

Use cases for web-based survey platform for software projects

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Abstract

Software projects are very complex and can fail in many ways. They are also often expensive and critical for the organizations. The goal of the master thesis is to find use cases and corresponding question lists for a web-based survey platform to support software projects. The purpose of each use case is to improve the probability of the software project's success. In interviews with 5 subject matter experts 10 use cases were identified, e.g. the validation and extension of project's controlling and the support of the change process. The focus of the use cases was on so-called soft-factors which can only be measured by qualitative evaluation done by humans. For each use case a corresponding question list was created. For this task the expert's input from the interviews, literature and Internet resources were considered. The experts then gave written feedback to the use cases and the question lists rating and commenting them. The feedback was used to remove many questions, adding additional user informations to some of them, rephrasing others and in few cases adding new questions. Also all use case descriptions were significantly changed. The platform was developed in parallel by the company BREVISIO with significant input from the subject matter experts and the author. The final use cases and question lists were included in the platform so that it is now fully functional.

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Chapter 1

Introduction

1.1 Context

Software projects are very complex [17] and there are a lot of reasons why they can fail, many of them depend on so-called soft factors [14],[16],[19],[22]. Examples of soft factors are the skill of the project members, quality of communication, motivation of the project members or good leadership of the project management. Soft factors are not easy to quantify and can only be measured by qualitative evaluation done by human.

There are many articles which investigate how success of a software project depends on soft factors. Atkinson [14] argues that the classical three project management criteria- cost, time and quality- are insufficient for project controlling and suggested other additional criteria, including soft factors. Nasir and Sahibuddin [22] assess critical success factors for software projects. Many of the most important factors are soft factors. Jeng [19] studied the relation of team internal soft factors to project success.

As soft factors are important for the success of a project, the project controlling should take them into account. Evaluating soft factors with external experts (e.g. auditors) has several disadvantages:

- They are expensive.
- Introducing external experts can have negative impact on morale and may be disruptive to the processes of the project.
- External experts are hired by top management or project management and most of the time the experts interact with the project management. This may lead to a bias to the opinion of these two stakeholder groups.

A more cost effective and less intrusive way to evaluate soft factors is to ask the project's stakeholders about their opinions. The main advantages of asking the stakeholders directly are:

- Normally all relevant information is known to some stakeholders, often the project team members, yet it is not communicated to project management (e.g. due to lack of trust or fear of retribution).

- Involving all stakeholders by asking their opinion has a strong motivational effect [9].

It is possible to ask the stakeholders' opinions using paper surveys yet it is more efficient using a web-based platform instead. Such a platform is described in the following.

1.2 Web-based survey platform

The main idea of the web-based survey platform (in the following just called platform) for software projects is to measure soft factors by directly asking the project's stakeholders about their opinions. The pre-specified characteristics of the platform are the following:

- Platform can support many companies and many projects for each company.
- The user interface of the platform is simple and intuitive.
- The stakeholders enter the data at several regular times leading to a time series of observations. For soft factors the relative change and the trend are normally more important than the absolute value.
- Each survey contains one or several use cases.
- Each use case has a corresponding question list.
- Each use case should be able to increase the project's success probability. A use case can do this directly, e.g. by increasing motivation of the stakeholders, or indirectly, e.g. by discovering a problem which can be addressed by follow-up actions. Note that in the latter case the project's success probability only increases if the follow-up actions are done (if nothing is done the use case may actually have a significant negative impact on motivation).
- The survey administrator can configure whether the data entry is anonymous or not.

Having such a platform has several advantages compared to the paper surveys, many of them related to the online nature of the platform:

- The platform allows fast and easy entry of the data compared to paper-based survey.
- The data entered into the platform is immediately available for analysis.
- The platform can send a reminder email when stakeholder forgets to answer the survey.
- The platform allows more stakeholders to provide information. It is even possible to collect information from all relevant stakeholders which allows comparison of the results of different stakeholder groups.

- The platform allows the comparison of results of several projects of the company.
- If the number of projects with the same use case is large then statistical analysis may be used to extract more information from the data (e.g. average values of similar projects).
- The platform contains tools to display and analyze data.
- Anonymous entered data is more accurate (because people don't fear retribution or don't expect rewards).
- The data collection is not disruptive to the stakeholders, especially project leader and project team members. In fact the process can be part of the monthly project progress report. As the data collection is not disruptive, it should be compatible to the culture of most companies.
- It is possible to begin collecting data from the start of the project.

1.3 Existing project support instruments

There are already some instruments to support software projects closely related to the platform. The most important are:

- **Project controlling by the project management.** The project management is normally responsible for the controlling of the project. The people most involved in the project management are the project leaders and sub-project leaders. The main tasks are the collection and the analysis of the data to assess the project's status. Quantitative data can be collected by the IT infrastructure, qualitative data is most of time provided by the project management itself. Often only hard factors, such as spend budget, are considered as they are easy to quantify.
- **Project audit.** The aim of an audit is to understand the current state of a project in order to increase project success probability. It is executed by so-called auditors. Auditors are experts who were not involved in the project and may even not be part of the same organization. Auditors establish the project's status by analyzing project's output (in case of a software project the running software itself, its source code, its design documents, a.s.o.) and by interviewing project members. The latter can be a significant disruption of the project.
- **Project supervision.** An external project supervisor consults the project management. The project supervisor is normally an expert level project leader.

Some key attributes of the above mentioned support instruments are shown in Table 1.1. Also the *potential* attributes of the platform are shown. Project supervision and project controlling by the project management are very similar: They both are limited in how they can measure soft factors, costs are moderate, and the disruption of the

	Can measure soft factors	Costs	Disruption	Duration
Project controlling by the project management	limited (often only assessments of project management)	moderate	small	project
Project audit	possible (when interviewing project members)	high-very high	high	limited
Project supervision	Limited (often only assessments of project management and project supervisor)	moderate	small	limited
Platform	yes	small	very small	project

Table 1.1: Attributes of some project support instruments.

project is small. While project supervision has limited duration, the project controlling by project management, as part of the project itself, goes on during the whole project. With a project audit it is possible to measure soft factors, yet its costs is high and the project is disrupted significantly. The proposed platform has the potential to be as good as or even outperform the other instruments in every mentioned attribute: It can measure soft factors, the project disruption is small and it can be applied during the whole project. It depends on the use cases whether the proposed platform is able to achieve this potential.

1.4 Goal of thesis

The company supervisor successfully introduced a survey to measure team atmosphere when working at his former company [18]. He then had the idea that such surveys may be useful for other projects and that a platform could be used to provide the surveys. As first notion the following possible uses of the platform were envisioned:

- reporting to a steering board.
- reporting to the management.
- giving information to the project manager.
- helping in improving the vision.
- helping in improving the team.

The goal of this thesis is to **systematically** establish use cases and question lists for the platform.

At the beginning of the thesis only the idea of the platform existed. Parallel to the work for the thesis, the platform will be implemented by the company BREVISO (<http://breviso.com/>). The main tasks are the following:

1. Define the use cases of the platform. The purpose of each use case is to improve the probability of the software project's success.
2. Create the question lists corresponding to the use cases.
3. Integrate the use cases with their question lists in the platform.

When finishing the thesis the platform should be in operation and contain the designed use cases.

1.5 Related work

Project Soft Factor Check Up is a web-based tool with similar goals and characteristics as the platform: Support of software projects with repeated fill in of a survey by several stakeholders. There are several differences to the platform of this thesis: There is only one question list with a very large number of questions (over 80). Also many questions can only reasonably be answered by the project management alone. Finally many questions refer to quite static situations which are not expected to change much during the project. The three differences are all disadvantages of *Project Soft Factor Check Up* compared to the proposed platform: The question list is too long, only few stakeholder can enter (all) data and time series are not useful for many questions. The web-tool *Project Soft Factor Check Up* doesn't seem to be in operation as it is not reachable from the main domain and the documentation is 10 years old.

Survey monkey [6] is a web platform to design, collect and analyze surveys. The main benefit of the proposed platform are the defined use cases with the corresponding question lists. In *survey monkey* the question list must be defined by the users themselves.

1.6 Content

In Section 2 the used methodology and the task of thesis are described. Section 3 describes the input provided to the development of the platform and how the users will interact with the platform. The obtained final results, the use cases and the corresponding question lists, are shortly discussed in Section 4. In Section 5 conclusions of the thesis are drawn and some further work is discussed. Finally the Glossary of Section 6 provides the descriptions of some frequently used terms.

Chapter 2

Methodology and tasks

2.1 Use of matter experts

As the thesis is of an empirical nature and there is not much specific previous research, the author decided to ask subject-matter experts (called experts in the following) for help. The approach of using such experts is recommended by Tharenou, Donohue, and Cooper [24] for example. When dealing with experts the following rules were applied:

- All interactions were piloted with the company supervisor who is also an expert. This allowed to optimize the interaction and to avoid misunderstandings. Such pilots were recommended by Langdridge and Hagger-Johnson[21].
- The experts were fully informed about the goal of the thesis and what is expected from them. By withholding such information there is a risk that experts may refuse to collaborate after an interaction. In addition such behavior would be very unprofessional.
- The interaction should be well prepared and as short as possible. As the experts are volunteers it is professional to not waste their time. In addition there is also again the risk that an expert will refuse to further collaborate when he feels that his time is not valued.
- Although the experts' input was very important, the final decision about the use cases and question lists was done by the author himself because there may be inconsistencies and the author is also an expert (see author profile in Table B.1).

2.2 Overview of the tasks

The tasks of the thesis were the following:

1. **Contact the matter experts:** The expert candidates were professional acquaintances of the company supervisor and the author. As candidates only persons were

considered who worked in IT for many years, had a senior position and had several different roles in projects in the past.

2. **Finding of suitable use cases:** To find suitable use cases all experts were interviewed. As the task of finding use cases is explorative yet still quite constrained (only use cases suitable for the platform are searched for) a semi-structured interview was used (for definition of the interview types consult the book of Langdridge and Hagger-Johnson[21], for example).
3. **Finding of initial question list for use cases:** For each use case found in the previous step an initial question list was created. The initial question list contained a higher number of questions than targeted for the final list (the proceeding steps removed questions from the list).
4. **Evaluation of the use cases and the question list by experts:** The experts rated and commented the use cases and the question list.
5. **Selection of final use cases and question lists.** At this stage the experts' feedback can only be used to remove use cases not add new one. The experts feedback was consolidated to get the final question list. The main action was to remove a question, yet some questions were modified and even some added. Addition of a question was only done when an expert proposed the question and both the author and the company supervisor supported it.
6. **Integration of the results in the software.** All necessary features for the software discovered in the previous steps were reported to the software developers. After the implementation the features had to be tested. As a final step, the use case descriptions and the question lists were entered in the administration GUI of the platform.

As mentioned in Section 2.1 each task involving an expert was piloted with the company supervisor. A graphical representation of the tasks focusing on the interactions with the experts is shown in Table 2.1. Please note that the numbering of the interactions in the table corresponds to the numbering of the tasks described above.

In the following the applied methods are described in details and accounts and results of the execution of the tasks are provided.

2.3 Contact of matter experts

The experts were contacted via email. From 8 contacted expert candidates, 5 accepted to become experts, 1 declined and 2 didn't answer at all. The profiles of the experts are shown in Figure B.2. The contact email contained a short description of the master thesis, the demand on the experts and the benefit for the experts. The demand was to attend 1 or 2 interview sessions and to fill out a questionnaire. The benefit was that the expert will have free access to the platform and had an influence on the use case

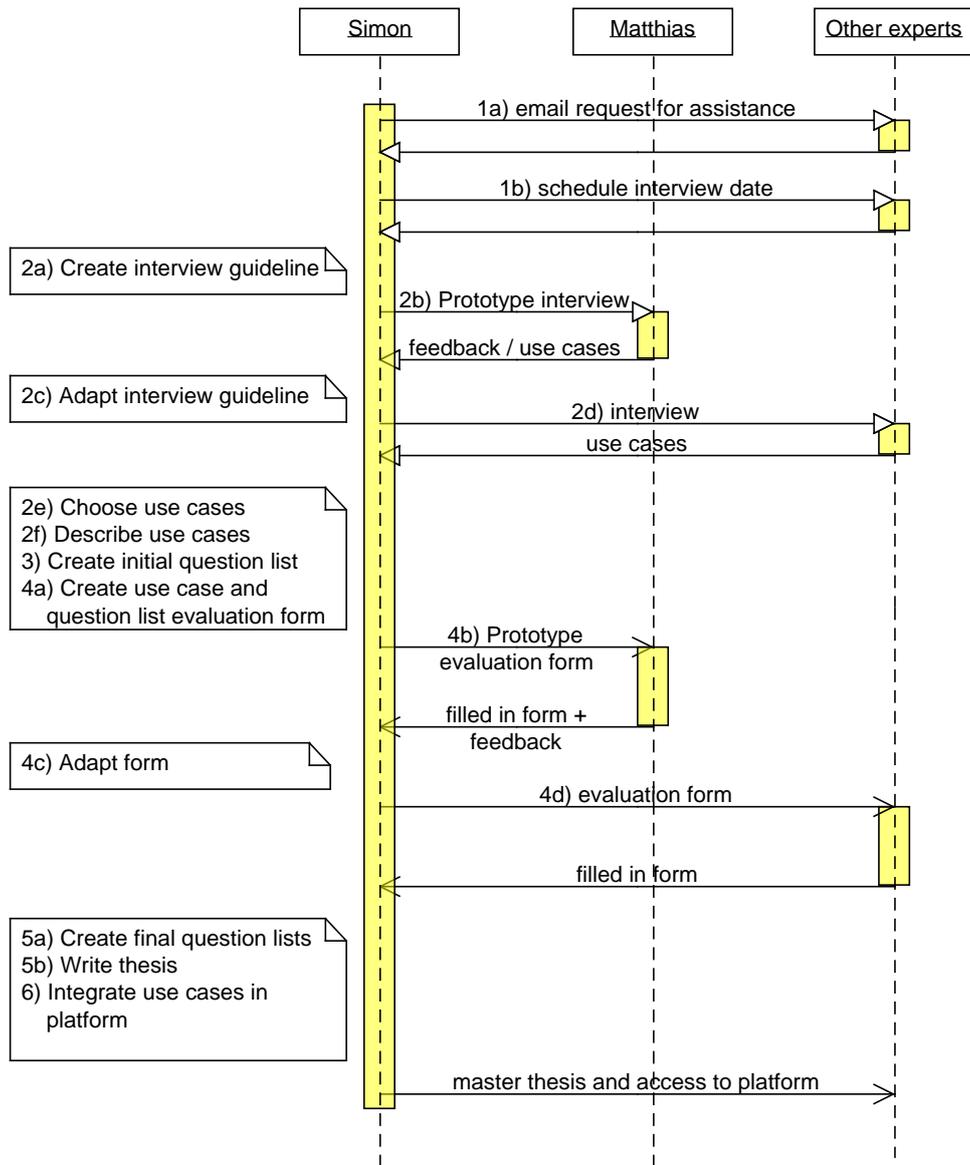


Figure 2.1: Sequence of the thesis tasks

selection which may allow him to use the platform for his specific needs. In addition each expert will get a copy of the thesis.

2.4 Interview

A good interview guideline is a key factor for a successful interview [21] so some time was spent to write such a guideline. The final guideline containing changes due to the pilot interview is given in Section A. Because the interview was only a semi-structured one the guideline was not rigidly applied but served as reference for which questions to ask the expert. Many recommendations of Langdridge and Hagger-Johnson[21] were followed when creating the guideline. The most important were:

- Use of open rather than closed questions.
- Use of single words or short phrases that encourage or reinforce the interviewee.
- Funneling: Start by eliciting the respondent's general views and then move to more specific concerns.

Langdridge and Hagger-Johnson[21] recommend to avoid jargon or technical terms. This recommendation was not followed as the interviewees and the author work in IT and the correct use of technical terms improves the quality of the communication.

The interviews were all held at the expert's work location or home to lessen the time burden of the experts. Before conducting the interviews the recommendations of Langdridge and Hagger-Johnson[21] and Tharenou, Donohue, and Cooper [24] were studied. The most important recommendations are:

- Inform the experts about the process of the interview.
- Encourage the experts to provide as much information as possible (*give permission to speak*).
- Leave gaps so that the experts are able to find space to think, compose their response and talk.

The duration of the interview varied from 30 to 45 minutes.

All interviews were recorded as recommended by Langdridge and Hagger-Johnson [21]. For the recording an iPhone[®] was used because:

- Tests conducted before the interview showed that the sound quality is good.
- A visible smart phone is common sight and therefore much less a distraction than other recording devices.
- The recorded data is easily transferred to other electronic devices.
- An iPhone was already available.

It was first planned to have a transcription of all interviews, but it was only done for the prototype interview because of three reasons: Firstly, one of the main benefits of having a transcription, the automatic text analysis, was not relevant for this thesis.

Secondly, the time needed for the transcription was excessive (over 6 hours for a 30 minute interview). And finally the author is also an expert so it was possible to extract the relevant information from the audit record easily.

In the interviews 11 use cases were discussed and many general comments and recommendations for the platform were given. These comments and recommendations and what was done with them are shown in Section C. Two of the use cases could be merged in one so the proceeding tasks had 10 use cases as basis.

2.5 Creation of questions list for the use cases

The questions have the following sources:

- The experts provided the questions in the interview. Some questions were also used in other use cases than the one the expert provided the question for.
- Literature
 - *Project soft factor check up (psf check up)* [23]: Used as inspiration what categories of questions may be relevant.
 - *Die Kundenrolle in IT-Projekten* [18]: Some questions for IT project controlling.
 - *Team check* [7]: Some questions related to work in teams.
- Internet research. Especially noteworthy is Project soft factor check up [4], the web application related to the article of Rey [23]. Although the questions were not directly used, they served as inspiration what kind of questions could be asked.
- Created by the author (mainly inspired by questions of the other three sources).

Internet sources only used for one use case are given directly in the use case description in Section D.

Following the recommendation of the company supervisor the answers to the questions are rated like Swiss school marks from 1 to 6. This has several advantages:

- Having the same scale for all questions will reduce the complexity of the survey and speed up the entry time.
- Having a range without an average mark will avoid the problem that the people just enter average ratings without thinking (this approach was mentioned in the book of Langdrige and Hagger-Johnson[21]).
- For Swiss users the marks are familiar.
- A granularity of 6 possible values is adequate.

For most questions the meaning of 1 is *strongly disagree* and 6 *strongly agree*, yet for some questions other ranges are needed. This means that a question has an optional corresponding range label. When this range label is missing, the one mentioned above is used.

When designing the questions the recommendations of Langdridge and Hagger-Johnson[21] and Tharenou, Donohue, and Cooper [24] were followed. The most important were:

- Eliminate complexities, i.e. the questions should be as simple as possible. This includes:
 - Only one question should be asked at a time (e.g. “How much do you like A or B?” should be two questions “How much do you like A?” and “How much do you like B?”).
 - Avoid ambiguous questions.
 - No double negatives.
 - Questions should have simple grammar structure (e.g. no mixing of past and present tenses)
- Language should be appropriate for the respondents.
- Questions should be neutral rather than value-laden or leading.
- Funneling: General questions are followed by more detailed questions.
- Avoid questions that are dependent upon prior questions for meaning (e.g. “Did you buy a copy of X?” followed by the question “How did you like it?”)

2.6 Evaluation of the use cases and the question lists by experts

To allow the experts to evaluate the use cases and the question lists an evaluation form was designed. It contained the use case descriptions and the question lists. The experts were asked to enter the following data:

- *How useful is the use case for software projects?* The scale of the evaluation mark goes from 1 (not all) to 6 (very useful).
- Optional comments to the use case.
- *How useful is a question for its use case?* Also here the scale of the evaluation goes from 1 (not all) to 6 (very useful).
- Optional comments to the question.

The filling in of the evaluation form was piloted with the company supervisor. From the feedback of the pilot some questions were added, a few questions removed, some questions modified and also the use case descriptions were modified. The (modified) evaluation form was completely filled in by the company supervisor. It was noted that answering the evaluation form took about 2 hours, which is far more than the time communicated to the experts in the contact email. It was decided that each expert only provides data for 5 of the 10 use cases reducing the time needed to fill in the form to an acceptable amount of one hour. As the company supervisor provided data for all use cases each use case was evaluated by 3 experts. Also the ETH supervisor Dr. Cécilie Tschopp gave feedback to the evaluation form.

From the feedback of the experts and the ETH supervisor the following actions were done:

- Use case descriptions were modified according to the expert's comments. This was done for every use case.
- Questions were removed. Several criteria were considered for deciding whether to remove a question:
 1. Evaluation marks were low. Questions with average mark under 4.33 were always removed. If a single mark was lower than 4 and the other two marks had an average lower than 5.5 then in all but one case the question was removed (the rationale for this is that when one expert has problems with the question probably also many users will have difficulties).
 2. The question is partially redundant, i.e. there are other questions about a similar topic. If so there was more incentive to remove the question.
 3. The question is the only one for a topic. In this case the question was only removed when it had very low marks.
- Additional user information was added to the question. This information clarifies the question and put it in context. On the platform the additional information will be shown below the question in a smaller font and a different color.
- Question modified according to expert's comments.
- New question added. This was only done when an expert proposed the question and both the author and the company supervisor supported it.

All actions were discussed with the company supervisor and agreed on by both the author and the company supervisor. The marks of the use cases and the summary of the actions are given in Table 2.1.

There was only one use case with rather low score, the *Unfiltered inside view of project status for important outside stakeholders*. It had an average mark of 4.33 and one mark was a 3. It was decided to keep the use case as the average mark is still over 4 (which has the meaning of sufficient) and the company supervisor gave a mark of 6.

use case	marks	number of questions				
		removed	info	modified	added	final
Validation and Extension of Controlling	6,6,5	7	1	1	0	16
Transparency of problems and avoidance of unproductive criticism	5,5,4	6	4	1	0	19
Support Change process	6,5,5	7	3	2	0	17
Measure team atmosphere for project management and team development	6,4,5	10	0	1	0	20
Assessment of cooperation and communication between supplier and customer in requirement specification working groups	5,6,6	4	8	3	1	11 / 13
Inside-outside comparison Controlling	6,5,6	4	4	6	0	16
Support of Scrum Retrospective	6,4,5	4	1	4	0	12
User feedback to applications/services of IT department	5,6,6	7	1	3	0	14 / 10
Feedback on the project leader's leadership	5,6,5	9	1	1	1	15
Unfiltered inside view of project status for important outside stakeholders	6,4,3	6	2	1	0	18

Table 2.1: Rating of the use cases and number of actions done per use case due to experts' feedback. Questions were either *removed*, attributed with an additional user information (*info*), *modified* or *added*. The number of questions in the final list is given in the last column (*final*).

Chapter 3

Platform

3.1 Work related to the development of the platform

The development of the platform is itself a software project where the author had the role of a project owner. The company supervisor was both project sponsor and project owner. The project team members were software developers of the company BREVISIO. The project owners had the following tasks:

- Create initial description of the platform and communicate it to the project team using a short design document, email correspondences and several online communications (chats). This task was mainly done by the company supervisor.
- Testing of the platform. This was an ongoing effort as all new features and bugfixes had to be tested as quickly as possible (a long time between the test and the implementation of the feature or the fix of a bug has the risk that the developer forgot most of the changes he or she did).
- Describing new features and bugs to the developers. For this MANTIS (<http://www.mantisbt.org/>), a free open source issue tracker, was used. To the date of the writing a number of 70 issues had been opened, 11 by the author. The most important issues discovered during the thesis are shown in Table 3.1.
- Entering the final use case descriptions and question lists in the administration GUI of the platform.

3.2 How users interact with the platform

There are only two kinds of users:

1. Supervisor
 - Has a corresponding company.

issue	type
Detailed descriptions should be shown when selecting use cases. It should be possible to manage these descriptions in the administration GUI.	feature
Each question can have an optional range label.	feature
Each question can have an optional additional user information.	feature
Correct Role concept: For each survey a person may see the results and/or answer survey and/or manage survey. A person should be able to take part in many surveys and his or her roles in those surveys may be different.	bug
Allow user to not answer a question (the value N/A).	feature

Table 3.1: Most important issues discovered during the thesis.

- Only user which is created by the registration process. The other users are all added in the survey administration.
- Can create surveys for a company.
- Can add new supervisors for the company.
- Can manage all surveys of the company. The supervisor has the role of a survey manager for all surveys (see below).

2. Non-supervisor

- Has no corresponding company (it is possible to be customer of IT projects of different companies).
- Added by other users who have survey manager role.
- Privileges of users are defined by the roles of the user in a survey.

Each user has an email address which also serves as login name and a corresponding password.

A user can have several roles for **each** project and an optional group assignment. The groups are identified by a name and can be used to split the users in different user categories (e.g. suppliers and customers in use case of Section D.5). The roles are:

- Survey manager: Administration of the survey: Change settings, administration of users and their roles. Can also add additional survey managers.
- Survey taker: Answers the questions of the survey.
- Survey viewer consolidated: See the results consolidated on the group level.
- Survey viewer individual: See the individual results of the survey. As the *survey viewer individual* has all information to get the consolidated results too, a survey viewer individual should also be a *survey viewer consolidated*.

The normal process of using the platform has the following steps:

1. User X fills out the registration form becoming the supervisor for his or her company.
2. User X creates a new survey S.
3. User X adds user M as survey manager to survey S → User M gets an invitation email with initial password.
4. User M logs into the platform.
5. User M manages the survey S: Selecting use case, selecting questions from the question list of the use case, choosing survey period and survey frequency.
6. User M adds users U_1, U_2, \dots to survey S selecting their roles → Users get invitation emails with initial password.
7. User M activates survey S.
8. Users U_1, U_2, \dots regularly fill out the survey. They get a reminder email if they forgot to enter the data.
9. X, M and some of the users U_1, U_2, \dots (according to their roles) view the results of the survey.

Chapter 4

Discussion of results

4.1 Discussion of usefulness of the use cases

When studying the found use cases the following high level goals can be identified:

- **Identification of a problem of the project.** Obviously the identification is the first step of resolving the problem.
- **Participation of stakeholders.** Participation has several benefits:
 1. It motivates the stakeholder [9]. Motivated stakeholder perform better and/or will provide more resources for the project.
 2. It limits the unhelpful, negative criticism in later phases of the project (as the stakeholder had the opportunity to voice his/her opinion). Such unhelpful, negative criticism may lead to waste of resources and may also lower motivation of the project team.
 3. It may influence the stakeholder to give more input to the project so that project's product improves.
 4. The stakeholder is remained of the project. This will increase the probability of useful input and, depending on the stakeholder, provide more resources for the project.
- **Team building [12].** One of the goal of team building is to improve how the team works together. Improving how the team works together will also increase the performance of the team.
- **Development of leadership skill [13].** Improving the leader ship skill of the project leader also improves the performance of the project team.

Table 4.1 relates the use cases to the above mentioned high level goals.

Use case	Goals
Validation and Extension of Controlling	Problem identification: General problems
Transparency of problems and avoidance of unproductive criticism	Problem identification: Focus on people related problems (e.g. unhappiness). Participation: Focus on project team members.
Support Change process	Participation: Focus on people affected, but not directly involved in the project.
Measure team atmosphere for project management and team development	Team building: Project team
Assessment of cooperation and communication between supplier and customer in requirement specification working groups	Problem identification: Between customer and supplier, focus on communication problems.
Inside-outside comparison Controlling	Problem identification: Focus on discrepancies between reporting of the project management and the results of survey. Participation: Focus on project sponsor.
Support of Scrum Retrospective	Problem identification: Incorrect implementation of Scrum methodology.
User feedback to applications/services of IT department	Problem identification: Problems of applications/services
Feedback on the project leader's leadership	Problem identification: Focus on leadership of the project leader. Development of leadership skill: Project leader
Unfiltered inside view of project status for important outside stakeholders	Problem identification: Mainly focus on inaccurate reporting of the project management.

Table 4.1: Goals of the use cases

4.2 Quality of the results

The use cases and final questions had all good marks so it can be expected that most of them will be useful for software projects. The number of experts, 5, was rather low so the reliability of the evaluation of the questions' quality and the use cases is not very high¹. Unfortunately no more than 5 experts could be convinced to support the thesis. The low reliability of the evaluation is yet not problematic, because the project manager using the platform can choose the following:

¹The low reliability here means that a use case or question could not be useful although the experts gave high marks.

- The use case(s) he or she thinks is most beneficial for the software project.
- The subset of the questions which is most useful for the software project.

Including use cases and questions which are not so useful is not harmful as in worst case they will not be selected.

4.3 Improving use cases and question lists

When the platform is running it will be possible to modify the question lists and use cases analyzing the users' choices:

- Use cases which are selected only very few times may be removed.
- Questions which are selected only very few times may be removed.
- Questions which are not answered (value N/A) most of the times may be removed.
- When an user gives for all periods the same answer to a question then the question measures something static. So it may be a candidate for removal (one of the key benefit of the platform is to have a time series of a measurements of something dynamic).
- For questions which are selected almost all the time additional detail questions may be added (e.g. for question "Is the top management committed to the project?" you could add "Is the CEO committed to the project?" and "Is the COO committed to the project?").

With the new feature of allowing users to add own questions (compare Table C.4) it will also be possible to find questions suitable for inclusion in the standard question lists by simply counting how many times a question was added. The difficulty here is to group the questions which are more or less the same (e.g. different phrasing of the same question).

Chapter 5

Conclusions and further work

With the help of the 5 experts 10 use cases for the platform could be identified and corresponding question lists were developed. The use cases and question lists are now included in the platform. It is planned to make the platform freely available to attract as many users as possible. The URL of the platform is <http://i-nature.com/psfs/>.

If there are enough users using the platform, GnostX will decide to start phase 2 of the project which may incorporate the following:

- Remove of questions and use cases according to the analysis described in Section 4.
- New Features of the platform. Some such features are mentioned in Chapter C. Others may be defined according to user feedback.
- General usability improvements.
- Add premium access with a monthly fee. Some of the features will only be available to premium users.
- Add consulting services to the platform. For a fee the users are consulted how to use the platform in the most effective way. This includes information how to interpret the results of the surveys.
- Improve of existing use cases (i.e. better description and change of question list).
- Search for more suitable use cases. Also here user feedback may be helpful.
- Add advertisements to the platform, e.g. using *Google ads* (<http://www.google.com/intl/en/ads/>).
- Present platform at events related to software projects (e.g. conferences, Scrum breakfast, a.s.o.) to promote its use.
- Translation of the questions from English to other languages. It is yet not clear if this is very beneficial as normally people involved in software projects are able to read and write in English.

Chapter 6

Glossary

In this section some frequently used terms are described in details.

The following project roles were mentioned several times in the thesis:

- The **product owner** is accountable for the project's output. In case of software projects his or her task is to guarantee that the software does what it should do. Often the project owner is a member of the organization which will use the finished software.
- The **project sponsor** has the general oversight of the project and represents it in the organization unit which does the project portfolio management (this organization unit is often called project management board). In contrast to the product owner a project sponsor has to see the project in context of a portfolio of projects. This may include the proposal to abort the project he or she is sponsoring. Often a manager is the project sponsor of many projects so that the time available for one project is small (this is one of the reason for applying use case of Section D.6).
- The **project management** is the group of people who plans, organizes, motivates, and controls resources, procedures and protocols to achieve project's goals [11]. The most important members of the group are the project and sub-project leaders.
- The **project leader** is responsible for the project. The project leader manages the three key aspects: time spend, money spend and quality of the software. Normally the project leader is part of the organization which develops the software. Often there is a hierarchical structure of the project where a project is composed of a set of sub-projects. The person responsible for the sub-project is called sub-project leader.
- The **project team members**: People working on the project without special functions (e.g. not project leader). In software projects these are mainly software developers and business analysts, but also people with specialized tasks like software testers.

- **Customers** will use the project's output, the software, when it is finished. They are normally the people who are strongly affected by the project's output, but have only marginal influence on the project (to improve their influence use case of Section D.3 can be applied).

Other terms are described below:

- **Change process:** The change process is the process of adapting individuals, teams, and organizations to a new situation [10]. In the case of software projects the new situation is the introduction of the software (i.e. the project's output) which often replaces an existing software. As the new software may be radically different than the old one (e.g. completely changing the business processes) the necessary adaptations in the processes and necessary tasks may be significant. Not rarely some employees may lose their jobs, others must be trained extensively.
- **Project controlling:** Project controlling implements verification and controlling function during the processing of a project in order to reinforce the defined performance and formal goals [15]. Project controlling aims to keep the project on-track, on-time and within budget. Project controlling is also responsible for the information flow to top and line management.
- **Soft factor:** Soft factors are used as a collective term for factors that are difficult to quantify exactly [25], e.g. the competence of a project team. Soft factors can normally only be evaluated by humans. Often soft factors have a psychological component.
- **Software projects:** Software projects are projects whose output is a working computer program. Often the project also includes the provision of the computer hardware and the installation of the software on this hardware so that the project's output is a computer program in operation.
- **Survey:** In this thesis a survey is defined as a set of questions which should be answered by a group of persons where the set of questions is the same for all persons.

Bibliography

- [1] Evaluating your supervisor. <http://www.morris.umn.edu/USA/SupervisorReview.rtf>.
- [2] Internal help desk support survey. http://guidestarco.com/sample_surveys/internal_help_desk_survey_sample.htm.
- [3] Project leader assessment form. http://www.lindsaymckennalimited.com/pdf/Project_Manager_Assesment_Template.pdf.
- [4] Project soft factor check up (psf check up). http://www.danirey.ch/psf_checkup/.
- [5] Scrum checklist. <https://dl.dropboxusercontent.com/u/1018963/Scrum-Checklist/Scrum-checklist.pdf>.
- [6] Survey monkey. <http://www.surveymonkey.com>.
- [7] Team check. Organization, Work and Technology Group, D-MTEC, ETH Zürich, based on [20].
- [8] Usability and user experience surveys. http://edutechwiki.unige.ch/en/Usability_and_user_experience_survey.
- [9] Wikibooks: Managing groups and teams/motivation in teams. http://en.wikibooks.org/wiki/Managing_Groups_and_Teams/Motivation_In_Teams.
- [10] Wikipedia: Change management. http://en.wikipedia.org/wiki/Change_management.
- [11] Wikipedia: Project management. http://en.wikipedia.org/wiki/Project_management.
- [12] Wikipedia: Team building. http://en.wikipedia.org/wiki/Team_building.
- [13] Wikipedia:training and development. http://en.wikipedia.org/wiki/Training_and_development.

- [14] R. Atkinson. Project management: Cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 17(6):337–342, 1999.
- [15] Jörg Becker, Martin Kugeler, and Michael Rosemann. *Process management: A guide for the design of business processes*. Springer, 2003.
- [16] Terry Cooke-Davies. The "real" success factors on projects. *International Journal of Project Management*, 20(6):185–190, 2002.
- [17] P. Fitsilis, A Kameas, and L. Anthopoulos. Classification of software projects complexity. *Information Systems Development*, pages 149–159, 2011.
- [18] Matthias Günter. *Die Kundenrolle in IT-Projekten*. Books on Demand, 2013. ISBN 978-3732205677.
- [19] Don Jyh-Fu Jeng. Structural analysis on team internal soft factors to project success. In *IEEE International Conference on Fuzzy Systems*, pages 523–530, 2011.
- [20] S. Kauffeld. *Der Fragebogen zur Arbeit im Team*. Hogrefe, 2004.
- [21] Darren Langdridge and Gareth Hagger-Johnson. *Introduction to research methods and data analysis in psychology*. Pearson Education Limited, 3 edition, 2013.
- [22] Mohd Hairul Nizam Nasir and Shamsul Sahibuddin. Critical success factors for software projects: A comparative study. *Scientific Research and Essays*, 6(10):2174–2186, 2011.
- [23] Dani Rey. Project soft factor check up (psf check up). http://www.danirey.ch/psf_checkup/PSF_Check_Up_Doku.pdf, April 2005.
- [24] Phyllis Tharenou, Ross Donohue, and Brian Cooper. *Management Research Methods*. Cambridge University Press, 2007.
- [25] Claes Wohlin and Magnus Ahlgren. Soft factors and their impact on time to market. *Software Quality Journal*, 4(3):189–205, 1995.

Appendix A

Interview guideline

- Description interview process: First information from the interviewer then the expert is asked open-ended questions. The expert is informed that the interview will be held in German (reason: All experts are either native Swiss German or German speaker)
- Introduction and information for the expert. Expert may interrupt and ask clarifying questions:
 - Confidentiality guarantee: Expert's last name is not mentioned and only job position and the companys key attributes (e.g. industry sector, size) are included in the thesis.
 - The interview is recorded to allow a correct transcription. The audio file will be deleted after the transcription. The expert should feel comfortable with the recording.
 - Start of audio recording.
 - Summary of the goal of the thesis: To find good use cases and questions for these use cases for a web-based survey platform. There are three meta-use cases: First a project is registered then the questions are regularly answered by various stakeholders and thirdly the (consolidated) results are displayed [use of PowerPoint slides to explain meta-use cases]. It should be noted that the platform should not be used for requirement specification.
- Main part of interview. Expert should do most of the talking. The following questions should be answered (German translation is added as those questions are asked literally and the interview will be held in German):
 - What kind of roles did you have in software projects? *In welchen Projektrollen waren sie schon tätig?*
 - Considering your previous project roles can you identify some use cases which would increase the probability of the success of software projects? *Ausgehen-*

den von ihren früheren Projektrollen welche Anwendungsfälle können Sie sich vorstellen, die die Erfolgchancen eines Softwareprojekts erhöhen könnten?

- For all use cases:
 - * Purpose of use cases? *Was ist der Zweck des Anwendungsfalls?* (Expert can be provided with examples when necessary: Teambuilding, Building of Trust, Controlling, Reporting, Improvement of Project organization)
 - * What is the benefit of the use case? *Was ist der Mehrwert des Anwendungsfalls?*
 - * What kind of questions should be asked? *Was für Fragen sollen gestellt werden?*
 - * Can you provide concrete examples of such questions? *Können Sie konkrete Beispiele von solchen Fragen nennen?*
 - * Which stakeholder should enter the data? *Welche Stakeholder sollen die Fragen beantworten?*
 - * Which stakeholder should be able to view the (consolidated) results? *Für welche Stakeholder sollen die (zusammengefassten) Resultate sichtbar sein?* (main issue here is the transparency of the results)
 - * Are the data entered anonymously? *Werden die Daten anonym eingetragen?* (main issue with non-anonymous entries is the possibility of punishment/reward due to good/bad rating)
 - * Are persons or situations evaluated? *Werden Personen oder Sachlagen beurteilt?*
 - * Is it a self-evaluation or an evaluation of other persons? *Handelt es sich um eine Selbstbeurteilung oder werden andere Personen beurteilt?*
 - * Should it be possible to configure the set of questions? *Soll die Liste von Fragen konfigurierbar sein?*
 - * How can the stakeholders be motivated to enter the data? *Wie können die Stakeholder überzeugt werden, die Formulare auszufüllen?*
 - How many questions should be asked per use case? *Wie viele Fragen sollen pro Anwendungsfall gestellt werden?*
 - How much time should the entry of data take in average? *Was soll der durchschnittliche Zeitaufwand für das Eintragen sein?*
 - Do you have some comments about the initial set of questions which I send you? *Haben Sie Kommentare bezüglich der ersten Liste von Fragen, die ich Ihnen geschickt habe?*
- The expert is asked if he has some other questions/comments about the discussed topic.
 - Wrap-up: The interviewer thanks the expert for his time and promise to keep him informed about the progress of the thesis. The expert is reminded of the benefit of

participation: Beta-user access to platform, influence on design of platform, hard copy of master thesis.

Appendix B

Profile of the author and experts

Academic title	Dr. phil. nat.
Years experience in IT industry	8
Current employer	Software development company (100 employees)
Current position	Software Architect (6 years)
1. Previous positions	Postdoc in computer science (2 years)
2. Previous positions	Software Developer (1.5 years)

Table B.1: Profile of author.

	Matthias	Manuel	Peter	Martin	Andreas
Academic title	Dr. phil. nat.	Dr. phil. nat	Dipl. Info / Dr. rer. pol.		Dr. phil. nat.
Years experience in IT industry	16	13	>30	>20	14
Current employer	GnostX, <10 employees, IT services	Public financial institution (500-1000 employees)	Transportation company (5000 employees)	Software development company (100 employees)	education institution (1000-5000 employees)
Current position	CEO	Head of a IT group	Head of project management office	Head of department	Head of department of research and services
Additional relevant information	Former CIO in a large public section institution (10 years)			Extensive project leader experience (> 10 years)	Leader architecture management at large financial institution (6 years)

Table B.2: Profiles of experts.

Appendix C

General comments / recommendations for platform from interviews

The following types of actions were done due to the comments and recommendations provided by the experts in the interviews:

- Add text to platform description (**PlatDescr**)
- Was considered when creating question list (**QuestList**)
- Was considered when creating use case description (**CaseDescr**)
- Completely accept recommendation (**Ok**)
- New feature for the platform implemented in the first version (**Feature**)
- New feature for the platform not implemented in the first version, but may be implemented in second version (**Version 2**)

The recommendations are shown Tables C.1-C.5.

recommendation	action
Data entry should be done during whole project → time series for whole project	PlatDescr
Questions should be grouped/categorized in similar questions. Some Redundancy in the questions of a group is ok.	QuestList
Number of questions: 5-20 questions	QuestList
Time for entering data: 5-10 minutes (first time may be longer).	QuestList
Set of questions should be configurable, yet not too much, as good set of questions is part of the benefit of the platform.	PlatDescr
For each use case the following should provided: description, purpose, what is the added value/benefit for the company, and also what actions are possible when results are bad. It is important to "sell" use-cases to users of the platform.	CaseDescr

Table C.1: General comments/recommendations of Peter

recommendation	action
Use of Swiss school marks (1-6). Reason: Everybody understands the scale and also good spectrum from terrible to very good.	OK
Should not be used for quick intervention but for the whole project time.	PlatDescr
Should only measure things which are actionable.	QuestList
It should be possible to add/remove questions while the project is running.	Feature
If there is a configuration for the anonymity of the data entry then it should be measured how many times which configuration is used.	Version 2
Unchangeable facts (like e.g. some external factors) should not be measured.	QuestList
The entry of the data should be a part of the project process (e.g. part of the controlling).	PlatDescr
Anonymity makes only sense, when there are at least 3 people per subgroup (when that level of detail is provided). In total a minimum of 6 persons is needed for anonymity.	PlatDescr
Number of questions about 10.	QuestList
An entry should not take more than 5 minutes (including everything, e.g. also log into platform).	QuestList

Table C.2: General comments/recommendations of Matthias

recommendation	action
When a subsample of people of a stakeholder group enters data it is preferable when always the same people enter the data as this will produce a more consistent time series.	PlatDescr
Experience from employee satisfaction survey: anonymity is only useful when there are at least 8 people. With less than 8 people, speculations and rumors about the results may have strong negative influence on motivation. Therefore results were consolidated on the hierarchical level where there are at least 8 people. If hierarchical consolidation is not possible (e.g. project with less than 8 people) it is better to have a non-anonymous survey.	PlatDescr
Set of questions should be configurable, as not the same questions are relevant for each phase of the project.	Feature
Better to have many simple questions (with simple scale) than few complex questions.	QuestList
Number of questions: 10-12 questions	QuestList

Table C.3: General comments/recommendations of Andreas

recommendation	action
Always use the same order for the question set as this makes a repeated entry easier.	OK
A feature of a good question list is the correct order of the questions.	QuestList
All questions should be suitable for time series. If the answer is unlikely to change over time (e.g. because it corresponds to a static situation) it should not be included.	QuestList
The set of questions should be a best practice set which should not be changed too much (as this is one of the benefit of the platform).	QuestList
The platform should allow adding own questions.	Version 2

Table C.4: General comments/recommendations of Manuel

recommendation	action
The platform should allow having a core set of questions which is always used and other questions which may be activated and deactivated during the project. Reason: Some questions are only relevant in some phases of the project.	Version 2/ Feature ¹
To answer the questions the stakeholders should not be required to think hard or to consult documents.	QuestList
There should not be too many changes in the question set as to provide meaningful time series.	PlatDescr
20-30 questions when the repetition period is 1 or 2 weeks.	QuestList
Time for entry: 30 minutes maximum when the repetition period is 1 or 2 weeks.	QuestList

Table C.5: General comments/recommendations of Martin. Feature that was implemented: Questions can be activated or deactivated once¹.

Appendix D

Use cases

In this Section the final use case descriptions and question lists are shown. Each question can have an optional additional user information. This information clarifies the question and put it in context. In the following tables this information is shown in italic. Also each question can have an optional range label which is shown in squared brackets. The default range label is [strongly disagree - strongly agree].

D.1 Validation and Extension of Controlling

Purpose	Improve quality and validity of controlling. By asking questions to stakeholders which are not considered in normal controlling a differentiated view of the project status is provided which helps to increase validity of the controlling. By asking questions which are not normally asked in normal controlling the quality and scope of the controlling is increased. Especially soft factors can be made visible.
What is measured	Project status (mainly not assessment of people) and also trust between stakeholders and <i>gut feeling</i> about the project.
Who enters data	Every stakeholder group (including project environment). From each group a subsample of people may be asked.
Transparency	Everybody sees consolidated results.
Anonymity	Configurable (depends on the culture of company).

Are the project goals clear?
Is the project budget adequate to achieve project goals?
Is the duration for the project adequate?
Do the project team members have the necessary skills to achieve project goals?
Are the stakeholders committed to the project goals?
Are the risks of the project acceptable?
Are the risks well managed?

Are relevant information efficiently communicated?
Is the project broken down in clearly specified and assigned tasks?
Has each task a clearly defined owner?
Are the tasks prioritized correctly?
Do you have the necessary resources for your tasks in the project?
Is the cooperation between stakeholders good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Is the project well managed?
Has the project a high enough priority for the top management?
Has the project a high enough priority for all relevant divisions of your company?

D.2 Transparency of problems and avoidance of unproductive criticism

Purpose	Being able to locate where in the organization people are not happy with (parts of) the project and also to avoid unproductive criticism. Not satisfied project members can either express their dissatisfaction which allow you to locate the problematic groups and act accordingly or they don't express it in which case they forfeit the moral right to complain about the project. Even applying this use case it may be that projects members don't answer truthfully but the use case is one of the most promising approaches to get the information. This use case is especially useful for projects which have severe problems.
What is measured	People's opinion about the project. This includes its status, but also its goals and vision.
Who enters data	Every relevant stakeholder.
Transparency	Everybody sees consolidated results.
Anonymity	Configurable (depends on the culture of company), but maybe somebody (project leader) sees the individual results.

How much do you know about the vision of the project? [nothing-everything I need to know] <i>The question is mainly useful at the beginning of the project.</i>
Do you agree with the vision of the project?
Do others in the project and the organization see and share the vision?
How committed are you to the project goals? [not at all-absolutely]
Does the project organization work efficiently?

Has each task a clearly defined owner?
Are the tasks prioritized correctly?
Do you or your team have the necessary skills for your tasks in the project?
Do you or your team have the necessary resources for your tasks in the project?
Do you or your team have enough time for your tasks in the project?
Is the input to your tasks adequate?
Is the cooperation with the stakeholders providing input to your task good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Is the cooperation with the stakeholders using your tasks' products good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Is the cooperation between members of your team good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Are relevant information efficiently communicated?
Are the relevant information communicated in a timely manner?
Is the project well managed?
Has the project a high enough priority for the top management?
Has the project a high enough priority for all relevant divisions of your company?

D.3 Support Change process

Purpose	Involve stakeholders affected by, but not normally directly involved in the project. This improves the acceptance of the project or at least shows in early stage that there is a problem with acceptance. It is important to have this feedback and involvement during the whole project. Often the change support starts too late.
What is measured	Awareness and acceptance of project.
Who enters data	Ideally all stakeholders not directly involved but affected by the project. For every such stakeholder group at least one representative should take part.
Transparency	Project management and stakeholder who entered the data should see consolidated results (it probably don't hurt if everybody sees the results).
Anonymity	Configurable (depends on the culture of company).

How much do you know about the vision of the project? [nothing-everything I need to know] <i>The question is mainly useful at the beginning of the project.</i>
How much do you know about the purpose of the project? [nothing-everything] <i>The question is mainly useful at the beginning of the project.</i>
Do you agree with the vision of the project?
Are the project goals clear to you?
How committed are you to the project goals? [not at all-absolutely]
Will the results of the project make your work easier or better?
Is the project important for you? [not important-very important]
Is project information which is relevant to you efficiently communicated?
Do you have adequate influence on the project's output?
Do you have enough time to provide input to the project?
Is the cooperation with the project team good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Does the project team understand your input to the project?
Does the project team use your input adequately?
How much do you know about the future impact of the project's output on your work? [nothing-everything]
Was the future impact of the project's output on your work adequately communicated?
Do you expect negative changes in your work environment due to the project? [not at all-certainly]
Were your worries about possible negative effects of the project properly addressed and answered?

D.4 Measure team atmosphere for project management and team development

Context	In big projects it is not easy to assess the team atmosphere. In companies line management this is sometimes done with a job satisfaction survey.
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Purpose	To find specific problems related to team atmosphere which can be acted upon and also to improve trust inside project team. This use case is useful for large project teams. In small teams the atmosphere can normally be evaluated by the project leader directly.
What is measured	Collaboration characteristic inside team.
Who enters data	Project team members
Transparency	Project management and project team see the results, probably not project sponsor.
Anonymity	Configurable (depends on culture), preferably not anonymous

Are the project goals clear?
Are the project goals realistic and achievable?
Do the project members identify with the goals of the project?
Do the project members know their task?
Do the project members coordinate their effort well?
Is there open and free communication between project members?
Do the project members provide all important information to other project members?
Do you feel understood and accepted by other project members?
Do team members respect each other and their different roles?
Do the project members take responsibility for their task and the project outcome?
Do the project members help each other when someone is short of time?
Do the project members feel responsible for the final results of the project?
Do the project team members actively listen to each other?
Are the project members open minded about other project members' ideas and opinions?
Do the project members try to solve discovered problems in a quick and efficient manner?
Do the project members try to solve conflicts?
Is there a positive work atmosphere in the team?
Do the project members provide constructive feedback to each other?
Do the project members consider the tasks of other members when doing their own task?
Do project members relay information that might be important for other team members?

D.5 Assessment of cooperation and communication between supplier and customer in requirement specification working groups

Context	Often requirement specification is conducted in group meetings ("Arbeitsgruppe") where the group is composed of the supplier representatives (in other use cases called project team members) and customer representatives. Usually these meetings are held during most of the project time when more requirements are discovered and also the detail level is continuously increased. Misunderstanding in requirement specification may lead to huge costs in the development phase of the project.
Purpose	Assess the cooperation and communication between supplier and customer representatives. Ultimately we want to avoid misunderstandings which are a high risk of the project, especially when there is a misunderstanding early in the project which is not discovered until late.
What is measured	Atmosphere in group, trust between supplier and customer, communication quality between supplier and customer. Important is the differentiation in the two stakeholder groups, suppliers and customer. Large discrepancies between the measured values (e.g. of trust) of the two groups is an indication of a problem.
Who enters data	Supplier and customer representatives. Each group has a separate question list.
Transparency	Consolidated results are shown to all supplier and customer representatives.
Anonymity	Individual results are shown to the supplier's project leader and also to the project sponsor. The reason for showing individual results is that when analyzing the results (especially problematic ones) it may become necessary to contact people who provided irregular answers.

Questions for Supplier
Are the customer representatives able to communicate their requests clearly and competently? <i>Here also the appropriate use of documentation methods (e.g. UML models) is asked?</i>
Do the customer representatives understand the supplier's explanations?
Do the customer representatives understand the supplier's solutions to their requirements?
Do the customer representatives have the necessary competence to provide input to the requirement specification? <i>Without this competence the customer may get a product which completely fulfills the requirements, but is not useful for the customer.</i>
Do the customer representatives have the necessary business knowledge to provide input to the requirement specification? <i>The necessary business knowledge comprise the knowledge what will be needed in the next 5-10 years and what business features should be part of the project.</i>
Are the customer representatives committed to the project?

Have the customer representatives been given enough time for their work in the requirement specification work group?
Are the customer representatives focused on the solution? <i>This includes the question whether it is possible to discuss priorities, mile stones and cheap temporary solutions.</i>
Is the cooperation with customer representatives smooth? <i>Too high values in questions regarding cooperation may be an indication that problematic issues are ignored. Ideally there are always minor conflicts which are then resolved</i>
How is the communication between supplier and customer? [easy-hard] <i>E.g. are questions answered and information exchanged in a timely manner.</i>
Are the customer representatives receptive to the supplier's solutions?

Questions for Customer
Do the supplier representatives understand what the customer representatives tell them?
Do the supplier representatives understand the current customer's business?
Do the supplier representatives know the most important current <i>daily business</i> work activities of the customer?
Do the supplier representatives understand the business requirements?
Has the requirements been clearly documented in a requirement specification?
Is the current requirement specification complete, well documented and agreed on by the relevant stakeholders?
Is the detail level of the requirement specification adequate?
Are the supplier representatives able to communicate their solutions clearly and competently? <i>Here also the appropriate use of documentation methods (e.g. UML models) is asked.</i>
Are you committed to the project?
Have you been given enough time for your work in the requirement specification work group?
Are the supplier representatives focused on the solution?
Is the cooperation with supplier representatives smooth? <i>Too high values in questions regarding cooperation may be an indication that problematic issues are ignored. Ideally there are always minor conflicts which are then resolved</i>
Do the supplier representatives use the correct business terms?

D.6 Inside-outside comparison Controlling

Context	The project sponsor is often not involved enough in the project. A possible reason is that each top manager sponsors many projects and so may not follow project close enough.
Purpose	Keeps the project sponsor involved in the project and acts as reminder that the project exists. In addition having both the inside view (project team members) and outside view (project sponsor) provides a controlling with high validity (e.g. it is more difficult to pad the reporting). In cases of low values it may be necessary that the project management clarifies the situation with the project sponsor.
What is measured	Project status. Self-assessment, assessment of other persons and also of situations.
Who enters data	All stakeholder groups, but for large stakeholder group only subsample of people.
Transparency	Everybody sees consolidated results.
Anonymity	Configurable (depends on the culture of company). But with less than 8 people non-anonymous.

How much do you know about the vision of the project? [nothing-everything I need to know] <i>The question is mainly useful at the beginning of the project.</i>
How much do you know about the purpose of the project? [nothing-everything] <i>The question is mainly useful at the beginning of the project.</i>
Do you still agree with the vision of the project?
Is the project valuable for the company?
Is the scope of the project still reasonable when considering the project context?
Are the project goals clear?
Is the project budget adequate to achieve project goals?
Is the duration for the project adequate?
Are there enough project team members with the necessary skills to achieve project goals?
Are the stakeholders committed to the project goals?
Do you have enough information to assess the current status of the project?
Is the project progress on time? [far behind schedule-far ahead schedule] <i>E.g. will the project achieve the mile stones.</i>
Is the cooperation between stakeholders good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Are the risks of the project acceptable?

Has the project a high enough priority for the project sponsor?
Has the project a high enough priority for all relevant divisions of your company?

D.7 Support of Scrum Retrospective

Context	A retrospective is a part of the software development framework Scrum (http://en.wikipedia.org/wiki/Scrum_(software_development)). It is a meeting held by a project team at the end of a part of the project (normally after an iteration which takes 2-4 weeks) to discuss what happened, what was good and what could be improved. Normally everybody thinks about it beforehand and the results are discussed in plenum.
Purpose	Evaluation whether project is following the Scrum methodology. Allows anonymous input to Retrospective and also input from stakeholders who are unable (e.g. due to too high time demand) to attend meeting. In addition having a time series of Scrum related measurements allows figuring out trends in the project.
What is measured	Is project following the Scrum methodology.
Who enters data	All relevant stakeholders: Project team, Scrum Master and product owner
Transparency	Everybody should see consolidated results.
Anonymity	Anonymous if anonymity is the main reason for using this usecase. But should be configurable as the usecase could be used because of the other reasons mentioned above.
Literature	Many questions bases on (Scrum checklist [5]).

Did we deliver working and tested software?
Did we deliver what business needs most for this iteration?
Is our process continuously improving?
Does the product owner fulfil his/her function?
Do we maintain the sprint backlog properly?
Does the product owner maintain the product backlog properly?
Are problems addressed in daily scrum?
Did the demonstration show working and tested software?
Is there useful feedback to the demonstration from stakeholders and product owner?
Is the "Definition of Done" correctly and thoroughly applied? <i>This question should only be answered by the software developers.</i>
Does the sprint meeting produces a sprint plan supported by the team?
Is the team disrupted or controlled by outsiders?

D.8 User feedback to applications/services of IT department

Context	Often providers of applications/services gather data from users to assess their applications/services (sometimes by paper surveys). As this is a quite general task it should be possible to create a standardized set of questions. By speeding up the entry process the platform may increase the number of users taking part in the survey.
Purpose	Get feedback from users of applications/services of IT department in an efficient and effective manner. This could be combined with the key performance indicators which were agreed on in the Service Level Agreements. In contrast to the other use cases the focus here is on the operation of applications (and services). For some software development methods the operation part is also included in the project.
What is measured	Satisfaction of service/application users. The measurements should help to locate the source of displeasure. Some questions, especially for the applications, measure conditions which don't change quickly. For these questions stable values over time are expected.
Who enters data	Users of applications/services
Transparency	Operation of IT department sees the results. It should be configurable if the applications/services users see the results.
Anonymity	Yes
Literature	Some questions based on (Internal help desk support survey [2]), many questions based on (Usability and user experience surveys [8]).

IT services
Is it easy to contact IT?
Does it take much time to contact IT?
Was the initial response of IT in a timely manner?
Could you always get clear information about the status of your issue on which work is being done?
Did you have to contact IT several time to get your issues solved? [always-never]
Were urgent issues treated with priority and fixed quickly?
Was the resolution of your issues quick?
Was the attitude of the IT staff professional?
Was the communication with the IT staff effective?
Was the information from the IT staff clear?
Was there enough information from the IT staff?
Did you provide proper information to the IT staff at the first contact?
Were you proactively notified in advance about changes that could affect you?

Was the IT service process improved because of your feedback?

Applications
Does the application meet your needs?
Does the application allow you to do your work efficiently?
Is it easy to learn working with new features of the application?
Is the application's user interface user-friendly?
Is the interaction with the application's interface easy?
Are the information and error messages clear? <i>The importance of this question depends on the frequency of the messages.</i>
Is the application responding quickly to the user requests?
Does the application run stable?
Are the help information and additional documentation of the application helpful?
Is the customer support for our application helpful?

D.9 Feedback on the project leaders leadership

Context	In some companies it is a standard process that subordinates also assess their superiors. This is often done with paper surveys.
Purpose	Efficient, anonymous and effective leadership feedback of the project leader. The first two are achieved by the platform, the last one by an optimized standard question set.
What is measured	Leadership skills of project leader or, in big projects, the leadership skills of sub-project leader.
Who enters data	Subordinates project team members
Transparency	Only owner of survey in platform can see results. This may be the project leader himself/herself or the HR department.
Anonymity	Yes
Literature	Few questions based on (Evaluating your supervisor [1]), many questions based on (Project leader assessment form [3]).

Does the project leader take the time to ensure you understand what is happening and why?
Does the project leader provide access to the information you need to contribute to the team? <i>Note that the project leader only has to organize the communication (e.g. by setting up communication channels). He or she doesn't have to do the communication him or herself.</i>
Does the project leader help you confront and resolve issues, even sensitive ones?

Does the project leader acknowledge your contributions and effort?
Does the project leader respect you other priorities (work related or private live)?
Does the project leader actively listen to you?
Does the project leader maintain the standards and procedures which were set and agreed as a team?
Does the project leader maintain the standards and procedures which were set by the project environment?
Is the project leader committed to the project?
Does the project leader challenge you to perform better, generate more ideas, practice?
Does the project leader demand mutual accountability for agreed upon tasks and goals?
Do you get support and direction when you need it?
Does the project leader recognizes and addresses concerns in a timely manner?
Does the project leader delegate authority appropriately?
Do the other team members support the project leader enough?

D.10 Unfiltered inside view of project status for important outside stakeholders

Context	Important outside stakeholders, like project sponsor, project committee and management board, are often not directly or actively involved in the project, yet are interested that project's goals are achieved. The information they get is normally heavily filtered by the project management.
Purpose	The outside stakeholders get a systematic, unfiltered inside view of the project which allows them to more accurately assess the project situation.
What is measured	Project situation, focus on project's "team atmosphere"
Who enters data	project team members
Transparency	Although results are mainly targeted at outside stakeholders, everybody should see the results (especially the project leader should also be included)
Anonymity	Only consolidated results are shown.

Are the project goals clear?
Are the requirements stable?
Is the project budget adequate to achieve project goals?
Is the duration for the project adequate?
Are there enough project team members with the necessary skills to achieve project goals?

Do you have fun working in the project?
Is there a good team spirit?
Is the cooperation with the customer good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Is the cooperation with the project management good? <i>Cooperation is not the same as harmony. It also includes good mechanisms for conflict resolution. It should be noted that having no conflicts at all is an indication of a serious problem, namely that sensitive issues are not addressed.</i>
Is the project well managed?
Has the project a high enough priority for the top management?
Has the project a high enough priority for all relevant divisions of your company?
Are relevant information efficiently communicated?
Do the project members identify with the goals of the project?
Do the project members coordinate their effort well?
Is there open and free communication between project members?
Do the project members take responsibility?
Do the project members feel responsible for the final results of the project?



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