return					9
Return on investment			12,		9
Break-even analysis	10				9
Revenue statement	10				9
Cost/benefit analysis	1, 6, 10	2, 4	3	7	
Financing requirements	10				
Expected financing needs	10				
Interest rates	10				9
Field specific terms, conditions and/or covenants	10				

Legal concerns

	Health	**IS**	**Mining**	**Agriculture**	**HP**
Legal concerns		2	3, 8	7	
Overview of permissions and permits			3, 8,		9
Types and names of permissions and permits			3, 8,		9
Critical issues					9
Timetable					9
Cost					9
Likely outcome of application					9
Current legislation	10				9
Legislative outlook	10				9
Current regulation	10				9
Regulation outlook	10				9
Governance	10		3		9
Insurance	10				9
Ownership			8,	7	9
Royalties			3, 8	7	9
Environmental concerns			3, 8, 12,	7	9

Testing

	Health	**IS**	**Mining**	**Agriculture**	**HP**
Testing	1, 5	4	3, 8		9
Endeavor	6		13		
Risk factors	6		3		
Political factors			3		
Environmental factors			3, 8		
Market influences			3		
Field specific testing	1, 5	4	3, 8, 11, 12		

Table C.4: Overview of the minimum information requirements for feasibility study reporting as emerged from our literature sample using GTLRM. The numbers in the table correspond with the numbers of the articles as presented in appendix B.

Present feasibility study results

	Health	IS	Mining	Agriculture	HP
Presentation		2, 4	3, 11	7	
Report		4	3, 11		
Introduction		4		7	
Endeavor title		4			
Endeavor scope		4			
Endeavor development team		4		7	
Problem statement		4			
Summary		4			
Boundaries set by the commissioner		4	3		
Presentation		2			
Focus on the decisions made within the feasibility study process		2			

Table C.5: Overview of the means of presentation of the feasibility study results derived from the literature sample based on the GTLRM