ZHAW Zurich University of Applied Sciences

School of Management and Law

Bachelor Thesis

Necessary adaptions of project management education for future project managers

Author:

Remo Luzi

Lehngasse 23

3812 Wilderswil

S14674477

W.BA.BO.14HS.VZGMPiE

luzirem1@students.zhaw.ch

Supervisor:

Elias Jehle

Institute for corporate development ZUE

Winterthur, 24.05.2017

Management Summary

Project Management is facing a more complex and dynamic market environment because of the fourth industrial revolution. This asks project managers to have a new set of skills. However, it is argued that the current project management education does not sufficiently prepare project managers to obtain this set of skills.

Therefore, the thesis aims to identify the necessary adaptions of project management education. This includes the question about which skills are relevant and how and where they are optimally obtained. In addition to that, an alternative education model suggestion should be developed.

First, the requirements of leadership in the fourth industrial revolution are identified. These serve as a basis for the formulation of five theses about how project management education should be adapted according to the literature. Additionally, the five theses are brought together in the suggested educational model. In a next step, the theses and educational model are tested by consulting the teaching and learning side. The former is done with five experts interviews with open questions and the latter with an online survey for business students of three different business schools.

It is found that soft skills are to be included in project management education as to reach a balance of hard and soft skills. As an additional point, it is suggested to include a practical part in the education in order to enable students to gain work experience in project management. It is recommended to assign students only to projects which are organized in a dynamical and autonomous way. Further, it is claimed that students should be taught about the identity of project management. Because of the proposed enlargement of the scope of project management education, it is seen as a necessity that project management becomes an independent discipline. Considering the inputs of the experts and the students, the suggested education model is described to consist of four modules of which two are theoretical classes and two are internships with partner companies. A contractual agreement with the partner company is thought to ensure that the students can work in projects which are carried out in a participative and decentral way. At the end of the education, students would receive an officially recognized certificate. Additionally, there would exist the possibility to directly be employed by a partner company, finishing its internal project management in a shortened

process. As another incentive, the education is thought to offer the regular assistance of an independent training institute for behavioral competencies to both students and partner companies.

The thesis presents a possible approach on how project management education could be offered. The formulations are of a general nature and for business students after their studies only. Therefore, it might be the subject for further geographical and branch related analyses in future papers. In addition to that, further studies could examine whether the scope and timing of the suggested model need to be adapted and how the model should best be implemented.

Table of content

I. Table of Figures

II. List of tables

1- Introduction

1.1. Problem

Within the last years, the market environment worldwide became rapidly more complex, chaotic and uncertain (Thomas & Mengel, 2008, p. 305). The increasing connectivity of the whole world brings employers and employees into a new environment which is faster and more dynamic than it was experienced before (Torres, 2010, p. 2). Schnoll (2011) adds that within this environment "the required skill sets of quality and regulatory professionals are constantly changing, and capability upgrades must be ongoing to ensure success" (p. 62). Taking these facts into consideration, experts often speak about the fourth industrial revolution which is faced in the foreseeable future.

This new world is often associated with the term 'VUCA' which is the acronym of volatile, uncertain, complex and ambiguous (Torres, 2010, p. 2). It leads to a new reality in the job market resulting in the emergence of new and more flexible working models, collective intelligence, the need for managers to have soft skills and the change from hierarchic structures to more cooperation and collaboration within organizations (Grabmeier, 2015, pp. 5-6).

For project managers, this market shift means that they have to be able to overview and manage a project within a more uncertain market environment (Thomas & Mengel, 2008, p. 304). According to the research of Córdoba and Piki (2012), however, the education of project management has not yet managed to catch up with the new market environment (p. 83). They mention that the current project management education does not prepare students to deal with complexity (Córdoba & Piki, 2012, p. 83).

This is also reflected in the success rate of projects. There is not a holistically accepted study about project failure because the definition and variables are different for every study. Nevertheless, many studies agree that project management still has a low success rate. As an example, Keith Ellis of IAG Consulting (2009) calculated that 74.1% of observed companies have an immature level of project management (p. 2). "These organizations waste 39% […] of their development budget due to poor requirements definition and management maturity" (Ellis, 2009, p. 2). In addition to that, McKinsey confirmed in a survey in 2015 that only 26%

of transformational change in companies are seen as a success (Jacquemont, Maor, & Reich, 2015).

Additionally, it was even found that there is either little or no empirical evidence that qualified and or certified project managers have more success in a complex world than accidental project managers (Crawford, 2005, p. 14).

Summarizing that there is a new market environment which is said to have a significant impact on business and project management, combined with the findings of studies about low project success and an immature project management, there seems to be a discrepancy between the requirements for a successful project within the new market and the existing skills in project management. This discrepancy could be explained by many variables, but one major aspect appears to be that the current education of project managers is not matching with the growing complexity of the market environment.

1.2. Goal / Research question

With the aim to identify improvement opportunities, the goal of the thesis is to examine how project management education needs to be adapted to fulfil the market requirements of the fourth industrial revolution. Therefore, the thesis question is:

'How does project management education have to be adapted in order to enable future project managers to cope with the market requirements in the fourth industrial revolution?'

This thesis examines the relevant competencies a project manager needs to have in the future, which way of learning the matter of project management is the most beneficial and how far the responsibility of project management education reaches. Additionally, an education model which is an additional alternative to the existing project management education offerings is presented and analyzed.

Previous studies focused on the assets and success factors of project management, connected project management education with other learning theories, discussed the lack of a developed professional community and the role of project management in companies.

As an addition to previous studies about project management education, this thesis develops the relevant characteristics project management education needs to have to optimally educate project managers. Furthermore, it recommends how this optimum education could look like in reality in the context of the fourth industrial revolution. This could enable schools and companies to implement a new form of project management training covering the ascertained characteristics or to adapt their existing education program.

1.3. Scope of thesis

The thesis is focused on business school graduates who want to work within the project management field once they finished their Bachelors degree. The focus is on business students since their studies are assumed to offer the highest emphasis on leadership and project management.

Depending on their subject, the students may have already had some lectures about project management in their studies. However, they do not have significant working experience in projects.

The scope of the thesis includes all forms of project management education on offer, such as certifications of project management institutes, university programs or courses offered by independent project management providers.

Generally, the thesis is not thought to have a geographical restriction since project management is a global topic and the suggested changes to project management education. However, since the project regulations and environment can vary in every country and due to the fact that the research sample is from Switzerland, the findings of this thesis cannot be automatically applied to other countries.

The thesis aims to identify the necessary adaptions on project management education which are based on the new market environment of the fourth industrial revolution. Theories and influencing factors, which ask for a change in project management education apart from the fourth industrial revolution, are not considered.

It is not the goal of the thesis to rate and rank current education models because of their different nature. Neither does the thesis strive for the perfect solution of an education model

which should fit all future project managers. The suggested adaptions of project management education are of a broad nature and may need to be differently implemented in the different education models.

1.4. Outline

In a first part, the theory of Leadership 4.0, project management and project management education is outlined in the theory section. This part intends to introduce the topic and to clarify certain terms. Additionally, the current project management programs and their limitations are shown. This theory section of chapter 2 is based on research only.

Chapter 3 further analyzes the required characteristics of a successful project management education according to research and develops five theses of required characteristics. These are then summarized in a suggestion of a new educational model which takes into account the requirements of the new market environment. The theses are derived from argumentation chains which are based on research of the former chapter.

The next chapter consists of the methodical approach with expert interviews and the online survey with business students. The topic is analyzed with a two-sided approach which means that the experts represent the teaching side and the students the learning side of project management education. Based on the chapters 2 ('Theory') and 3 ('Thesis') the questionnaires are designed and interviewees are chosen.

The answers of the experts and students are then clustered, analyzed and compared with each other in the analysis part in chapter 5. In addition to that, the theses are critically examined and specification may need to be made. Subsequently, the opinions of the respondents about the suggested model are compared. At the end of chapter 5, there is a summary of the findings and the theses are answered.

The whole thesis is then summarized, discussed and brought into context in the discussion in chapter 6. An updated version of the suggested education model and its procedure is presented. Lastly, limitations are discussed and an outlook is given in the last section of the discussion.

2- Theory

2.1. Leadership 4.0 definition

The term Leadership 4.0 emerged from the fourth industrial revolution. There is no unity on when the fourth industrial revolution started and it is even contested that the fourth industrial revolution is taking place now, since definitions and terms can vary depending on the authors. But generally spoken, the main idea about a new market environment is convergent among researchers. The publication of professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, is chosen as a representative example.

He claims that the technological development of the fourth industrial revolution is so extensive that it comes along with a profound change of the human civilization (Schwab, 2016, p. 1). It is often argued that these changes are just a part of the third industrial revolution. The third industrial revolution is said to have emerged in the start of the second millennium and is characterized with new tools to improve productivity like the internet, e-mail and social media which allow unprecedented access to information (Boneau & Thompson, 2013, p. 1). However, Schwab (2016) states that due to the following three key aspects, society is confronted with a new type of industrial revolution (p. 3):

- Velocity
"Contrary to the previous industrial revolutions, this one is evolving at an exponential rather than linear pace" (Schwab, 2016, p. 3).

- **Breadth and Width**
"It builds on the digital revolution and combines multiple technologies that are leading to unprecedented paradigm shifts in the economy, business, society, and individually" (Schwab, 2016, p. 3)**.**

- **Systematic impact**
"It involves the transformation of entire systems, across (and within) countries, companies, industries and society as a whole" (Schwab, 2016, p. 3).

Torres (2010) agrees that the impact of a new market environment is that big that "the changes in the economy are bigger than our ability to react" (p. 2).

She describes the fourth industrial revolution with the term 'VUCA' which stands for Volatile, Uncertain, Complex and Ambiguous and which was originally created by the US military at the end of the Cold War (Torres, 2010, p. 2). Such an environment asks for a new thinking model of leadership (Torres, 2010, p. 2).

As a result of a high frequency of disruptions and technological innovations, the average lifetime of companies is continuously shortening as it can be observed on the example of the companies of the S&P 500 underneath in Figure 1.
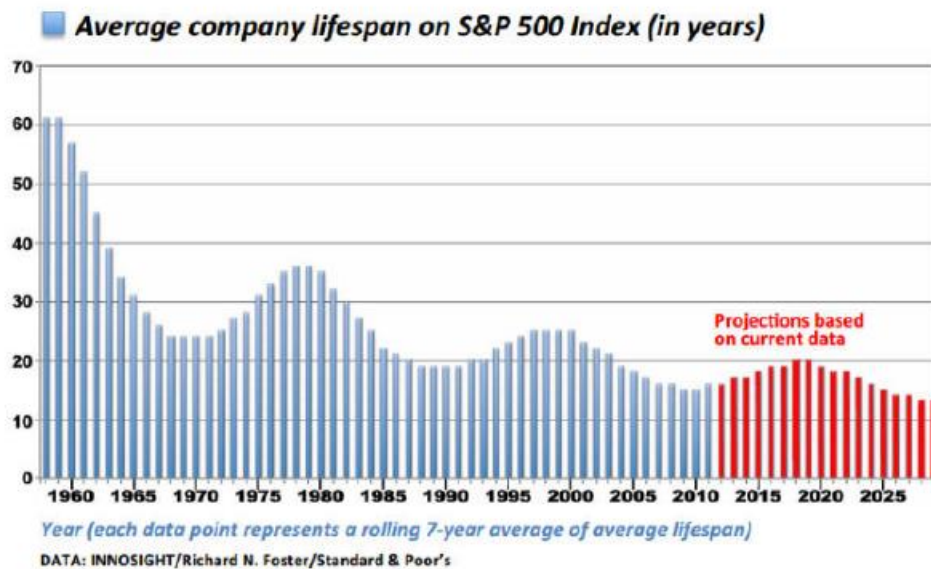
Figure 1: Average company lifespan on S&P 500 Index,

Source: Innosight (2012). Creative Destruction Whips through Corporate America. Executive Briefing Winter 2012

2.2. Leadership 4.0 requirements

The new market environment causes new leadership requirements and competencies. It is decided to take into consideration the requirements definitions from market research institutes which conducted interviews with experts instead of focusing on sole theoretic definitions. This is because it is assumed the market leaders define the requirements someone needs to have to be employed by them therefore have a bigger influence on the market than the definitions of research do.

Hays (2015) figured out the main challenges for business leaders in Switzerland, Germany and Austria which are named to be the management of change, the management with growing complexity in the leadership area and to act as a role model (p. 16). INQA (Initiative Neue Qualität der Arbeit [INQA], 2014, pp. 6-11) even chose a more detailed approach and conducted 400 in-depth interviews with business executives, coming up with the following 10 key topics for modern leadership:

1- Flexibility and Diversity are success factors
2- Process competence is more important than the focus on results
3- Self-regulating networks and collective intelligence is the best answer for a dynamic market environment.
4- No more need for linear hierarchies.
5- Willingness for cooperation is more important than the sole focus on returns.
6- Personal coaching for the personal and professional development is crucial for employees and managers.
7- Self-determination and appreciation most motivate employees.
8- Focus on social topics (stakeholder-perspective).
9- Wish for a change of paradigms in the leadership culture.
10- Criticism on the development of the existing leadership culture.

These key topics are the basis for the development of the theses in chapter 3 ('Thesis') and will be compared with the answers of experts and students in chapter 5 ('Analysis').

2.3. Project management education

The Project Management Institute (PMI) defines in its PMBOK Guide, the handbook for project management knowledge, a project as the following:

> A temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates that a project has a definite beginning and end. The end is reached when the project's objective have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists (Project Management Institute [PMI], 2013, p. 3).

Project management is defined as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (Project Management Institute [PMI], 2013, p. 5).

There are different paths to become a project manager. A standard procedure which one must undergo in order to call him- or herself 'project manager' does not exist. Despite this fact, the following educations are best known and most common in project management education:

2.3.1. Certificates

There are two worldwide accepted certification institutes, namely the Project Management Institute (PMI) and the International Project Management Association (IPMA). Both institutes offer several certification levels in order to allow a worldwide comparability of project management candidates and a minimum standard in project management knowledge. For both programs, only the basic certificate is presented due to the fact that the thesis is about business student graduates.

PMI offers the 'Certified Associate in Project Management (CAPM)' as their most basic certificate. It is a multiple-choice exam of three hours, testing the knowledge of the candidate in several project management areas (Project Management Institute [PMI], 2013). In order to apply, a student must either have a secondary degree and 1'500 hours of project experience or a proof that he or she visited at least 23 hours of project management education (Project Management Institute [PMI], 2017).

IPMA offers the 'Certified Project Management Associate IPMA Level D' as their most basic certificate. The exam takes as well three hours but there are single choice questions, multiple choice questions, questions requiring decisions and text-based tasks (International Project Management Association [IPMA], 2017). The application does not ask for any experience or project management classes (International Project Management Association [IPMA], 2017).

Both certificates are thought to convey the students the basic knowledge and to enable them to work in a project management team. However, Pant and Baroudi (2006) find that the "PMBOK is more concerned with the hard skills required in project management than the soft skills" (p. 124). This is as well the main point why Thomas and Mengel (2008) argue

that the current certification centers do not sufficiently prepare future project managers for complexity (p. 306).

In Switzerland, there exists another project management method called 'Hermes' which was developed by the Swiss Government and is used for government projects in the area of IT, services, products and business organizations (Swiss Confederation, 2017). Since this is a nationally recognized method and only used for government agencies, it is not further be discussed in this section.

2.3.2. University

There is not a complete project management discipline which a student could choose to study. Universities only offer project management courses as a component of a discipline like business administration. Within the classes, students learn the rules and techniques in a theoretical way. This gives the students a certain understanding of the hard skills, but as described by Shelly (2015), the soft skills cannot be learned by content and rules-based teaching (p. 484). Shelly (2015) also claims that "students benefit from the experience of applying what they are learning, rather than just discussing the relevant theories" (p. 478).

2.3.3. Further education

It is observed by the author, that many people do not start their career in the project management area but start working as experts or in a different working area and then later visit evening courses or do an online course to learn about project management. Often a worker needs a further education so that he or she can start leading projects or overtake some responsibilities. There is a high quantity of project management courses in the further education sector. The courses are often designed to teach a certain method or focus on a specific branch. All in all, there is no consistent consensus among the courses. These courses are intended to teach working individuals a slight understanding of project management in an efficient manner. Considering the argument of Córdoba and Piki (2012) that students have to reflect their own skills (p. 83) and to learn soft skills in a group based learning environment (p. 84), the evening or online courses are not seen to guarantee this sort of learning.

2.3.4. Workplace education

Due to the fact that companies often have their individual processes, big companies tend to have their own project management procedures and teach them within the organization to their employees. With this tactic, employers assure that the knowledge of their employees is tailor-made for the project management tasks of the company. This certainly allows workers to optimally carry out project works for their specific task but since the education is bound to the company or even just certain tasks, they may lack a holistic understanding of project management and cannot use the internal education outside of the company.

2.3.5. No project management education

Since there is no official requirement to possess a diploma in project management to work as a project manager, it is not unusual that people start working on projects without having finished a corresponding education. The 'learning by doing' approach might help the project managers to directly collect work experience and to think in new ways to solve a problem because they are not influenced by any education. One could argue that Crawford (2005) did only find low empirical evidence that qualified or certified project managers have more success in a complex world than accidental project managers (p. 14). However, the technical skills in project management are found to be a necessary prerequisite in order to be taken seriously by subordinates and to enable a project manager to efficiently work with the tools needed (Hysong, 2008, p. 286). It is therefore argued that if one does not know about the existence or the proper usage of project management tools, he or she is predetermined to lose too much time to complete and analyze the respective reports. This time is likely to be missing for other project manager tasks.

3- Thesis

3.1. Required characteristics of project management education

In order to be able to examine potential improvements in project management education, it is expected that one must first know which characteristics project management education needs in the new market environment. Based on existing research presented in the chapters before, five theses are created which serve as the basis for the newly suggested project management education model and which is reviewed in the expert interviews and the online survey for business students. All the key topics of modern leadership according to the INQA study (see chapter 2.2. 'Leadership 4.0 requirements') can be assigned to one of the theses.

<u>1. Need to make project management an independent discipline</u>

Project management started as an engineering discipline which enabled engineers to build advanced technologies in a structured way (Pant & Baroudi, 2008, p. 124). Even though its extent has changed, project management is often still considered as a further education for experts which have to start leading projects. Many companies offer relatively short evening courses where project managers learn tools and techniques on how to manage a project. This may still be the case today in small regional projects. However, the New Expert Survey 2014 of Gemünden and Schoper (2014) shows that project management is transnationalizing, virtualizing and professionalizing and that project management is becoming more and more an important topic for senior management (p. 8). Additionally, societies and organizations start being organized in a project structure (Gemünden & Schoper , 2014, p. 8). Then with project management as a leading conception, a company can bundle its strategy and become much more flexible and adaptive (Bea & Scheurer, 2011, p. 427).

Since project management is said to gain significant importance, there are new tasks which project managers will have to deal with. In order to be able to solve these, it is seen as not sufficient to be a topic expert with some project management knowledge (Harney & Thomas, 2013, pp. 511-512).

Already Wang (2002) claimed that project management itself is no mature profession with its own core values and beliefs, a sound community and the sense of identity (pp. 6-8).

Kendra and Taplin (2004) then confirmed that organizations "must develop a project management culture based on shared cultural values of the organization's members that support adoption of project management" (p. 30).

Even though project management is said to be more established than several years ago (Pant & Baroudi, 2008, p. 126), the observed education programs still focus on teaching topic specialists. Additionally, many big companies have their own internal project management education and the existing certifications mostly specialize in teaching explicit knowledge in their programs (Pant & Baroudi, 2008, p. 126). Since the offering of project management education still appears to be fragmented, project management does not seem unified and is argued to still lack a common understanding of values and of a project management identity.

The thesis claims that project management as a whole needs to develop its own values and identity and that it has to become an independent discipline in cases where the knowledge about project management is more important than the knowledge about a certain topic. This is thought to be necessary to align project management education with the new role of project management for businesses and society.

Thesis 1 can be assigned with the INQA key topic number 2 ('Process competence is more important than the focus on results').

2. Project management students not only need a theoretical but also a practical education

Universities these days are keen on teaching the technical side of project management and certification teaching material like the PMBOK Guide from the Project Management Institute (PMI) are putting the focus on the hard skills of project management (Pant & Baroudi, 2008, pp. 126-127).

However, Harney and Thomas (2013) state that if a student is only taught technical processes, he cannot simply switch at work to become creative and to solve complex problems (p. 513). Schools reacted with Case studies to address this issue. The created case puts the student in a situation, allocates him or her to a certain role and asks him or her to solve this situation.

Unfortunately, working through a created case in the classroom neither simulates a real business situation nor fosters the maturity of the pupil (Harney & Thomas, 2013, p. 513).

As noticed by Thomas and Mengel (2008), competencies which are relevant for a project manager to cope with complexity are rather obtained by getting exposed to the unknown (p. 311). Harney and Thomas (2013) add that simply learning theory without at the same time fostering liberal and intellectual skills, results in an inadequate education (p. 516). A more liberal education includes the learning of skills like analysis, critical thinking and synthesis and their use to leverage the acquisition of knowledge in a wise and effective manner (Harney & Thomas, 2013, p. 516).

Shelley (2015) claimed that project managers need to be able to lead change based on experience and their ability to apply practical knowledge in their daily job which is still in the process of being transformed into scientific theories and models (p. 483).

An attempt to create a real project management case and to take into account unpredictable changes was made in Switzerland by developing the 'Swiss Island' project management simulation. This game is a program in which teams can simulate a project and slip in different roles. The game can adapt complexity and comes up with different changes in the project for every group (Spirit at PM GmbH, 2017). Another example of such a simulation is the SimulTrain 11 which is as well used to recreate the daily work routine of a project manager and which allows the players to lead a project team and to interact with different stakeholders (Simultrain.com, 2017).

Although these approaches are more realistic than case studies, it is argued that the students indeed can choose an option but that they do not have to conduct this action. As a justification example, it is argued that it is easy to click on a button which says 'Talk to an employee with low performance about his personal problems', but in reality, this task requires much more than a mouse click. Albeit the simulations show the consequence of one's decisions, it is reasoned that the games do not have any severe consequences for the players as real project decision would have.

As another point to bear in mind, workplace learning includes all forms of learning activities and enables the student to profit from it formally and informally (Jugdev & Mathur, 2013, p. 635). Informal learning is seen as the key for project managers to cope with the complex world in the fourth industrial revolution (Jugdev & Mathur, 2013, p. 639). Informal learning means that students learn by experience and by the interaction between each other and not

the formal way (Jugdev & Mathur, 2013, p. 640). This informal learning process can in fact be simulated, but in order to profoundly experience it, to face complexity and to be affected in a serious way, working in a real workplace is seen as inevitable (Jugdev & Mathur, 2013, pp. 641-643).

This leads to the outcome that next to the theoretical education, it is thought that project management students need to start working in an area of project management during their education so that they get the relevant practical knowledge at the same time as the theory about the processes and tools. The insights one gains from working is seen as a crucial part of the formation since it is seen as hardly realistic to gain work related learnings from simulations.

Thesis 2 goes hand in hand with the INQA key topics of leadership number 1 ('Flexibility and Diversity are success factors').

3. Need to teach project management within an independent, non-profit organization.

Companies often measure success on a quantitative basis since the advantage of project management for the company is not directly measurable in numbers (Jugdev & Mathur, 2013, p. 637). Jugdev and Mathur (2013) reckon that this results in the fact that project management is still not that much respected by the management of a company as it may deserve (p. 637).

Consequently, enterprises still mainly invest in tangible assets and do not give enough value to intangible assets (Mathur, Jugdev, & Fung, 2007, p. 471) and therefore there is only a low corporate sponsorship for project management education (Alam, Gale, Brown, & Kidd, 2008, p. 225).

This trend seems to go on, even though a company can only build up a competitive advantage in project management by investing in intangible project management assets (Mathur, Jugdev, & Fung, 2007, p. 471). This is because intangible project management assets are based on tacit knowledge which cannot be transferred or copied as it would be the case for tangible project management assets (Mathur, Jugdev, & Fung, 2007, p. 471). An intangible asset is defined as an asset which is non-monetary, of physical nature and often hard to evaluate (Kostagiola & Asonitis, 2009, p. 419). Tacit knowledge is described as knowledge which is

only established through experience and is of an unwritten and unspoken manner (Seidler-de Alwis & Hartmann, 2008, p. 138).

This investment behavior leads to a paradox. On the one hand, companies wish for project managers with an in-depth knowledge of technical operations as these measurable factors are taken into consideration for investment decisions (Mathur, Jugdev, & Fung, 2007, p. 471). On the other hand, employees are supposed to be flexible, able to adapt and creative in changing situations (Harney & Thomas, 2013, p. 513). These characteristics are harder to measure and therefore not sufficiently considered in the investment decision (Mathur, Jugdev, & Fung, 2007, p. 471). Albeit, as found by Gemünden and Schoper (2014), project management is professionalizing and "projects will be seen more often as an entrepreneurial undertaking to deliver business results" (p. 11). It seems that the professionalization of project management has not yet been fully recognized.

On the university side, it is often the case that a project management education program is rated based on the reputation of the respective university and not of the content of the program itself (Harney & Thomas, 2013, p. 516). Shelley (2015) adds that the educational system of remembering the context in a pedagogy style, may get the students good grades but does not build their long-term capability (p. 485). Regarding the syllabus of business students, Harney and Thomas (2013) criticize that especially in undergraduate programs soft skill courses are "not only separated from core courses on accounting, finance, marketing, strategy, etc., they are vastly outnumbered by them and rarely if ever form a consistent pathway" (p. 512).

Considering the low recognition given to project management by companies, the lack of investment in intangible assets of project management and the biased perception of university educational programs on the one hand and the growing importance and professionalization of project management on the other hand, project management education is recommended to be offered within an independent organization.

This aims at preventing the conflict within companies between measurements by numbers and the wish for a competitive advantage. On the university side, an indigenization of project management seems not to be executable. An institution that is not profit-oriented can focus on the formation of intangible assets. It internalizes the values and beliefs of project

management without having to take into consideration the values and beliefs of an entire enterprise.

Thesis 3 can be brought together with the INQA key topic number 9 ('Wish for a change of paradigms in the leadership culture') and number 10 ('Criticism on the development of the existing leadership culture'). Furthermore, this thesis is an advancement of thesis 1 ('Need to make project management an independent discipline') since it was found that apparently, it is hard to realize the model of project management as an independent discipline within existing schools and companies.

4. Projects are optimally carried out in a participative and decentral way.

As the world is getting more complex, enterprises need to adapt themselves to the thriving change and become more flexible (Bea & Scheurer, 2011, p. 427). Employees need to be able to move between hierarchies and departments for the fast business processing and they need to work towards goals in an effective and creative manner (Thomas & Mengel, 2008, p. 308).

Additionally, the main trend of project management is seen in the virtualization of project management which means that projects will be more and more virtually managed and that teams will not work in the same place (Gemünden & Schoper , 2014, p. 10). Changing teams need to work together in different constellations whose workers are stationed in different countries and time zones, connected with digital technologies (Grabmeier, 2015, p. 12).

With a strict hierarchy, project members are not thought to be able to work effectively between departments and in different geographical areas. The bottleneck effect of a classical strict hierarchy is argued to be too significant. This means that if a leader of a project has to take too many decisions on his own because the hierarchy asks him or her to do so, he or she may not be able to process all the requests promptly and he or she would fall behind and major delays can be the result. According to the study of the Forum "Gute Führung der Initiative Qualität der Arbeit (INQA) a majority of more than three-quarter of managers do not see a future for the old strict hierarchy in an organization and endorse a change in the management culture (Initiative Neue Qualität der Arbeit [INQA], 2014, p. 7). The arguments

mentioned above conclude that decentrally organized projects are of advantage for the project team as well as the project deliverables.

The need for decentralization of project management comes together with the need to give project managers the competencies they need in order to work effectively and in a creative manner towards a goal within such a changing environment (Thomas & Mengel, 2008, p. 308).

Moreover, employees on all organizational levels need to cooperate in order to innovate as fast as the market asks them to do so (Grabmeier, 2015, p. 12). Therefore, projects not only profit from a decentral organization, but also from a participative working environment. This is again congruent with the INQA key point number 5 ('Willingness for cooperation is more important than the sole focus on returns').

To conclude, projects of the future are seen to be highly flexibly organized in order to keep up with the rapid changes in the market which lead them to a decentral structure. Additionally, there is a need for collaboration between the different team members, teams and departments and everyone can come up with new ideas. A rigid hierarchy is expected to not be of any use.

Thesis 4 covers the INQA key topic number 3 ('Self-regulating networks and collective intelligence is the best answer for a dynamic market environment'), number 4 ('No more need for linear hierarchies'), number 5 ('Willingness for cooperation is more important than the sole focus on returns') and number 7 ('Self-determination and appreciation most motivate employees').

5. Need to include lectures about behavioral competencies in project management education.

For Pant and Baroudi (2008) one of the biggest tasks for a project manager is to create a good relationship with the team and other stakeholders (p. 125). Going hand in hand with the eight point of the INQA key topics in chapter 2.2, this challenge is said to become even bigger if the complexity of the market environment rises.

In order to allow them to cope with this complexity, there is a need to train project managers equally in hard and soft skills (Pant & Baroudi, 2008, p. 125). Then as mentioned by Gray and Ulbrich (2017) in a review of existing project management literature regarding the success factors of a project manager, "one success factor is represented by project managers

themselves, whose personality, skills, knowledge, competencies, and traits affect project success" (p. 424). This means that the adequate education of a project manager even gains in importance.

In the current educational forms, explicit knowledge which represents the hard skills is already well established whereas the tacit knowledge, representing the soft skills, is often omitted (Pant & Baroudi, 2008, p. 126).

It could be reasoned that the development of soft skills is not within the responsibility of project management education and has to be attained autonomously or in another place since project management institutes cannot cover the education of everything a project manager needs to know. Otherwise, the project management education would also have to teach topics like writing skills.

It is certainly important that the discussion about the scope of project management and its limits is held and that project management modules cannot start from scratch educating the relevant skills. However, Thomas and Mengel (2008) explain that future project managers need to be able to be intelligent in an emotional and spiritual way (p. 311). The project vision and communication maintenance impact project outcomes and the activities of making sense, generating meaning and learning are crucial (Thomas & Mengel, 2008, p. 308). Team members need to emotionally identify with the ambitions of the whole team so that they are "willing to understand individual behavior, goals, and motifs and to share values" (Thomas & Mengel, 2008, p. 311). The points mentioned in this paragraph can be summarized by the term 'emotional intelligence' which is described as the ability to understand, percipience and influence the feelings of oneself and others (Mayer, Salovey, & Caruso, 2004, p. 187). To possess this ability is confirmed to be a contributor to project success (Rezvani, et al., 2016, p. 1112).

For the reason that the soft skills gained significant importance for project managers and that the acquisition of these skills is not guaranteed by society, the individual itself or other educational programs, it is seen to be necessary that project management education needs to cover or at least enroll them for the sake of optimally preparing them for the market.

Due to this, behavioral competencies lectures are suggested to be included within project management education with the goal to help the students developing their soft skills and to learn techniques of how to use them in the best way. It is important to mention that the lectures themselves are not said to ensure that someone becomes emotionally intelligent. The students themselves have to develop and use soft skills, but the lectures are intended to be a sound cornerstone to introduce the topic in a structured manner and to assist, guide and coach the students.

Finally, the last two key topics of the INQA study, number 6 ('Personal coaching for the personal and professional development is crucial for employees and managers') and number 8 ('Focus on social topics (stakeholder-perspective)') are in line with the fifth thesis. Theses number 2, 3 and 4 already foster students to learn soft skills as an additional benefit and it could be argued that the suggestions of these theses teach the student soft skills in a better way than in classes about soft skills. Nevertheless, the fifth thesis stands separately as a conscious complement to the education in order to have soft skills as a separate topic.

3.2. Suggestion of a new project management educational model for emerging project managers

Taking the five theses of Chapter 3 into consideration, certain adaptions are suggested in this part and based on them, a new educational model is presented which could serve as a supplement or alternative of the existing project management education offerings.

Summing up the theses made in this paper, project management is seen as an independent discipline (Thesis 1). In order to give the students not only a sound understanding of project management knowledge but also of project management culture, project management is claimed to be optimally taught by an independent, non-profit organization (Thesis 3). Students collect practical experience in projects supplementary to their theoretical education (Thesis 2). These projects must be carried out in a participative and decentral way (Thesis 4). To additionally assist students with their personal development and to coach them, they receive lectures about behavioral competencies (Thesis 5).

The traditional approach in chapter 2.3 has emerged traditionally and made sense so far since project management evolved from System Engineering and System analysis where hard

approaches were used (Pant & Baroudi, 2008, p. 126). In a more dynamic and complex business environment, however, it is found that the approach is too static and with it, students may learn theories which have already been revised or are not used anymore in practice (Shelley, 2015, p. 478).

Even though managers endorse the idea of new leadership forms, they are not changing them since they lack time for leadership tasks, see difficulties in the delegation of self-reliance to employees and feel that the shift from attendance orientation to result orientation is difficult (Grabmeier, 2015, p. 11). This means that students end up in the same systems again and again. Therefore, the new model attempts to build the best learning environment for students in which they are confronted with modern dynamics from the beginning of their career. In order to do so, the suggested model is a dual education model which combines education and practical work and which consists of three parts:
- Educational part
- Practical part
- Behavioral part

A visualization of the idea of the suggested model is shown in Figure 2 on the next page. The parts are separately described from chapter 3.2.1 to chapter 3.2.3.
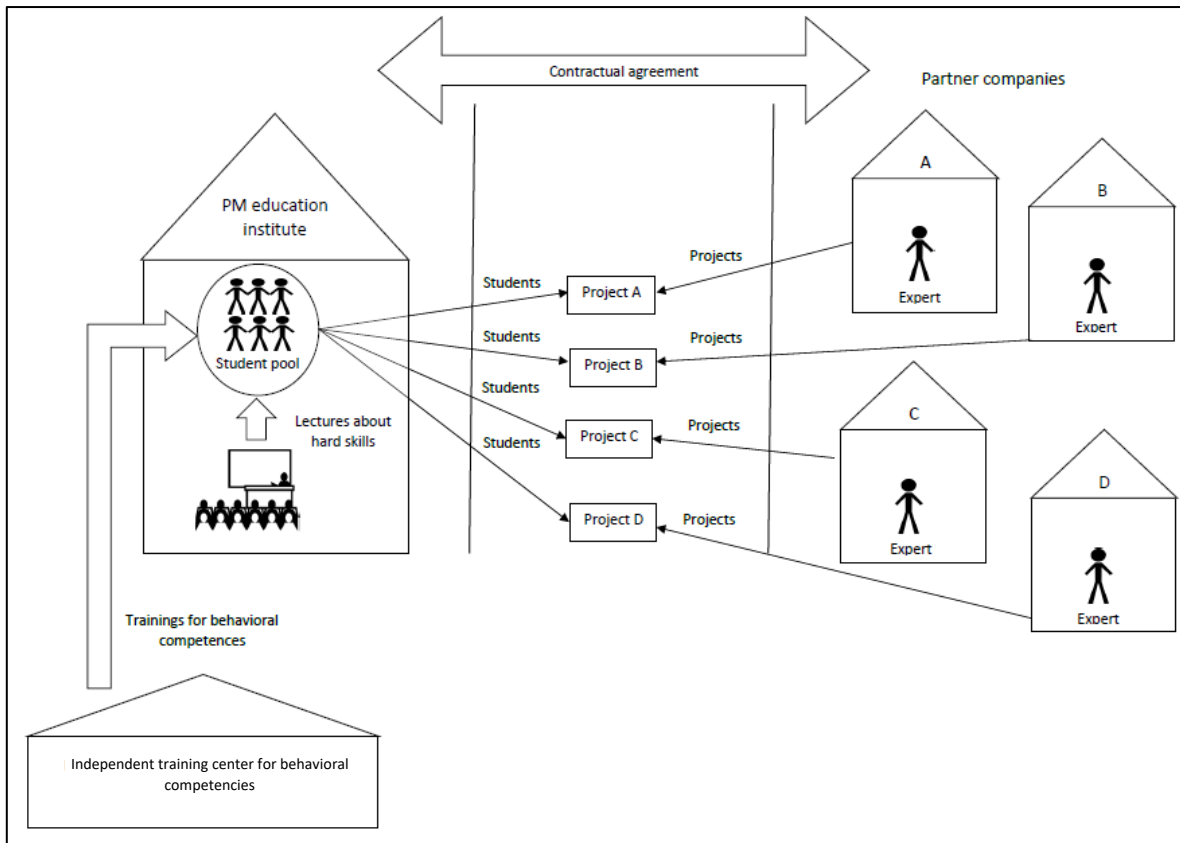
Figure 2: Suggested education model

Image Sources:
Clipart Library. (2016). Lecture *[png file]. Retrieved from http://clipart-library.com/clipart/102322.htm*
Clker.com. (2010). Black Stick Man Clip Art *[png file]. Retrieved from http://www.clker.com/clipart-black-stick-man-*
1.html

3.2.1. Educational part

The responsible for the whole program is an independent non-profit organization which follows the goal to offer the best possible project management education to students and to create a project management identity for the students. This organization teaches students the hard skills and is the coordinator for the administrative tasks. Because the organization is independent, it can fully focus on developing a project management identity and design the lectures as helpful as possible. As a result of this, project management disciplines are no longer fractioned since one institute unites the different parts.

The educational part covers the theses 1 ('Need to make project management an independent discipline') and 3 ('Need to teach project management within an independent, non-profit

organization'). The institute is independent and set up as a non-profit organization and its teaching plan aims to make project management an independent discipline.

3.2.2. Practical part

For the working experience, the organization works together with partner companies which offer the students the possibility to work within some of their projects for a certain amount of time. As they want to ensure that students work in a dynamic working environment, the independent non-profit organization signs contractual agreements with the partner companies to assure some minimum standards of the projects.

This solution is seen to be beneficiary for the independent non-profit organization since specific partner companies can be picked by the organization, the whole project management infrastructure of the partner company can be used and students can work on real projects. The contractual agreement assures that school and partner company agree that students work in projects which are carried out in a participative and decentral way and define how the student is deployed there. Furthermore, it sets out how many students are accepted by the company for a specific time period.

The student will have a personal coordinator working for the non-profit organization and an expert from the company which introduces and supervises him or her. The coordinator and coach are in constant contact, exchanging how the student is doing within the project. The reason for this is to ensure the best support for the student.

The student pool of the institute has the aim of encouraging students who are interested in project management to exchange opinions and experiences about the work experience they made in their working modules.

The practical part covers thesis 2 ('Project management students not only need a theoretical but also a practical education') and 4 ('Projects are optimally carried out in a participative and decentral way'). This means that a part of the students' education is work related and that the projects they are working in are of a participative nature and organized in a decentral way. This is assured due to the fact that the institution only works with selected partner companies which work with this kind of project infrastructure. Additionally, the contractual agreements define what kind of projects students will be working in.

3.2.3. Behavioral part

Regularly during the whole education phase, the students are given seminars about behavioral competencies from an external training center. Firstly, students visit courses which address the issue of soft skills and introduce them to the topic. Another offering is personal coaching for each student since these are beneficial to address and work out the needs and problems of employees (Freibichler & Lemm , 2016, p. 210). In these sessions, the student can reflect on lessons learned in school and at work. Additionally, work related or private issues can be addressed by the students without the institute or employer being noticed.

As Harney and Thomas (2013) claim "the maturity of the students is treated by undergraduate management education as something to be developed by the students himself or herself on his or her own time" (p. 512). This externalization might be tempting to apply since it frees up time and effort for other activities. However, as the importance of soft skills grows and since these are not ensured, it is seen as useful to include this part in project management education. Then soft skills are argued to be the necessary base in order to tackle issues:

> Personal development towards knowing ourselves is a major step towards understanding others and towards learning how to influence both towards solving crucial problems ahead of us. This comprehensive knowledge will enable us to intelligently apply our bodies of project management knowledge successfully (Thomas & Mengel, 2008, p. 311).

When personal development is such a crucial skill, then some lectures about it are argued to have a big impact on the young students.

Anyhow, the assumption of this part is not that it gives the students soft skills, but that it provides them with a sound cornerstone for their personal development and to trigger the examination of one's own personality. Finally, the soft skills have to be obtained by the students themselves.

The training institute is independent and the discussed topics and outcomes are confidential. This aims at motivating the students to be fully honest and participative since their school and employer are not included in this course.

The behavioral part goes hand in hand with the fifth thesis ('Need to include lectures about behavioral competencies in project management education'). The separate and independent training is intended to optimally assist students in their personal development.

3.2.4. Procedure

Figure 3 illustrates how the process of the suggested education model would look like.
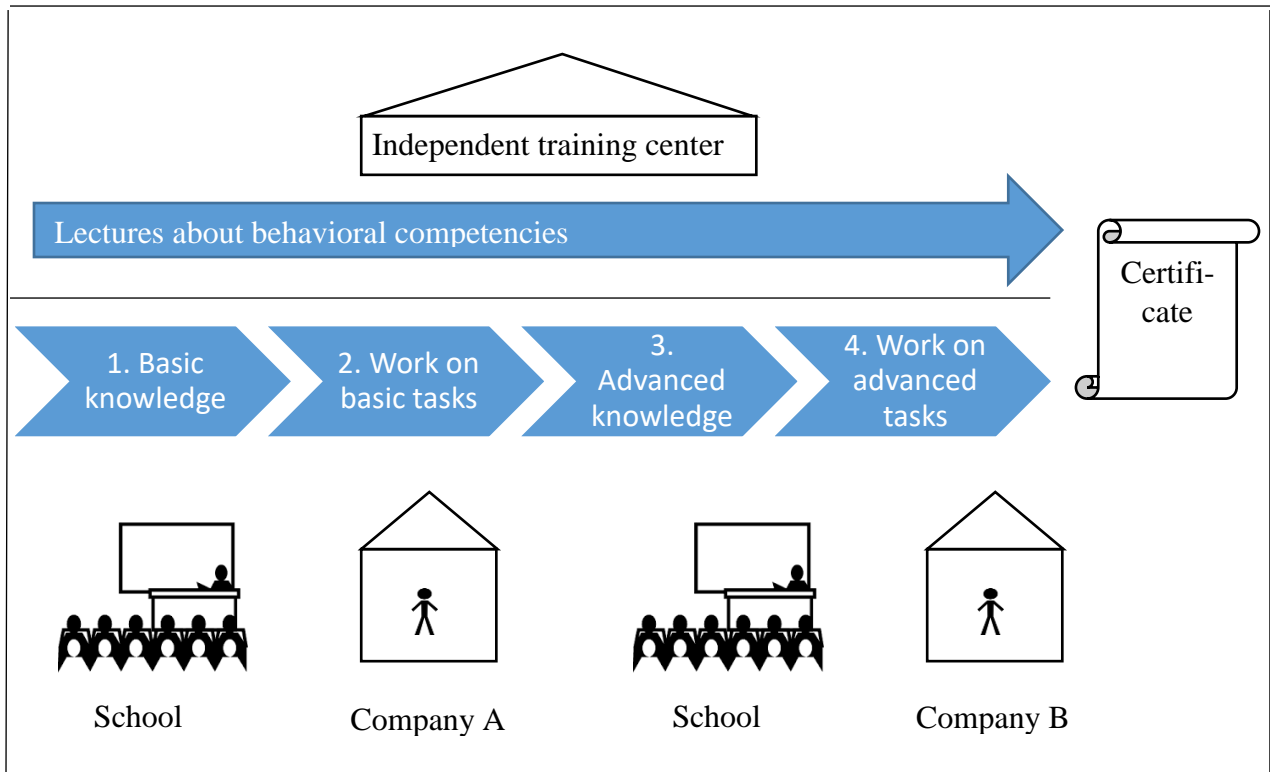
Figure 3: Procedure suggested education model

Image Sources:
Clipart Library. (2016). Lecture *[png file]. Retrieved from http://clipart-library.com/clipart/102322.htm*
Clker.com. (2010). Black Stick Man Clip Art *[png file]. Retrieved from http://www.clker.com/clipart-black-stick-man-1.html*

The education is split into four modules:

- Module 1: The students start with basic classes about project management tools and techniques. They learn what project management is about and what the most important tools are.

- Module 2: Afterwards students work on their first project where they have to do basic tasks. The aim of this first internship is to get familiar with the daily business of project management.

- Module 3: The third module includes classes about more complex project management theory. This is as well the moment when students can exchange their lessons learned and experiences from module 2 and to reflect how they had to adapt the theory in a working environment. The positive effect of a learning environment and the ability to reflect on ones' learnings is confirmed by Thomas and Mengel (2008, p. 478).

- Module 4: In the last module, students work again in another project having more advanced tasks and their own responsibilities.

The procedure includes a rotation between theoretical and practical work in order to help students to immediately apply their theoretical learning and to enable them to reflect on lessons learned of the previous modules.

Every student receives a grade for each theory and working part. At the end of the education, the final grade of the student is the arithmetic mean of the four grades of the modules. Having finished this course, the students receive an official certification as Project Managers.

The lecture about behavioral competencies is held additionally to the different modules in a workshop form and is not graded since they serve as a support for the students' personal development.

3.2.5. Opportunities

Based on the thoughts mentioned in chapter 3, the following opportunities for students and partner companies are identified. The opportunities for the independent training center are not discussed since this is outside of the scope of the thesis.

3.2.5.1. For students

It is assumed that the project combines theoretical and practical work in an effective manner and allows the students to gain work experience with two companies which have a sophisticated project management infrastructure and which carry out their projects in a participative and decentral way. Furthermore, students already receive a salary.

On the educational side, there are in-depth lectures about project management offered by project management experts and students get the sense of a project management culture and identity since the school is independent. Additionally, the students are given personal coaches at work and at school, are supported in their personal development by an independent training center and are able to reflect on their lessons learned because of the rotation system between theoretical and practical modules.

3.2.5.2. For partner companies

For partner companies, the benefit is seen in having a cheap labor force which is well educated and which already has experience in the second working phase. The pool of the school is therefore also an accessible source for talent recruitment after the project management education. Because of the certificate, employers will know that the students did learn the hard skills combined with real project experience and is not only competent in theory but also used to work in projects. Another point to take into consideration is the fact that students are likely to be motivated workers because they actively chose the education project manager and are therefore thought to be highly interested in the topic.

3.2.6. Limitations

Limitations of the models are that details like the duration, salary or the coordination is not further specified and that the model is only offered to business students with a Bachelors degree. A possible problem is the fact that the whole process could take too long for students or that there are not enough partner companies, which fulfill the criteria of the school, which are interested in a collaboration.

Another critical point is the recognition of the certificate. If major companies rather perfer to employ students with an existing global certification, the suggested model would not be of any benefit to the students.

4- Method

Aiming to optimally examine the theses and idea mentioned in the chapter before, a two-sided approach is used. The aim is to analyze the market environment, the profession project management, the project management education and the suggested model from the teaching side, in the form of expert interviews, and from the learning side, in the form of an online survey for business students. With this procedure, the analysis can be made from a holistic perspective and discrepancies between experts and potential future project managers are pointed out. This ensures that the necessary adaptions for project management education can be proposed from the expert and student side and not having a one-sided approach only.

4.1. Expert interview

Five interviews were conducted with the following experts:

- Lucia Nievergelt, Consultant at RESO Partners AG (Zurich) and member of spm, the Swiss Project Management Association.

-Bernhard Kruschitz, Owner of BKI AG (Winterthur), specialized in Hermes 5.

- Markus Mettler, Founder of BrainStore (Biel), innovation expert.

- Sascha Wyss, Program Manager at Syngenta AG (Basel) and President of the PMI Swiss Chapter.

- Nicolas Abbondanza, member of the executive board at SPOL AG (Berne), lecturer at Kalaidos, specialized in IPMA and Hermes 5.

The constellation ensures that the topic can be discussed from different perspectives since the experts work in different branches and places and specialize in different certification and project management standards. All the experts have project management experience of several years and have already lead projects themselves.

Before the meeting, the experts received a briefing without the suggested model which is shown in the Appendix 1. The interview is organized by 16 open guiding questions. The structure is along the topics fourth industrial revolution, project management, project managers and project management education. Afterwards, the suggested idea of this paper

was presented to them and there was an open discussion about the idea itself, possible advantages and disadvantages and implications. The transcripts of the relevant parts of each interview are listed in Appendix 2 to 6.

For the analysis of the expert interview, an approach, that is based on the six-step approach of analyzing interviews which are structured by guiding questions by Mühlfeld, Windolf, Lampert and Krüger (1981, pp. 325-352), was used.

In a first step, the author listened to the answers of the questionees and noted the obvious and clear answers in the briefing of each expert.

Secondly, the important part of the text was transcribed and the statements of the experts were assigned to a category. Furthermore, the notes of the first step were extended.

Thirdly, an inner logic between the statements was established and summarized in an Excel sheet to improve the visibility. This inner logic was summarized in a separate line in Excel in the words of the author as a fourth step.

The fifth step was to inferior the findings from step four with suitable quotations of the experts.

As the last step, the findings were presented in the text of this thesis together with one illustration.

4.2. Survey with potential and current project management students

In order to learn about the opinions of the students, a survey was carried out among 28 business students between the age of 21 and 28 of which 13 are male (46,43%) and 15 female students (53,57%). 12 of these students are currently studying at the ZHAW University of Applied Sciences (42,86%), nine at the Lucerne University of Applied Sciences and Arts (32,14%), six at the Bern University of Applied Sciences (21,43%) and one student's school is unknown (3,57%). All 28 participants are currently within their Bachelor degree.

The survey was created based on the outcome of the expert interviews and consists of 26 questions. The structure is the same as in the expert interviews. For every question where the student had to choose between several options, there were six possible answers in order to

avoid the tendency to the middle of indecisive students. The students were given a verbal and percentage explanation of each possible answer. The questionnaire is listed in Appendix 7.

The open questions of the survey were analogously analyzed as in the expert interview with the difference that the answers were already written and did not have to be transcribed. The second difference is that the answers of the students were not assigned to topics but to key words only since the answers to the open question were much shorter compared to the ones of the experts.

The closed questions were summed up and visualized in pie charts by the online survey tool umfrageonline.ch. The author did not use any further approach for quantitative analysis since the survey is designed to reach conclusive findings with the results generated by the survey tool itself.

The most important choices of the students are described in the text as well as are accentuated in the pie chart (Figures 4 to 7, 9 and 11 to 13).

5- Analysis

This part outlines and analyzes the findings from the expert interview and online survey. It is ordered along the four themes of the questionnaire: fourth industrial revolution, project management, project manager, project management education. The analysis examines the answers with regards to the five theses and the suggested educational model.

In each of these topics, the answers of the experts are presented, followed by the ones of the students and finally compared with each other in a summary and linked with existing research. At the end of this chapter, there is a summary of the findings referable to the fourth industrial revolution, project management, the project manager, project management education and the suggested educational model. As the last point, the five theses are answered.

Since only six out of the 28 students (21,43%) already have some working experience in project management, there are two questions to find out the interest the questionees have in the topic. 19 students (67,86%) answer the question whether they could imagine working in project management one day at least with "Possibly (50-70%)". Almost half of the students (13 answers, 46,43%) see themselves working in project management in the future which is shown in Figure 4. Therefore, the elected students seem to have an interest in the topic.
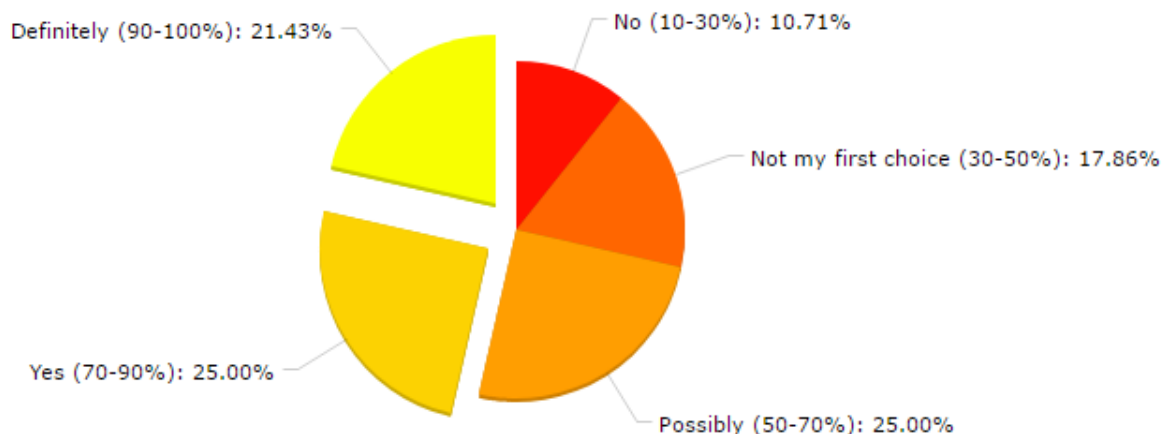
Figure 4: Answers to the questions whether students could imagine working in project management one day

5.1 Fourth industrial revolution

Since it is the theoretical foundation of this paper, the fourth industrial revolution is brought up first in the interviews and the online survey in order to clarify whether the considered parties acknowledge the resulting change in the market environment. In addition to that, the questionees are asked to assess the consequences of the fourth industrial revolution.

5.1.1. Experts

All experts acknowledge the fourth industrial revolution and its impact on society and businesses. Two experts, however, state that technological breakthroughs are not a new phenomenon. Bernhard Kruschitz, for example, comments that "it's obvious that there is a big impact on technology as well as on business and society but that's not a new effect, that's already known and that happens already for 50 or 60 years" (personal communication, March 17, 2017). For project management, all experts see a good development since companies will need much more capable project managers in the future.

Nicolas Abbondanza expresses this the following way:

> Project management will be more and more a success competence for companies. [...]
> For a long time, project management was only an operative topic. [...] And now this
> is a changing moment in the awareness of project management. It means that the C-
> Level more and more agrees that project management is a strategic topic (personal
> communication, March 21, 2017).

Furthermore, it is mentioned there will be an ongoing need for flexibility, collaboration within teams and task force orientation. Markus Mettler additionally points out the firework effect, which means the fourth industrial revolution is "going in all directions and I think as well business models have evolved in many different directions" (personal communication, March 17, 2017).

5.1.2. Students

19 students (67.86%) agree on the view of the experts, seeing a big or even huge impact on society (Figure 5, page 32). The answers of the students regarding the effect on project management can be summarized in four clusters:

1- Autonomy of employees (mentioned eight times)

2- Change of company structure / leadership style (mentioned six times)

3- Increasing need for flexibility (mentioned six times)

4- Decrease in human labor / higher fluctuation (mentioned five times)
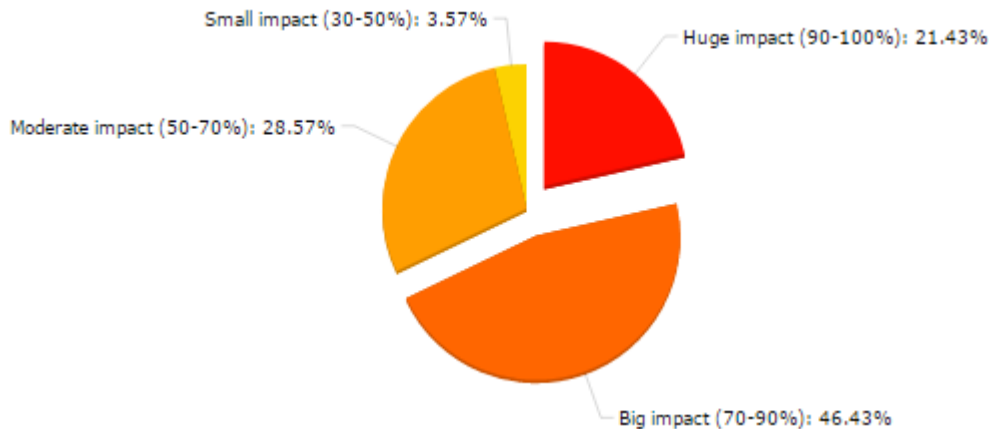
Figure 5: Answers to question 'Could you imagine doing a project management education'?

5.1.3. Summary

To conclude, statements of experts and students are consistent with each other. The fourth industrial revolution especially has an impact on the collaboration of teams as it becomes much more participative and task force oriented. Team members are asked to work more independently and to be highly flexible. Experts mainly focus on the fact that the technological disruptions are not new and on the increasing significance of project management, whereas the students mainly mention the consequences for companies.

These points are convergent with existing research in the INQA study key points number 1 ('Flexibility and Diversity are success factors') and 5 ('Willingness for cooperation is more important than the sole focus on returns').

This goes along with the findings of Torres (2010, p. 2), Schnoll (2011, p. 62) and Schwab (2016, pp. 1-3) in the theory section of this paper in chapter 2.1. which state as well that the role of project management will increase due to the changes which come along with the fourth industrial revolution.

5.2. Project management

Following the fourth industrial revolution, the next chapter of the questionnaires aims at clarifying the opinion of the experts and students about the current outcome of the project. It should assess the project success and determine the factors which make a project successful.

5.2.1. Success rate

This questions aims at understanding how successful projects are at the moment and which numbers are used to measure the success of a project.

5.2.1.1. Experts

Regarding the current success rate of projects, there are mixed opinions among experts.

According to Bernhard Kruschitz, for example, there is a business behind these studies. Then if a study states that a high number of projects fail, a consulting company can promote its solutions in order to improve project success to the client. Two other subjects interviewed for the purpose of the thesis say that project success rates are still too low. All experts agree that project success depends on the viewpoint and especially how it is measured. Summarizing this, Markus Mettler makes the following statement:

> My personal feeling is that if you ask the people involved, they would probably say that 80% of projects are successful. If you ask me and I would analyze the projects, I would probably say that maybe 30% are successful. But again, the question is how do you define successful. I would say for at least 80% of the projects you could have substantially higher impact on project results and on team satisfaction if collaboration would be improved (personal communication, March 17, 2017).

Two experts outline that it is important for projects to fail since this is their nature. This implies that if all the projects were successful, the company would fail to innovate. Nicolas Abbondanza underlines this by saying that "we have unfortunately in Switzerland a no failure culture and this is wrong in project management. You have to fail" (personal communication, March 21, 2017).

5.2.1.2. Students

The answers of the students about the success rate of project management are demonstrated in Figure 6.

The majority of 16 (57.14%) students say that between 50% and 90% of projects are successful which means that they state that at least every second project is a success. Nine (32.14%) think that some projects are successful (30-50%) and only three (10.71%) expect the success rate between 10% and 30%. The extremes of 0-10% and 90-100% are not chosen by any student. There seems to be no thriving opinion in this question. The only definite conclusion which can be drawn is that students have different definitions of project success. They just agree on the fact that the extremes of complete project success or failure can be excluded.

Hardly any project is successful (10-30%): 10.71%

Lots of projects are successful (70-90%): 21.43%

Some projects are successful (30-50%): 32.14%

Several projects are successful (50-70%): 35.71%
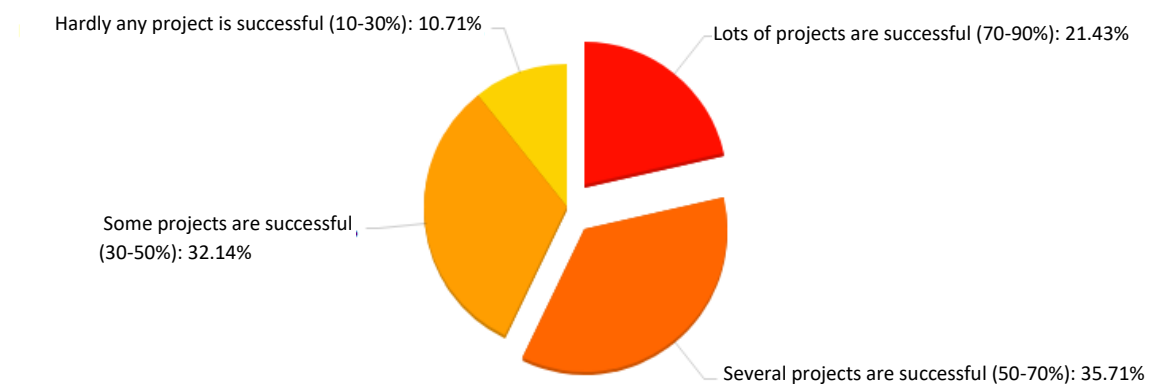
Figure 6: Answers to question 'Are projects successful at the moment according to your experience?'

5.2.1.3 Summary

It turns out to be difficult to exactly define project success and to know how high its rate is. The students rate the current project success higher than most of the experts, but there are varying answers among experts and students. The experts' argument from different viewpoints and therefore the main conclusion to be drawn is that project success seems to be not measurable with a simple success formula. Additionally to that, experts accentuate the importance of failure in project management.

The research of Crawford (2005, p. 14), Ellis (2009, p. 2) and Jacquemont, Maor and Reich (2015) which was used to describe the problem in chapter 1.1. draws a more negative picture

about the situation of project management than the experts and students do. The analysis section relativized these findings and put them into context. As mentioned before, there are many different studies stating different success rates. However, it appears that the results of such studies need to be considered with differentiation.

The INQA study does not mention the success rate of project management due to the fact that the scope of the study is the future of business and not of project management alone.

5.2.2. Success factors

Additionally to the success rate of project, this part seeks to understand how project success is defined and which criteria are used to assess the success of a project.

5.2.2.1. Experts

Generally, the experts agree on the fact that a project is successful if the project goal is met. But it is often not clear what the actual goal is. Most of the experts concur on the point that a project should deliver value for the customer. Sascha Wyss puts that in context with the history of project management:

> I think when project management started as a profession, it was as long that the project was in scope, on budget, on time, it was a success and the more the profession gets mature, the more we actually look at whether the project does deliver value (personal communication, March 20, 2017).

If a project is not successful, the reasons given by the experts are misunderstandings with the client, the existing structure of a company which is too rigid, that decisions are fear driven, that goals are not realistic, that project are discontinued too fast and the fact that useful tools are still not used enough or appropriately.

5.2.2.2. Students

Students answers vary from each other since some of them mention reasons why projects are successful and reasons why they are unsuccessful and other students only focus on the former or the latter. Six students do not give any answer. Subsequently, the findings need to be regarded with a certain degree of prudence.

Clustering the answers, the most important success factor is to deliver the highest possible value to the customer. How to exactly measure this value is not further specified. In the open question about project success factors, the points most often mentioned are that a good result of a project can be explained with the motivation of the employees and the appropriate usage of project management tools. Another point for six students is that a project highly depends on the ability of a project manager. Furthermore, three mention the need and nature of projects to fail. Having a look at unsuccessful projects, the main reason is seen in missing communication, an inadequate hierarchy, high complexity/uncertainty, missing sustainability or a wrong scope.

5.2.2.3. Summary

As project management is not an exact science, project success cannot simply be measured by its efficiency or equivalent. The main question is how to define success and how many projects should fail as part of their nature. The point where experts and students most agree on, is that the customer satisfaction has to be guaranteed and that project management knowledge is crucial for project success. Analogously to the findings of the experts in the previous chapter 5.2.1., some students mention the necessity to fail in project management in this chapter.

When a project is not successful, both parties blame communication problems, an inadequate company structure and problems with the goal definition.

 In the research field, project management success is an often-discussed topic. An early definition comes from Avots (1969) who defined project success to depend on three factors: time, budget, project performance (p. 81). Later Baker, Fisher and Murphy (1983) found that client satisfaction has to be included as a success factor as well (p. 6800). The Project Management Institute PMI mentions in its PMBOK Guide the competing project constraints Scope, Quality, Schedule, Budget, Resources and Risks but specifically states that this list is not just limited to these six points (Project Management Institute [PMI], 2013, p. 6).

Therefore, depending on the context and the teaching material, the list of success factors can vary but experts, students and research analogously have a coinciding perfection of what makes a project successful which is that the goal is met with the planned resources and that

the customer is satisfied with the project outcome at the end of the project. However, this definition is in a general manner and would have to be broken down for the different kind of projects.

The INQA study does not mention the success factors of project management due to the fact that the scope of the study is the future of business and not of project management alone.

5.3. Project manager

After analyzing the requisites for project management, experts and students are asked to describe how the activity of a project manager will look like in the future, what kind of competencies he or she needs and which company is the most supportive for the work as a project manager.

5.3.1. Activities

The emphasis of this section is to examine whether the daily activities of the project manager change in the new market environment. Knowing the future work area of the project manager is seen as the basis to name the competencies which are necessary to carry out these activities.

5.3.1.1. Experts

As project managers face a new market environment, three experts think that someone leading a project should not be just an expert anymore, but a leader: "As a project manager, you need to be a leader and leadership will be more and more important for project management" (Nicolas Abbondanza, personal communication, March 21, 2017). According to the experts, the project manager of the future is highly adaptive, has a good understanding of leading people and a deep technical knowledge. Sascha Wyss explains that change:

> Project management in just 15 years changed a lot and that is something a project manager has to understand: That what he learns today is not something he will be doing in this way in the next 20 to 30 years (personal communication, March 30, 2017).

Yet this statement is just correct for a certain type of projects. There is an exception for technological projects in IT or as Bernhard Kruschitz said that technology projects need "engineers, engineers and engineers" (personal communication, March 17, 2017).

5.3.1.2. Students

The online survey does not contain a specific question for the activities of future project managers for the reason that during the creation of the survey, it was assumed that most of the students do not yet have practical experience and can therefore not know which activities, in particular, would change for them. However, some answers to question 9 ('How do you think that it [fourth industrial revolution] will affect your daily work?) can be considered for this part. Most of the students mainly see the most challenging activities of future project managers to introduce a different leadership style and to manage internal and external complexity as already mentioned in chapter 5.1.2..

5.3.1.3. Summary

Summing up the points made by experts and students, the project managers tasks are about leadership and staying on top of things. This implies that a project manager has to make sure that the project is rapidly adjusted to internal and external changes and to give clear guidance to the team and stakeholders in order to manage the uncertainty of the market.

This is mainly convergent with the key topic number 1 ('Flexibility and Diversity are success factors') in the INQA study. Agreeing on that, Hays (2015) mentions the management of change and the management with growing complexity as two of three main challenges for business leaders in Switzerland, Germany and Austria (p. 16).

The future importance of leadership and the need to manage change is as well mentioned by Pant and Baroudi (2008, p. 125) , Thomas and Mengel (2008, p. 308) and Grabmeier (2015, p. 12). This goes as well hand in hand with the findings of Gemünden and Schoper (2014, p. 10) even though the establishment of virtual teams is not specifically mentioned by the experts. Gray and Ulbrich (2017) even see the activity of a project manager to be an important factor to influence project success (p. 424).

5.3.2. Competencies

Building up on the activities named in chapter 5.3.1., this section is about the necessary competencies which should be developed and the optimal place to obtain them.

5.3.2.1. Experts

Four of the experts state that a project manager needs both social competencies and hard skills. For social competencies, they specify communication skills and a high flexibility and agility to be especially important. They additionally point out the need to like people and to have a cultural understanding. As the experts see project management as no exact science, there are no calculations or processes which could be learned in school in order to know how project management works according to them. To express it in the words of Sascha Wyss, project management "is not an exact science, it is not something a project manager could say 'if you do it perfectly according to PMBOK or whatever then you will always have successful projects', that is just not going to fly" (personal communication, March 20, 2017).

As the only expert, Lucia Nievergelt takes reference to an official model about competencies, mentioning the competence cube of IPMA which outlines the necessary competencies for project managers. However, she relativizes that competencies always depend on the project. Therefore, the different competencies mentioned in the 'competencies cube' of the IPMA are apparently not equally applicable for each project.

As for the place and method to obtain these competencies, all experts mention that soft skills cannot be completely learned out of the book but that some basics skills can be sparked in class and that there are many possible ways to become a successful project manager.

Summing the given descriptions up, the basic tools and techniques of project management should be taught in a school to ensure a basic knowledge of each student. In this stage, it is important to already include some soft skills in order to trigger the personal development. But this will not be enough since soft skills have to be obtained by everyone individually. For Lucia Nievergelt it is hard to learn soft skills since 50% of it comes from personal predisposition. But she claims that there are certain things you can learn like feedback culture.

According to the experts, the main part of social interaction as well as the adequate usage of tools and techniques then have to be learned on the job. However, work and life experience is said to overtake the most important part for the personal development.

5.3.2.2. Students

In accordance with the experts, 24 answers mention as well the importance of a combination of social competencies and hard skills. Separately, eight focus on organizational skills and seven on leadership.

Being asked about the optimal place to learn these competencies, 15 mentions say on the job itself and six reckon that they have to be learned on you own. This majority therefore agrees with the experts that the important competencies are not to be learned in an institution. In comparison to that, 11 mentions are in favor of learning them at school and only in three cases, the further education is seen as the right place to obtain these competencies. Most of the comments go in the direction that one can learn some content in school but that experience is key to obtain them. However, five students mention that an individual needs to have certain characteristics in his personality in order to be a good leader. One students, for example, writes that "if someone is really introvert, it is nearly impossible to change completely and get a good leader".

5.3.2.3. Summary

The main emphasis of experts and students lies on the combination of soft and hard skills. Anyhow, the former are said to be difficult to learn since a big proportion of them comes along with the personal nature of a person.

These findings are congruent with the key topics of the INQA study number 1 ('Flexibility and Diversity are success factors'), number 2 ('Process competence is more important than the focus on results'), number 5 ('Willingness for cooperation is more important than the sole focus on returns') and number 8 ('Focus on social topics (stakeholder-perspective)').

The importance to combine soft and hard skills and that a project manager has to build relationships with the stakeholders are as well key findings of Pant and Baroudi (2008, p. 125). The soft skills mentioned by experts and students meet with the definitions of Thomas and Mengel (2008, p. 308), Bea and Scheurer (2011, p. 427), Grabmeier (2015, p. 12) and

Rezvani et al. (2016, p. 1112). Hysong (2008) additionally outlines the importance of technical skills as a basis for the working activity as a project manager (p. 286).

Regarding the place where students should learn the competencies, the experts foresee the school to teach the basic hard skills. Advanced hard skills and soft skills in general are to be learned on the job and on you own through life experience. The majority of the students agree on that, even though they give a higher importance to the education in school than the experts do. Both do hardly put any emphasis on further education.

This part is not covered by the INQA study since it puts the focus on the key topics for the future of project management and not specifically on the optimal education for project management.

5.3.3. Optimal structure for a project manager
To round off the section 'project manager', the last question of this part seeks for the optimal internal working environment for the project manager in order to enable him or her to perform.

5.3.3.1. Experts

For three of the experts, it is clear that task force orientation with dynamically composed teams and a projectized structure enables a project manager to work more successfully on a task. Bernhard Kruschitz, however, describes that hierarchies have their advantages as well:

> Strict hierarchies have a big advantage in companies because they have a lot of power which you can release for projects. And that is something that is often underestimated. If you have hierarchies, you can really steer and put energy in projects over this hierarchy (personal communication, March 17, 2017).

5.3.3.2. Students

As indicated in Figure 7 on the next page, the biggest part of the students (11 answers, 39,29%) feel that the projectized company is the ideal work environment for project managers. 10 other students (35.71%) speak out for a functional organization. The classical line organization with a strict hierarchy is not chosen by any students.
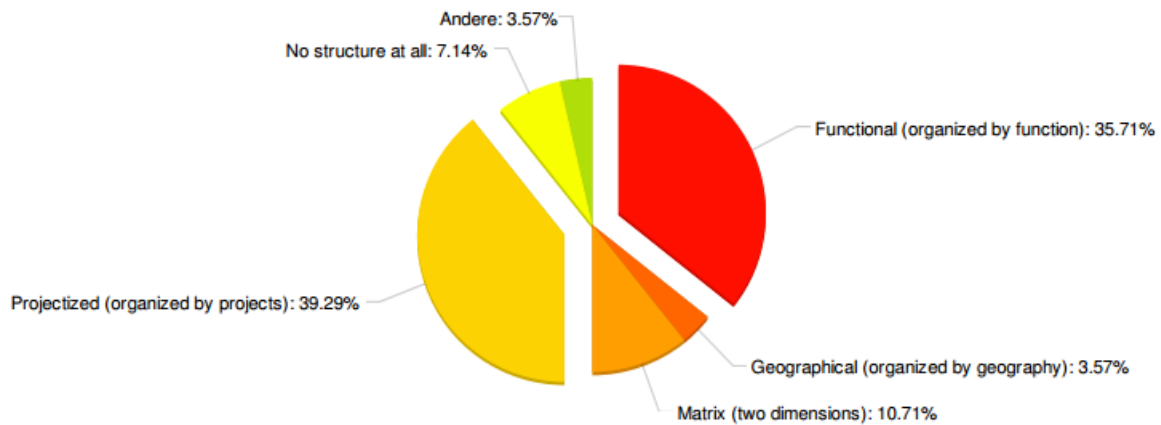
Figure 7: Answers to question 'If you would work as a project manager, how would your company have to be structured / organized (hierarchy) that you could optimally fulfill your job?'

5.3.3.3. Summary

Thus, overall experts and students agree that the classical hierarchy is disused since it does not match with the style project managers have to work in the future. Even though the classical hierarchy comes along with a concentrated power which can set many triggers at the same time and have a strong steering effect, the future of projects is to be found outside of strict hierarchies. There is no absolute consensus about the optimal organization of companies among students, but the experts see a task force oriented projects as the future.

This is convergent with the findings of the INQA interviews resulting in key topic number 4 ('No more need for linear hierarchies').

The research used for thesis 4 ('Projects are optimally carried out in a participative and decentral way', chapter 3.1.) clearly see the future of a project structure in decentralized teams. Those members need to be able to move between hierarchies (Thomas & Mengel, 2008, p. 308). Furthermore, according to Bea and Scheurer (2011), the teams are virtualizing (p. 427) and Grabmeier (2015) adds that the teams in a company will even be changing (p. 12). Thence, these findings of research point into the same direction as the majority of the experts and most of the students' answers do.

5.4. Project management education

As the fourth cornerstone of the questionnaire, current education models and suggested adaptions to them are brought up. Additionally, the extent of project management education and the question whether project management should be an independent discipline are made subject of the discussion.

5.4.1. Existing programs

Firstly, the experts and students are asked what they see as the main differences between the existing project management education programs and where they see differences between the different project management education providers.

5.4.1.1. Experts

On the expert side, there are varying opinions as in which order the project management education may be made. Several orders are described as a possible way with the comment that there exist other possibilities as well. All the experts state that there is no strict procedure to follow if you want to work in project management in the practical life. It is described that people often start working in project management before they visit some theoretic courses. Regarding the existing programs, project management classes at the university are most mentioned by the experts. But one point which is underlined by four experts is that simply having a diploma does not prove the ability to perform of someone in project management. "We have a lot of degrees but we have no information about the ability to act of these people. We can see if he performs, when he works" (Nicolas Abbondanza, personal communication, March 21, 2017).

Between the different education programs, no expert points out any major difference. Three experts agree that the current education models do not ensure that the project management students get the competencies they need for their future job as mentioned in chapter 2.2. Two experts even mention that they met some students with a Master degree in project management who lacked a sound understanding of some basic hard skills. With two other experts the question about whether existing education model ensure that students obtain their competencies is not discussed.

5.4.1.2. Students

25 students (89,29%) already had some project management classes in their degree which ensures that they can answer the following questions based on their own experience. The students are shown different project management education forms and asked whether they already heard about this form. The result is the following:

Awareness:

1- University / Business school	Selected by 23 students
2- Certificate	Selected by 16 students
3- External course (evening classes)	Selected by 12 students
4- Education program of employer	Selected by 11 students
5- Other: Online courses	Selected by two students

The next question of the survey asks the students to rate the existing education models based on how well they prepare them for their future work. The choices of the students are presented in Figure 8. The best rate receives the education program of the employer with 2.24. Since only one student chooses 'Other' in the question before, this option is not considered. The standard deviation of the remaining four points lies between 0.8 and 0.92 which does not significantly influence the result.

	Best possible preparation (90-100%) (1)		Good preparation (70-90%) (2)		Moderate preparation (50-70%) (3)		Not the best preparation (30-50%) (4)		Bad preaparation (10-30%) (5)		Worst possible preparation (0-10%) (6)		I don't know (0)	Ø	±
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ		
Certificate	1x	3.57	9x	32.14	14x	50.00	2x	7.14	1x	3.57	-	-	1x	2.74	0.81
External course (evening classes)	-	-	5x	17.86	12x	42.86	8x	28.57	1x	3.57	-	-	2x	3.19	0.80
University / Business school	2x	7.14	6x	21.43	14x	50.00	5x	17.86	1x	3.57	-	-	-	2.89	0.92
Education programme of employer	4x	14.29	14x	50.00	4x	14.29	3x	10.71	-	-	-	-	3x	2.24	0.88
Other (if you wrote something in...	1x	3.57	-	-	1x	3.57	1x	3.57	-	-	-	-	25x	2.67	1.53

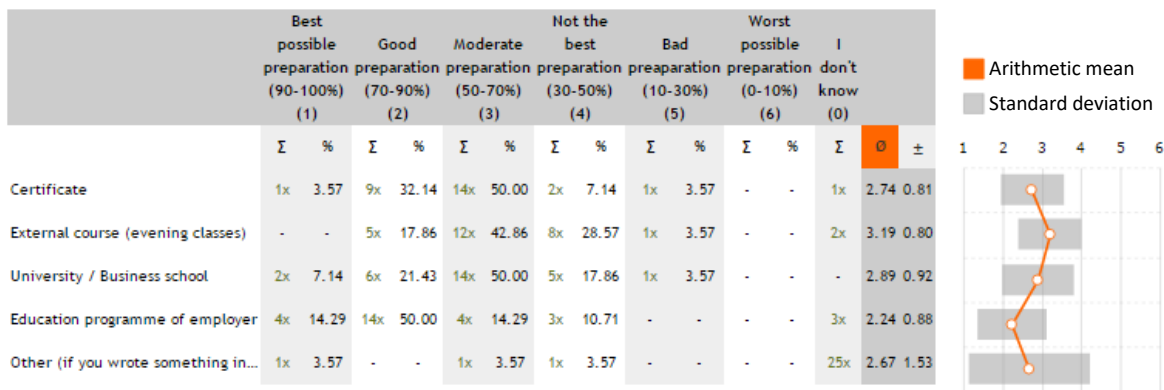Arithmetic mean
Standard deviation

Figure 8: Extent of preparation of different project management education programs

Combining the awareness and the rating of the students, it can be found that even though it is not that well known, an education program of the employer is seen as the best way to prepare someone for this profession.

Additionally, these findings clearly show that external courses in project management are not the favorite mean of education for the business students.

5.4.1.3. Summary

Project management courses at universities are best known by experts and students.

However, no definite statement can be made on the effectiveness of the programs except that no program seems to fully satisfy neither experts nor students. Three experts mention that a degree does not prove the ability to act of a student and the ratings are quite close to each other. To sum up, it seems that the models do not noticeably differ from each other, but none of the educations manages to fully convince the considered parties.

Critics of the current project management education can be found as well in the research of Pant and Baroudi (2008, p. 126), Harney and Thomas (2013, p. 512) and Shelley (2015, p. 485). These papers criticize the same points as the experts did.

The INQA study does not cover this topic since it examines the key topics for the future of businesses and not how existing education programs influence the future of project management.

5.4.2. Recommended changes

As a next step, the aim of the questionnaires for experts and students is to identify the required adaptions of project management education which could help to better prepare emerging project managers.

5.4.2.1. Experts

All the experts speak up for a practical part already within the education. Markus Mettler even suggests that these projects can be really short in the beginning:

> Personally, when I coach people who start with project management or when I work with startups, I am a big fan of very small projects to start with, because that is where you learn most. So instead of giving a three week or a three month assignment, let's start with a one hour assignment and see what happens" (personal communication, March 17, 2017).

In addition to that, two experts wish that a common language for project management should be fostered. Bernhard Kruschitz explains that many useful tools and courses are already offered on the market but the big challenge for a young individual is to get access to these services. As another point, one expert considers project management classes in every discipline as reasonable since not only business students will work on projects.

5.4.2.2. Students

The biggest cluster which is mentioned 16 times is the need to combine the education with work or at least to generate a feeling of reality during the studies so that students treat the cases with the necessary seriousness. The answers include the wish to learn more practical content rather than just the theory. One student, for example, outlines this by making the following statement: "Real case projects are better to learn, as there is a real risk of damage. Knowing that the project is only a 'game' makes people less concentrate and less focused".

Few students even say that a part of the education should be about the project management identity and values and not just its tools and techniques.
Six students mention that they do not have any idea how project management is to be improved.

5.4.2.3. Summary

The recommendation of the experts and of most of the students is to add a practical part to the traditional theory based learning. As a second priority, the emphasize should be given to convey a project management identity to the students.

The need to foster practical learning in project management education is mentioned as well by Thomas and Mengel (2008, p. 308), Harney and Thomas (2013, pp. 513-516), Jugdev and Mathur (2013, p. 635), Grabmeier (2015, p. 12) and Shelley (2015, p. 483) in their research.

Mathur, Jugdev and Fung (2007, p. 471) and Jugdev and Mathur (2013, p. 637) agree on the fact that the project management identity is still undervalued in the sense that schools and companies do not draw sufficient attention to its elaboration.

The INQA study does not recommend changes since it only outlines the result of 400 in-depth interviews about the future of businesses.

5.4.3. Extent of project management education.

As it is clear from the parts above that social skills are crucial for a project manager, the following question is whether project management education should include them in its program or whether the students have to obtain soft skills somewhere else.

5.4.3.1. Experts

As already stated before, all the experts are clear about the fact that soft skills cannot be learned out of a book. But it is suggested by four experts that it makes sense to cover them at least a bit in order to raise awareness and explain the students the general principles about it. However, a project manager must not just have soft skills since "[...] soft skills to a certain degree can be misleading because they can be used to compensate for systemic deficits or for absence of process" (Markus Mettler, personal communication, March 17, 2017). Therefore, a good mix between hard skills and soft skills has to be maintained which is seen to be true by four experts.

However, the experts name as well some soft skills which everyone has to develop in his or her personal way which means that they should not be part of soft skills lectures. The examples given are common sense, ethics, personal behavior, values, empathy and open-mindedness. The answers of the three experts talking about this point differ from each other, but the mentioned competencies are personal ones which deviate from person to person and could therefore not be generalized to uniformly cover them in a course about soft skills. Consequently, these soft skills are recommended to be excluded from soft skills classes.

5.4.3.2. Students

In comparison to that, the answers of the students are not that clear in favor of soft skills. Even though the majority agrees on the importance, the students do not that strongly endorse the need to have soft skills as a part of project management education as the experts do.

Figure 9 on page 48 displays that just half of the students see soft skills as 'Very useful (70-90%)' or as the 'Most important part (90-100%)'. Even though a big majority of students gives a crucial importance to soft skills for a successful project manager in question 13 ('In order to be a successful project manager which competencies do you think you would need?', chapter 5.3.2.2.), the answers stay in line with the ones of question 14 ('How and where

should these competencies be learned? (on your own, in a school, on the job...?)', chapter 5.3.2.2.) where the option to obtain soft skills at work or on your own is mentioned almost twice as much as learning them in school. Bringing these answers together, a majority of students seems to acknowledge the importance of soft skills. Nevertheless, there are varying opinions regarding the way to obtain them.
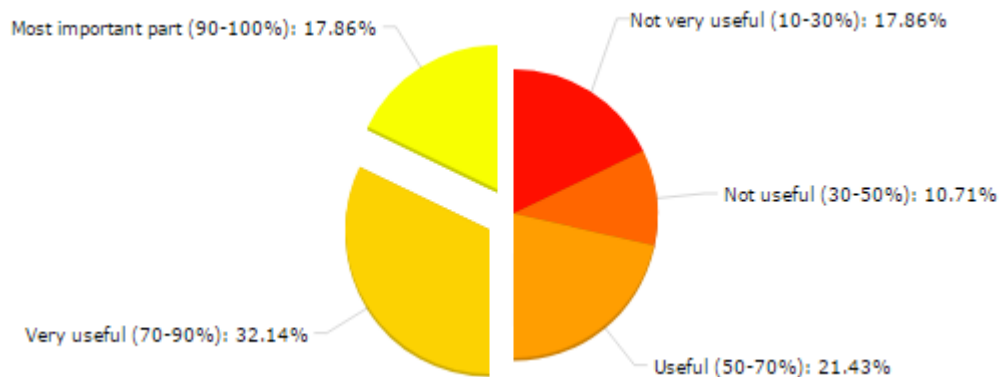
Figure 9: Answers to question whether social skills should be included in project management education

5.4.3.3. Summary

Therefore, most of the students and experts see soft skills as a part which belongs within a project management education, but the extent of it may still has to be further discussed. Additionally, there is not one single opinion on how important theses lectures are.

Mathur, Jugdev and Fung (2007) set a high emphasis on soft skills and even see them as a competitive advantage for companies since a company cannot just buy the soft skills of another company to overtake the competitive advantage because of their intangible nature (p. 471).

The studies by Pant and Baroudi (2008, pp. 125-126), Thomas and Mengel (2008, pp. 308-311), Harney and Thomas (2013, p. 513) and Shelley (2015, p. 486) argue as well in favor of soft skills in project management education.

The INQA study does not provide a suggestion of the extent of project management education because the aim of the study was not to improve project management education.

5.4.4. Project management as a discipline?

The more project management is evolving, the more there is a discussion about whether project management is optimally provided to existing experts in a further education course or whether it should be taught as an independent discipline. Traditionally, a topic experts is allocated to a project which he or she has to lead and learns the most important project management techniques in an evening course. Proponents of the idea that project management should be an independent discipline argue that the traditional approach leads to wrong selections because of the 'Halo effect'. The term was first used by Edward Thorndike in 1920 and stands for the tendency that if someone is good at a certain activity, it is implied that this person must be automatically good at other unrelated activities as well (Hintle, 2012, p. 97). In the area of this topic, this would mean that just because someone is a competent expert, he or she makes a good project manager in this area as well.

5.4.4.1. Experts

This topic is not discussed in detail with two experts. The other three experts explain that project management should be its own discipline and that the skill of project manager is still underestimated. Two experts outline that especially if a project is complex and comprehensive, the leader of this project has to be more a project manager than an expert.

Sascha Wyss makes the following statement regarding this matter:

> Still today there is way too much emphasis on the subject matter and not enough on the quality of a project manager and this usually also the reason why projects fail because it is still underestimated, the skill of project management (personal communication, March 17, 2017).

He adds that "a very good experienced project manager can manage about any kind of project because in the end, the subject matter you can always get from the subject matter expert on the project" (personal communication, March 20, 2017).

Bernhard Kruschitz summarizes the current situation with an illustration (Figure 10) which demonstrates the life cycle of a project manager. In the beginning, a project manager comes from a specific area with expert knowledge but after a certain time the project management skills rise and even surpass the expert skills. He explains that a topic expert might still lead a

small project but that for every bigger project, project management knowledge is of much greater importance.
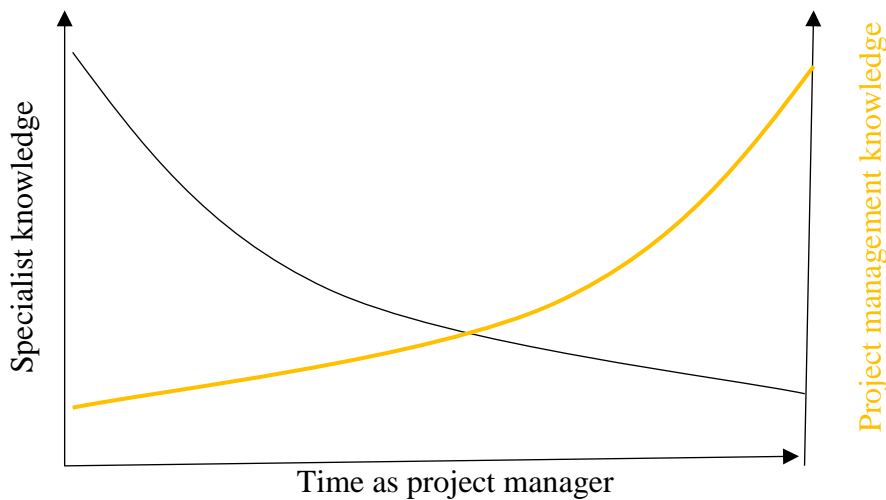
Figure 10: Development skills of a project manager (based on expert interview with Bernhard Kruschitz, March 17, 2017)

Nicolas Abbondanza agrees on the opinions of Sascha Wyss and Bernahrd Kruschitz, by saying that "the project manager cannot only be a topic specialist, he must be more and more a leader" (personal communication, March 21, 2017). Additionally, he describes that "normally the best topic expert has not a lot of soft skills" (personal communication, March 21, 2017). As a result, such a topic expert would not be predestined to be a successful project leader.

But even though it is stated that project management should be its own discipline, the three experts make it clear that every project manager has to be at least a generalist in the field where he or she is working in. If a project manager lacks general knowledge about the topic, he or she is not able to lead a project successfully. "If you are a project manager and if you have no idea about the subject you are managing, then you are lost" (Bernhard Kruschitz, personal communication, March 17, 2017).

Thus, there is a certain knowledge about the topic which is expected from future project managers to bring as a prerequisite. However, the main emphasis should be on the project management function.

5.4.4.2. Students

The greater number of students agree on that but the option of project management as an independent discipline was only chosen by 11 students (39.29%), followed by 'A project manager should be an expert who had evening classes in project management' (six students, 21.43%) and Project management should only be learned within a company' (five students, 17.86%). The analysis of the answers is shown in Figure 11. As already found in chapter 5.4.1.2., evening classes for students without experience is given the lowest importance. The education programs of employers are the best-rated option of the existing education programs. However, they seem to lose importance when they are compared with the possible independence of project management and the option of teaching experts in evening classes.
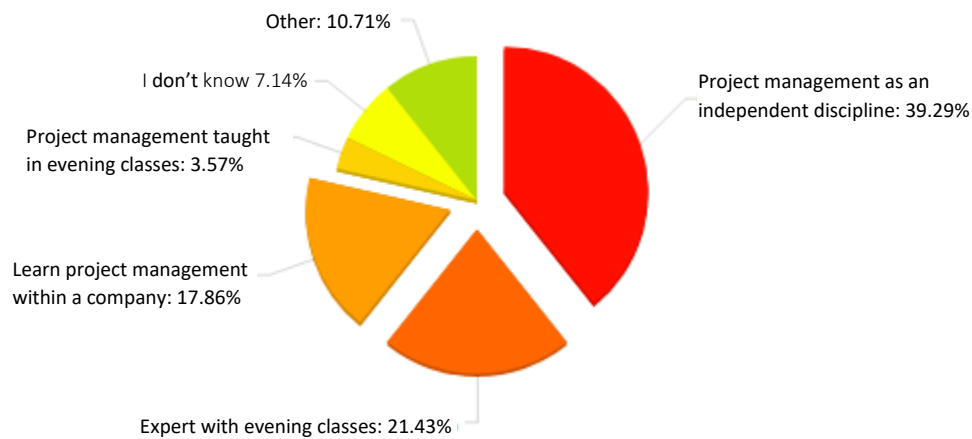
Figure 11: Answers to question where project management should be learned

5.4.4.3. Summary

The majority of experts and students acknowledge the increasing importance of project management and that project management should be an independent discipline. A bulk of them mentions as well that the skill of a project manager is still underestimated. Nonetheless, there are still discrepancies on how independent project management as a discipline should be. The reasonable level of independence of project management seems to strongly depend on the different sectors as they often ask for a different type of project manager.

In accordance with the findings of this part of the analysis, Bea and Scheurer (2011) suggest using project management as a leading conception (p. 427) and Gemünden and Schoper

(2014) even go one step further, claiming that not only organizations but also societies start being organized in a project structure (p. 8). The need to make project management an independent discipline is as well expressed by Wang (2002, pp. 6-8), Kendra and Taplin (2004, p. 30) and Pant and Baroudi (2008, p. 126). Mathur, Jugdev and Fung (2007, p. 471) and Jugdev and Mathur (2013, p. 637) agree on the claim that the project management identity is still undervalued.

The INQA study does not provide a suggestion on whether project management should be independent or not since it examines the future of business as a whole and not just for project management.

5.5. Suggested education model

5.5.1. Suggested model for project management education - Experts

Since the discussion with the experts is open in order to talk about the points they mentioned beforehand, they move into different directions and are not bound to prepared questions. Overall, the first impression of the experts about the model is that it is interesting but every expert names certain things which could become a problem or would have to be improved. The feedback is split into three sections: Partner companies, students, training center.

5.5.1.1. Partner companies

According to Lucia Nievergelt, the model solves the problem that students which come from a business school often do not really have work experience but they are already generating a lot of costs for the company. The point that companies would be interested in such an approach since they have cheap and qualified labor is made as well by Bernhard Kruschitz. And Sascha Wyss points out that it tackles the existing problem that students are not always ready to work after their studies which this model would prevent.

On the opposite, the main problem mentioned by two experts is that it is time-consuming to find companies which fit the profile. And Sascha Wyss claims that those might not be interested since they have their own pools or want to work internationally. He points out that the suggested model could be interesting for small and mid-sized enterprises but those might not be interesting for students:

[...] the question is when someone has a Bachelor degree and even does such a project management education institute, would these people then want to go to a KMU? Most likely they want to go to one of the big players (personal communication, March 20, 2017).

He further explains that a program like this does not make sense after a Bachelors degree. It would be better to offer it as a kind of apprenticeship for young people who want to choose the career path 'project manager' or to offer it after an apprenticeship.

Bernhard Kruschitz thinks that confidentiality could be endangered for partner companies and that the institute would maybe not manage to get the necessary volume of partner companies and projects. Nicolas Abbondanza outlines the importance of the trust which a school needs to establish among the participating companies. As a solution, the education institute "must assure to the project owner that the organization takes the responsibility of leading and supporting the trainee project manager" (personal communication, March 21, 2017).

An additional adaption is suggested by Markus Mettler: "I see very little self-organization in it, I see very little independence and I see very little opening of enterprise structures silos in it. I would just like to break these walls. There are far too many" (personal communication, March 17, 2017). His idea is to enable not only students but also companies to team up together and to use the synergies which such an institute could provide.

However, he agrees on the independence, saying "the easiest way to do it is just by starting your own school because I don't think it is compatible with today's schools" (personal communication, March 17, 2017).

5.5.1.2. Students

All the experts see the benefit for a student not to finish an education without any working experience. Additionally, Nicolas Abbondanza mentions the ability to act which the students could improve within this program and the experts in general thought that students would like a program like this. Lucia Nievergelt adds that the rotation between work and school is good because this would benefit the reflection process of the students.

However, Markus Mettler classifies the idea of a students' exchange as too classic and that students are not involved enough and that it lacks dynamics: "I personally also believe that learning impact for students is very high on a topic area [...] but unfortunately I also strongly believe that you will learn almost nothing about serious project management" (personal communication, March 17, 2017).

5.5.1.3. Training center

This point is most willingly accepted by all the experts since soft skills are of such a high importance in this working area. Sascha Wyss, for example, claims that these skills are especially needed in change management: "And from that point of view, I would absolutely agree that this should be included in which form ever but in a project management education these things belong" (personal communication, March 20, 2017).

But Bernhard Kruschitz and Nicolas Abbondanza highlight the importance of the institute to be independent since this is seen as the only way to ensure that its potential is used.

As a slight adaption, Markus Mettler suggests offering the service of the training center not only to the students but also to the student faculty and the customers.

5.5.2. Suggested model for project management education – Students
Other than in the expert interviews, the online survey does not allow to align the conversation to the students' answers. Therefore, the questions of the online survey are created on the basis of the answers of the expert interviews. In the first three section ('Demand') the interested of the students in such a program is examined. Secondly, the students share their thoughts about the advantages and disadvantages of the program. Finally, they assess the different parts of the program.

5.5.2.1. Demand

As assumed by most of the experts, the students are interested in the suggested program: 21 students (75%) choose an answer between 'A bit interested (50-70%)' and 'Very interested (90-100%)' which can be seen in Figure 12 on the next page.

All students answer that this program would be at least a 'Sufficient preparation (50-70%)' for their future activity as a project manager (Figure 13, page 55).

Taking these answers into consideration, the idea of the model proves popular among the attendees of the survey. Then despite the fact that one quarter (seven students) are 'Not that much interested (30-50%)' or even 'Not interested (10-30%)' in the program, they still see it as at least a 'Sufficient preparation (50-70%)' for a task as a project manager.
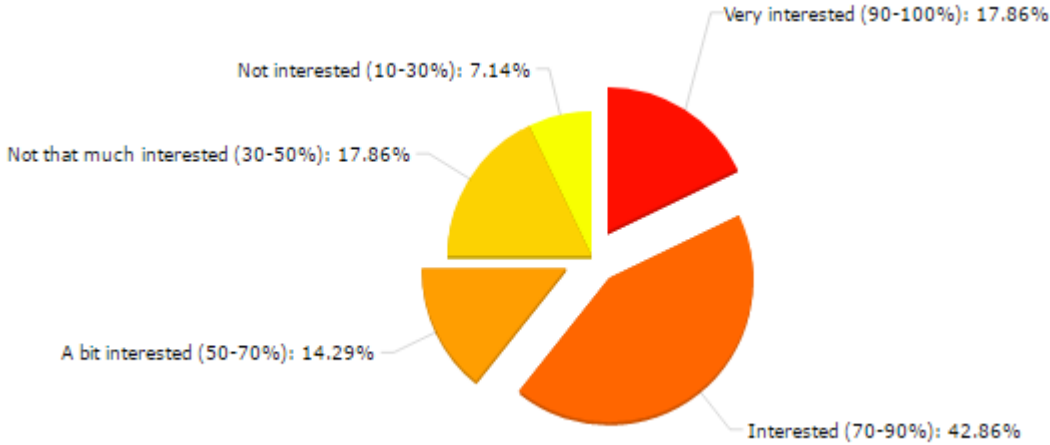
Figure 12: Interest of students in suggested model

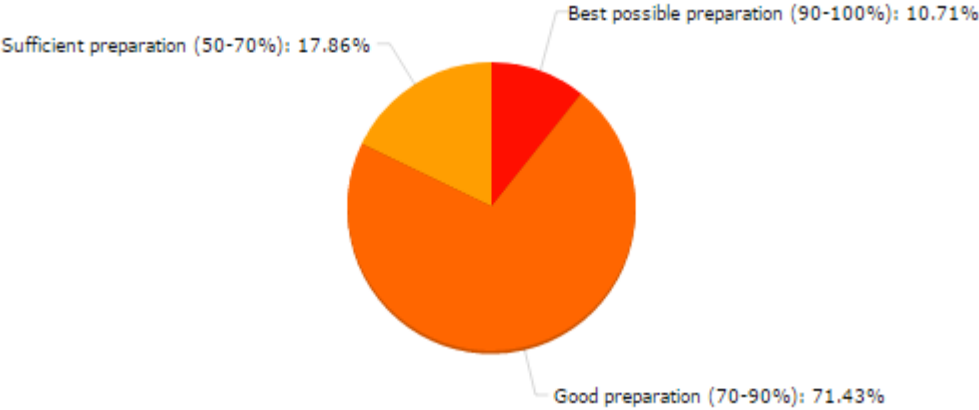*Figure 13: Answers to question how well the suggested model would prepare the students for their future work*

5.5.2.2. Advantages

Analog to the prediction of the experts, the students conceive the main benefit of this program to be the improvement of their skills which is stated 12 times. Additionally, it is mentioned that this program includes practical experience (seven mentions) and would increase career

opportunities (five mentions) with the two employers which the students worked for and on the job market in general. The certificate is only mentioned once and four participants do not give an answer.

5.5.2.3. Disadvantages

Going hand in hand with the statements of the experts, students opinion the program as potentially too long (10 mentions) and note that it might be hard to find enough partner companies (two mentions). As a significant number of nine students (32.14%) do either not detect any drawbacks or do not give an answer.

5.5.2.4. Different parts of the program

The uniformly structured survey allows a specific analysis of the utility and importance of the different aspects of the suggested education model which is shown in Figure 14 underneath.

	1 (1)		2 (2)		3 (3)		4 (4)		5 (5)		6 (6)		Ø	±	I
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%			
Independence of institute	-	-	2x	7.14	6x	21.43	12x	42.86	5x	17.86	3x	10.71	4.04	1.07	55%
Mix of theoretical and prac…	-	-	-	-	1x	3.57	3x	10.71	8x	28.57	16x	57.14	5.39	0.83	89%
Projects are carried out in …	-	-	-	-	1x	3.57	9x	32.14	15x	53.57	3x	10.71	4.71	0.71	68%
Lectures about behavioral…	1x	3.57	1x	3.57	5x	17.86	7x	25.00	7x	25.00	7x	25.00	4.39	1.34	63%
Possibility to work for two c..	-	-	-	-	-	-	6x	21.43	15x	53.57	7x	25.00	5.04	0.69	76%
Salary for the working mod…	-	-	2x	7.14	6x	21.43	12x	42.86	4x	14.29	4x	14.29	4.07	1.12	55%
Selected partner companie..	-	-	-	-	-	-	12x	42.86	10x	35.71	6x	21.43	4.79	0.79	65%
-	8x	100.00	-	-	-	-	-	-	-	-	-	-	1.00	0.00	0%
?	-	-	-	-	1x	100.00	-	-	-	-	-	-	3.00	0.00	67%
Consulting companies, IT-…	-	-	-	-	-	-	-	-	1x	100.00	-	-	5.00	0.00	67%
i dont kow	-	-	-	-	-	-	1x	100.00	-	-	-	-	4.00	0.00	67%
Missing question	1x	100.00	-	-	-	-	-	-	-	-	-	-	1.00	0.00	0%

Legend: ■ Arithmetic Mean ▨ Standard Deviation ■ Weight (%)
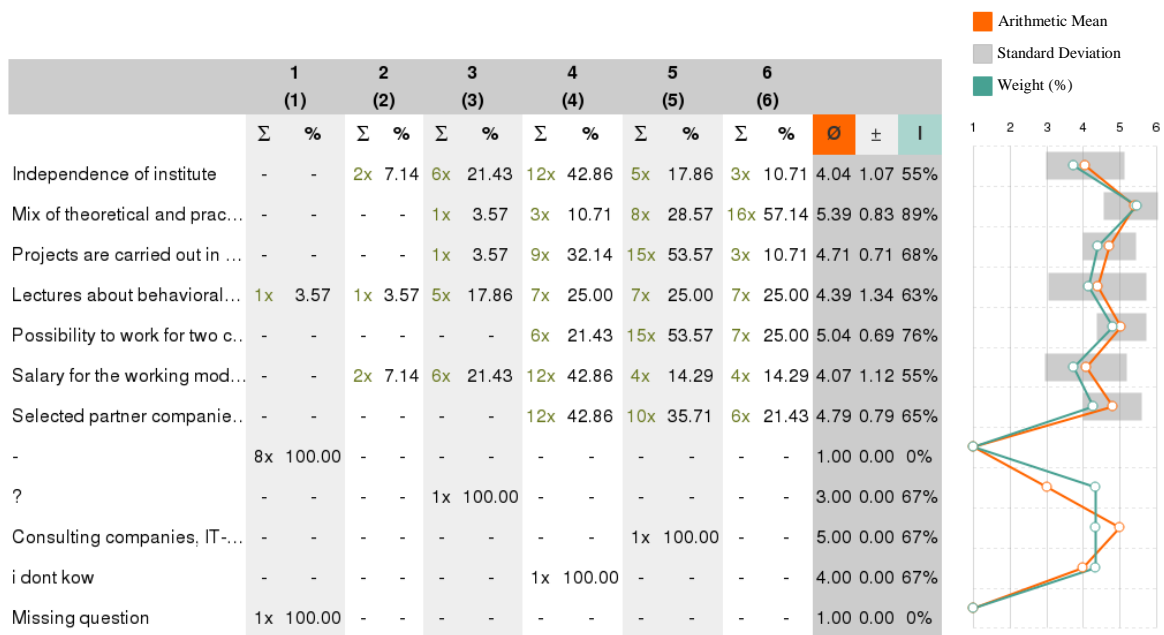
Figure 14: Rate and importance of the different parts of the suggested education model

The sections '-', '?', 'I dont kow' and 'missing question' are due to an error in the survey since the students could not finish the survey without filling out this blank field and can therefore be ignored. The grade 1 means that the student does not like this part at all and

grade 6 means that the student likes this part a lot. The importance options are '- -' (0%), '-' (33%), '+' (67%) and '++' (100%).

The weighted findings are shown in Table 1 underneath.

In order to receive the weighted grade, the grade is multiplied by the weight students give to it. The higher the result, the better the option performs in the ranking.

The relating thesis to each characteristic is shown in brackets.

Part	Grade	Weight (decimal)	Weighted Grade	Rank
Independence of institute (Thesis 3)	4.04	0.55	2.222	7
Mix of theoretical and practical education (ability to reflect) (Thesis 2)	5.39	0.89	4.7971	1
Projects are carried out in a decentral and participative way (Thesis 4)	4.71	0.68	3.2028	3
Lectures about behavioral competencies (soft skills) (Thesis 5)	4.39	0.63	2.7657	5
Possibility to work for two companies (work experience) (Thesis 2)	5.04	0.76	3.8304	2
Salary for the working modules (no thesis)	4.07	0.55	2.2385	6
Selected partner companies (ensured minimum standard) (Thesis 4)	4.79	0.65	3.1135	4
Consulting companies, IT companies (no thesis)	5	0.67	3.35	Not included since just mentioned by one person (distortion)

Table 1: Weighted rank of different parts of suggested education model

The mix of theoretical and practical knowledge is clearly the most important characteristic, having the highest grade of 5.39 out of 6 and the highest weight of 89%. This is consistent with the answers from question 19 ('Which adaptions do you suggest on the educational side

in order to improve project management education?', chapter 5.4.2.2.) and 23 ('What are your personal benefits of such a program?', chapter 5.4.6.2.).

This advantage of work experience is confirmed with the option 'Possibility to work for two companies' being ranked in the second place.

Worth mentioning is that students seem to give a high emphasis on how project are carried out. They do not mention this point earlier in the advantages section (Question 23, 'What are your personal benefits of such a program?', chapter 5.4.6.2.) of the suggested model.

The same applies for the benefit of being able to work for selected partner companies with an ensured minimal standard which is in the fourth place of the ranking.

Another important point is that the part 'Lectures about behavioral competencies (soft skills)' is ranked surprisingly low compared to the answers of question 20 ('What are your personal drawbacks of such a program?', chapter 5.4.3.2.) in which 50% of the students stated lectures of soft skills as 'Very useful (70-90%)' or even as the 'Most important part (90-100%)'. This confirms the assumption that soft skills are an important part of project management education, but students do not prioritize it for the education.

The salary and the independence of the institute are seen as the least important part of the new education program.

The importance of the independence of the institute is surprisingly low compared to question 21 (Should project management be an independent discipline, chapter 5.4.4.2.) in which 11 students (39,29%) reckon that project management should be an independent discipline.

5.6. Summary of the Analysis

This part sums up the findings from chapter 5 and is used as the base of the discussion and conclusion in chapter 6.

5.6.1. Fourth industrial revolution

The fourth industrial revolution is analyzed in chapter 5.1 ('Fourth industrial revolution').

The existence of a more dynamic and complex market environment which has an impact on the way business is carried out is acknowledged by experts, students and research. However, up to this point, there is no unique definition of the fourth industrial revolution since the experts explain that the root of the industrial revolution dates back more than suggested by research. Anyhow, it is seen that there is a discretion to act in the current situation. The main points mentioned are the key role of successful communication within companies, the fact that the relationship with employees is about to change which means that traditional structures have to be redesigned and that the autonomy and flexibility of employees will increase. Furthermore, project management is believed to benefit from the development since it is said to gain management attention and to become a vital success factor for the company.

5.6.2. Project management

The future of project management is outlined in chapter 5.2.1 and ('Success rate'), 5.2.2 ('Success factors').

There seems to be no agreement on the exact appropriate measurement of the success of project management among experts, students and research. Studies are said to not project the whole picture and the importance to fail is seen as a viable step in the learning process of a project manager. Therefore, it might be found that it is not the nature of project management to be measured or valued within a tool or to be meaningfully represented in a number.

Common ground is found by experts, students and research that the main value of project management is to deliver value to the customer and this might then be the main goal of any project. However, no suggestion is given about how customer satisfaction should be quantified in order to allow a representative measurement. Students further mention the

motivation of the employees, the appropriate use of project management tools and the ability of the project manager to be contributing success factors for projects.

Talking about the causes of projects failure, the participants and research have a clearer view. The experts mention six reasons for project failure. Firstly, misunderstandings with the client are an occurrence which can be often observed and lead to a not optimal project outcome. Secondly, the structure of a company often does not allow a project to be carried out in the best suitable way. Thirdly, the existing tools for project management are seen as very helpful, but in unsuccessful projects, they are not appropriately used. Two other issues are that decisions are said to be often fear-driven and that projects are said to be discontinued too fast. Finally, the goal setting is blamed for not being realistic. Students agree on the communication problems and the incorrect goal definition but additionally claim that an inaccurate company structure can lead to project failure as well.

5.6.3 Project manager

The optimal future of a project manager is looked at in chapter 5.3.1 ('Competencies') and 5.3.2. ('Optimal structure for a project manager').

Dealing with a new extent of uncertainty in the market, a 'modern' project manager's major task is named to be a leader which can guide his or her team through this fast-paced environment. This leader should be highly adaptive and have a good understanding of diversity, combined with a deep technical knowledge in project management. As an exception to this, project demanding an extraordinary technical knowledge need to be led by engineers.

Generally spoken, a project manager optimally possesses both strong social and hard skills including the following competencies:

- Communication skills
- Flexibility
- Empathy for people
- Cultural understanding
- Leadership skills
- Project management knowledge
- Organizational skills

But even the best project manager is not seen as proficient to deliver a good project result if he or she is forced to work in the wrong hierarchy. With one exception, experts, students and research dismiss strict hierarchies and speak out for either a task force/projectized or a functional company structure.

5.6.4. Project management education

The analysis of the current education models is done in chapter 5.4.1. ('Existing programs') and 5.4.2 ('Recommended changes').

The present education of a project manager is said to not prepare students in the best way for their future activity according to experts and research. The difference between the current programs is not given importance. It is further mentioned that the obtainment of a diploma does not necessarily prove the ability to act of a project manager. Students select employer programs as their favorite program out of a given list, but many mention in the open questions that they do not know the programs well.

However, experts, students and research wish for a more practical orientation in the education of project management. By practical work, it is not meant to solve more case studies, but to participate in some real projects. Additionally, experts mention that they miss a common language in project management and some students would like to learn more about the identity and values of project management.

The question regarding the extent of project management (chapter 5.4.3.) and whether it should be treated as an individual discipline (chapter 5.4.4.) are analyzed in the following part 5.5.5..

5.6.5. Suggested model

On the one hand, Experts and students see the suggested program as a valid alternative to the existing education offers. On the other hand, both of them mention some doubts about the timing and extent of the program. The main point which the project management institute would need to tackle is that it needs to ensure that partner companies have the sufficient incentives in participating in such a program.

5.6.6. Theses

Regarding the theses of this thesis the following conclusions are drawn:

5.6.6.1. Thesis 1

<u>Need to make project management an independent discipline</u>

This thesis is directly analyzed in chapter 5.4.4. ('Project management as a discipline?') as well as chapter 5.5.1. ('Suggested model for project management education – Experts') and chapter 5.5.2. ('Suggested model for project management education – Students').

This thesis can just be partially approved. Even though the importance and professionalization of project management is higher than it used to be and will continue to grow, there are still certain sectors where projects need to be led by experts in the future. Subsequently, highly specialized projects where a significant understanding of a certain subject matter which has to be specifically obtained, is presumed have to be excluded from this thesis. An often-used example in the interviews and online survey is the IT sector.

For any other project, the thesis is confirmed by experts and the majority of the students with the condition that the project manager needs a certain understanding of the project he or she is managing.

5.6.6.2. Thesis 2

<u>Project management students not only need a theoretical but also a practical education</u>

The analysis of the second thesis is mentioned in chapter 5.4.2. ('Recommended changes'), chapter 5.5.1. ('Suggested model for project management education – Experts') and chapter 5.5.2. ('Suggested model for project management education – Students').

This thesis is fully approved by experts and students. Important points to keep in mind are the necessity to have a theoretical knowledge as a basis and that a good mix between the two is applied. It is found that it makes more sense to actively combine theoretical knowledge and practical work instead of finishing a theoretical education followed by working on a project for the first time.

5.6.6.3. Thesis 3

<u>Need to teach project management within an independent, non-profit organization</u>

This thesis is analyzed in chapter 5.5.1. ('Suggested model for project management education – Experts') and chapter 5.5.2. ('Suggested model for project management education – Students').

Neither experts nor students see the identity of project management as a discipline endangered if it is taught at an existing education institute or a company. These education forms, in fact, have an existing infrastructure which is helpful for the education process. Additionally, an independent institute can lack trust or confidentiality. Only one expert reckons that such an institute should be done independently since it does not comply with the current school system.

Students grade the independence of the institute with 4.04 out of 6 which is positive but only weighted with 55% which results – together with the salary – in the lowest importance of all the parts of the suggested program (Table 1, p. 64).

To summarize, according to experts and business students, project management can be taught appropriately as a discipline outside of an independent, non-profit organization. But there may be the problem that an existing school would not be able to implement the suggested program.

This thesis cannot be approved since the professionalism and identity of project management is ensured by the existing project management providers. However, an institute may have to be independent when it wants to implement an education program like the suggested one since existing education providers would may face conflicts of interest with their existing partner companies. The non-profit part of the thesis can be eliminated since there is no sign of an expert or student that this would make a difference worth mentioning.

5.6.6.4. Thesis 4

<u>Already during the learning process, projects are optimally carried out in a participative and decentral way</u>

The analysis of this thesis takes place in chapter 5.3.3. ('Optimal structure for a project manager'), chapter 5.5.1. ('Suggested model for project management education – Experts') and chapter 5.5.2. ('Suggested model for project management education – Students').

Experts agree on this point but point out that the suggested model might not ensure this since the education institute would not have a direct control on how the projects of the partner company are carried out in reality and whether the students would be sufficiently involved.

Students find this part the third most important out of seven of the suggested program and set a high emphasis on it. Subsequently, there is an interest of students to work from day one in projects which are participative and hierarchically decentralized.

Therefore, the thesis can be approved. However, the suggested approach in the suggested education model is seen to have the potential for improvements. The most important ones are to ensure sufficient incentives for partner companies, the correct timing and the appropriate scope of the program.

5.6.6.5. Thesis 5

<u>Need to include lectures about behavioral competencies in project management education</u>

The last thesis is mentioned in chapter 5.3.2. ('Competencies') and chapter 5.4.2. ('Recommended Changes') and analyzed in chapter 5.4.3. ('Extent of project management education'), chapter 5.5.1. ('Suggested model for project management education – Experts') and chapter 5.5.2. ('Suggested model for project management education – Students').

Similarly to research, experts give soft skills a significant and comprehensive importance. Students agree on that soft skills are important but are not that clearly in favor of promoting them in project management education as experts are.

For the existing education model, they rate the lectures with 4.39 out of 6 (Table 1, p. 64) which is positive but only weighted it with 63%. Subsequently, the lectures are on rank 5 out of 7.

Therefore, the thesis can be accepted with the condition that soft skills should be a part of project management education but that these do not compensate for lacking hard skills. Thus, a valid mix between soft and hard skills is seen as optimal.

Regarding the suggested education model, the independent training institute provides a useful solution since it is an addition to the four modules and not a main part of the education.

6- Discussion and conclusion

The goal of this part is to combine all the previous parts and to come to a conclusion. It should further answer the research question, show how the suggested model is recommended to be updated in order to align it with the findings of the analysis, to mention the limitations of the paper and to give an outlook for future research.

6.1. Answer to research question

The aim of this paper is to examine the research question 'How does project management education have to be adapted in order to enable future project managers to cope with the market requirements in the fourth industrial revolution?' as well as to identify the competencies a project manager needs and where he or she obtains them in the best way. Furthermore, it examines how far the responsibility of project management education goes. Lastly, a suggestion is made how a project management model which takes the characteristics of the new market environment into consideration could look like.

The Problem section in chapter 1.1. outlined that project management is argued to have a success rate which is too low and has to be adopted. The low success rate is explained by new market dynamics which create more uncertainty and complexity. With the current education models, project management students are said to not be optimally prepared to cope with this environment since the hard skills are emphasized too much. The research used in this paper claims that there is a need for more soft skills in project management education. However, these soft skills cannot be acquired by teaching in a content and rules-based manner (Shelley, 2015, p. 484). Instead, students should be able to reflect their own skills (Córdoba & Piki, 2012, p. 83) in a group based learning environment (Córdoba & Piki, 2012, p. 84) with the experience of applying knowledge instead of just studying the theory (Shelley, 2015, p. 478).

The new market environment which the research is mentioning above is often called the fourth industrial revolution and described with the term 'VUCA' which stands for Volatile, Uncertain, Complex and Ambiguous (Torres, 2010, p. 2). Realizing the impact of the new market on leadership, 400 in-depth interviews were conducted by INQA (Initiative Neue

Qualität der Arbeit [INQA], 2014) in order to work out the ten key topics of leadership for businesses in the future. These points were outlined in chapter 2.

In pursuance of breaking the findings of the INQA study (Initiative Neue Qualität der Arbeit [INQA], 2014, pp. 6-11) down to project management, the following five theses were formulated in chapter 3.1.:

1. Need to make project management an independent discipline
2. Project management students not only need a theoretical but also a practical education
3. Need to teach project management within an independent, non-profit organization.
4. Projects are optimally carried out in a participative and decentral way.
5. Need to include lectures about behavioral competencies in project management education.

Based on these five theses, a suggestion of an alternative education model for future project managers was compiled in chapter 3.2.. This model includes an educational, a practical and a behavioral part. Furthermore, the procedure of the education, as well as opportunities and limitations from the viewpoint of the author, were described.

 The theses and the suggested education model were looked over in a two-sided approach. Firstly, the 'teaching side' was asked to take up their position in the form of five expert interviews. Secondly, the 'learning side' was asked about their opinion in an online survey with 28 students from three different business schools.

In chapter 5.1., the majority of experts and students agreed with research used in this paper that project management is highly affected by the fourth industrial revolution even though it was mentioned that this is not a new phenomenon. The main changes are seen in team collaboration, the increasing autonomy of employees. Additionally, students pointed out the that companies will face an increase in fluctuation of human labor joined by the need to become more flexible. Even though there is a need for adaption, experts and research used in this paper were clear that the changing demands of the market are in favor of project management since it is claimed to become a success factor and to gain importance. Therefore, it is reckoned by the author that there is a need for change and that it is the right time to adapt the project management education in order to fulfill the new market requirements and to align the education with the professionalization of project management.

In chapter 5.2., the discussion was about the definition of project success and what makes projects successful. It was recognized that a project is successful when the goal is met and when the client is satisfied. In spite of this apparently straightforward definition, it was said that clients often do not know what they want and that project success highly depends on how it is formulated. No general success formula was found. Due to this, it is seen as necessary by the author to invest in the skills of the project managers which are either the hard, technical skills or the soft skills. No clear trend can be seen by the author in the reasons mentioned for project failure since the mentions address both areas of hard and soft skills.

In the following chapter, it was made clear that the future activity of a project manager is seen in leadership and staying on top of things which speaks for the main emphasis on soft skills in project management education. Regarding the competencies, however, the considered parties stressed the importance to not only possess soft skills since they do not make up for the hard skills which a project manager needs. A project manager should therefore combine both soft and hard skills. The basic knowledge of a project manager was suggested to be obtained in school. The school education should therefore already include some lectures about soft skills as a cornerstone. But the majority of the questionees reckon that life and work experience are the best triggers for soft skills since these are hard to teach. At the end of the chapter, the company structure was brought up as an external factor which influences project success. The majority of experts and students, as well as the considered research, coincided that a flexible and participative company structure positively leverages the outcome of projects.

To summarize, the author feels that the trend in project management tends to move towards an increase in the importance of a competent and suitable project manager. This project manager must possess the soft skills to lead his or her team in dynamic times and to successfully communicate with the stakeholders of the project. He or she should combine this with a sound understanding of project management and at least some generalist knowledge of the subject matter in order to successfully plan and execute a project. Optimally, this project manager works in a dynamically organized team to be enabled to flexibly react to market changes.

Breaking these findings down to the educational level of project management in chapter 5.4., experts and students stated that the existing project management education models, described in chapter 2.3., do not assist project management students in the best way in obtaining the viable competencies to cope with the new market environment. It was thought that the emphasis lies too much on the hard skills.

Based on that, the following three recommendations were given:

- Add a practical part to the education of a project manager
- Impart a project management identity to project management students
- Give the students access to the necessary tools to obtain the competencies they need

These findings suggest that the human factor gains importance in the education of project management. The theory of the education should not only be about tools and techniques but also about values and beliefs, fostering a project management identity and developing a common project management language.

The dominating opinion about soft skills is that educational institutes should include those in their schedule, although it is agreed that soft skills cannot be learned but just triggered out of class.

The enlargement of scope and complexity in project management education creates a challenge for classical education institutes since they are asked to include much more content from different disciplines.

The professionalization of project management and the extensive scope of project management education call in the opinion of the author for the independence of project management in education which implies that it becomes a separate discipline. This was confirmed by experts and students with the caveat that the necessary level of independence varies for the different disciplines.

Taking the answers of experts and students into consideration the following inferences were drawn regarding the theses:

Thesis 1 ('Need to make project management an independent discipline') was partially approved with the exception of highly technical projects which require in-depth technical expert knowledge.

Thesis 2 ('Project management students not only need a theoretical but also a practical education') was fully approved.

Thesis 3 ('Need to teach project management within an independent, non-profit organization') was not approved since the suggestions are not seen to deliver an additional value compared to existing education institutes. Regarding the suggested model, however, it was mentioned that the independence of the education institute might be an necessity since existing education providers are thought to not be interested in offering such a model.

Thesis 4 ('Projects are optimally carried out in a participative and decentral way') and Thesis 5 ('Need to include lectures about behavioral competencies in project management education') were fully approved.

As an answer to the research question of this thesis, it is recommended by the author to foster more soft skills in project management education for the sake of reaching a balanced level of soft and hard skills in project management education. It is suggested to make education institutes accountable for at least triggering some soft skills, coaching and personal development. This can be justified with the fact that these points are of too crucial importance in the market environment of the fourth industrial revolution as to assume that an individual will eventually gain them without any help.

Additionally, the author speaks out for including a practical part in project management education and to give the students a sense of project management identity. It is the intention of the author to stress the importance that the students have to get their hands on real projects since a reconstructed case study does not sufficiently represent reality. The structure of these projects should be dynamically composed teams with a high autonomy of every team member.

Consequently, another proposition of the author is to mainly focus the technical education on the basic theories and the correct usage of project management tools to streamline this part.

From the viewpoint of the author, the independence of project management is an appropriate adjustment with regards to the increasing importance of project management and the fact that the discipline is still underestimated. The independence is seen as a necessary step to ensure that the enlargement of project management is applicable. However, it is recognized that there can occur exceptional cases for projects which are highly technical and therefore require expert and possibly engineering knowledge. Nevertheless, this is assumed to only be applicable in particular exceptions.

6.2. Adaptions of the suggested model

More detailed implications can be made about the suggested model and about which adaptions are seen as meaningful. The model is described as an 'interesting alternative' by both experts and students, but both were not fully satisfied with its structure. The students of the online survey mainly sympathized with the idea of being a student there. Nonetheless, the moment after a Bachelor degree is not seen as optimal. In order to make project management fully independent, it was argued that it makes more sense to offer the suggested model after an apprenticeship or high school.

The independent center received a thorough positive echo from both parties asked about it.

The main issue was found for the partner companies. The suggested model failed to convince both experts and students that the model arouses sufficient interest for partner companies to work together with the school. Due to this, some additional adaptions have to be made to provide enough incentives that partner companies are interested in a collaboration.

The following points are suggested to provide the necessary incentives:

Suggestion 1

Experts and students expressed their doubts that partner companies may not be interested in a cooperation since the suggested model would internationally not be taken serious enough and that companies with the necessary project management infrastructure would mainly rely on existing international certification standards. Additionally, thesis number 3 ('Need to teach project management within an independent, non-profit organization') was not approved

as there was no additional value seen in the independence and non-profit structure of the institute.

Combining these two points, the education institute providing the suggested model is recommended to work together with either the Project Management Institute (PMI) or the International Project Management Association (IPMA) which are the main global certification institutes. In a partnership, an internationally accepted certificate would be provided. The advantage for one of the certification institutes would be that the whole administrative process is taken care of within the project management institute and that their reputation benefits since their name is on the latest education form of project management.

Suggestion 2

The independent center which was originally thought to only coach students would offer its services as well to partner companies, providing them with internal conflict management and classes on behavioral skills. The selling point for the partner company is that it does not have to hire external and expensive consultants for this service. Since the training center already mentors the young talents, it already has some insights into the company and its culture and can holistically assess the situations from different points of view.

Suggestion 3

In order to offer another selling point for companies and students, it is recommended to include a direct employment option in the contractual agreement between companies and students. This means that if the student has proved to be a good worker and fits into the company culture, the partner company can employ him or her directly after having finished the diploma. The teachers of the project management education institute work together with the leader of the project management education within the partner company to determine which modules of the company education the student has to pass in order to get the project management diploma of the company as well. Therefore, the student would receive the internal company diploma in a shortened process.

This education model could be offered to partner companies with a different selling point. The partner company does not just provide its infrastructure to get students as a cheap labor force. They get students which are educated in both soft and hard skills tailor-made for

project management. These students are relatively cheap and already have some project management experience. Companies can then make the fine adjustments to their internal project management processes instead of offering the whole project management course to graduates from business schools or universities. As a result, companies save time and costs and can almost directly use the student for their projects. This approach departs from the transactional nature of the first suggestion since the student does not just work for the time of a module in the company. Instead, a long-term relationship can be established. In the case of an offer, the student can directly enter the company's project management department and does not have to start from scratch. Another advantage for the student is that he or she can gain the company's project management certificate by just passing the outstanding modules instead of undergoing the whole process of the certification.

Since the model of chapter 3.2. has to be modified, the graphical representations of them have to be revised as well. Figure 15 on page 74 illustrates how the procedure of the adapted suggested education model would look like for students. The updated version of the suggested education model is represented in Figure 16 on page 75. The suggestion 1 and 3 can be found in Figure 15 and the suggestion 2 and 3 is shown in Figure 16. The suggestions are marked in bold.
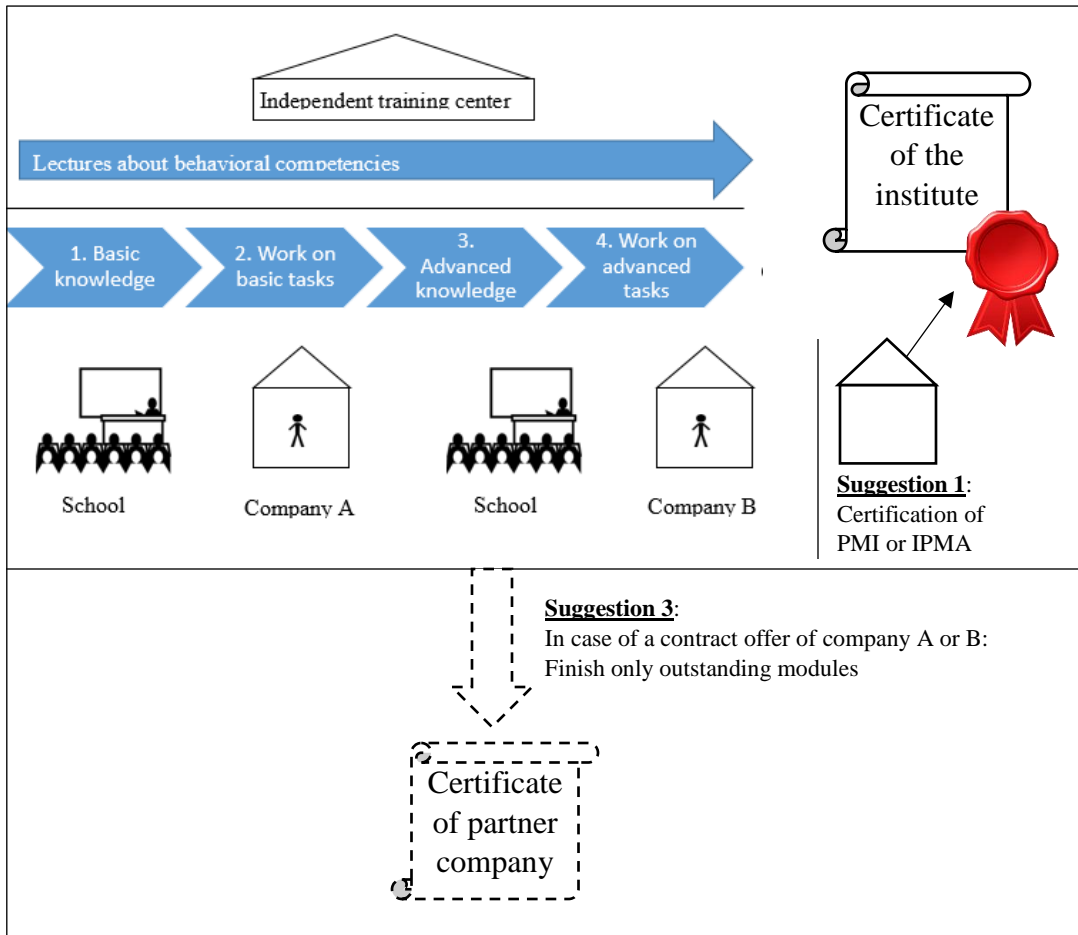
Figure 15: Updated version of the procedure of the suggested education model
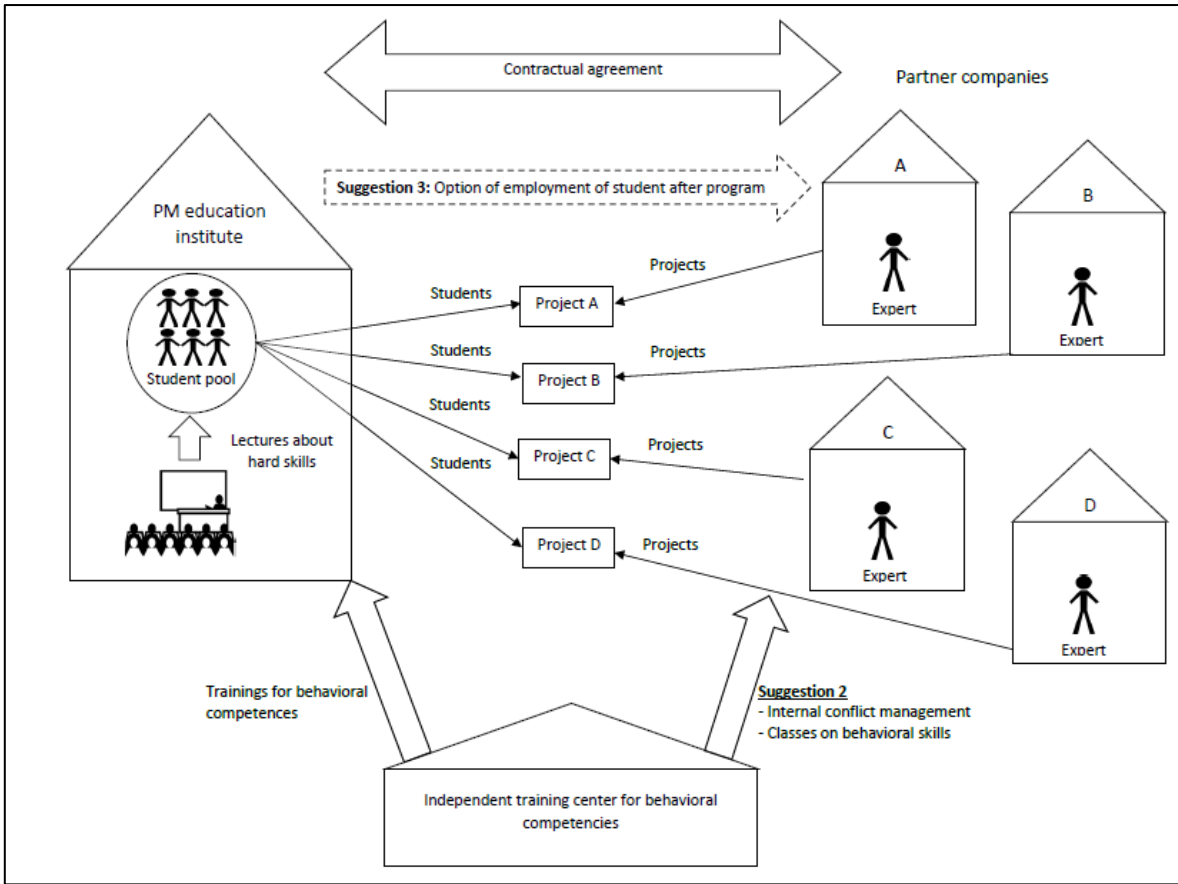
Figure 16: Updated version of the suggested education model

6.3. Limitations and Outlook of thesis

Despite the careful preparation of research, the expert interviews and the online survey, there are still certain limitations and shortcomings which have to be mentioned.

In order to not exaggerate the scope of the thesis, the model targets business students finishing their Bachelor's degree only. Other education forms were not analyzed. The finding that the scope of the suggested education model with four modules could be too time intensive was not further investigated because this would have gone beyond the scope of this paper. However, future studies could be carried out about how the timing or scope of the suggested education model could be improved.

Another point to bear in mind is that the thesis did not come up with a solution for how to measure project success in a quantitative manner. This could be further investigated and verified. Lastly, even though that topic was briefly touched in chapter 5.3.2. ('Competencies'), the thesis did not work out which soft skills have to be taught to business students and which ones are to be excluded form soft skills classes. The explanation of this can be given by the limited scope of the paper. However, future research could observe which soft skills benefit the students' learning process if they are taught in a classroom and how they can be implemented in existing education programs.

Possibly the analysis contains some distortions since the sample size was only five experts and 28 business students. This was in accordance with the supervisor. Nevertheless, further studies may include or focus on potential project management students which have a different educational background. Beyond that, the research sample is only from Switzerland since considering interview partner and survey respondents from outside of Switzerland would have gone beyond scope. However, the thesis could be adapted for other countries with the aim to compare the geographic discrepancy of the results. In this context, there could be as well taken a bigger sample to avoid distortions.

Furthermore, the scope of the thesis is in a general manner and did not set a branch focus. Therefore, the results of the paper are generally formulated and several specifications, adjustments and differences by branches might be further examined. Furthermore, future

studies could do an in-depth analysis about which types of projects are still to be led by experts rather than project managers.

The expert interview with Lucia Nievergelt did not have the same structure as the other interviews. Her thoughts on some points were therefore not discussed in detail. The explanation for this is that it was the first interview and that the structure was slightly adapted based on the lessons learned of the interview.

The claim of Markus Mettler that the idea to exchange students between companies is too classic was not included in the updated version of the suggested education model due to the fact that this point was only mentioned by him and because the other four experts agreed on the applicability of the exchange of students within the companies.

In addition to that, some questions of the online survey were not formulated clear enough or the possible options left margins for interpretations which made it occasionally challenging to compare results with each other.

The studies of Crawford (2005), Ellis (2009) and Jacquemont, Maor and Reich (2015) draw an immature picture of project management. These were chosen in order to clearly outline the need for change in project management education. However, these are not representative for research as a whole, since several other studies describe the situation as less dramatic. There are many studies on both the supporting and disagreeing side of the studies used in this thesis.

Some studies used in the paper are of a certain age. Reconducting them in 2017 would might lead to some adaptions. However, it is believed that these adaptions would not influence the outcome of the thesis.

The problem description of chapter 1.1. included the suggestion of Córdoba and Piki (2012) to foster a group based learning environment (p. 84). The idea of the suggested education model was to ensure this by having a student pool where students can exchange views and benefit from the experience of other students. However, this point was neither surveyed by experts nor by students. Advanced studies could review whether the student pool of this paper creates a group based learning environment and in what sense that benefits the students.

Regarding the final suggestion of the education model, further studies could test the implementation of the approach and outline possible ways how the application could be done.

Existing project management providers could use this thesis to investigate to which extent they could adjust their current offering in order to amend it to the requirements of the fourth industrial revolution.

Another possibility for advanced studies lies in the human resources and psychology disciplines to work out how effective the personal development courses and coachings are for students' development of soft skills and whether they benefit from the rotation between work and theory modules.

7- Bibliography

Alam, M., Gale, A., Brown, M., & Kidd, C. (2008). The development and delivery of an industry led project management professional development programme: A case study in project management education and success management. *International Journal of Project Management, 26*, 223-237.

Avots, I. (1969). Why Does Project Management Fail? *California Management Review, 12*, 77-82.

Baker, B., Murphy, D., & Fisher, D. (1983). Factors Affecting Project Success, in Cleland, D.I. and King, W.R. (eds.). (N. Y. Reinhold, Ed.) *Project Management Handbook*, 669-685.

Bea, F., & Scheurer, S. (2011). Trends im Projektmanagement. *Zeitschrift Führung + Organisation, 6*, 425-431.

Boneau, J., & Thompson, G. (2013). Leadership 4.0. *Leadership Excellence, 30*(1), 6.

Córdoba, J., & Piki, A. (2012). Facilitating project management education through groups as systems. *International Journal Of Project Management, 30*, 83-93.

Crawford, L. (2005). „Senior management perceptions of project management competence". *International Journal of Project Management, 23*, 7-16.

Ellis, K. (2009). *Business Analysis Benchmark – 2009: The Path to Success.* New Castle: IAG Consulting.

Freibichler, W., & Lemm , S. (2016). Steuerungssysteme. *Zeitschrift Führung + Organisation, 85*(3), pp. 209-212.

Gemünden, H., & Schoper , Y. (2014). Future Trends in Project Management. *Projektmanagement Aktuell*, 6-16.

Grabmeier, S. (2015). New Leadership - Führung in der Arbeitswelt 4.0. *Zukunftsmonitor*, 1-14.

Gray, K., & Ulbrich, F. (2017). Ambiguity acceptance and translation skills in the project management literature. *International Journal of Managing Projects in Business, 10*(2), pp. 432-450.

Harney, S., & Thomas, H. (2013). Towards a liberal management education. *Journal Of Management Development, 32*(5), 508-524.

Hays. (2015). *HR-Report 2015 / 2016 Schwerpunkt Unternehmenskultur. Eine empirische Studie des Instituts für Beschäftigung und Employability IBE im Auftrag von Hays für Deutschland, Österreich und die Schweiz.* Ettlingen: Hays.

Hintle, T. (2012). Guide to management ideas and gurus. *Economist*, pp. 97-98.

Hysong, S. (2008). The role of technical skill in perceptions of managerial performance. *The Journal of Management Development, 27*(3), pp. 275-290.

Initiative Neue Qualität der Arbeit [INQA]. (2014). *Führungskultur im Wandel. Kulturstudie mit 400 Tiefeninterviews. Monitor.* Berlin: INQA.

International Project Management Association [IPMA]. (2017). *IPMA Level D*. Retrieved April 17, 2017, from http://www.ipma.world/certification/certify-individuals/ipma-level-d/

Jacquemont, D., Maor, D., & Reich, A. (2015). *How to beat the transformation odds*. Retrieved May 15, 2017, from http://www.mckinsey.com/business-functions/organization/our-insights/how-to-beat-the-transformation-odds#0

Jugdev, K., & Mathur, G. (2013). Bridging situated learning theory to the resource-based view of project management. *International Journal Of Managing Projects In Business, 6*(4), 633-653.

Kendra, K., & Taplin, L. (2004). Project success: a cultural framework. *Project Management Journal, 4*, 30-45.

Kostagiola, P., & Asonitis, S. (2009). Intangible assets for academic libraries: Definitions, categorization and an exploration of management issues. *Library Management, 30*(6/7), pp. 419-429.

Mathur, G., Jugdev, K., & Fung, T. (2007). Intangible project management assets as determinants of competitive advantage. *Management Research News, 30*(7), 460-475.

Mayer, J., Salovey, P., & Caruso, D. (2004). Emotional Intelligence: Theory, Findings and Implications. *Psychological Inquiry, 15*, pp. 197-215.

Mühlfeld, C., Windolf, P., Lampert, N., & Krüger, H. (1981). Auswertungsprobleme offener Interviews. *Soziale Welt, 3*, pp. 325-352.

Pant, I., & Baroudi, B. (2008). Project management education: The human skills imperative. *International Journal Of Project Management, 26*, 124-128.

Project Management Institute [PMI]. (2013). *A guide to the Project Management Body of Knowledge (PMBOK guide), fifth edition.* Newton Square, Pa: PMI.

Project Management Institute [PMI]. (2017). *Certified Associate in Project Management (CAPM)*. Retrieved April 17, 2017, from https://www.pmi.org/certifications/types/certified-associate-capm

Rezvani, A., Chang, A., Wiewiora, A., Ashkanasy, N., Jordan, P., & Zolin, R. (2016). Manager emotional intelligence and project success: The mediating role of job satisfaction and trust. *International Journal of Project Management, 34*(7), p. 1112.

Schnoll, L. (2011). How Will You Manage? *Quality Progress, 44*(9), pp. 62-64.

Schwab, K. (2016). *The Fourth Industrial Revolution.* Cologny: World Economic Forum.

Seidler-de Alwis, R., & Hartmann, E. (2008). The use of tacit knowledge within innovative companies: knowledge management in innovative enterprises. *Journal of Knowledge Management, 12*(1), pp. 133-147.

Shelley, A. (2015). Project management and leadership education facilitated as projects. *International Journal Of Managing Projects In Business, 8*(3), 478-490.

Spirit at PM GmbH. (2017). *Swiss Island*. Retrieved April 17, 2017, from http://www.swiss-island.ch/joomla/index.php/de/

Swiss Confederation. (2017). *Hermes*. Retrieved April 17, 2017, from
https://www.isb.admin.ch/isb/de/home/themen/projektmanagement/hermes.html

Thomas, J., & Mengel, T. (2008). Thomas, J. & Mengel, T. (2008). Preparing project
managers to deal with complexity – Advanced project management education.
International Journal Of Project Management, 26, 304-315.

Torres, R. (2010). *New Leadership Rules.* BCG.

Wang, X. (2002). Developing a True Sense of Professional Community: An Important
Matter for PM Professionalism. *Project Management Journal, 33*(1), 5-11.

8- Appendix

8.1. Briefing expert interview

Briefing expert interview

Expert	Name of the expert
Interviewer	Remo Luzi
Title	Leadership 4.0, the future of project management education in order to meet the expectancy of the market regarding the fourth industrial revolution
Research question	How does project management education have to be adapted in order to enable future project managers to cope with the market requirements in the fourth industrial revolution?
Scope	Business school graduates which want to work within the project management field. Depending on their subject they may have already had some lectures about project management in their studies. However, they do not have significant experience in working on projects.

Definition of Leadership 4.0 and its consequences:

The term Leadership 4.0 emerged from the fourth industrial revolution. There is no unity on when the fourth industrial revolution started and it is even contested that the fourth industrial revolution is taking place now, since definitions and terms can vary depending on the authors. But generally spoken the main idea about a new market environment is convergent.

The fourth industrial revolution is used to describe a new technological development which is so extensive that Schwab (2016) even claims that it comes along with a profound change of the human civilization (p. 1). It is often argued that these changes are just a part of the third industrial revolution. This revolution is said to have emerged in the start of the second millennium and is characterized with new tools to improve productivity like internet, e-mail and social media which allow unprecedented access to information (Boneau & Thompson, 2013, p. 1). However, Schwab (2016) states that due to the following three key aspects, society is confronted with a new industrial revolution (p. 3):

- **Velocity**

  "Contrary to the previous industrial revolutions, this one is evolving at an exponential rather than linear pace." (Schwab, 2016: 3)

- **Breadth and Width**

  "It builds on the digital revolution and combines multiple technologies that are leading to unprecedented paradigm shifts in the economy, business, society, and individually." (Schwab, 2016: 3)

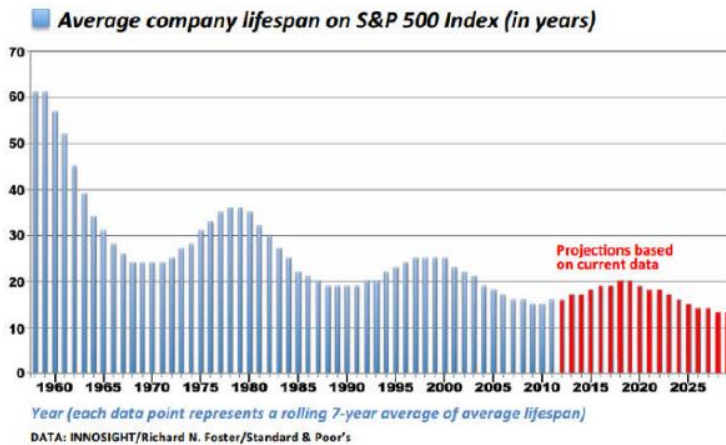- **Systematic impact**

  "It involves the transformation of entire systems, across (and within) countries, companies, industries and society as a whole" (Schwab, 2016: 3)

"The changes in the economy are bigger than our ability to react" (Torres, 2010: 2).

The market environment of the fourth industrial revolution is often described with the term 'VUCA' which stands for Volatile, Uncertain, Complex and Ambiguous (Torres, 2010, p. 2).

This new market asks for a new thinking model of leadership (Torres, 2010: 2).

As a result of a high frequency of disruptions and technological innovations, the average lifetime of companies is continuously shortening as it can be observed on the example of the companies of the S&P 500 underneath in Figure 1.

Average company lifespan on S&P 500 Index (in years)

Projections based on current data

Year (each data point represents a rolling 7-year average of average lifespan)
DATA: INNOSIGHT/Richard N. Foster/Standard & Poor's

The main challenges for business leaders in Switzerland, Germany and Austria are seen as the management of change, the management with growing complexity in the leadership area and to act as a role model (Hays, 2015: 16).

According to an INQA (2014: 6 – 11) study including 400 in-depth interviews with business executives, these are the 10 key topics for modern leadership:

1- Flexibility and Diversity are success factors

2- Process competence is more important than the focus on results

3- Self-regulating networks and collective intelligence is the best answer for a dynamic market environment.

4- No more need for linear hierarchies.

5- Willingness for cooperation is more important than the sole focus on returns.

6- Personal coaching for the personal and professional development is crucial for employees and managers.

7- Self-determination and appreciation most motivate employees.

8- Focus on social topics (stakeholder-perspective).

9- Wish for a change of paradigms in the leadership culture.

10- Criticism on the development of the existing leadership culture.

Structure of the interview:

Fourth industrial revolution

1. In the briefing you can find an overview of the new market environment according to research. What is your comment on the allegedly profound change technology has on businesses and the society?

Project management

2. How is project management affected by this change?

3. When is a project in this new market environment successful from the viewpoint of the project manager and when from the viewpoint of the client?

4. As how successful do you rate project outcomes at the moment?

5. Why is there such a low success rate for projects? (or such a high one?)

Project managers

6. How does the work of the future project manager change?

7. Which competencies do future project managers need in order to successfully fulfill their tasks?

8. How and where should future project managers obtain these competencies?

9. Which is the optimal organizational structure of companies in order to enable project managers to successfully fulfill their tasks?

Project management education

10. How does the current education process for emerging project managers look like?

11. What is the difference between the existing education models for project management? How do they prepare students for their future activity?

12. How do the current education models ensure that the students get the competencies we have discussed in question 7?

13. What kind of adaptions are necessary for project management education and why?

14. Research often talks about the need for soft skills in project management. It could be argued that this is not within the responsibility of project management education but has to be obtained by the students themselves. What is your view on that?

15. Which competencies or skills are not within the responsibility of project management education and where should emerging project managers learn them?

16. There is a discussion on whether project management is profound enough to be an independent discipline or whether it is just taught to experts, which have to lead a project, in the form of evening classes. What is your point of view on that?

17. Presentation of my thesis

18. Discussion of my thesis

Bibliography

Hays (2015). *HR-Report 2015 / 2016 Schwerpunkt Unternehmenskultur. Eine empirische Studie des Instituts für Beschäftigung und Employability IBE im Auftrag von Hays für Deutschland, Österreich und die Schweiz.* Ettlingen: Hays

Schwab, K. (2016). *The Fourth Industrial Revolution*. Cologny: World Economic Forum.

Torres, R. (2010). New Leadership Rules. BCG.

8.2. Transcript Lucia Nievergelt, 13.3.17
Question 1

Absolut. Das Einzige wo ich ein bisschen eine Frage habe, ist es die vierte, die fünfte, die sechste. Ich habe heute ein bisschen darüber gelesen auch dass es nicht ganz unbestritten ist, dass es jetzt die vierte ist oder wie auch immer aber das sind ja in dem Sinne auch Punkte wo man dann einmal sagt, jetzt ist ein neues Zeitalter erschienen und ich denke wir haben in den letzten vielleicht 40 Jahren so viel neue Technologie gesehen und wie auch geschrieben. Es ist ganz exponentiell, es explodiert und jedes Jahr ist es noch mehr und noch schneller. Wir haben ein sich so schnell veränderndes Marktumfeld, dass ich sich auch die ganze Industrie und das ganze Arbeiten rapide verändert.

Question 2

Projektmanagement an sich - würde ich sagen - hat einen reisen Aufschwung erlebt, ob es gebraucht wird, wie es gebraucht wird und wie es weiterentwickelt wurde. Wenn man Projektmanagement in den Anfängen anschaut, dann definiert man Ziele, dann macht man ein Wasserfalldiagramm, so lange haben wir für dieses Teilprojekt, so viel kostet es und dann sind wir fertig. Wie sich das Ganze entwickelt hat, es gibt inzwischen hunderte von Methoden, Projektsysteme, Scrum seit 2-3 Jahren. Auf jeden Fall, dass was sich verändert hat, ist dass man zu Beginn des Projekts nicht mehr weiss, was am Ende rauskommt. Dadurch, dass sich jede Industrie so sehr beschleunigt hat mit Rausbringen von neuen Produkten.

[...]

Es ist notwendig, dass das Projekt nicht starr ist, dass es angepasst wird an den Markt, der sich rundherum so schnell entwickelt, weil sonst widerspricht man den Prinzipien von gutem Leadership, dass man seine Resources effizient und effektiv einsetzt.

Question 3

Es gibt da die Research dazu, die sagt glaube ich, dass ca. 80% der Projekte scheitern. Ich kann das jetzt aus persönlicher Sicht nicht ganz so wiedergeben aber das ist wahrscheinlich auch das Feld wo ich mich bewege. Ich denke die meisten Projekte sind wohl nicht erfolgreich, weil die Definition von einem erfolgreichen Projekt ist ja eigentlich, ob es seine Ziele erreicht. Ich denke, dass hat sich schon verändert, dadurch dass die Ziele sich verändern.

[Further inquiry]

In der Projektwelt lässt man sehr viele Projekte wieder sterben. Man startet ein Projekt und merkt dann nach ein paar Monaten, erstens das kostet irgendwie mehr, es scheitert am Sponsoring, an der Management attention und dann stampft man das wieder ein, das sind auch die Zahlen von den Projekten.

[...]

Die IT Projekte, die beim Bund so in den Sand gesetzt wurden in den letzten Jahren veranschaulichen dies ganz gut. Einfach weil der Auftraggeber auch gar nicht weiss, was er möchte. Das ist auch wahnsinnig schwierig dies zu definieren und je schwieriger das zu definieren ist, desto eher scheitern dann Projekte auch.

Question 6

Was ich so in der Schweiz erlebe, ist dass va Unternehmen, die sehr schnell unterwegs sind, immer weniger stur nach Methoden arbeiten. Auch nicht mehr man macht zuerst mal das, dass dann diese Analyse, sondern ein sich sehr bewegender Projektleiter nimmt die Methoden zur Hand, die im Helfen, seine Ziele zu erreichen.

[...]

Ich denke, dass das was die Branche verändert, dass ist wirklich die Agilität und dass man auch viel mehr Energie darauf verwendet zu hinterfragen, ist das was wir machen immer noch den Zielen entsprechend, sind die Ziele immer noch diese, die wir erreichen wollen und was muss am Projekt geändert werden, dass die Ziele angepasst werden können.

[...]

Question 7

Also es gibt von der IPMA einen Kompetenzen ICB.

[...]

Und auch da kann man nicht sagen, der muss alle haben. Es gibt einfach Projekte, die brauchen mehr von den einen Kompetenzen und dann Projekte, die brauchen mehr von den anderen. So als Tendenz ist ganz klar sichtbar, dass die sozialen Kompetenzen wichtiger werden für Führungspersonen. Ich denke aber auch da, du kannst ein Super guter Typ sein aber trotzdem kein Projekt leiten. Es braucht so ein Skillset, das angepasst ist, was man macht.

[...]

Question 8

Kompetenzen sind ja eine Mischung aus Wissen und Erfahrung, dann sind wir Menschen so eine interessante Spezies, die auch aus Erfahrung von Anderen lernen können. Ich denke es kann niemand einfach von der Uni kommen, ohne jemals gearbeitet zu haben und wahnsinnig kompetent sein, weil es geht einfach nicht. Man kann nicht alles aus Schulbüchern lernen.

[...]

Question 14

Ich denke es ist sehr schwierig, soft skills zu lernen. Da kommt wirklich schon 50% von persönlicher Veranlagung. Es gibt einfach Leute, die empathischer sind und das ist nicht etwas was man in einem Abendkurs lernt. Ich denke was man lernen kann, was auch im Arbeitsleben sicher gefragt ist, ist so Feedbackkultur, Umgang miteinander. Darum denke ich, ist es auch sehr wichtigen den dualen Ausbildungsweg (zu machen), dass jemand eine Lehre macht und danach noch studiert und das fördert das sicher besser als wenn man 4-5 Jahre in einem Vorlesungssaal sitzt und da Frontalunterricht erlebt. Ich denke, da ist Zusammenarbeit mit anderen das Lehrreichste was man machen kann.

Question 15

Common sense, gesunder Menschenverstand ist schon das wichtigste was ein Projektleiter mit sich bringen müsste. Und das lernt man nicht in der Schule.

Suggestion

Ich finde das Modell ziemlich gut, es bildet eigentlich auch etwas ab, was in dem Sinne teilweise schon existiert. Vor allem im deutsch, englischen Raum sind Praktikum nach dem Studium eigentlich fast schon ein Muss. Das kennen wir in der Schweiz nicht ganz so aber wenn du in der USA ein Studium machst, dann versaust du wahrscheinlich 1-2 Jahre im Praktikum, wo du halt schlecht bezahlt bist aber dir so deine Sporen abverdienst. Was sehr interessant ist and diesem Gebilde ist, man lernt was, und man kommt dann wieder zurück.

[...]

Der Turnus ist ganz interessant. Das ist extrem befruchtend, einfach darum weil es greifbarer macht, was gelernt wird. Es löst schon einmal das Problem, dass Studenten, die von der Hochschule kommen und eigentlich noch keine Arbeitserfahrung haben aber sehr sehr viel Kosten. Das ist ja bei Neuanstellungen in Firmen immer das Problem, du stellst jemanden ein, der sehr teuer ist aber je nachdem noch so diese Bugs hat, die so ein unerprobtes Produkt hat.

[...]

8.3. Transcript Bernhard Kruschitz, 17.3.2017
Question 1

It's obvious that there is a big impact on technology as well as on business and society but that's not a new effect, that's already known and that happens already for 50 or 60 years. So technology means, for example, television, we didn't have television 50 years ago and now we have television. And the whole technology based on these simple techniques which have evolved. But of course, the impact on business is still increasing but of course things we do also on political system as we know from elections in the United States and so on but that's not new. That's important, it's not new. It's a marketing instrument also if we talk about digital transformation because we did a lot of transformation already. Whole businesses have disappeared and new businesses have taken a reality like ebay and so on. So there are a lot of new business model already around.

Question 2

As we already know we had a big tendency to outsourcing, for example development to India, service centers to Poland or Czechoslovakia so we already see a big impact of this new business models of an open industry also with service deliveries. So therefore, the impact is already quite visible that we have distributed project teams, that we have impact on technology also on PROJECT MANAGEMENT with cloud services and so on. And I think generally project management has to be on the leading edge to manage transformations of course.

Question 3

In general project management is successful if we reach the goals. But the question sometimes is what are really the goals, what are the requirements we have and therefore project management of course is a new market, a changing market environment, has to react on the varicosity of speed on organization, on teams and so on. But there we already have experience with agile processes, agile teams and so on. But many companies are not ready yet to react on an agile way also in project management behavior. So it has an impact on this area.

Question 4

Projects usually are biter than they seem because as you know there are many reports which say that for example 70% of IT projects don't reach their goals and so on and you always have to consider that this is a business behind these reports so like the consulting business. If you can say project are not successful then you can sell your business, your consulting and so on to the companies. So if we measure the success on projects always depends on where are the trigger points for the measurement. So that is very important. For example, if you construct buildings, then the starting point of the measurement is offers of the suppliers and construction companies and at the end you compare against the offers. When we measure IT projects for example you have guys somewhere in the marketing department which has an impact on the idea and he will suggest this project will cost 1 million and

there are no offers, no concepts around and these offers and concepts are often taken then as a baseline to measure the success of a project and this is a pity because it seems that projects especially in IT never reach their goals because the goals are not realistic when you set the trigger for the measurement and that is the problem. So my view is that projects usually are successful and sometime they fail but that is normal otherwise that would not be projects. So if you have projects that have a high innovation, of course you start a lot of project and of course you have a failing rate. If you don't have failing rates you are not innovative. That is very important. So the ability of management to deal with projects they have to stop because they will not reach the goal or the ideas were not realistic behind the goals of the projects. So business development means always failing so it's not so that if you start a project that you can be sure at the beginning of the project that the sense of the project is given and that it makes really sense to invest a lot of money. You have to find out during the project. And if you find out that it is too risky or that the benefit is not given then you will have to stop it. That is the principle of project management overall. So you always have a failing rate, hopefully, if you don't have one you make something wrong in the management.

Question 5

Yes

Question 6

I think we have to consider different situations. On one hand, we have very fast and agile projects and on the other hand we have high complexity of existing systems which are running. And if they come to an end of a life cycle you have to replace running systems that are running. So this are different types of project which need different skills and different people also in the project management area. So if you look at the small project to develop a new product to go into a new market you need a completely different setup because there you need agile people, you need marketing oriented people, you need entrepreneurs and that is a difference between this kind of projects and people and the technology driven, technology oriented stuff which need engineers, engineers and engineers. And no marketers and that is really a difference. So if you talk about the future of project management we always have to bear in mind the different companies, the different markets and the different types of projects. Because the benefits really are different. And later on when we talk about education we also have to bear in mind this aspect.

Question 7

First, it needs social competencies: communication, conflict management and leadership and whatever so that is in all of the projects one of the typical success factors. And this includes also communication against the stakeholders, to sell the value of the projects to the teams and whatever. So for all the projects that is one of the success aspects. For all projects, it needs skills for project management like techniques for estimation of effort or whatever. So the real basic techniques also are a success factor. So we cannot say now that

if we invest more into training of the social skills and we reduce the training in basic skills in project management.

Question 8

Basic competencies in project management: techniques, processes, methods of project management that is something you can just learn on high schools or universities or wherever. But you have to learn it and you have to use it to get fit in these techniques because if you use it for the first time you need a lot of time and you are not really a performer on these elements. So later on when you are a professional of these elements, it just hast to flow. It is important that it is not the key for project management, it is the fundament. If you're not fit in these techniques, you need too much time which you miss in other areas. I think that is the basic that people have to learn and that is why we have universities, there you learn. And the transfer happens in the businesses, in the companies. There you need to have possibilities where you can adapt and there you also have to develop your social skills. But of course during your studies you develop your social skills also but not specific by doing project management tasks but by working in groups and to make team work.

Question 9

The optimal organization is difficult to define because in Switzerland most companies are small companies with maybe 20 persons working there, maybe 5. For example, in our company we have 5 persons working in it. So most are small and there are some big ones. But usually studies focus on big companies and I think that is a problem because these are not the drivers. Innovation often happens in small companies, not in big ones. They sell (buy) the innovations. If you look at Facebook for example they sell (buy) companies all the time because they are not able to do innovation with their own company. So you have to buy it in. So the question is what is the context we are talking about. When we talk about big companies of course there you have possibilities like project management pools, if you set up a poo. In a small company, it is impossible if 5 or 10 people are working there or even if you are 50. Then you have specialists, all the 50 people in a new company, in a startup, are specialists on their subjects. So you can't have pools you don't have the possibilities. But in big companies you can set up project management pools, all the big companies have these pools for example. There you have project manager for the large / huge projects and if you have a large project, you take one from the pool to lead this. But that's only the structure. So project management pool may help. In specific if you have HR departments which follows the path to say we have a project management career model it also helps and has to do with structure and if you develop people. For example, one company I was working for there was a pool and each person had a development plan and we had a personal external coach to push on the personal development so that you can say after 1 year that this person can take leadership of a more complex project for example.

[Further inquiry]

Strict hierarchies have a big advantage in companies because they have a lot of power which you can release for projects. And that is something that is often underestimated. If you have hierarchies you can really steer and put energy in projects over this hierarchy. Very often we have matrix organization for a project and if you have a lot of projects and all are within this matrix, you have the problem of the whole resource sharing and everything gets slow. So if you want to push something, you need these hierarchies and you need assignments of these resources and you can use the power of hierarchy to support your project. It is not so that if you have flat hierarchies that you solve problems, maybe you create other problems.

Question 10

First is to show your qualification so you can show it by your certificates that you make a PMI certificate for example as a PMP. This helps to get a job, to get an assignment on a project. People can say that he knows the techniques of project management, he has an idea about the techniques. That is the fundament, PMP covers the fundament. The other thing is that if you had a project where you were working on the important thing is to reflect what you learned and to adapt it for the next project. So when you were the leader of some projects it really helps to make an IPMA certification to show that you have the experience from the practice because you have to certify your person together with your project. I think you know this IPMA model with this different levels for seniority of project management. So in CH and other countries these IPMA certifications have a high visibility. So if you were running some projects it really helps to make this certification and to get the possibility to do the certification, it might be necessary that you make some additional training courses to be fit for the certification. That is the second thing that you look for these certificates and that you can combine education with practical work. So you always need to work on a project to understand what you learned. That is the normal transfer process that you learn to transfer the techniques. Project management also sometimes is vice versa: you make a project and you don't know what you do but something happens and then you make an education and then you can reflect on what happened in the project. Nothing is linear in life as well in project management education is not something in which you study, study and then when you know everything then you do your fist project that is not the way to get your experience.

Question 11

[...]

Question 12

Not in all cases because I met people who made Masters and they didn't have any idea about the basics. They had a lack of basic knowledge and that is a little bit strange but this is possible that you make a Master and there you don't learn the basic techniques like effort estimation and things like that because that is a precondition. But they don't fulfill the precondition and it's not tested by the universities whether they really fulfill and so that is a little bit a problem. So they seem to know, but they don't know.

Further inquiry

Usually that is something that you cannot train in the university like conflict management that is only something you can learn in the field. And that is something where organizations can support project managers: coaching, supervising, things like that. So if we talk about the other question where we were talking about the organization structure: if an organization has the possibility to supply coaching, supervisors to project manager this really helps to reflect critical situations to make peer groups and so on.

Question 13

It all is the question: Who delivers what? When we talk about project management education at the university level: should they also deliver coaching after the time of the university or is it another business. In my point of view, it is another business but that is available already. So if we look at the whole landscape of what is available of services or education for project management, everything seems to be around but the question is "Do I have access to it?". When I work in a company and when I work in this structure of the company often resources are limited and one of the limits is money. So if you need a coach it has its cost and it is a question of the culture of the company. Is it part of the culture that you can look for a coach or is the basic assumption that if I have an employee as project manager, he knows everything and he has everything. So it is also a cultural question. So one question is what should and educational school / university deliver and how to get it is the other question.

Further inquiry

Access is not easy. The main point is that access is not easy and the other thing is how do I know that it is important or not? It is very difficult to say now I am in a situation where I need support and how can I quickly get the coach which helps me in my reflection in reflection in solving the problem, in solving the conflict. So that is the point.

Question 14

Social skills are something that is needed generally from leaders, not only from project managers also from any responsible for business processes. So therefore it is not only a question of project management, it is a question of modules in education. It has to be part of the education if you have a profile as a project manager but also as a normal manager, it is not only bound to project management.

[Further inquiry]

Yes at least one module

Question 15

Yes there are thing you have to get on your own which cannot be part of an education. For example project management and leadership in general has to do with reflecting elements of ethics for example and the cultural context you are in. And the question is how you can

reflect this as a person in your personal lifetime you have and in different situations you can make different experiences and the reflection of all these subjects so cultural subjects, ethical subjects. This reflection has an input on your personal behavior in critical situations because in critical situations it is always the question what are your personal values, what are the values you make visible about role models and so on and that is something I think is very difficult to put into project management education and therefore you have to look on your own. It is your personal responsibility to reflect these elements. It is like religion.

Question 16

If you are a project manager and if you have no idea about the subject you are managing, then you are lost. So typically, first you have to be expert or generalist at a subject. You don't have to be an expert but at least a generalist.

[Example IT]

So you need a connection to the subject you are dealing with, if you don't have this connection you are lost. Personal example IT

So you always need a general or specific education in an area and then you can add on project management.

[Drawing (often done for new employees, small budget = expert, big expert = project manger, comparison level IPMA)]

Suggested model

That is a very interesting picture and I have experience in this. We were talking about IM with Markus Prandini. He implemented in IM this model and the students got some hard skills in lectures in project management and they had to develop a customer project between the study during the first year already. So he was looking for partner companies and then they gave him projects and also experts.

[Example]

So this model was really good, it was functioning but this always need a little time to find the projects and the model was changes and they reduced it because it was quite consuming and afterwards we just had this situation with the pool and we were working on case studies again as well as we always do.

[...]

Students help to get competencies?

Yes

Would students be interested?

Yes

Companies?

Yes because they can get cheap workers, cheap know-how.

- Training center

Question is whether it has to be independent but it should be different, it shouldn't be the same person which makes this part and this part that it has the visibility that now we are on this subject and now we are on this subject. Independent could mean that you at ZHAW it is the institute of psychology.

But we implemented as well in IM a coach. So each project had a coach from this part. So the different lecturers they also were coaches on the subject but as well on how should we do this work. At the end the students had to make a presentation, together with the expert, a business presentation. They had to write a project report about their topics with the concepts and the whole thing was put together in a book. Coaches had to make sure that the process goes on but if they had a conflict so that they could solve the problem and that they could get on again.

- Problem to find enough companies, do you see other problems?

Confidentially is something you can have restrictions.

It is always the question of the volume. How many projects do we need. You need to have a lot of connections with companies if you want to set something up like this, the connection is everything.

8.4. Transcript Markus Mettler, 17.3.17
Question 1

That is a tough question. I think it would make sense to break this question up in multiple parts because technology has evolved over the last 150 years, business has evolved over the last 150 years and what is fascinating is that technology is like a firework, going in all directions and I think as well business models have evolved in many different directions. So if you ask me a short summary is a firework effect; it is going in many different directions on the technology side and as well on the business side. I think we would have to be much more specific in one branch and say how does this technology have an impact on business.

[Further inquiry]

Of course it does, I mean everything has an impact on how we do business. If you sell ice cream on the lake and if it's nice weather it has an impact on your business. I think everything we do, every technology which appears or disappears has an impact on the business and I think many of these causes within a very short time are just completely accepted and not considered as having an impact on the business.

Question 2

[...]

It is a question of how you define project management and I see life as being a project and project management just as being part of life. So you can consider everything in your life as a project and obviously technology as it evolves has an impact on how you manage your projects. And so again the more specific the question is, the more I might be able to answer.

Question 3

So let's look at the dynamics. And let's look at where technology can help us in the dynamics. And let's look at the role of the project manager and I don't like that term very much because as life is a project I see pretty much everyone as a project manager, I don't see an organization today where you would have people that are not in project management. Or in other words if I go to a shoe maker and I bring him my shoes and ask for new soles then for him that is a project. If I go to the coffee and I order a coffee then it would be a small coffee and a small project. So what I think is interesting is that for the first time customers and project managers are able to share data seamlessly. Customers are capable of doing much more research on their own before they enter in a relationship with their supplier and again I use a very simple example: if you go to a restaurant, you can do your research on the menu and on what products they use and based on that this will influence your decision. And so I think the customer has access to much more information before he decides to get involved with a supplier, vice versa too and during the project both sides would be capable of sharing much more information and thus increasing productivity but also creating much more focus on what is relevant and reducing frustration. So this is the potential which lies in the technology and in project management but I think it is very

weakly used. I think people make very little use of it and unfortunately many organizations I work with, even internal projects or projects with outside suppliers are still run as if the technology would not be available. Because you have old hierarchies, you have fear driven management so people's main concern basically is to stay out of trouble and not to focus on creating value for the customer and obviously like that sharing information is not necessarily beneficiary because the more transparent data gets, the more transparent also hierarchical chaos turn visible towards customers so you keep the data to yourself.

[Further inquiry]

I think this has a lot to do with experience and not with success. So if the customers pays the invoice, if the customer signals that the customer is happy, then projects are considered a success. Maybe additionally to that, if you don't have too much internal damage while doing the project, then it is considered as a success. If this really is a success I wouldn't necessarily say that the project was successful in a case like that because you could have maybe produced the same value with a fraction of the effort or with a substantially higher output.

Question 4

My personal feeling is that if you ask the people involved, they would probably say that 80% of projects are successful. If you ask me and I would analyze the projects, I would probably say that maybe 30% are successful. But again, the question is how do you define successful. I would say for at least 80% of the projects you could have substantially higher impact on project results and on team satisfaction if collaboration would be improved.

Question 5

I think it's a lack of collaboration but that is a very broad field. I think one point, I mentioned it earlier, is that many decisions are fear-driven and so project work in general is related to change. So change by its nature is related to the unknown and the unexpected. So you suddenly need to take decisions where you don't have the data to take decisions. If you build a house and it's a standard house then you have centuries of experience which is more or less transferred by architecture schools or wherever. So people learn the trade so there are surprises but much smaller ones than in project management. So whenever these decisions take place, in general people go for the safe solution, for the pleasing solution because they don't want to go into trouble which blocks breakthrough innovations. Now I don't advocate for breakthrough innovation but I say instead of too early focusing on one solution it makes much more sense to forward in an agile way to say we have 5 or 6 options, we say let's take all these options take one step further with a fixed deadline, fixed resource set and then only start deciding which one or which ones to focus on. So I believe in a much more dynamic approach to decision taking where you move forward with more options for a longer period of time but controlled resources. Which implies that if you move forward with 5 options, finally 4 of them will be killed and if you're project is killed or the project you have been working on is killed - because in larger environments you will split project between the teams – then in the classical understanding you would have winners

and losers and you would have competitions and in our hierarchical organizations losers do not get promoted and winners get promoted. So there is a wrong incentive to move forward because you not honor team's performance and I am speaking about the teams working on the 5 different projects and you honor the winter team's performance and you declassify the others. I think that is a really dangerous development when it comes to project management because it means lastly only what really is safe and sure will be done and that prevents breakthrough change.

Question 6

[...]

And if you look at how our corporations are organized, how our NGO's are organized, how our government is organized, how the army is organized, how the church is organized and even how many start-ups are organized it is basically copy paste from the Romans. Even small start ups with 15-20 people they manage within a few months or a few years to integrate four / five hierarchical levels and I don't believe this is smart in a know how environment where peer to peer information is much more relevant and where many more people are capable and should be taking decisions.

[...]

And I think the power of project management lies in dynamically composed teams and by not having the same usual suspects, sitting around the same conference table in the same depressing room with the same depressed plant listening to all the conversations over and over again. But if you compare 2000 years to 2000 days this is so young that many people just don't feel comfortable with it yet because they fear that they lose control or they fear that it gets chaotic or it get unstructured or even anarchic and if you organize agile work well it is actually much much more transparent, much better organized, much more efficient. So you can do the other case by analyzing strictly, hierarchical, traditional organizations which appear utterly organized from the outside. Actually the hierarchies and the organization is a perfect decise of pure chaos. Because if you analyze how are decisions taken, how are resources allocated, you will see that there is an enormous amount of waste involved, especially of human capital but also resources. There is very much fear driven decision making and the overall output and satisfaction is at a fraction of where it could be.

Question 10

I think the only way you can learn project management is by managing projects, very simple.

[...]

The best way to learn it, is by doing it.

Secondly, before starting discussing roles and behavior and very simple set of processes. In other words, by providing a very simple framework, a basic framework which the team then based on experience in field and environment can adapt to and experiment with. And

in this framework, there are a few key factors. One is learn to work with good briefings, so make sure you have a common understanding of what you are looking for before you start. Secondly, work with dynamically composed teams.

[...]

So make sure that everyone who joins the project, really wants to join the project. Thirdly, think about motivation factors, also short term motivation factors, long term motivation factors. I think this is really critical because if I just tell you go out and manage my project you will do it because you want your degree or you want your salary or you want to please me but I must make sure that anyone on the project is motivated and people have different motivation factors.

[...]

Then make sure that teams have a simple process they can work with and the process can be as simple as start with a briefing, get a commitment, provide value, present results, deliver feedback, have a good debriefing with your learnings, fully sufficient.

[...]

[Further inquiry]

I think so and I think it also has to do with the systemic problem in the academic world that many people who teach project management, actually are completely incompatible with project management and many people who actually never were into teaching project management but who have just been experiencing projects in various environments for many years could share their experience in a very simple way and does prevent students from following those old classical paths of behaving like management and telling others what to do and how to do it.

Question 13

I think you have to speak about size or dimensions of projects. Personally, when I coach people who start with project management or when I work with startups I am a big fan of very small projects to start with because that is where you learn most. So instead of giving a three week or a three month assignment, let's start with a one hour assignment and see what happens. Because if you have robust processes they are scalable and you can do the same thing in an hour as you can do for 3 months or 3 years. Then I also think you need lots and lots and lots of projects with different topics, different customers and different team constellations / different team sizes and maybe in different environments / different cultures. Because the more you are exposed to different factors, the more you learn what really matters.

Question 14

I think if you need to teach soft skills, then there is something fundamentally wrong with the environment you are in.

[...]

I think here it is much more question of having a learning environment where soft skills are present.

The idea of having a class in front of me and I would have to teach them soft skills that makes absolutely no sense. And I think soft skills to a certain degree can be misleading because they can be used to compensate for systemic deficits or for absence of process.

[...]

I think there are certain things which you might want to teach. Questions of respect, diversity inclusion, acceptance of other opinions, acceptance of other weaknesses especially in teams and this can be pretty eye opening if you look at it from an educational standpoint. And so I would say there are certain aspects that you can teach but I think the soft skills follow clarity in framework and not vice versa.

[...]

Suggested model

This dynamic here [partner company – students] is very classic.

[...]

I like this part of it (training center). I would move this part actually to the middle because this part should not be relating only to the education institute but it just be just as much accountable towards partner companies. So I like this part very much. I find this dynamic here very difficult because in general you actually just putting students in boxes and sending them via Fedex to companies where some so-called expert opens the box and then tells them what to do. So I see very little self-organization in it, I see very little independence and I see very little opening of enterprise structures silos in it. I would just like to break these walls. There are far too many. I would just like to tear down the walls and in that sense I am much more of a pull principle where also between the partner organizations, people can team up. Because I can tell you it is heavily frustrating if you are an expert and every year you get this Fedex box of students and they kind of jump out of the eggs and stand around and have no clue, it is utterly frustrating because you see no progress, they see no progress and it takes an enormous amount of time to get there I personally also believe that learning impact for students is very high on a topic area. If you do an internship at Swisscom you will learn a hell of a lot about telecom but unfortunately I also strongly believe that you will learn almost nothing about serious project management.

I like this neutral body here (training center). I think it should be countable to both sides or maybe even to 3: students, students faculty and customers. I think it can also be very small

and I strongly believe that the teams should be composed much more dynamically between the organizations the students.

[Further inquiry]

If you want this to happen, the easiest way to do it is just by starting your own school because I don't think it is compatible with today's schools but luckily in Switzerland you can open your school tomorrow. I strongly believe in the power of pull. If you have a clear message and If you show people what you want to do then you find out if there is a market for this and I think there definitely is a market for this but I personally think it's relatively difficult to do something like this within a current school or university. And if you expose yourself by doing it on your own, there is a really nice side effect because you will get an immediate response of the people who have been thinking about these things. I am sure there are any people that are thinking about this because if I were an expert at Swisscom then I would be frustrated and if I would be a good teacher here, I would be frustrated.

[...]

8.5. Transcript Sascha Wyss, 20.3.17

Question 1

It is a chance but it also has an impact on everyone of us. There is a lot more information, there is a lot more adaptation, change which is needed of everybody. So from that point of view everybody no matter if a private person or a professional has to be able to adapt constantly, has to be able to change, to learn constantly to be able to cope with the new development and that is the new reality.

Question 2

For Project Management this is a huge opportunity because every change actually triggers projects. So with projects you manage change. So the more change there is, the more projects are needed. And form that point of view it means that there would be much more need in the future of project management than even today and we see this increase.

Question 3

It doesn't have so much to do with the new market but just has to do with the maturity of project management. I think when project management started as a profession it was as long that the project was in scope, on budget, on time, it was a success and the more the profession gets mature, the more we actually look at whether the project does deliver value. How is the customers satisfaction to actually define if a project was successful or not.

Question 4

There are different numbers and I think it really depends on from which perspective you look at it. So I think we get an increase of successful projects because of these different perceptions. Because first of all the in scope, on time, on budget most of the time it doesn't happen. But this is the reason where these low number come from. But this is not really the point. A project can be all of that at the end but if the customer feels that he cannot use the tool that you create or that the changes do not create a values for business, it is not successful. And I think with the recognition of that and the change in how project management is conducted today, we will have more success which means through project management we create more value than we did before.

Question 5 (Projects which fail)

Projects can always fail because every project is different and then you have a million of reasons. So it might be that communication wise it was not really clear what the project should deliver, that a customer or the owner of the project has a wrong idea of what the project should deliver and there might be unforeseeable risks which can lead to big delays. It is not an exact science, it is not something a project manager could say if you do it perfectly according to PMBOK or whatever then you will always have successful projects, that is just not going to fly.

Question 6

[...]

Project management in just 15 years changed a lot and that is something a project manager has to understand: That what he learns today is not something he will be doing in this way in the next 20 to 30 years but that actually every year project management changes / evolves and here you have to stay on top.

Question 7

[...]

Question 9

The most ideal one is a projectized company structure which means that it is fully buys into project management. So that everything is done by projects.

[...]

Question 10

In principle there are some formalized project management majors, I think in a few universities. But in principle it's more learning by doing, it's not a formalized project manager education. There are trainings which are not very long, a week or so, in project management. Certifications like PMP for experienced managers or for junior ones the CAPM which is in principle the PMP without the experience but you cannot learn project manager.

Question 12

No in principle not. The point is that if you look at a formalized project management education in a week you can learn that or if you study for a PMP which doesn't matter if you do a certification or not, you need about 100-150 hours and you know what you have to know. And then obviously is the background which ou need to have which is either the really IT project manager which means it makes sense that you have kind of a formal education in IT, that you really deeply understand this subject or you're more like generic where it makes sense to have a business background and that is to learn on the business side or a MBA or something like that. But the rest has to come through experience. Now would it make sense that universities do offer a major in project management my answer to that would be probably no because project management is not something you should learn at university the same way you shouldn't learn at university to make a major as a farmer. It is more like an apprenticeship ship from my point of view. At the same time you have it, you are learning it but what I would say is that just as one subject at university project management is taught and ie the university of Fribourg does that. Because no matter which profession or which subject you learn at university, having a background / an understanding of project management really adds values. Be it if you later have to run a project no matter what actually your mater was or be it that you are actually the owner of a project, the

sponsor then you understand and have the background what a project is, why it is done and why it is so important to do things in a projectized way and I think that would really hep.

Question 13

I think for people who at one point of time feel that they want to be project manager they are the ways to do that. I don't even know if it's even realistic that somebody should say at 16 I want to be a project manager. Probably to learn first something a subject matter and then going to project is probably the better way. But the point is really the more common the understanding is for project management why it is important, why it is of advantage and of value for every business, the more actually successful project will be. Because then everybody is talking a common language and then they can work better together.

Question 14

People could say that 80% of what a project manager does is communication. So from that point of view I would say it is not like English, I would say that 50% or more of what a project manger has to be able to do to actually manage a successful project. So from that point of view for whatever a project management trainee is, to also include soft skills makes a lot of sense to also give the awareness how important it is and just to give some methods, some things people have to be aware of on the way. But that it is just clear that soft skills cannot be taught. These tips and tricks are helpful along the way and some will remember it in certain situations and can use that but in principle stuff can only be learned by doing it, by experiencing it.

Question 16

I absolutely feel that yes.

[...]

So still today there is way too much emphasis on the subject matter and not enough on the quality of a project manager and this usually also the reason why projects fail because it is still underestimated, the skill of project management. So just because somebody has taken evening classes in project management, does not make this persona good project manager. And on the other side, a very good experienced project manager can manage about any kind of project because in the end, the subject matter you can always get from the subject matter expert on the project. So it is more crucial to have somebody who can organize the whole thing, tract and control he whole thing, deal with the policies, communicates to all the stakeholders. I even see a danger: usually ie in IT, if you have project manager know how to code themselves, you see them then actually sit down and to start coding when they see that something is not going the right way or so. But in principle they do not have time for that. Because if there is a large project, it takes up all the time and then people get sidetracked by that. So from that point of view I would rather feel it is better if the knowledge of project manager is not so deep. Then the temptation is not there that they do something, they should not do.

Suggested model

It is an interesting approach I would say but there is a big but. The but is that there is probably no or few other disciplines that is so international as project management. Ie look at the Swiss project management culture, you have the government which have their own methodology. They are really swiss based. But if you look at all the big global companies they all go with PMI where they actually look for new project manager, they look for PMP. The reason is that it has an international credibility and wherever these people come from, Africa, US or here form Switzerland they know they have a certain standard, a common language and so on. That is the first thing you have to consider.

[...]

If I would be a student that would have a Bachelor degree: so I could either do that so I have something which is in Switzerland so that if I want to do something anywhere else, nobody would care at all whether I have done that or not or I could spend probably a fraction of the time doing a PMP or at least a CAPM at the beginning. Then I have an international certification which is respected all over the world and everybody will understand what I have done. Which one will I do? Most likely the second one and that is probably one of the reasons why that will fail.

The other reason is that every company itself has its own project management methodology and for them it is important that project management know that by heart and they are developed like that. So they rather take a junior like that and then train him on their internal project management methodology and have somebody which really speaks their language and does projects the way they want. Then they would not corporate with such a project management institute.

[Example]

The question is what is the scope. Because probably where it would be attractive would be for smaller companies, KMU's. But then again, the question is when someone has a Bachelor degree and even does such a project management education institute, would these people then want to go to a KMU? Most likely they want to go to one of the big players.

[...]

I think it is interesting but the way you have proposed it right now would kind of not work. And the problem is again that we see it then really as an individual profession which cannot be learned. It is way more important that when this guy does the Bachelor that he is exposed to project management that he can get all the information. So that afterwards he can without any further education make the decision to be a project manager and starts as that, doing a certification and then he might get old and get additional certifications. But I don't see it as something you would do after a Bachelor.

[Further explanations]

Well obviously, it would be especially with this corporation with this partner companies, he would be better prepared. It is just the question also if that would work with the partner company. I just thought about what do junior people do after the university at the moment? And what they are really doing is that they go to consultancies as an intern or so. If the partner companies would be consultancies I think that is the point where it would become interesting. But the problem is once again that they are very international. But if they would have kind of an institution which would say: "Well we train them, you pay us for example a certain amount but we are like a project management academy. So we ensure that all your consultants actually have the skill set of project management that is needed". Then on the other side the consultancy bring to the company and let them do projects, perhaps that might be interesting. Once again the problem would be that it would be only in Switzerland and consultancies are looking for global solutions so they would rather go for a central training academy they set up and they train their project management's globally than to make for Switzerland an exception. That could be the but.

[...]

Probably what would be even more interesting would be that to simply to make a project management apprenticeship or a technical afterwards but the problem is this Bachelor. Look at the job ads. You see something like project management job, Bachelor or Master needed in either Business, Finance or Technology / IT and I think: so what? Why do you want now this Bachelor or Master? Because as I see it, it is a different area. So if it is not important if you have a Bachelor in Business or Science, why do you need a Bachelor at all?

But that is also my experience. The whole university education for project management is highly questionable. I don't see a point why you should study at university to be a good project manager.

I like your idea but the question is where it would be. Perhaps it would be right after apprenticeship, perhaps after a KV-Lehre. That afterwards you do like a Technikum but after a Berufsmatura in this area and this might be a better idea. Because people that come to university they are still much more on the theoretical side and I agree there is a problem when somebody comes fresh from university and they have no experience and cannot be used. This can be in any profession. People that come from university they do not have practical experience. So for every profession you have to see how you deal with that. Now adding like a sort of apprenticeship after the university I don't know whether that is the way to go forward then you could start arguing that for any other profession too.

If somebody go to university and do the Bachelor, that they at least have project management know how while they do the Bachelor, makes for me a lot of sense. And the afterwards then they have to go to a consultancy and there work as an intern and there get the practical part which belongs to the theoretical part. But really creating a professional path for somebody who knows I want to be a project manager that would make a lot of sense. Ie after apprenticeship and have a special education for that and this could be very close to the model that you have

- Training center

Absolutely and one example is the organization change management. In principle if you look at one of these methodologies with the change cycle, how people experience change, how you can actually with the right messaging influence them that they accept the change and this is actually nothing else than soft skills. And that is talk today and the methodology. And from that point of view, I would absolutely agree that this should be included in which form ever but in a project management education these things belong. Absolutely agreed.

8.6. Transcript Nicolas Abbondanza, 21.3.17
Question 1

I agree absolutely with the key success factors defined here in this page. I think leadership will more and more be changed. The key success factors will be flexibility and diversity management. Then also the process competence that will be more and more important, more important than focusing on results. Self-regulating, no more linear hierarchies. In the future, you will work more and more in task force organizations with lateral powers, lateral guidance, lateral governance and these are new opportunities and also new problems for many organizations, for many companies independent of the size of the company.

Question 2

Project management will be more and more a success competence for companies. project management is the instrument or the method to realize strategies and is more and more a strategical topic and not only an operative topic. I think project management is growing up from in the bottom up manner. First of all, many companies have defined company processes, management processes. And then they also have a growing maturity of project management, more and more they have introduced project management methods. For a long time, project management was only an operative topic, not a topic of the CEO, not a topic of the C-Level. And now this is a changing moment in the awareness of project management. It means that the C-Level more and more agrees that project management is a strategic topic and they begin to grow up project management governance, project management systems to be able to improve project management competencies in the own company, in the own organization. And this is what we see, this is what we discuss also with the C-Level of companies and with the digitalization process and in the industry 4.0 process that this is more and more important.

Question 3

At the end of the day, the project is successful when the project delivers, what the customer needs, what he ordered. It seems to be simple but it is absolutely not simple because a project is something new, a project is an adventure, not only for the project manager but also for the customer. Usually the customer, the order of the project management is not clear at the beginning of the project. So the same big picture is not given between the project owner, the project customer and the project manager. So more and more they have introduced new challenges. The Agility is one of these challenges, the power is one of these challenges, the speed is one of these challenges. And a lot of companies speak about agile project and mean speed projects. So agility in most of the cases is not understood what it really means with agility and they see the speed in agility. Because in many companies the duration of the project is too long so they need speed and they think with agility they will generate speed. So this is one of the opportunities and one of the challenges of project management.

Question 4

I think most companies have project management competencies, individual project management competencies but they miss project management system, a systematic way to work. A project management governance top down which defines what are the guideline of project management in this sense.

[...]

Would you say that at the moment companies are handling that good or not so good?

Not so good because this part is well done (change the business). Because to organize a project management system, to organize a project management governance with the necessary project at strategical lever, at tactical level and at operative level will be more and more an issue.

Question 5

The awareness of the C-Level that the project management systems must be introduced as a governance part of the company and when we see they know exactly what they have to do in running the business but if the business becomes a project you cannot work alone in the introduced projects of business organization, so you have to reorganize, you have to become flexible, I have to become agile, I have to work with task forces and the well known company hierarchy will be changed and for a lot of people and organizations, not only private companies as well governmental organizations, this will be a challenge. Not to work in the well known structure but to reorganize the company task force oriented. This is the main challenge I think.

Question 7

If we speak about the competencies of a project manager, I think we also have a mindset change because the project manager cannot only be a topic specialist, he must be more and more a leader. Unfortunately, also today the mindset in the company is when the project manager knows absolutely perfect his topic, so he is the best project manager and it is not like this. As a project manager, you need to be a leader and leadership will be more and more important for project management. And also the capacity, the ability to work with changes, with agility. You need a fluid intelligence for more and more fluidity in the way of work of a project manager.

[...]

Question 8

I think you must be open-minded, you must be clear that you have never finished to learn. You also have to manage diversities in the team. This means other religions, other cultures, women and men. The diversity success factors you have to integrate successfully in your project.

[Further inquiry]

On of the growing up this competence are making courses in school and the other part is making life experiences.

[...]

To make experience on working, on doing. Certifications like a IPMA or a PMI certification helps to grow up a certain way of systematic work, a certain way of methods but the rest you have to do experience, with doing and with making mistakes. We have unfortunately in Switzerland a no failure culture and this is wrong in project management. You have to fail. You have to learn to do the things right and you do the things right. This is efficiency and effectiveness.

[...]

Question 10

[...]

The ability to act, I think this is important because with the Bologna reform we do not really have support at management level. If I search a senior consultant at my company I have 10 people that are interested. Of these 10 people I have 8 with Master degrees and 2 with doctor degrees and this is the usual case. But the ability to act I cannot see of that. With this Bologna reform we now have in the market a lot of Ma's, MBA's, CAS, DAS. We have a lot of degrees but we have no information about the ability to act of these people. We can see if he performs, when he works. I think more and more we have to introduce in this selection, how well is the ability to act, the ability to work, the ability to perform. And in order to orient the project management education, this must go in this direction.

[...]

It is important that if I can send this person tomorrow to a customer and he performs or not.

Is this person having a lot of theoretical know-how but not able to perform at a customer's platform.

Question 13

Yes to give more and more importance to the practical part and not only to the theoretical part and I think the IPMA certification goes into the right direction.

[...]

Question 14

[...]

I told you the best topic expert is not the bets project leader. And normally the best topic expert has not a lot of soft skills. He comes from the topic part, from the technical part and

normally does not have enough empathy to introduce people introduce people in a task force team, working in a lateral guidance. It means to be a leader without power.

[Further inquiry]

I think it must be included but I think a good mix between soft skills and between tactical. methodical and systematical skills is important. Because a lot of people give more priority to the soft skills and that is not the right way. A project leader at the end of the day has to deliver results and he cannot be as well the psychologist in the team. But on the other side he must also have a certain empathy to introduce the right people into the project, into the organization of a task.

Question 15

Yes, empathy, open mindness, communication capacity is a key success factor. Communication is really important because a project must often be in contact with all the stakeholders.

[...]

He cannot be only oriented to the processes, for the he has the specialists of the task force who are oriented to the processes of the working packages, to generate results of the working package. The project manager must be more a communicator, an introducer of all stakeholders and he must be working in a way to see before what happens, proactive working. These are the key capacities. And then the fluidity.

Question 16

I think you must have a certain experience to be an expert in some topic. But as a project manager you cannot put the expert part back from the leadership part.

[...]

Suggested model

Yes it is absolutely a possible approach. I think one point you have to focus is that this position of project management needs trust. Trust also from the company. Project is not only a training platform. Project is more and more a critical success factor in a company. So for me as a C-Level member I have to be sure that I can trust the project manager. And if he comes from a school, he may don't receive enough trust for this position.

[...]

Do you get the necessary trust of the company, of the project organization, of the project owner to make these experiences?

[...]

This organization must assure to the project owner that the organization takes the responsibility of leading and supporting the trainee project manager.

[...]

If you are able to receive the necessary trust from the two members of the organization, that would be an approach.

Interesting for students?

I think yes because this is an opportunity to make sure that this ability to act can be improved, can be realized and can be also showed.

Independent training center?

This is a good idea. This coaching part is an important part.

[Example of own company]

Would students be better prepared with this model?

Yes I think with this experience that is a good experience. Because a lot of C-Level members tell you exactly the same what I have told you today that they have a lot of managers with certificates. Today we have this as well pushed by the HR organizations. We have a lot of certificates, a lot of diplomas and all of these only show me that you have the power to learn but not the ability to act. And with an approach like this you can show both. You can show the methodical and theoretical know how but you can show as well the ability to act.

[...]

Today with all this speed, with all these agilities, with all these opportunities, you have no time. You have to go into a company and you have to perform immediately. So you don't have the time to be supported to be trained into the company. Because all the time you work, every hour is money. And companies need people to come with certain experience, with certain certificates and abilities which go immediately to perform.

8.7. Online survey for business students

Introduction

First of all, many thanks for taking your time :-)

This survey is carried out for my Bachelor thesis which is about the future of project management education for emerging project managers relating to the requirements of the fourth industrial revolution.

It will take you about 10 minutes.

All the data and information you give is confidential and will only be used for this thesis.

Personal information

1. Gender *

◯ male

◯ female

2. Age

Please choose... ▼

3. Do you study a business topic? *

◯ yes

◯ no

4. At which school are you studying? *

Project management

If you have to choose an option on a scale, the % range in brackets is intended to clarify this option.
For the first question for example, it would mean that if you choose the option "Maybe (50-70%)" that you are 50-70% sure to do an education in project management.

5. Have you ever worked as a project manager? *

○ yes

○ no

6. Could you imagine working within project management one day? *

○ Almost Unimaginable (0-10%) ○ No (10-30%) ○ Not my first choice (30-50%) ○ Possibly (50-70%) ○ Yes (70-90%) ○ Definitely (90-100%)

7. Could you imagine doing a project management education? *

○ Definitely (90-100%) ○ Yes (70-90%) ○ Possibly (50-70%) ○ Not my first choice (30-50%) ○ No (10-30%) ○ Almost Unimaginable (0-10%)

Fourth industrial revolution

The term "Leadership 4.0" emerged from the fourth industrial revolution.
The fourth industrial revolution is used to describe a new technological development, which is so extensive that it is even claimed that it comes along with a profound change of the human civilization. This includes for example the elimination of hierarchies, increased autonomy of employees and the appearance of a number new state of the art technologies.

The market environment of the fourth industrial revolution is often described with the term VUCA which stands for Volatile, Uncertain, Complex and Ambiguous.
This new market asks for a new thinking model of leadership.
As a result of a high frequency of disruptions and technological innovations, the average lifetime of companies is continuously shortening.

8. Above you can find an explication about the fourth industrial revolution. How strong do you think that this revolution impacts your future business environment? *

○ Huge impact (90-100%) ○ Big impact (70-90%) ○ Moderate impact (50-70%) ○ Small impact (30-50%) ○ Hardly any impact (10-30%) ○ Irrelevant impact (0-10%)

116

9. How do you think that it will affect your daily work? *

[ ]

10. What do you think makes a project successful in this new market environment? *

- [ ] Finish the project at the lowest possible cost
- [ ] Deliver the highest possible value to the customer
- [ ] Finish the project as fast as possible
- [ ] Finish the project on budget
- [ ] Finish the project in scope
- [ ] Finish the project in time
- [ ] Working with the latest tools and methods
- [ ] [_____]

11. Are projects successful at the moment according to your experience? *

- ( ) Almost every project is successful (90-100%)
- ( ) Lots of projects are successful (70-90%)
- ( ) Several projects are successful (50-70%)
- ( ) Some projects are successful (30-50%)
- ( ) Hardly any project is successful (10-30%)
- ( ) Irrelevant number of projects is successful (0-10%)

12. Why do you think projects are successful / unsuccessful at the moment? *

```
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
```

13. In order to be a successful project manager which competencies do you think you would need? *

```
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
```

14. How and where should these competencies be learned? (on your own, in a school, on the job...?) *

```
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
[                                                                    ]
```

15. If you would work as a project manager, how would your company have to be structured / organized (hierarchy) that you could optimally fulfill your job? *

○ Line organization (strict hierarchy)

○ Functional (organized by function)

○ Geographical (organized by geography)

○ Matrix (two dimensions)

○ Projectized (organized by projects)

○ No structure at all

○ [   ]

Project management education

16. Did you already attend some project management classes during your studies? *

◯ yes

◯ no

17. What kind of education models for project management have you already heard about? *

☐ Certificate

☐ External course (evening classes)

☐ University / Business school

☐ Education programme of employer

☐ [   ]

18. How do you think that these education models prepare you for your future role as a project manager? *

	Best possible preparation (90-100%)	Good preparation (70-90%)	Moderate preparation (50-70%)	Not the best preparation (30-50%)	Bad preaparation (10-30%)	Worst possible preparation (0-10%)	I don't know
Certificate	◯	◯	◯	◯	◯	◯	◯
External course (evening classes)	◯	◯	◯	◯	◯	◯	◯
University / Business school	◯	◯	◯	◯	◯	◯	◯
Education programme of employer	◯	◯	◯	◯	◯	◯	◯
Other (if you wrote something in the empty box in the question before)	◯	◯	◯	◯	◯	◯	◯

119

19. Which adaptions do you suggest on the educational side in order to improve project management education? *

[ ]

20. Research often talks about the need for soft skills (personal attributes that enable someone to interact effectively and harmoniously with other people) in project management. It could be argued that this is not within the responsibility of project management education but has to be obtained by the students themselves. Would classes which focus on developing your soft skills be useful for you? * *

- ( ) Irrelevant (0-10%)
- ( ) Not very useful (10-30%)
- ( ) Not useful (30-50%)
- ( ) Useful (50-70%)
- ( ) Very useful (70-90%)
- ( ) Most important part (90-100%)

21. There is an ongoing discussion on whether project management is profound enough to be an independent discipline or whether it is just taught to experts, who have to lead a project, in the form of evening classes. What is your point of view on that? *

- ( ) Project management should be an independent discipline (profession "Project manager")
- ( ) A project manager should be an expert who had evening classes in project management
- ( ) Project management should only be learned within a company
- ( ) Project management should be taught in evening classes
- ( ) I don't know
- ( ) [ ]

120

Suggested model

In my thesis I developed a new possibility of teaching project management.
This education is offered by an independent, non-profit organization. The organization works together with companies which let the students work within their projects. The education process is divided into 4 modules:

- Module 1: Student learns basic hard skills and tools
- Module 2: Student works in a first project on basic tasks
- Module 3: Student goes back to school where he or she learns advanced skills and tools
- Module 4: Student works in another project with advanced responsibilities

For each module the students receive a degree and the final degree is the average of the 4 grades.
In the working modules, the student has an expert which gives support.

During these 4 modules, the student regularly visits trainings which help him developing his soft skills.

22. Would you be interested in visiting such a programme? *

○ Very interested (90-100%) ○ Interested (70-90%) ○ A bit interested (50-70%) ○ Not that much interested (30-50%) ○ Not interested (10-30%) ○ Not interested at all (0-10%)

23. What are your personal benefits of such a programme? *

24. What are your personal drawbacks of such a programme? *

25. How do you think that this programme would prepare you for your future activity as a project manager? *

○ Best possible preparation (90-100%) ○ Good preparation (70-90%) ○ Sufficient preparation (50-70%) ○ Not sufficient preparation (30-50%) ○ Bad preparation (10-30%) ○ Worst possible preparation (0-10%)

26. How do you like the different parts below and how important are they for your selection of an education programme in project management? *

1 = Don't like this part at all
6 = This part is great

	1	2	3	4	5	6	Importance
							-- - + ++
Independence of institute	○	○	○	○	○	○	○○○○
Mix of theoretical and practical education (ability to reflect)	○	○	○	○	○	○	○○○○
Projects are carried out in a decentral and participative way	○	○	○	○	○	○	○○○○
Lectures about behavioral competences (soft skills)	○	○	○	○	○	○	○○○○
Possibility to work for two companies (work experience)	○	○	○	○	○	○	○○○○
Salary for the working modules	○	○	○	○	○	○	○○○○
Selected partner companies (ensured minimum standard)	○	○	○	○	○	○	○○○○
	○	○	○	○	○	○	○○○○

122