Facilitating Corporate Project Sponsorship

Developing Industry Connections for Management and Technology Projects at L'Haute École de Gestion in Fribourg, Switzerland

Interactive Qualifying Project Report completed
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Abstract

This report examines how corporate sponsorship of student projects can be facilitated and maintained by L'Haute École de Gestion-Fribourg (HEG-FR) in the new Bachelor of Business Administration in Management & Technology degree program. We interviewed both academics and industry professionals to gain their perspectives on project-based curriculum, isolating the perceived motivators and deterrents of project sponsorship. We then give recommendations on how the HEG-FR can create new and improve existing relationships with sponsors as well as ensure the longevity of the program.

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Glossary of Terms

Coding	In the context of thematic content analysis, coding is the process of identifying and tagging key words and phrases in the primary documents.
Co-Op	A six-month internship that is part of a university curriculum. Most co-op models alternate six months of company work with six months of academic coursework. Co-op is a global model.
European Credit Transfer System (ECTS)	System which establishes standardized credit-hours for university classes across Europe. Implemented as part of the Bologna Process.
Global Perspective Seminar (GPS)	This seminar introduces WPI first-year students to university research and project work. Students learn about one of the grand challenges facing our world and carry out a project relating to material covered in class.
Hard Skills	Skills and abilities concerned with knowledge that could be obtained through traditional academic pursuits. Examples of hard skills include: mathematics, writing, typing, computer programing, and specialized knowledge.
Humanities and Arts (HUA) Project	After finishing five classes in humanities or arts, all WPI students complete a capstone project in their selected area of focus. Projects are either individual research projects that are guided through a seminar, or are a demonstration of skills and talents through a performance or portfolio.
Interactive Qualifying Project (IQP)	All students at WPI must complete this graduation requirement. Students, typically in their third year, work in small teams on an issue outside their major field of study at the intersection between technology and society. Methods emphasize social science research techniques, written and oral presentations of findings, and global perspectives.
Intern	An undergraduate student who is hired to work at a company for a set period of time. Internships usually focus on introducing the student to the work of the company.
Lecture	The standard model of instruction at universities. Faculty (and sometimes guests) delivers a prepared lesson to a group of students. Visuals may aid the lesson, but information is predominantly conveyed orally.
Major Qualifying Project (MQP)	All students at WPI must complete this graduation requirement. Students, typically in their final year of study, work individually or in small teams on a research or design capstone project in their field.

Mentor	Someone who provides individual undergraduate students with guidance and career advice including the job application process, career goals, class selection, or internships.
Project	An educational model where students work individually or in teams on a pre-defined task designed by an outside organization or university faculty. This work is unpaid as students receive academic credit for their work. Project work is conducted under the supervision of a faculty advisor from the university, and their sponsor does not directly manage the student team.
Seminar	An educational model whereby students learn through a dialogue with faculty and peers. Seminars can be thought of as lectures with fewer students and more student interaction.
Small and medium-sized enterprise (SME)	A company with fewer than 250 employees.
Soft Skills	Skills and abilities that contribute to interpersonal interactions. Examples of soft skills are: leadership, teamwork, communication, organization, and etiquette.
Sponsor	Company or individual who provides students with clearly defined project objectives, necessary resources, guidance, and a professional working environment.
Thematic Content Analysis	A method of interpreting qualitative data where recurring themes are identified and interpreted from a collection of primary sources.

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Executive Summary

L'Haute École de Gestion-Fribourg (HEG-FR) is designing a new Bachelor's of Business Administration in Management and Technology (M&T) degree program. The curriculum aims to create graduates competent in both managerial and technical fields. This is a particularly strong combination in an economy predominantly comprised of small and medium-sized enterprises (SMEs), where it is necessary for employees to be well-versed in multiple fields. Students will gain first-hand experience through completing corporate-sponsored projects.

The objective of our project is to make recommendations on how the HEG-FR can facilitate corporate sponsorship of student projects, and maintain these relationships over time.

We performed a thematic content analysis on interviews conducted with professionals in both academia and industry. Interviews were held in-person, over the phone, and via email.

Our analysis identified five motivators for companies to become involved in project sponsorship: producing cost-effective solutions, accessing innovation, recruiting, networking, and contributing to education.

Conversely, we discovered three main reasons why companies are apprehensive to participate. First, they are concerned first and second-year bachelor students are too inexperienced. Secondly, they do not see enough value in sponsoring project work. Lastly, they are unsure as to how student teams may be incorporated into their company. In particular, companies are reluctant to work with students who are too young to be recruited for employment. Additionally, they do not see how the benefits of sponsoring projects outweigh the costs of involvement. Our interviews also revealed that long-term project sponsorship is most commonly maintained through personal contacts between the company and university that must be carefully cultivated and maintained.

We recommend that the HEG-FR optimizes their search for corporate sponsors in three ways:

- **Strengthen alumni network:** Professionals who have a connection to either the HEG-FR or Fribourg are more likely to participate in sponsorship and maintain a long-term relationship.
- **Refine course and curriculum descriptions:** Many of our interviewees did not understand how project work could be incorporated into their company. In part, this is due to the terminology used in the current project descriptions.
- **Implement Preparatory Courses:** Students would benefit from classes that compensate for gaps in their knowledge to prepare them for early project work.

1 Introduction

1.1 The Proposed Program

The new Bachelor of Management and Technology degree program at L'Haute École de Gestion-Fribourg (HEG-FR) is an interdisciplinary degree program that will produce graduates who are capable intermediaries between the management and technical divisions in any company, but specifically targeted for the small and medium-sized enterprise (SME) market in Switzerland. Within the program, students' coursework consists of 60% management courses and 40% technology courses. Students chose one competency in each of the Management and Technology disciplines. The options are:

Advanced Management

- SMEs & Entrepreneurship
- Leadership, Organizational Behavior & HR
- Marketing, Strategy & Innovation
- Finance & Accounting
- Supply Chain Management

Technology

- Information & Communication Technology
- Life Science
- Engineering
- Architecture & Construction

As classes are taught in French, German, and English, students are expected to be proficient in all three languages by the time they graduate. This trilingual approach is unique among similar programs.

To strengthen students' practical, interdisciplinary skills, all students will complete a sequence of five semester-long,[1] industry-sponsored projects. All five projects can be completed with the same company for the duration of the students' studies; however, this feature is dependent on what projects are available. For full-time students, project work will begin in the first semester, while part-time students begin project work in their third semester. Students will work in small teams of four to six to address questions posed by companies. Students will also work closely with companies and faculty advisors to produce meaningful solutions.

1.2 Market Needs

Small and medium-sized enterprises (SMEs) make up 99% of industry in Switzerland and employ two-thirds of the total workforce (Higher Education and Research in Switzerland, 2015). SMEs can be categorized by their size and structure: micro SMEs have fewer than 10 employees, small companies have 10-49 employees, and medium companies typically have 50-249 employees. Corporate structure plays a role in categorizing businesses as well, especially when companies are close to 250 employees. Large, family owned companies act much more like SMEs than medium-sized companies with isolated departments and bureaucratic management (Baldeggar, 2015). Regardless of their classification, SMEs demand employees with interdisciplinary skills, but large companies have a need for interdisciplinary employees as well. Although this project program is intended to produce employees for SMEs, large, multinational corporations in Switzerland including Nestlé, Novartis, Roche, and Swatch also need employees who can work between the business and technical departments. A project based-education, such as the one proposed in the

[1] Each semester at the HEG-FR is 16 weeks long, including one week for midterms and one week for final exams. The projects only run over the remaining 14 weeks (Baldeggar, 2015).

M&T degree program by the HEG-FR, will prepare interdisciplinary students for employment in a variety of working environments.

1.3 Our Project

We worked with the HEG-FR to evaluate how project work within the M&T degree program can be effectively communicated to potential sponsors. Our sponsor, Dean Baldeggar, will be meeting with Swiss government education officials in November 2015 to secure funding before the program is set to begin in September 2016. Statements from interested companies will be important for the November meeting as they show support for the curriculum. Our objective was to give the HEG-FR a better understanding of how companies perceived project sponsorship so as to strengthen their argument for pitching corporate involvement. Moreover, we were to make recommendations to improve the program for both short-term efficacy and longevity. Our research tasks included:

- Evaluate corporate understanding of the project program,
- Gauge corporate interest,
- Review similar project programs, and
- Identify potential challenges of the program.

As well as providing recommendations on:

- Increasing corporate involvement with project work at the HEG-FR,
- Structuring preparatory programs to be most beneficial for Swiss students, and
- Ensuring the program's longevity.

2 Literature Review

The primary objective of this project was to make recommendations on how the HEG-FR can facilitate corporate sponsorship of student projects, and maintain these relationships over time. In this review of literature, we provide further detail regarding the structure of the Swiss Education System and accreditation standards. We then proceed to examine both the structure and learning outcomes of project programs, and follow with a discussion on the long-term maintenance of corporate and university partnerships.

2.1 The Swiss Education System

Higher education in Switzerland is different from the U.S. in that Swiss students pursuing a bachelor's degree tend to be older and more experienced than their American counterparts. Our project focuses on a bachelor's degree program in Switzerland; therefore, it is important to understand the Swiss educational system as a whole and the backgrounds of incoming students.

In Switzerland, publicly funded universities are far more popular than private institutions (Baldeggar, 2015). Yet, in the United States, private colleges and universities are the norm. Public universities in Switzerland are required by law to operate under the accreditation standards of the Bologna Process, similar to how WPI subscribes to the Accreditation Board for Engineering and Technology (ABET). The HEG-FR fully satisfies the Bologna accreditation standards, ensuring that the M&T degree program is viable.

The Bologna Process is a set of guidelines governing higher education in Europe. The Bologna Process is part of the European Higher Education Area (EHEA), which was launched in 2010 (Official Bologna Process). Switzerland and forty-six other countries, mostly in Europe, subscribe to the Bologna Process, European Credit Transfer System (ECTS), and European Higher Education Area (EHEA). For Switzerland, compliance is required by law. As a result, the M&T

degree adheres to these standards in order to receive crucial federal funding that will hopefully be secured at a meeting between Dean Baldeggar and government officials in November 2015.

The accreditation standards that govern the Swiss education system also place an emphasis on the ability for students to move between countries without losing course credit. The EHEA was a major component of the Bologna Process that took effect in 1990. Their mission is to "ensure more comparable, compatible, and coherent systems of higher education in Europe" (Official Bologna Process). These standards allow students to complete more international coursework by implementing the European Credit Transfer System (ECTS). The ECTS is a system for credit accumulation that allows for transparency between universities and different forms of study. Credits are allocated based on the time required to complete all aspects of the course. All university degree programs at the two upper tier educational levels in Switzerland are required by law to use ECTS hours (Bologna Process). Internships, project work, traditional classes, self-study, research, and other forms of educational endeavors can be approved for credits under the ECTS (ECTS users' guide, page 2). The project work component of the M&T degree, the core of our project, is completed by the students for credit in the form of ECTS hours as opposed to traditional monetary compensation.

A typical full-time course load carries a weight of 60 ECTS credits per year, but a majority of the undergraduate students at the HEG-FR study in the part-time program (Baldeggar, 2015). Part-time programs are completed over four years, while full-time programs are completed in three years. Finally, part-time students are concurrently attending university and working in industry for a significant portion of the work week (Baldeggar, 2015).

2.2 Similar Programs and Educational Theory

Project-based curricula may be a more effective educational model than the traditional lecture-based model. According to Mills & Treagust (2003), while lectures are the most common teaching practice in engineering curricula, they often do not prompt students to account for the broader social, environmental, and economic implications of their profession. Taking WPI's well-developed project program as an example, it is evident that project based work strengthens students' job skills. The study entitled *Benefits of a Project-Based Curriculum: Employers' Perspectives* outlines the benefits employers saw in hiring graduates from a project-based curriculum at WPI. More specifically, "… graduates from WPI possessed especially strong skills in the areas of communication and collaboration—qualities that…the study showed were strengthened through participation in project-based learning" (Vaz and Quinn, 1). Therefore, by implementing a project-based curriculum into the new degree program at HEG-FR, graduates will be better equipped for employment because they have skills that apply outside of an academic environment.

Project-based learning is characterized by the practical application of knowledge and technical skills learned in the classroom. Theoretical material learned in lecture is put into practice when students complete project work, especially in industry. The application of theoretical knowledge develops students' skills to enhance their work in industry (Lutz & Schachterle, 1996). Students in the M&T program will constantly be involved in project work, honing their skills and knowledge until they graduate. As described by Lutz and Schachterle (2015), "A project-based learning curriculum makes recruitment, training, integration, and advancement of employees easier for employers." This hands-on approach to learning provides a powerful selling point for HEG-FR to use when pitching the new program to potential project sponsors and employers.

Real-world experience that students gain from project-based work cannot be replaced by problem-based learning that is rooted in theoretical projects contained within the classroom. According to a survey conducted by Dym et al (2005), students who participate in problem-based curricula do not have the opportunity to apply their knowledge in practice. These students do not gain experience in hands-on designing and constructing, which is critical for engineering disciplines. It is imperative that students of the new Management and Technology Bachelor's program gain practical experience in their field through the completion of ongoing project work. The skills gained from project-based work will better prepare future graduates for employment than the skills they would gain from a theoretical and problem-based curriculum.

WPI found that, within their own curriculum, the experience of an off-campus project could not be reproduced on-campus. A recent study found that "survey respondents who had completed at least one project away from campus reported significantly greater positive impact not only in areas in which it was anticipated—expansion of worldviews and personal development and enrichment—but in very specific areas of professional development related to interpersonal relationships, communication skills, and understanding of ethical responsibilities" (Heinricher et al., 2014). In the study, projects that were carried out locally with an outside sponsor were still considered to be off-campus; some of the domestic off-campus project centers were as close as Nantucket, Boston, and Worcester. Additionally, Heinricher et al. included IQPs[2], HUAs[3], and MQPs[4] in their research. Regardless of the projects' focus, when students are immersed in work outside of academia, their professional skills are developed. The projects proposed by HEG-FR

[2] Interactive Qualifying Project – See glossary for details
[3] Humanities and Arts Qualifying Project – See glossary for details
[4] Major Qualifying Project – See glossary for details

resemble off-campus, domestic projects. Projects will be sponsored by partners outside of the university from different areas across Switzerland. The Heinricher et al. study shows promise for the proposed program at HEG-FR, suggesting that the new M&T program will allow students to develop skills outside of academia.

2.3 Academia and Industry Relations

Feedback derived from industrial partnerships within academic programs could strengthen the curriculum for future students. When developing ongoing courses or creating new ones, academics value close links with companies and their feedback on course material. (Soltani et al., 2013). In the context of the new M&T program at HEG-FR, close collaboration between industry project sponsors and academics will help improve the curriculum over time through a constant feedback loop. Additionally, students know that real-world experience is important, and are therefore more inclined to enroll in a program that offers them the opportunity to work closely with industrial companies. The M&T program emphasizes sponsor-student interactions, and this has the potential to continue generating student interest and enrollment in the degree program. These factors contribute to the longevity and growth of the program. A close relationship between industry and academia aids in ensuring that students are receiving an education that prepares them for the industry that they intend to enter.

Cultivating a long-term relationship between students and industry partners may prepare students for work in their field after graduation and give sponsors revealing insight to potential hires. Students whose project was sponsored by an outside company feel that mentor programs enriched their education, experience, and employability. (Soltani et al., 2013). University–industry links benefit students by developing professional experience and skills, bringing additional funding to university programs, and helping them find a satisfying career (Lambert, 2003; Santoro

and Chakrabarti, 2002; Royal Academy of Engineering, 2007; Tynjälä, 2008; Wood, 1983). Thus, a project program that allows students to work closely with the same company throughout the course of their studies, such as the one proposed at HEG-FR, is effective in preparing students for industry.

Project work can nurture graduates to be better trained for the field and make the recruitment process much easier for companies. In a study conducted by Soltani et al (2013), researchers investigated how maintaining a relationship between students and employers throughout the course of their degree program affects the recruitment practices of industry partners. Research shows that 93% of companies agree that through sponsoring students during undergraduate studies, they are able to better fulfill the company's recruitment quota of well-qualified graduates. Companies value the opportunity to recruit talented students, stay connected with academic departments, and recoup the costs of training graduates during the first months of their employment. Sponsorship is an effective recruiting tool; research reveals that over 65% of the sponsored students will stay with their sponsoring companies (Soltani et al., 2013). When attempting to engage new companies as project sponsors for the M&T program at HEG-FR, it is important to note the recruiting possibilities that accompany the role of project sponsorship. Students, industry and academia can benefit greatly from the student-industry interaction that results from long-term, corporate-sponsored projects.

Strengthening the relationship between academia and industry can promote the innovation of new technologies for small and medium-sized enterprises (SMEs). Dornbuscha et al. (2015) have shown that in the United Kingdom, inventions that emerge from collaboration between industry and academia are likely to be stronger catalysts for technological progress than those facilitated by industry alone. Universities involved with companies in technology and innovation

can increase the knowledge and competence levels among different technology firms, thereby spurring new innovation in industry (Dornbuscha F., Neuhäuslerb P., 2015). This suggests that the SME market in Switzerland can benefit from stronger relationships between academia and industry.

3 Methodology

Our approach to evaluating academic and industrial perspectives on corporate project sponsorship consisted of a series of interviews followed by a thematic content analysis. In this chapter, we explain the justifications behind our decision to collect our data through this method. We then discuss the differences in our interviewing techniques between academia and industry as well as provide brief profiles of the interviewees. This is followed by a description of our thematic analysis.

3.1 Interview Method Justification

Interviews were the most appropriate method for personal contact with industry and academic individuals. We were looking for more in-depth, qualitative information than a survey could provide, and focus groups would have been logistically challenging in the busy, corporate world. Short interviews, between 30 to 45 minutes, were respectful of the representatives' time, while still allowing us to obtain substantive data.

After our arrival on site, new research questions arose outside the purview of our original project goals. Unfortunately, this made in-person interviews with WPI faculty impossible. Instead, we conducted interviews over the internet using Skype. If an interviewee was unable to Skype, we simply emailed them our interview questions and obtained the answers in writing. We also hoped to interview faculty at Northeastern University about their relationships with co-op sponsors, but were unable to establish any contacts.

Asking potential sponsors for their feedback on the degree program helped us to further understand its strengths and shortcomings. In particular, we focused on the project work component from the sponsor's perspective. During the interview, conversation was guided toward the representatives' thoughts on: hiring a part-time intern, sponsoring a semester-long project,

giving guest lectures and seminars, participating in a mentorship program, and previous experience working with undergraduates. Additionally, interviewees were given examples of various levels of corporate involvement and were asked to speak to the merits and shortcomings of each option. Interviewees were also provided with an outline of the proposed project progression students would follow through the course of their studies. They were asked to speak about available projects within their companies. The information on this sheet is available in *Appendices A & B.*

3.2 Perspectives from Existing Academic Project Programs

3.2.1 Worcester Polytechnic Institute

To better understand how relationships are formed and maintained between a university and project partners, we interviewed several faculty from WPI. Our subjects included Professors David Finkel, Kristin Wobbe, Diane Strong and Kevin Sweeney. Assessing a well-established, project-based degree program was a major component of our research. WPI has developed both a successful project program and strong relationships with sponsors.

Professor David Finkel has directed the Silicon Valley Major Qualifying Project (MQP) Site for 15 years, working closely with companies to facilitate student projects. This MQP site is for Computer Science, Electrical and Computer Engineering, and Robotics Engineering and undergraduate students who complete a project for industry receive the equivalent credit of a bachelor's thesis at other institutions. Kristin Wobbe, Associate Dean of Undergraduate Studies, coordinates the Global Perspective Seminar (GPS) at WPI. GPS is a program designed to introduce and acclimate first-year students to project-based work. We interviewed Professor Wobbe to collect information on the challenges and benefits of having young, inexperienced students carry out projects. Professor Diane Strong is an experienced MQP advisor in the Robert A. Foisie School of Business at WPI with an expertise in Management Information Systems (MIS). Her area of

expertise is similar to that of Professor Finkel, and we asked her additional questions that focused on business-related and interdisciplinary projects. Professor Kevin Sweeney is the director of the Wall Street MQP site, and has experience working with project sponsors and business-related projects. Professor Sweeney also maintains an Executive Advisory Board for the Wall Street MQP Center in order to keep in contact with past and present corporate project sponsors. Given his experience in maintaining and developing partnerships, we asked additional questions targeting this area. Interview questions for WPI faculty can be found in *Appendices B-E.*

As a model program, our sponsor suggested that we examine the project-based Industrial Design Bachelor's degree program at the University of Applied Sciences-St. Gallen (FHSG). In order to examine the relationship between FHSG and its project partners, we interviewed Dr. Lukas Schmid, the director of Design and Engineering at FHSG. This university is known to be one of the leading business schools in Switzerland and its emphasis on project-based curriculum motivated our pursuit of an interview.

3.3 Understanding the M&T Degree and Project Program

A complete understanding of the degree program was necessary to inform potential partners of its objectives and methods. We became experts in the program by reviewing all the literature provided to us by the HEG-FR previously and upon our arrival, compiling a PowerPoint visual aid, and translating additional documents to supplement our knowledge. In interviews with potential corporate project partners, we presented them with relevant overviews of the degree program including details on the academic structure, project program, and proposed project sequence. We clarified any questions interviewees had and documented their concerns. Through our knowledge of the program, we attempted to convey Dean Baldeggar's vision for the M&T

degree. The short PowerPoint presentation given to industry professionals is on file with this report**.**

3.4 Industry Review

By researching companies and their representatives prior to interviews, we learned basic information regarding each company as well as the interviewee's background. Using this knowledge, we tailored our interview questions for each individual to add further depth to our data. In order to compile this preliminary information on interviewees, a 'one-sheet' was developed for each company and contact that gave pertinent information in a concise format. These included information such as: the company's mission, values, industry, history, familiarity with the program, and previous involvement with universities as well as the interviewee's role at the company, their previous education, and previous employment. For each interview, one person developed the 'one-sheet' and briefed the group on pertinent information to be used when developing auxiliary interview questions. This method optimized the time spent by the group on becoming familiar with each interviewee prior to the interview. Most information compiled in the 'one-sheets' originated from the companies' websites, additional news sources, and professional social networking sites such as LinkedIn.

All of our interview subjects were contacts we received through our sponsor and other staff at the HEG-FR. Our sponsor scheduled four of the six interviews while the other two industry interviews (Immoscout24 and Johnson Electric) were independently scheduled. The majority of interviews took place at each company, with the exception of Hans-Jörg Mihm of Extramet, which was conducted at the HEG-FR. A summary of the interviewees is included below:

- **Hans-Jörg Mihm** (CEO of Extramet AG): Mr. Mihm is highly involved in the development of the M&T degree program and sits on the advisory board for the program.

Our interview with Mr. Mihm reflected his instrumental role in the degree program more than his role at Extramet.

- **Mike Baur** (Founder and CEO of the Swiss Start-Up Factory (SSUF))**:** Mr. Baur is the vice president for the new Innovation Lab at HEG-FR, of which SSFU is a strong partner. SSFU is a start-up incubator with high standards for their clients.
- **Christian Gmür** (Managing Director at Leonteq Securities AG): Mr. Gmür is an alumnus of the HEG-FR and an early partner of the M&T program. He is involved with piloting a new mentorship program at Leonteq. His company is a global leader in structured investment products.
- **cYrille Boinay** (CEO of bComp)**:** bComp is a small company that designs high-performance, natural fiber materials in Fribourg. Mr. Boinay has a strong history of entrepreneurship and is an alumnus of the HEG-FR.
- **Martin Waeber** (Managing Director of Immoscout24): Mr. Waeber was heavily involved in the development of the M&T program; however, he was unable to continue that involvement after his recent promotion to Managing Director. Immoscout24 is the real estate subsidiary of Scout24, a larger online marketplace known where users can find cars, jobs and other commercial products.
- **Enno de Lange** (Manager of the Research Center at Johnson Electric in Murten)**:** Mr. de Lange's is Johnson Electrics' dedicated liaison to universities. Johnson Electric is a global company with over 40,000 employees that produces electric engines, solenoids and other electrical components.

Table 3-1 summarizes the employers, job title and familiarity and/or affiliation with the M&T degree program of the interviewees. This information allowed us to frame individual interview questions appropriately.

Table 3-1 Industry Interviewee Details

Name	Employer	Job Title	Prior Familiarity	Affiliation with HEG-FR
Hans-Jörg Mihm	Extramet	CEO	Well Informed	On M&T Advisory Board
Mike Baur	Swiss Start-Up Factory	Founder & CEO	Very Familiar	Innovation Labs Partner
Christian Gmür	Leonteq,	Managing Director	Well Informed	HEG-FR Alumnus
cYrille Boinay	bComp	Founder and CEO	Somewhat Familiar	HEG-FR Alumnus
Martin Waeber	Immoscout24	Managing Director	Informed	Previously involved in M&T degree development
Enno de Lange	Johnson Electric	Manager of the Research Center	Well Informed	No Affiliation

3.5 Thematic Content Analysis

After interviewing professionals in both industry and academia, we conducted thematic content analysis in order to extract relevant information from which we could make recommendations for the M&T program at HEG-FR. We divided our interviews into two distinct groups: industry and academia. When permission was given, we recorded audio during our interviews. If we were unable to record an interview, we took detailed notes. These audio recordings were transcribed verbatim, and then passed through several iterations of analysis.

First, each team member coded transcripts and notes from interviews for key points. These key points were then cross-referenced by each coder, to check for relevancy to the M&T program. Key information that was identified by more than one coder was considered to be critical. Portions

of the transcripts that did not directly pertain to the goals of the degree program were left uncoded. Next, the remaining coded elements were cross-referenced within each interview group: either academia or industry. Any elements that were repeated in multiple interviews were considered to be a major theme. These themes directly informed our recommendations to the degree program, and are discussed in detail in the upcoming chapters.

4 Data and Analysis

In this chapter, we review the information we received through our interviews as well as highlight the recurring themes that emerged from our analysis. We discuss both academic and industry perspectives on project programs in the USA and in Switzerland. In addition, we examine how personal and alumni networks influence corporate sponsorship. We conclude this chapter with a discussion on the biases and errors in our techniques that may have influenced the data we received.

4.1 Academic Perspectives

4.1.1 A Case Study of the Bachelor's Degree in Industrial Design at the University of Applied Science - St. Gallen

In our interview with Dr. Lukas Schmid, Co-Director of the Institute of Innovation, Design, and Engineering at the University of Applied Sciences at St. Gallen (FHSG), we gained insight into the internal structure of their new Bachelor of Industrial Design (ID) degree program. The ID program at FSHG was of particular interest to us because of its similarity to the HEG-FR's M&T program. The ID curriculum is divided into two equal distributions of engineering and business components, closely resembling the distribution of courses in the M&T program. Students will complete a total of five projects that follow the progression of the value chain, beginning in the first and third semester for full-time and part-time students, respectively. Project work is completed for class credit only and in collaboration with corporate sponsors who propose internal problems to be solved by teams of four to six students.

According to Dr. Schmid, the curriculum heavily emphasizes the practical application of knowledge acquired through lectures to a corporate environment, describing this model as one of

the program's "core features." Additionally, the project-based curriculum is designed to maximize student autonomy by allowing them to devise their own solutions to the presented problems. Student teams are provided with two faculty "coaches;" one coach has an expertise in engineering, and the other in management. Each week, students are required to lead a meeting with their coaches to discuss their project's progress as part of a session known as "atelier," or "workshops." The purpose of this is to assess students on their project progress as well as to provide feedback and advice on issues that have arisen. Beyond facilitating the initial contact between students and corporate sponsors, students are responsible for all further contact, communication, and research associated with their project.

Professor Schmid emphasized that the ID program is designed to allow students to strengthen their leadership skills. Administrators, for example, do not change the curriculum if students encounter a problem within their project. He explains, "It would be very easy for me to prevent [recurring problems]...But, this is not what we want. Furthermore, Schmid cited two advantages that project-based learning has over traditional lecture-based pedagogy. First, students "can make mistakes… something they normally can't do within the setting of a study program." This mentality is seen within the ID curriculum structure. Students do not undergo an assessment year where they are required to pass every exam within each class they take. Instead, if students do not pass a module within the ID curriculum, they are allowed the opportunity to retake it. Secondly, project-based curriculum allows students to apply their knowledge and teaches them to adapt in a business environment where solutions are not always directly taken from the textbook. Thus, project-based learning provides students with experience navigating a corporate environment, where they can grow from their mistakes, unlike the predetermined theoretical work found in academia.

Dr. Schmid cited cost effectiveness, recruitment, and opportunities for innovation as the ways in which companies may benefit from sponsoring projects. Companies do not pay a fee to sponsor projects with students in the ID program. Thus, student projects are inexpensive solutions for companies who do not have the available resources to investigate questions or solve problems that are out of the scope of the main corporate objective. In addition, Dr. Schmid explained that project sponsors may view project sponsorship as a means of assessing potential employees. Finally, Dr. Schmid claimed project sponsorship allows for innovation within the company by injecting "new insights from young people," and offering multiple outside perspectives. When prompted about alumni relations at FHSG, Dr. Schmid discussed its potential as a tool to reach out to new project sponsors. He explained, "A hope, in the near future, when we have got alumni from our study program… they are motivated to come back to the university and say, 'we have interesting questions for an industry project.' " It is important to note that the first class of the study program has not yet graduated, so it is unclear as to whether reaching out to alumni will be a successful method of procuring project sponsors for ID program.

4.1.2 A Case Study of Project Programs at Worcester Polytechnic Institute

The WPI faculty we spoke with independently identified three factors that motivate companies to become involved with undergraduate projects: A sense of social responsibility, a source of economical solutions to problems, and a platform to recruit new employees. Professors Finkel, Strong, and Sweeney facilitate projects in their respective fields across the country, yet their experiences are remarkably similar. They see the same forces motivate companies to sponsor projects, and understanding why companies take interests in student projects is an important beginning to successfully implementing a new project program at HEG-FR.

Many companies are involved with undergraduate projects, and this partially stems from a feeling of social responsibility. Professor Sweeney noted that individuals at a company may sponsor projects as a way to "give back" to the community and the educational process. Likewise, Professor Finkel states that companies become involved with undergraduate studies due to a desire to support education. These observations, in conjunction with the statements from industry professionals in section *4.5.2*, highlight social responsibility as a strong motivator for corporate involvement with undergraduates. Secondly, student projects offer companies cost-effective solutions to challenges within the company and innovative answers to questions that could lead to product development. Professor Finkel emphasized that companies will often give students "back burner" projects. These are issues the company would like to have investigated, but lacks the resources to pursue. Similarly, Professor Sweeney listed the affordability of projects among the reasons he sees for corporate sponsorship in Wall Street. In the project programs at WPI and the HEG-FR, the sponsoring company does not pay students. At WPI, the Silicon Valley and Wall Street MQP centers collect a fee from sponsoring a company, which is used to defray the costs of operating a project center. This fee is significantly less than the cost of hiring full-time employees, and companies view it as a worthwhile investment.

Three of the four WPI professors that were interviewed made the observation that many companies are motivated to sponsor projects because they expect this interaction with students will be an effective recruiting platform. Professor Sweeney described student involvement in projects as a "networking activity," illustrating how the student-sponsor relationship transcends the boundaries of the project work itself. Project sponsors observe the students' work from an employer's perspective which gives them the opportunity to evaluate students before they enter the job market upon graduation. Moreover, Professor Finkel stated that many MQP sponsors use

the project as a "7-week long interview" that often leads to a job offer. These advanced, in-depth projects are seen as an opportunity for potential employers to get a preview of how the student would operate as a full time employee, thereby motivating companies to sponsor projects as a window into the pool of prospective employees. Professor Strong indicated that companies use project work as a scouting tool and are drawn to WPI's reputation. Although the HEG-FR does not yet have an established project program, the information derived from professors at WPI is still very applicable to the market in Switzerland. Companies, through sponsoring projects, can gain insight into a prospective employee's potential without taking on the risk of hiring the individual. Thus, companies are motivated to sponsor projects because the project work serves as an effective recruiting and talent-scouting platform.

4.2 Defining Characteristics of a Successful Project

WPI faculty identified key criteria for the successful implementation of student projects at a sponsoring company. Professor Strong defined a 'doable' project as one that is "relatively well specified, but not so specified that the students don't have design work and decisions to make." This implies the importance of communication between project sponsor and faculty mentors as a critical factor when defining the students' project scope. Effective communication will ensure that reasonable expectations are set for both project sponsors and students. Both Professors Finkel and Strong also identified that projects must be off the sponsor's "critical path" as another criterion for the components of a successful project experience. Well defined, reasonable and clear expectations for outcomes of a student project must be set because it allows room for students to make mistakes without the added pressure of performing crucial tasks in a corporate setting. Thus, there is an important distinction to make: successful student projects are designed to allow for the practical application of knowledge obtained in the classroom, and students are not company employees.

4.3 Project Sponsor Retention

Several themes regarding the maintenance of sponsor relationships emerged from our interviews. Many of our interview subjects reiterated the same key points: continued project sponsorship is contingent upon effective communication and alumni connections. They also identified legal considerations and clear explanations of project expectations, as sources of difficulty in securing sponsorship.

First, a positive project experience is contingent upon effective communication between the university and the corporate sponsor. Professor Finkel indicated that it is critical for students to have a mentor within the company who can help students become acclimated to the corporate environment. This mentor would be responsible for introducing students to the methods and practices of the company as well as providing feedback on the project. Finkel emphasized it is pertinent that a mentorship role is established before the project begins to ensure that both the company and the university are in compliance with project expectations. Similarly, Professors Finkel, Strong, and Sweeney each articulated that identifying a company mentor is critical to maintaining project sponsorship. Each interviewee cited instances of losing sponsorship after the initial contact left the company or received a promotion. To avoid this, Sweeney suggested that a board of advisors for the project site or company could be used to keep companies interested in the projects. Additionally, Finkel explained that he does not facilitate project sponsorship with companies of fewer than 50 employees, as he finds that smaller companies do not have the sufficient resources for collaborating with students. Thus, maintaining long-term project sponsorship appears to be dependent on keeping key individuals at the sponsoring company involved and aware of the project expectations and requirements.

Strong alumni and personal relationships were also identified as instrumental in starting and maintaining corporate sponsorship. Professors Strong, Sweeney, and Finkel all indicated that alumni working in industry initiate the majority of projects. A possible reason for this may be that alumni from WPI already know and understand the project program. They also clearly see the benefits students' projects can bring to their company. Additionally, they are personally drawn to be involved with their alma mater as a way of giving back. Project work can also come to fruition through the personal industry contacts that are cultivated by faculty members as well as the university's reputation. WPI has a well-established project program, thus companies often reach out to the university with proposals for future projects. A strong alumni network, combined with a positive reputation, benefits the sponsor recruiting process. However, alumni culture is generally weaker in Europe than it is in the U.S. (Axelsson, 2014).

4.3.1 Sources of Difficulty in Securing a Project Sponsor

Even though the project program at WPI is well established, difficulties still arise from time to time when trying to retain corporate relationships. Professors Strong and Sweeney cited a recent change in a USA labor law that has a negative impact on project sponsorship: the law penalizes companies using unpaid interns. While students working on projects for WPI do not count as unpaid interns, both interviewees indicated that several companies did not want to assume the liability regardless of their WPI's legal status. Therefore, companies may not be interested in sponsorship for reasons ulterior to the project program.

The concept of project work is sometimes difficult to explain to new sponsors. Professors Sweeney, Finkel, and Strong observed that companies are accustomed to working with undergraduates operating as interns. Differences between internships and projects must be clearly indicated to companies interested in pursuing sponsorship. However, even if corporate partners do

not fully understand the concept of project work initially, it is something that they become more comfortable with over time. Professors Finkel and Strong stated that after the company's first year acting as a sponsor, they have a better understanding of what projects are and what is expected of them. Most companies that Professor Strong works with are repeat sponsors, suggesting that sponsoring companies are satisfied with student project work. This also simplifies the process of recruiting and training new sponsors, and thus makes it easier for the university to maintain the program. Professor Strong found that the best method to introduce companies to project work is by comparing it to third party consulting: students work on their defined task, manage their own schedules, and are largely independent from the company. She also stated that companies must be aware of students' schedules that include classes, exams, and other commitments that determine their availability. These factors are all difficult for first-time sponsors to understand, however; as sponsors become more experienced working with students, their understanding of the model increases. Therefore, integrating project work into sponsoring companies becomes a more seamless transition after the first year of a company's sponsorship.

4.4 First-Year Projects

In order to gain insight into the structure and resulting outcomes of a first year project program, we examined WPI's Global Problems Seminar (GPS). The objective of a GPS project is to refine students' professional skills such as working in a team, writing, researching, and presenting. While GPS projects enable first year WPI students to develop these "soft skills," students that matriculate into the HEG-FR are required to work for one year in industry, usually through the Swiss apprenticeship program. Therefore, it is reasonable to assume that Swiss students have already acquired these "soft skills." In addition, the scope of GPS projects differ from the proposed projects at the HEG-FR, which are focused on the application of technical

knowledge learned in the classroom to real-world problems. Moreover, according to Professor Wobbe, GPS projects rarely involve sponsors from outside the university and thus do not offer further insight into how industry sponsors might involve young students. Our focus is to understand the relationship the HEG-FR will have with corporate sponsors and therefore the information gathered from interviews regarding first-year projects was not applicable to M&T project program.

4.5 Industry Perspectives

4.5.1 Existing Corporate Involvement with Undergraduates

In Switzerland, corporate involvement with universities spans a broad spectrum of commitment ranging from participating in university lectures, to sponsoring bachelor's and master's theses. For example, Mr. Baur has an established relationship with the HEG-FR where he both gives and attends lectures. The HEG-FR also recently opened an innovation lab center, of which Mr. Baur is vice president. Messrs. Boinay, Gmür, Waeber, de Lange and Baur all confirmed involvement with undergraduate and graduate thesis work. This pattern of behavior shows that many companies are willing to work with students and universities, creating a platform for additional corporate involvement in the form of project work. *Table 4-1* (below) outlines the varying statuses of the most common forms of involvement that our interviewees had with universities including, but not limited to, the HEG-FR. All interviewees participated in theses sponsorships, and while not every interviewee participated in guest lectures, they were aware of this model. Additional information on their personal role with university involvement can be found in the rightmost column.

Table 4-1 Interviewees' Previous Corporate-University Involvement

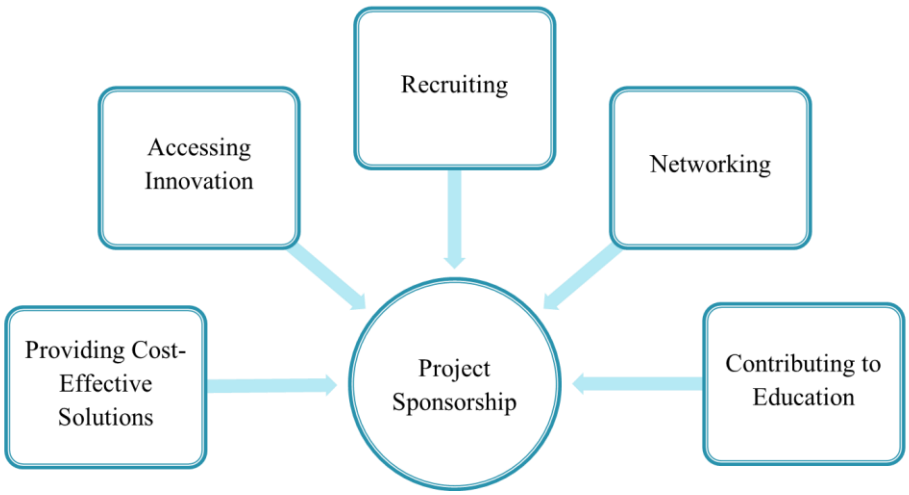
Company	Previous Involvement		
	Theses Sponsorship	Guest Lectures	Other
Extramet	Yes	Yes	M&T Advisory Board
Swiss Start Up Factory	Yes	Yes	VP of HEG-FR Innovation Lab
Leonteq	Yes	No	Piloting Mentorship Program
bComp	Yes	Yes	No
Immoscout 24	Yes	No	No
Johnson Electric	Yes	Yes	Sponsors Semester Projects

Mr. Boinay indicates that given the small size of his new company, he appreciates the opportunity that university involvement affords him to advertise his company's brand. Currently, Mr. Boinay gives guest lectures at the HEG-FR covering topics related to personal brand marketing and is looking to increase his level of lecture involvement in the future. In addition to thesis sponsorship, Mr. de Lange indicated that Johnson Electric works with students on a number of smaller, semester-long projects. However, these projects cater to Master's students as they are more technical in nature, and thus require a higher level of expertise. Although Johnson Electric does not participate in internship programs, Mr. de Lange was aware of two distinct internship structures. One form involves students working over the summer at an internship outside their area of expertise, while the other takes place during the school year with students working in their field for university credit. However, the universities that Johnson Electric partners with do not participate in either of these internship models. Mr. de Lange completed his PhD at the University of California Los Angeles and became familiar with these internship models during his time in the USA.

4.5.2 Perceived Benefits from Corporate Sponsorship

As shown in *Figure 4-1*, our interviewees from industry identified five major motivators for becoming involved in project sponsorship. The interviewees indicated that they view project sponsorship as beneficial to their company for the following reasons: (1) projects provide inexpensive and (2) innovative solutions to internal problems, (3) a platform for recruiting prospective employees, (4) networking opportunities, and (5) the ability to contribute to education.

Figure 4-1 Diagram of the 5 Major Motivating Factors for Companies to Become Involved in Projects



As previously discussed, project sponsorship is a cost-effective way for companies to address certain types of problems. In industry, cost-effective solutions are desirable and sought after to create competitive products in a corporate world. Mr. Baur describes projects as a "win-win situation" for both his company and the students involved. Companies pay less than they would for a full-time employee, and students gain valuable industry experience as part of their coursework. Mr. Baur gives further insight in his observation that even if these well-selected students were paid, or considered interns, they are still delivering quality work at a fraction of the cost. He concludes through a preliminary cost-benefit analysis of time and resources that

sponsoring a project is "well worth the investment." According to Mr. Waeber, students' project work is appealing to companies because it eliminates the need to hire an additional professional that would require a full-time salary. At Johnson Electric, one of their most valued resources is company time, which is directly correlated with company funds. The company "…has a limited amount of time that [they] can spend doing [projects off their critical path]." Student projects will be focused on lower priority work that full-time employees do not have time to pursue. Finally, Mr. Mihm described project work as an inexpensive method of training students for potential full-time positions because it exposes them to company practices and culture. Thus, student projects are advantageous to companies because they provide quality work at minimal cost.

Companies can stay abreast of emerging, innovative ideas through involvement with undergraduates. As Mr. Baur mentioned, "young people are very innovative" and are assets to his company because they provide progressive ideas. Students expose project sponsors to the latest research being developed in academia, which allows the company to stay current and competitive, according to Mr. Waeber. Similarly, Mr. Boinay hopes to be involved in student programs through giving lectures in order to remain educated on new technologies and practices. Therefore, a significant benefit of project sponsorship for companies is the opportunity it affords them to stay up to date on technology and innovation.

Another motivator for companies to be involved in undergraduate work is the platform projects provide for recruiting new hires. As Mr. Gmür described, industries are fighting a "war for talent" that manifests as a competition to recruit the best "new minds coming out of university." Through thesis work and apprenticeships, Mr. Waeber mentioned Immoscout24 will hire 25 to 50% of the students involved in thesis work. Similarly, Mr. de Lange estimated that Johnson Electric hires approximately 50% of students who completed thesis work with their company,

resulting in full-time positions. Although Mr. Mihm did not give a specific statistic, he indicated that some of the involvement Extramet has with universities serves to recruit new hires. Mr. Baur sees his company's relationship with universities as beneficial for recruiting both future employees and clients, as some individuals may become entrepreneurs that could benefit from the services that the SSUF provides. However, he is only interested in pursuing professional relationships with students who perform well in their project work and duties. Both Messrs. Baur and Boinay further confirmed that project sponsorship is a strong platform for recruiting new hires, with Mr. Boinay adding that any form of university involvement allows him to advertise his company to potential employees who may be interested in bComp's work. All forms of corporate involvement with universities, including lecture series, thesis work, and project sponsorships, give both parties competitive opportunities. Students are able to show potential employers their skills and capabilities, and each industry representative we interviewed confirmed that these interactions helped their company identify and recruit new employees.

Many companies become involved with undergraduates for the purpose of building professional networks, both for their employees and the students. Mr. Mihm recognized that on-campus events are networking opportunities for Extramet where, by participating, the company gets exposure with the students. Additionally, students know that the visiting companies are looking to hire talented individuals. Not only do networks between students and employers contribute to hiring and recruitment, but Mr. Gmür asserted that it helps when new hires already have an existing network within the company. He noticed that students who interact with industry professionals integrate more easily into corporate culture and make better candidates for leadership and managerial roles. Furthermore, Mr. de Lange cited similar reasons for Johnson Electric's participation on university campuses. He stated that representatives from Johnson Electric speak

at lectures, seminars, and other university programs for publicity among students. This suggests that project programs provide networking opportunities for companies. Not only will students establish a relationship with their primary sponsor contact, but their work will expose them to other employees and the company culture as a whole.

Many representatives indicated that their company interacts with young students in various capacities as a form of continuing to education. One of the most popular forms of involvement associated with this benefit is the capstone thesis. Bachelor's and master's theses bring new developments to the company by giving it access to the results of the research. Furthermore, the benefits of new ideas extend beyond theses. Several of the contacts we spoke with saw young people as particularly innovative and included it as a reason to work with students in a variety of capacities. Meanwhile, some explicitly mentioned continuing education and professional development as reasons to attend seminars, lectures, and other events as participants. Mr. Kaiser specified that keynote speakers and table-top exercises are reasons he is motivated to attend conferences and alumni events, and indicated that these could be a powerful tool to bring alumni, professionals, and students together. Continuing education, professional development, and innovative ideas could be a way to add value for companies to a partnership and increase the success of events.

Finally, industry professionals recognized a desire to contribute to the educational process as a reason to become involved with undergraduates. When asked about his extensive involvement with the HEG-FR, Mr. Mihm declared, "I wish for education." In the same way, Mr. Boinay sees his work in academia as a 'hobby' that he enjoys. Through motivating students to start their own businesses, Mr. Boinay hopes to pass his entrepreneurial experience on to the leaders and innovators of tomorrow. Mr. Gmür values the long-term relationships he forms with students

working with him at Leonteq. Thus, support for education is a motivating factor in many industry professionals' involvement in work with undergraduate students.

4.6 Potential Benefits for Students

Project work provides students with a valuable opportunity to grow professionally. Mr. Mihm asserted that students must learn to work in teams and collaborate effectively in a corporate environment. Projects and other forms of immersive learning have been found to develop these skills and strengthen existing ones. Moreover, through first-hand experience, students learn corporate structure, standard professional protocols and experience different corporate cultures. Mr. Boinay explained that project work can not only help students find their passions and fortes, but can develop students into employees who are cognizant of other departments and industries. Lastly, as previously discussed, building a professional network is a natural byproduct of project work. By cultivating a professional network early on in their careers, many students can develop advantageous industry relationships. As discussed in *4.5.2 Perceived Benefits from Corporate Sponsorship*, many companies use sponsored project work as a platform for recruiting employees. For students, project work is an opportunity to showcase preliminary skills and display marked improvements to sponsoring companies which could potentially yield a lucrative job offer. Overall, project work gives students a valuable and beneficial opportunity to gain real-world experience that has the potential to lead to future employment.

4.7 Industry Comments on Project Program Design

Project work must be constructed with both the sponsors and students in mind and a unique compromise must be reached to account for each party's needs. As Mr. Waeber and Mr. de Lange explained, companies view involvement with students as an investment. If companies are expending resources to sponsor a project, they are expecting to receive a valuable return. On the

other hand, academic projects are an educational tool that, as Dr. Schmid and Mr. Mihm described, lends students a safe environment where they can learn from their mistakes. However, the possibility of acceptable failure in the project work can put sponsoring companies at risk, although failure can yield some of the most valuable learning experiences for students. As discussed earlier, one way of minimizing companies' risk is to assign students exploratory projects outside of the companies' critical path. Additionally, Mr. Mihm explained that projects are very flexible, indicating that there is room for variation between projects. At the FHSG, the approach for defining project work expectations involves simply setting minimum expectations for sponsors. Companies may choose to become more involved beyond these expectations, but it is not required. Further, flexibility in the project structure is advantageous for the FHSG's program because there can be significant differences between the project's time frame and the sponsoring company's schedule. This concept is conveyed through Mr. Waeber's observation that the long-term mentality of many companies differs greatly from the 14 week time frame during which a semester-based student project would be completed. For example, many of the engineering projects at Johnson Electric span over a 3-4 year period, while M&T projects follow HEG-FR's 16 week semesters. Mr. de Lange explained that he would need to first devise how a student could be integrated into his company without interfering with their long-term projects, before advising student projects. Therefore, it may be difficult for companies to envision the depth of student work, given the semester-based time scale. Thus, project flexibility is critical because it allows project sponsors and students to come to a consensus on the scope of the project that accounts for the possibility of project failure.

Our interviewees also provided us with insight into the academic topics that they believe should be integrated into the curriculum. When shown a list of potential project topics, Mr. Boinay,

and Mr. Waeber identified "Market Research," as the most important project topics to delegate to students. In addition, Messrs. Baur, Mihm, and de Lange all asserted that it is imperative for students to have a strong understanding of market analysis and testing. Mr. Baur explained, "I think one topic for our company and for our incubation process which is very important is market testing." Moreover, Mr. de Lange mentioned, "Market opportunity analysis… that would be definitely feasible [at Johnson Electric]. We have business development, development managers… [there are] always things they don't get around to doing, so I definitely see that as an opportunity." Finally, Mr. Kaiser recommended that courses covering statistical and quantitative analysis be offered to develop students' skills in data analysis.

4.7.1 Drawbacks to the Program and Sources of Confusion

In our discussions with industry professionals, many voiced concerns regarding the structure of the project program. The majority of our interviewees emphasized first-year projects as a particular weakness of the program. In addition, several identified certain aspects of sponsorship, such as how projects can be incorporated into company work, as concepts that require further clarification. Finally, a few of our interviewees expressed reluctance to commit to mentorship outside of the project program.

Many companies are hesitant to become involved with undergraduates, especially first-year students. This apprehension stems from the students' lack of technical knowledge. When asked about involving first-year students in projects, Mr. Gmür replied, "You need a basic understanding of what you're doing." Many others echoed this sentiment. Mr. Boinay saw many opportunities for student involvement with market opportunity analysis, a rather non-technical area. However, he felt that other project topics "go too deep into a field where you really need specialists," indicating that first-year students would be unqualified for these more advanced

projects. Mr. Waeber voiced his concerns that undergraduates, especially first-years, do not have enough knowledge to add value to the sponsoring company or its products. Rather, these students may require more preliminary coaching than they are worth. Mr. de Lange, like many other interviewees, was averse to sponsoring first-year students' projects because he feels the technical projects at Johnson Electric will be too difficult for students who do not yet have an advanced technical background. He also commented that, unlike with master's students or a bachelor's thesis, many first and even second-year students are too far away from graduation to be recruited. This eliminates a major motivator for project sponsorship. For corporate sponsors, project work with first-year students involves incurring more risk as a product of endorsing students' inexperience.

Our research also revealed that the project work model can be difficult for companies to understand. Companies often need further clarification on how these projects can interface with their corporate structure. Many interviewees, including Mr. Waeber and Mr. Gmür, said they did not see how projects "fit" into their company and they did not have any projects readily available. Without previous experience with project work, companies have a difficult time conceptualizing what projects will entail for both students and the sponsoring company. Mr. Mihm confirms, "It is difficult for people to … understand student projects and their many nuances [for the first time]." However, as discussed in section 4.3.1, sponsoring companies typically come to understand the program after their first year. While extra clarification may be necessary at the beginning of a sponsorship relationship, misunderstandings can be remediated after the first project cycle.

Many of the professionals we interviewed were apprehensive about mentoring students outside of project work. Mr. Boinay expressed interest to participate in what he referred to as "coaching" students in conjunction with sponsoring project work, with a particular focus on career

development. He explained, “It would seem that mentorship as a stand-alone program is not worth pursuing.” Many other interviewees, including Messrs. Mihm, de Lange, Gmür, and Baur, stated that the concept of mentoring students was relatively new for them. Mr. de Lange explained that he is involved with a minimal amount of mentoring, about one hour per week, on student theses. Mr. Gmür mentioned that he is piloting a mentorship program, the first of its kind, at Leonteq. He currently mentors one student and is looking “to see how much work is involved.” Finally, when first asked about mentorship, Mr. Baur was unsure as to whether he would be interested in participating. When prompted for further details, he explained that it was uncertain to him as to whether mentorship could only occur separately from other types of student interaction. When we clarified that mentorship could exist as a component of an internship or project program, much like in the bachelor's thesis, he agreed that the SSUF would be able to mentor students. All in all, mentorship outside of project or theses’ work appears to be an unfamiliar concept in industry.

4.8 Securing Project Sponsorship

Mr. de Lange made a notable suggestion in his discussion of how important it is to find the “right person” to sponsor a project. Ideally there would be a particular individual at each company who could be a liaison between the university and the corporation. This liaison could also handle daily work associated with establishing student projects and other forms of companies’ involvement with universities. He suggests that someone already working with university relations would be most open to incorporating project-based learning into the existing university relations with the HEG-FR or otherwise. According to Mr. de Lange, establishing one sole liaison who ideally has experience in academia can also minimize miscommunications resulting from conflicting sources within the company.

A company liaison may also ameliorate any initial legal barriers that arise with beginning project sponsorship. Legality issues can often accompany projects completed in an industrial setting. As Mr. Boinay explained, many companies will want to have insurance policies to cover student workers. Filling out the associated forms takes away from the day-to-day work of industrial partners. Legal barriers, specifically regarding insurance discrepancies, can be resolved by the partnering university prior to students' arrival. Mr. Boinay stated that if all the necessary paperwork was filled out by the university prior to a student's arrival, it would be easier for him to act as a sponsor. Delegating all project oriented work to liaisons, on the academic side and on the corporate side of university-industry relationships will ease the burden of project sponsorship for both parties.

4.9 Brainstorming

University representatives should work with companies early on to help them brainstorm ideas for successful projects, understand their role as sponsors, and show them the academic value of project work. The concept of a brainstorming session prior to project work has been proposed by many interviewees and should bring together university representatives, industry partners, and students. If all parties can meet before formal project works starts, everyone will be aligned towards a common goal. Mr. Mihm suggested that this could be used to incorporate student interests into the project, which in turn could make students more invested in their project work. If projects align with student interests then students are going to be more enthusiastic about working on their project, learn more from the experience and produce a higher quality of work. Prior orientation or brainstorming work can make the transition from academia to industry smoother for students and industry, orient both parties towards a common goal, and produce a high quality of work at the project's summation.

4.10 Preparatory Coursework

Through the course of our industry interviews, preparatory coursework for project programs surfaced as an aspect of the M&T program with high potential for implementation. This motivated our research into potential areas for students' professional experiences. In meetings with Dean Baldeggar, he informed us of his idea to use preparatory coursework to give first-year students either a technical or managerial background in whichever area they need the most improvement. He explained that for an incoming student with at least a year of experience in a management discipline, the preparatory coursework would serve to teach this student a broad range of lower-level information related to technology. The opposite, intended to give a management overview for incoming students with a technology background, would hold true as well. These suggested preparatory courses would take place during the summer prior to a student's first semester in the M&T program. However, due to the federal laws surrounding the Swiss education system, Dean Baldeggar said that he could not make such preparatory coursework mandatory for students. Although the coursework could be extremely beneficial for incoming students in preparing for project work, the decision lies with the students (Baldeggar, 2015). Inquiring about preparatory coursework models, Dean Baldeggar suggested we look into similar preparatory coursework in the USA. *Table 4-2* and *Table 4-3* outline existing preparatory coursework models.

Table 4-2 Summary of Alternative Education Programs at Other Universities

School	Project Type	Project Duration	Compensation (for Students)
Rochester Institute of Technology	Co-Op	6-18 Months	Monetary
Northeastern University	Co-Op	6-18 Months	Monetary
Drexel University	Co-Op	6-18 Months	Monetary
Harvey Mudd College	Clinic	8-10 weeks	Credit Based
Worcester Polytechnic Institute	Project	7 Weeks	Credit Based

Table 4-3 Topics Covered in Preparatory Classes

Co-Op	Project	Clinic
Job-search and career-management skills	Research design	Independent research methods
Workplace skills	Presentation skills	Presentation skills
Professional-style résumé and cover letter writing	Specific research and field skills on the project topics students select	Advanced topics within area of study with corporate collaboration
Interview techniques	Develop social science hypotheses based upon literature review	
Career path choices and decision making	Writing an organized project proposal	
Professional behaviors and work culture	Developing a model for reporting their project findings.	
Workplace issues	Social science research and analysis	
Professional and ethical responsibilities during professional experiences	Communicating project findings	
Contemporary workplace issues and professional communication		

For the institutions outlined in *Table 4-2*, the associated preparatory coursework is targeted to supplement deficits in students' knowledge. These courses often aim to teach students a combination of hard and soft skills. "Hard skills" are technical and specific to a field of study or academic discipline. "Soft skills," on the other hand, encompass communication, management, leadership and interpersonal skills as previously discussed in section 4.4**.** Terminology referenced in *Table 4-2* and *Table 4-3* is defined as:

- **Co-operative Education Program (Co-op)**: Students alternate semesters between academic studies and full-time work in a chosen industry. In this model, students earn academic credit and receive monetary incentives. There is a co-op coordinator affiliated with the university who helps students prepare for their co-op work.
- **Project**: Students complete interdisciplinary tasks in small, self-managed teams. Industry partners and faculty advisors give students guidance while they are completing project work. Students are ultimately responsible for the completion of project work and receive university credit.
- **Clinic**: Students work in groups of four or five on industry-sponsored, science-oriented projects. Throughout the course of the project, students receive guidance from a student project manager, faculty advisor, and a liaison at the sponsoring organization. Each week, students are expected to submit progress reports to sponsor liaisons outlining the project requirements. Sponsor liaisons must then approve the team's proposed methods for accomplishing the outlined work.

Although some outlined preparatory coursework is intended for non-project programs, the course descriptions still provide an overview of skills students need to work well in a professional environment. Co-op preparatory coursework tends to focus on professional development and

familiarizing students with the company they will be working with. Preparatory coursework for project or clinic work is focused on developing students' social science research skills. Overall, the outlined preparatory coursework uniformly aims to prepare students for work specific to their project by teaching research skills, professionalism, and project understanding.

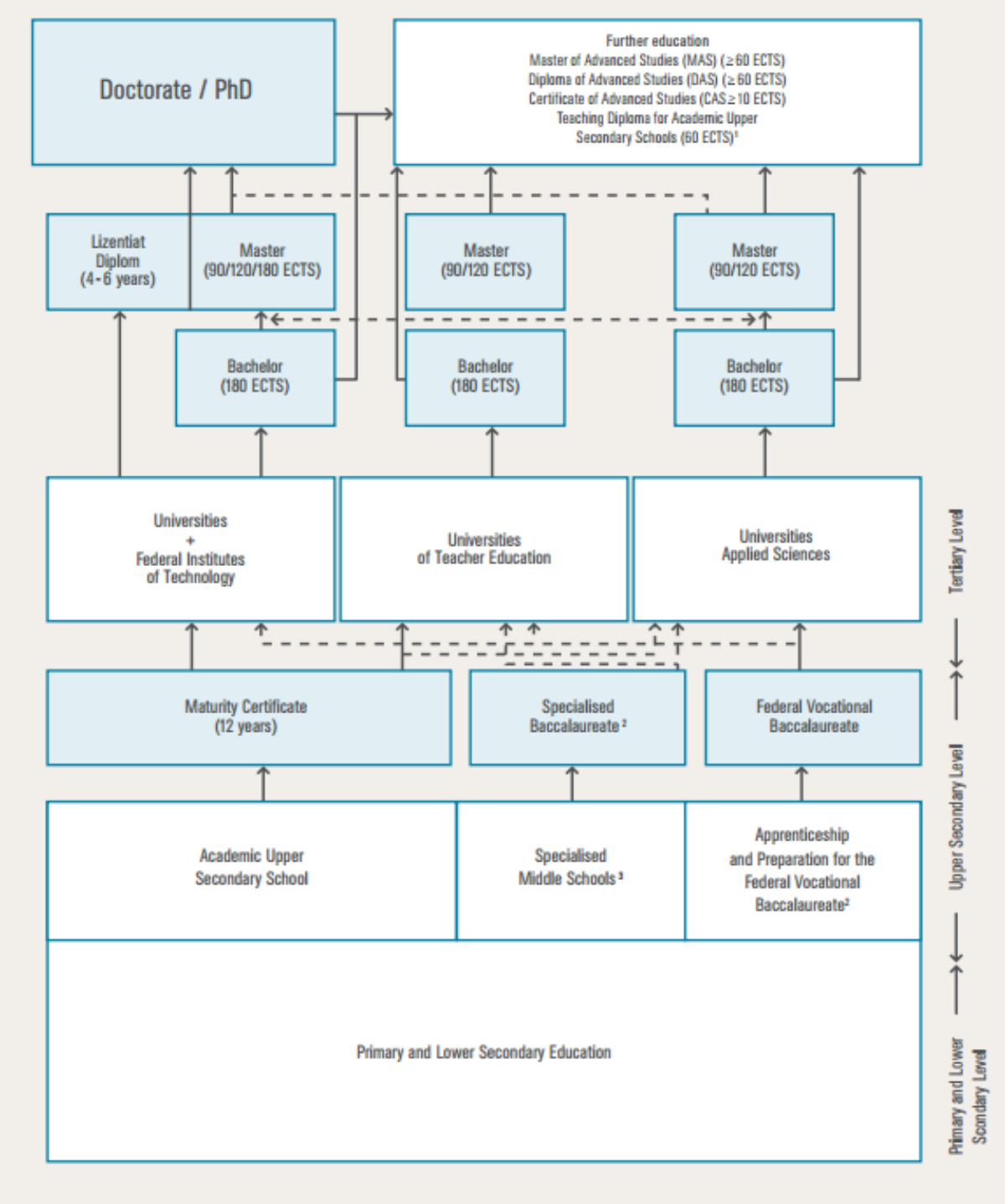
Data related to preparatory coursework also surfaced in our interview with Mr. Boinay. He suggests that students invest time, prior to beginning a project, to research the corporate sponsor extensively and participate in any coaching programs available to them. By beginning their project with solid background knowledge, Boinay reasons that it will be easier for sponsors to integrate students into the company without compromising productivity. Further, Mr. Mihm describes the usefulness of an orientation day for students completing projects. The orientation would take place "a few days before [the project begins, the students would then] understand the company, and … the philosophy." Overall, given students' prior professional experience and the interest in company specific preparatory modules, the project program can be structured for success.

4.10.1 Post Lower-Secondary Education

In devising potential preparatory courses to be incorporated into the M&T curriculum, prior experience in industry that students have before matriculating into the HEG-FR must be considered. In Switzerland, completing an apprenticeship is one of three immediate career and educational opportunities for students coming out of lower-secondary education. The significant role this model plays in defining incoming M&T students' prior professional experience requires research into various career paths, with emphasis on the apprenticeship. *Figure 4-2* outlines the many tracks available to the Swiss to become skilled workers or obtain various degrees through higher education (HEG-FR International Programs Brochure, 2015). The apprenticeship model "combines education in school and in the workplace" (Wolter, 2014). Students work 3-4 days at

their apprenticeship firm and participate in educational training for the other 1-2 days per week. Usually, apprenticeships for skilled workers usually last 3-4 years and those for unskilled workers are for one year. Up to 60% of all apprentices in Switzerland leave the training firm within the first year, indicating that many of these individuals are now pursuing university admission (Wolter, 2014). A final year of study after the completion of an apprenticeship, usually the shorter variation, prepares students for the Matura examination that is required for admission to a University of Applied Science (Wolter, 2014). If a Swiss student meets the admission criteria for a degree program, they must be accepted (Baldeggar, 2015). Once a student is admitted, they can work toward a bachelor's degree with the opportunity to continue on with a master's or PhD program (HEG-FR International Programs Brochure, 2015).

Figure 4-2 Swiss Education System Flowchart ("HEG-FR International Programs," 2015)



Through informally interviewing a current student of the HEG-FR, we were able to gain an understanding of how the apprenticeship model and military service influence incoming students' skill sets. Nicolas Frésard completed a year-long apprenticeship at a bank at his Canton of origin and later served in the military, as is required of all able-bodied Swiss men once they are of age. However, military service for Swiss women is voluntary (Swiss Armed Forces, 2015). Nicolas, like many of his peers, entered the HEG-FR with an experienced skill set heavily influenced by his apprenticeship and military service. For example, he described how the military improved his communication, teamwork, and leadership skills. This was further enforced because he was required to both follow and give orders in unfamiliar Swiss German, as his native language is French. Furthermore, completing a one-year apprenticeship with a bank in his hometown afforded Nicolas the opportunity to work within a routine in a professional environment. Through this experience, he also gained technical knowledge related to his duties at the bank. Therefore, Swiss students typically begin university at an older age with a variety of hard and soft skills already within their repertoire.

4.11 The Importance of Personal and Alumni Networks

Through our interviews, it became apparent that geographical, university and personal affiliations with the canton of Fribourg influence companies' motivation for becoming involved in project sponsorship. Mr. Baur noted that his willingness to participate in project sponsorship came in part from his connection to Fribourg. He explained, "My heart still beats for Fribourg, so the interaction came easily because of my background, and I grew up there." In addition, Mr. Boinay cited his personal connection to Dean Baldeggar as the initial source of his interest in becoming involved with students. He stated, "Rico was one of my professors, and I did my thesis with him…this was a reason [for becoming involved]." Similarly, Mr. Waeber described his

interest in the program as a result of attending the university in Fribourg. This suggests that those who have originated or attended university in Fribourg may be more willing to participate in the new program out of a desire to give back to the Fribourg community.

Reaching out to alumni is a potential tool for facilitating project sponsorship. Ms. Morisod, assistant to Dean Baldeggar, explained that in the French region of Switzerland, it is highly uncommon for universities to maintain alumni networks. She explained that while the HEG-FR is currently developing an alumni association, the program is in its infancy. The HEG-FR maintains various accounts on social media such as LinkedIn, Facebook, Twitter, and Google Plus. These are used to keep alumni informed of events at the university, as well as schedule networking events for alumni; however, these have been minimally successful to date. In addition, Ms. Morisod explained that the HEG-FR is working to develop an alumni database in order to archive information such as the location and contact information of alumni, so as to better organize alumni events. Moreover, she mentioned that the HEG-FR is also launching a magazine for students and alumni that can keep all parties informed of events on campus.

Messrs. Kaiser, Waeber, and Boinay each provided insight into methods of reaching out to alumni. Each cited technology and social media as instrumental in keeping alumni connected and informed. Messrs. Kaiser and Waeber both mentioned that active networking events are effective and direct ways of maintaining alumni relations. Mr. Boinay also suggested that distributing routine publications with alumni updates and highlights is also instrumental in keeping alumni connected to the university. Additionally, Mr. Kaiser recommended that alumni are given incentives for participating in the alumni network. He stated that alumni could be offered benefits such as library cards, database access, continuing education programs, discounts, webinars and access to software for participating in alumni associations. Mr. de Lange suggested that allowing

alumni to retain their university email could also be an active means of keeping alumni connected in addition to project presentation and networking events. Finally, Mr. Kaiser noted that his fond memories from his time at the HEG-FR contribute to his desire to give back to the community as an active alumnus. This suggests that positive undergraduate experiences contribute to the success of alumni relations after graduation.

The concept of an alumni association is much less common in Europe than in the USA. According to a study conducted on the challenges of building an alumni network for Stockholm University in Sweden, "alumni constitute an important, large, but often underused resource for universities in countries that do not have a long tradition of developing and maintaining alumni relations" (Karin, 2015). Lacking a history of alumni associations, Switzerland is one of these countries (Baldeggar, 2015). With the exception of the University of St. Gallen and EPFL, alumni associations in Switzerland are extremely underdeveloped. Notably, there are bureaucratic features of the Swiss education system that contribute to the nonexistence of alumni associations. All public universities in Switzerland are primarily federally funded and Karin et al. concluded "...in a fully state-funded system, there is an exception that the state (or university) should provide what is needed, which reduces the expectation that alumni should volunteer time or resources." If alumni do not feel an obligation to give back to their university, there is no need for an alumni organization to coordinate their efforts. However, sponsoring student projects is a significant way that alumni can give back to the university that cannot be replaced by government resources. In this way, the HEG-FR has an established need to pursue the development of a strong alumni association.

4.12 Potential Errors in Analysis

4.12.1 Differences in Language and Culture

It is possible that our approach to interviews influenced the responses we received to our questions. The most noteworthy is language. With this, we encountered two language specific challenges. First, English was not the native language of our industry interviewees. As such, it is possible that some of our questions were misunderstood. Secondly, we found that our word choice was critical to the comprehension of our interviewees. There were a few instances in which the wording of our questions directly impacted the responses we received. For example, when prompted to discuss any "reservations," corporate sponsors may have of the Industrial Design degree program at FHSG, Dr. Schmid discussed sponsor's time commitment. In this instance, we intended to gain his perspective on reasons why a company may be apprehensive to sponsor student projects. However, he interpreted the term, "reservations," to mean the act of reserving time working with a company. We also found that our interviewees often had different terminology for "mentors." We found that many of our interviewees were opposed to the idea of acting as a "mentor," for students. In many cases, they indicated that they did not see the value in mentorship. However, when prompted further, many suggested that they would be interested in "coaching," students. We consider "mentor" and "coach," to be synonymous terms. At the time of our interviews, we were unaware of these differences in word choice and meaning. This is discussed in further detail in *Section 5.2.*

Throughout our interview process, we also became aware of a few cultural differences that may have also impacted the responses we received. There were certain subjects, such as the cost of the program, which we intentionally did not discuss because it is considered impolite to discuss financial matters in Switzerland. We also discovered what is referred to as the "Swiss No," where

the absence of a response to a question is considered a "no." Therefore, it is possible that what we interpreted as the lack of a response to mean that an interviewee was unsure of the answer, when they intended to respond negatively.

4.12.2 Selection Bias

It is important to recognize that our interviews had an inherent selection bias. It is important to recognize that Dean Baldeggar facilitated all of our interviews. Each interviewee had varying levels of familiarity with the M&T program, and had already expressed interest prior to our interviews. In addition, each interviewee was a personal contact of Dean Baldeggar.

5 Conclusions & Recommendations

The new Management and Technology degree program was insightfully conceived to address the growing need in Swiss industry for an interdisciplinary workforce. The curriculum has the potential to attract a wide range of companies to sponsor project work. The following section discusses ways in which the HEG-FR can procure corporate project sponsors and maintain these relationships, thereby ensuring the long-term success of the project program.

5.1 Building an Argument for Project Sponsorship

5.1.1 Highlighting the Benefits of Involvement

Professionals in both industry and academia were able to identify several common factors that lead companies to become involved with students in many different capacities. Companies provide theses work, hire interns, give lectures, and sponsor projects for similar reasons and these motivators form the foundation of an argument for companies to sponsor projects within the M&T program.

- **A Sense of Social Responsibility & a Desire to Contribute to Education:** Industry professionals perceive involvement with academia as a way to give back to the community and the educational process as a whole. In particular, those who have a personal connection to Fribourg or the HEG-FR are more likely to be interested in M&T projects.
- **A Platform to Recruit New Talent & Increase Publicity/Branding:** Companies view involvement with students as an opportunity to discover and assess new talent, as well as promote their company to future employees, and increase brand recognition.

- **Affordable Solutions:** Student work is an inexpensive way for companies to address challenges or explore new ideas that would be too time consuming to pursue internally or too expensive to outsource professionally.
- **Education and Innovation from Youth Perspectives & Faculty Advisors:** Students and their advisors provide an external perspective on internal operations. Through project work, companies can gain new insights from students and the expertise of faculty advisors. Young people can be particularly innovative, potentially asking questions and offering solutions that have not yet been considered by the company. Additionally, young students sometimes find the most elegant solutions to problems because they are not constrained by conventions or orthodoxies.
- **Networking:** Relationships with academic institutions help sponsors and students expand their networks. Companies find that the onboarding process is easier for new employees with larger networks within the company, and those with larger networks make better candidates for management positions.

5.1.2 Identifying Concerns Regarding Project Sponsorship

Many of the companies we interviewed were concerned that first and second-year bachelor students lack the fundamental knowledge and experience to carry out effective project work. As discussed in section *5.1*, this might derive from misconceptions as to what can be expected from student projects. This also might be a cause for further investigating, as was addressed with our discussion of preparatory programs in section *4.10*.

Companies were reluctant to voice support for a project program because they did not see 'how projects fit into their operations.' Though this concern is vague, it is likely an indication that the representatives we spoke to were unclear of the expectations for project work. This could be a

reflection of our translations, but we feel that sample project problem statements could help regardless of which language is used. Sample projects would allow potential sponsors to see what types of questions students can address, and would clarify some of the more abstract projects such as *Managing a Technology Project.*

5.1.3 Addressing Concerns

Increasing and refining early communication can abate many concerns that companies have surrounding project sponsorship. Because the project model is new to Switzerland, there are many companies who are unfamiliar with it. Several factors exist that, if not fully and precisely explained, can lead to a negative experience in the first year or dissuade companies from sponsoring projects altogether. Extra attention should be given to emphasizing:

- The expected contributions from the company
- The capabilities and limitations of the students
- The 14-week time frame of each project

Furthermore, many companies seemed to be under the impression that students would be working on similar projects as their full-time employees. This misconception should be addressed early on by explaining that the best projects are usually experimental or exploratory questions the company would like to see developed further.

The issue of companies' trust in first-year students can be further addressed by better preparing students for project work. The best way to do this is through coursework prior to the first semester or preparatory work immediately preceding and specific to each project. Companies are also hesitant to engage in project sponsorship with first-year students because potential for recruiting is low. The HEG-FR can emphasis other common motivators for project sponsorship to compensate for the compromised recruiting motive, especially "giving back to education."

Although low recruiting potential is a negative side effect of students' first-year status, companies can also have the freedom to choose a lesser time commitment for these projects which may better suit their resource allocation strategy.

Students admitted to the M&T program will have spent at least one year working in a professional environment and developing associated skills. Experiences such as apprenticeships, military service, and other forms of employment set Swiss students apart from many American university students. Thus, while the American preparatory courses we examined focused on developing soft skills to help students with no experience in professional environments, any preparatory work at the HEG-FR will likely deviate from this model. Instead, their preparatory coursework can form the technical foundations necessary for early project work.

5.2 Vocabulary

In hindsight, certain words that we used over the course of interviewing industry partners were interpreted differently than we intended. Some clearly indicate a disparity between the academic and industrial cultures, while others were more issues of translation.

- **Project**: Academics see projects as assignments that students complete in one unit of study. Projects are student-managed undertakings that achieve pre-determined goals. They are meant to be educational for the students and emphasize process. On the other hand, industry sees projects as long-term, in-depth aspects of their business plan. To industry, the quality results are paramount to the process.
- **Advisor:** There are several ways to refer to people who advise students, each with its own nuances. First, a "mentor" has a familiar, personal relationship with the student. This differs slightly from a "coach" who helps a student with professional and career topics.

The faculty who assist students with projects by providing advice and criticism are also referred to as "coaches." The term "advisor" is not widely used in Switzerland.

- **Sponsor:** As we have used it in this report, the word "sponsor" refers to the company or individual who provides students with the basic objectives of the project; however, in Switzerland, the word "sponsor" has heavy connotations of monetary contribution. This is almost entirely a reflection on the translation from English. In German, the term "Auftraggebender" would be far more appropriate as it literally translates to "assignment giver." In French, the term "mandat" is more commonly used.

5.3 Ensuring the Longevity of the Project Program

The first year of organizing project sponsors will be the most difficult because each company must be contacted, convinced, and trained. There is a steep learning curve leading up to project sponsorship because it is a model most companies are unfamiliar with, but our interviews showed us that after their first year, companies have a much clearer understanding of their role. Other project programs see most companies return as sponsors for several years, and this not only eases the burden of recruitment, but returning sponsors require minimal attention before project work begins. Additionally, as students graduate from the program and its reputation spreads, less effort will be required to contact and convince companies to sponsor projects. WPI found that alumni are the most common way relationships are started, and even without a graduated class, FHSG is receiving inquiries regarding sponsorship. These inquiries are spurred by reputation after only a single year of operation. For the HEG-FR, the conclusions above imply that less effort will be necessary to form and maintain relationships with project sponsors in years to come.

Through our research, we identified that strong alumni networks are a fruitful source of new sponsors. The HEG-FR has an alumni association and although it is only recently developed,

the program is moving in the right direction and it is worth emphasizing its relevance to the M&T program. Establishing a strong sense of community and university association with the M&T undergraduates can increase their likelihood of giving back to the program in the future. After graduating, students can be tremendous assets to the project program, acting as knowledgeable and dedicated individuals who begin partnerships with new companies. Establishing and maintaining an active alumni network, especially within the M&T program, is an effective method for building relationships with new, high-quality sponsors.

A project advisory board has the potential to serve the M&T program in several capacities. First, it helps the program adapt to changing industry needs. The Wall Street MQP Center finds the feedback it receives "is extraordinarily helpful in ensuring the relevance of the Project Center to its student participants and to its corporate sponsors" (WPI, 2015). Secondly, it allows companies and individuals to become involved with the program beyond sponsoring projects. Not only does it foster a deeper interest in the program, but it allows sponsors to stay involved even if they are not currently working with students. As a small commitment for sponsors, it is advantageous for the university.

5.4 Action Items

- **Construct an Effective Argument for Promoting Project Sponsorship**: Highlight the motivators listed in section 5.1.1 and preemptively addresses the concerns in section 5.1.3**.**
- **Compare Projects to with Familiar Terminology:** When explaining student projects to potential sponsors, draw parallels with more familiar concepts. Student teams resemble consultants in that they submit findings and recommendations on a pre-defined issue within a company. Additionally, projects resemble bachelor theses. Students research and

investigate a topic or question. It is important to note that projects are not usually as scientific or technical as a thesis.

- **Frame Projects as "interesting questions students can work on:"** The HFSG uses this phrasing rather than asking companies to "sponsor a project" as it is easily grasped by those with little exposure to project work.
- **Set Reasonable Expectations for Sponsor Involvement and Project Outcomes:** Clarifying sponsors and student expectations for project work can alleviate many concerns potential sponsors have.
- **Implement Preparatory Coursework for Students:** Create summer courses targeted at giving incoming students with either a management or technology background broad, basic skills in the area they are least experienced in. This additional background can be used to assuage sponsors' concerns regarding the inexperience typical of first-year students. Although these courses cannot be mandatory, per Swiss educational law, it is recommended that the HEG-FR highly emphasis the advantage these courses will give to first-year students when securing and succeeding in their first-year project work.
- **Establish Preparatory Periods Prior to Engagement with Sponsors**: The project experience could benefit from students conducting preparatory work in the two weeks prior to engaging with their sponsor. Work would consist of focused research on the technical aspects of their project and provide students with the specific knowledge necessary to address their given issue. Additionally, "soft" skills such as working in a team and navigating a corporate environment, as well as an overview of the culture and practices of the sponsoring company, could be covered at this time. The addition of preparatory periods for students would be a means of compensation for gaps in education prior to the first year.

Further, this recommended project-specific module can be implemented before, or at the start of, each semester.

- **Identify an Appropriate Liaison Within Each Company:** Sponsor relationships are maintained through personal contacts, and the most common reason for lost sponsorships is a career change for the university's liaison within the company. The best liaisons spread their interest in project work throughout the company, leaving a friendly environment after their departure. A good liaison will have prior project experience, either through completing or sponsoring project work and be interested in creating a successful project program. Furthermore, they will have professional experience in either management, technology, or both. Ties to the HEG-FR, whether they are an alumnus, from the Fribourg area, or involved in another capacity will also identify a good liaison. That is to say, it is unlikely to find someone at every company with all these traits, and a good liaison could have none of these attributes. These are simply helpful in identifying potential contacts.
- **Strengthen Alumni Relations**: A strong alumni network is an effective tool for securing project sponsorship. By recording and storing data such as where alumni are employed and their address of residence, the HEG-FR would be able to effectively reach out to alumni of the program. As students graduate, some will bring projects to their company as alumni of the M&T program. These students already understand the project program, so it will be easier for their company to become acclimated to project sponsorship.
- **Utilize the Advisory Board:** An advisory board specific to the M&T project program will keep companies involved beyond project sponsorship. Members of the project advisory board should be aware that their position holds little influence over the structure of the program. Rather, their seat allows them to stay current with the HEG-FR and the M&T

project program. An advisory board would also help the M&T program evolve with the changing needs of industry.

- **Host Project-Related Events:** Hosting an event where students present their projects could be an effective method for building the program's reputation. These events could be open to students, alumni, current sponsors, and the general public. Networking opportunities, keynote speakers, and project showcases could all increase attendance. These events would promote alumni and corporate interest in students' project work, paving the way for future sponsorship.

5.5 Suggested Future Interviews

First, any continuation or expansion of our project should gather more data in an attempt to control the biases and sources of error discussed in section *4.12*. Given more time, we would have continued our research with:

- **Potential Sponsors:** We were unable to meet with any companies who had significant experience sponsoring undergraduate projects. These companies could have been asked about the benefits and challenges of sponsorship. Companies with no prior project experience can be used to judge the efficacy of our recommendations regarding communication with potential sponsors.
- **L'École Polytechnique Fédérale de Lausanne (EPFL)**: The EPFL was mentioned several times over the course of our research. They have a variety of relationships with many companies as well as a relatively strong alumni association; the EPFL could be valuable as a case study for both corporate involvement and alumni programs. Questions to ask would be similar to those we asked of FHSG (Appendix H) but with some

modification. One particularly interesting line of questioning could be surrounding what services they provide for alumni and the events they hold.

- **Art Heinricher, Dean of Undergraduate Studies at WPI**: Dean Heinricher organizes WPI's Project Presentation Day, and a similar event has potential benefit for the HEG-FR as previously discussed in section *5.4*. Questions could target the history of Project Presentation Day, why WPI hosts it, and the factors that contribute to its success.
- **La Chambre de Commerce et d'Industrie Fribourg**: The Fribourg Chamber of Commerce is an association of businesses in the canton of Fribourg. Unfortunately, we were unable to schedule an interview with representatives, but the questions we prepared can be found in Appendix I.
- **Students**: Speaking with additional students at the HEG-FR could be useful, especially when deciding what preparatory programs would be most effective. Students coming from various backgrounds such as apprenticeships, the military, and upper secondary education could talk about what they learned from their experiences. These findings could be useful in deciding the syllabus for any classes preparing students for project work.

5.6 Future Projects

Our work suggests that several future projects can be carried out either internally or by an outside group. Broad topics to be investigated include:

- **Alumni:** As the HEG-FR works to strengthen its alumni association, this project could report on the hallmarks of other, well-established networks and investigate how to best form an active alumni association in French-speaking Switzerland. Later studies can comment on the efficacy of HEG-FR's alumni practices after it has accumulated a few years' worth of graduates.

- **Preparatory Courses:** Investigate the role of preparatory coursework in preparing undergraduate students for completing corporate sponsored projects. This project would include a more in-depth study of the project preparatory coursework model at universities in the United States and Switzerland, where applicable. Additional universities in other countries could be represented if they have a similar project model. Focus could be placed on the effectiveness of the preparatory coursework model and how it can be explicitly applied to HEG-FR's project program. A detailed analysis of the role apprenticeships and military service play in preparing Swiss undergraduate students for project work will be necessary to give accurate recommendations. Finally, students can investigate ways to integrate this project preparatory coursework module into the M&T program.
- **International Programs:** At the moment, the HEG-FR has more "students in than out," (Andrea Rohrer) meaning there are more international students studying abroad at the HEG-FR than there are students of the HEG-FR studying abroad at other universities. As a result, the HEG-FR is looking for ways to increase their Swiss students' interest in studying abroad. The Bologna Process eases the process of transferring university credit between European countries, and the HEG-FR can take advantage of this accreditation requirement to promote international study. A future project could give recommendations to the HEG-FR on how to increase interest in their under-utilized foreign study programs.
- **Long-Term Evaluation of M&T Degree:** After several classes of graduates have entered the workforce, a future project could evaluate graduates' satisfaction with the M&T degree they received. The project could also involve an analysis of how

graduates' employers view the M&T project program and how it may have played a role in hiring decisions.

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Appendix A: Models of Corporate-Student Interaction

Lectures, Discussions & Seminars: This method is the standard model when giving a lesson on a particular topic, or sequence of topics that inform students of new knowledge. Seminars have discussion based dialogues that allow for student reflection on the material covered. Guest Orators are welcome and current employees have the opportunity to sit in on a desired lecture.

Mentorship: Mentors are industry professionals that provide individual undergraduate students with guidance and advice, free of charge, on topics that can include the job application process, career goals, class selection, or internships.

Projects: Students work individually or in teams on a pre-defined task designed by a corporate sponsor who acts as a mentor throughout the duration of the project. This work is unpaid and completed in parallel with the students' academic obligations, and is conducted under the supervision of a faculty advisor from the university. The student team is not within the managerial jurisdiction of the sponsor i.e. the group operates more like a consulting group than a group of interns.

Bachelor's Thesis: The Bachelor's Thesis is a capstone graduation requirement usually carried out with a corporate sponsor. The purpose of a Bachelor's Thesis is to assess whether the students have mastered the fundamentals of the subject area.

Internship: Interns are undergraduate students who are hired to work for a company for a set period of time. Internships give students the opportunity to experience working in a professional environment, and apply classroom knowledge to real world problems.

Appendix B: Project Descriptions

Managing a Technology Project: Create a foundation for further work in Managing projects with strong, technological components.

Market Opportunity Analysis: What customer needs should be covered by the company in the next 5 to 15 years?

Product Portfolio & Technology: How can the company cover a current existing need? What are the business models to implement? What factors influence the development of the product and how to establish proper documentation?

Prototyping: How to test a product in the first phase of creation? What influence does this new product have on the business model?

Implementing the Value Chain: How to finalize a product that goes into series production? How to produce and market the product?

Appendix C: Interview Questions for David Finkel

1. How do you approach companies regarding sponsoring projects? How often do they approach you about sponsorship?
2. What is the most common way relationships are started (i.e. alumni connections, personal relations, desire to give back, etc.)
3. What do you look for in a sponsor/company? Particular industry, management style, company philosophy, project structure…
4. In which ways do project sponsorships benefit companies (i.e. incentives)?
5. Have you seen any commonalities among sponsors that contribute to a positive project experience?
6. Is there anything that is initially confusing to companies (about their role in projects)? Understanding scope, definition of 'sponsorship' etc...
7. What are companies' concerns with project sponsorship?
8. What're the challenges of project sponsorship? What factors can negatively impact the experience? Solutions to problems that surfaced…
9. What factors make for a positive project experience?
10. How much does your sponsor list change year to year? Have you been working with the same couple companies for 20 years, or do they come and go more often?
11. The program we're working with is a strong blend of business management and technology. Have you ever had any projects that were interdisciplinary (esp. business and tech)? What made those projects different from a single-subject MQP?

Appendix D: Interview Questions for Diane Strong

1. Thank you/introduce project
2. How many MQPs do you advise per year? How many years have you been advising MQP?
3. What is your level of involvement with the sponsors?
4. What is the most common way relationships are started (i.e. alumni connections, personal relations, desire to give back, etc.)?
5. Have you seen any commonalities among sponsors that contribute to a positive project experience?
6. How much does your sponsor list change year to year? Have you been working with the same set of companies for several years, or do they come and go more often?
7. With your expertise in MIS in mind, are most of the MQPs you advise in this field? Can you give us an idea of what one of these projects would be?
8. Can you send us a few recent MQP project descriptions (initial problem statement)?
9. What are the challenges within a project that combines business, management, and technology?
10. Do you find that companies are apprehensive to sponsor interdisciplinary projects vs. single subject projects? Is there anything that makes sponsors apprehensive?
11. Is there anybody else we could talk to that has experience with Business and Management projects? Interdisciplinary projects (esp. tech and business)?

- Other: Management of ICT Projects (Information and Communication Technology)
    - Data Engineering & Business Intelligence
    - Basics of Programming (Computer)
    - SI (System Intelligence?) Management

Appendix E: Interview Questions for Kristin Wobbe

1. Who proposes GPS project descriptions?
2. What considerations are taken when outlining projects for first-year students?
3. How technical are the GPS projects?
4. What challenges arise in a GPS projects that aren't as prevalent with older, more experienced students?
5. What are the benefits of having project-based work in the first-year? How do you think students benefit the most?
6. What knowledge or skills do you expect students to learn by the end of the project?
7. How often are outside organizations involved? Is there a commonality between organizations that makes them well suited for working with first-year students?
8. What prompted WPI to create the GPS program?

Appendix F: Interview Questions for Kevin Sweeney

1. How do you approach companies regarding sponsoring projects? How often do they approach you about sponsorship?
    a. What is the most common way relationships are started (i.e. alumni connections, personal relations, desire to give back, etc.)
2. What do you look for in a sponsor/company?
    a. Particular industry, management style, company philosophy, project structure…
3. In which ways do project sponsorships benefit companies (i.e. incentives)?
4. Have you seen any commonalities among sponsors that contribute to a positive project experience?
5. Is there anything that is initially confusing to companies (about their role in projects)?
    a. Understanding scope, definition of 'sponsorship' etc...
6. What are companies' concerns with project sponsorship?
7. What're the challenges of project sponsorship? What factors can negatively impact the experience?
    a. Solutions to problems that surfaced
8. What factors make for a positive project experience?
9. How much does your sponsor list change year to year? Have you been working with the same couple companies for 20 years, or do they come and go more often?
10. The program we're working with is a strong blend of business management and technology. Have you ever had any projects that were interdisciplinary (esp. business and tech)? What made those projects different from a single-subject MQP?

Appendix G: Industry Interview Questions

The following set of questions was the basis for all interviews. Modifications for each company are noted below.

1. Greeting/Introductions
2. Explanation of our project
3. What do you know already about the program? Anything at all, good or bad, right or wrong?
4. Management and Technology Bachelor's program overview/Presentation
5. Do you have any questions? Need any clarification?
6. Please tell us about any previous involvement you've had with undergraduates
    a. Specifically:
        i. Type of program (Internship, projects)
        ii. Student profile (specific age, major, area, university...)
        iii. How long did that last (cycles, durations)
        iv. Level of involvement
        v. Why did you become involved?
        vi. What about the program made for a positive experience? A negative experience?
7. Present definitions of: Lectures & Seminars, Mentorship, Projects, Interns
    a. Overview of models of corporate involvement
8. Can you talk about your thoughts on these models?
    a. What is appealing?
    b. What is not appealing?
    c. Which of these models do you see being an appropriate level of involvement?
    d. Is there someone who is able to commit to serve as a mentor/advisor/sponsor/manager for the students?
9. Present academic concentrations
    a. Business: SMEs & Entrepreneurship; Leadership, Organizational Behavior & HR; Marketing, Strategy, & Innovation; Finance & Accounting; Supply Chain Management
    b. **Technology:** Information & Communication Technology; Life Sciences; Engineering; Architecture & Construction
10. Are any of the following project topics well-suited for your company?
    a. **Managing a Technology Project:** Create a foundation for further work in Managing projects with strong, technological components.
    b. Market Opportunity Analysis: What customer needs should be covered by the company in the next 5 to 15 years?
    c. Product Portfolio & Technology: How can the company cover a current existing need? What are the business models to implement? What factors influence the development of the product and how to establish proper documentation?
    d. Prototyping: How to test a product in the first phase of creation? What influence does this new product have on the business model?
    e. Implementing the Value Chain: How to finalize a product that goes into series production? How to produce and market the product?

- **Extrament :** No modifications
- Swiss Start-Up Factory
    - Would you prefer that the SSUF sponsor the project work directly, or help facilitate your clients' participation in project sponsorship?
    - How do you see small companies participating?
- **Leonteq:** No modifications
- bComp
    - We see that you have listed on your company's website that you partner with the Executive MBA at HEG-FR, among others (see one sheet). Please tell us about your experience regarding previous and current involvement with undergraduates and universities.
    - Are any of the following project topics well-suited for your company or the start-up that you work with? Emphasis on supply chain because theirs is all within Europe.
    - We see that you are an alumnus of the HEG-FR at the undergraduate level. Can you tell us about your involvement as an alumnus? Outside of the partnership? Do you have any suggestions to improve the alumni association? What would you like to see?
    - For the degree program, we are looking into the benefits and feasibility of a preparatory program for students that would take place during the summer before they begin classes at HEG-FR. The program would give students a background in the field *(M or T) that they are less familiar with and potentially prepare them for project work. We see that you completed an 'apprenticeship' Wyhus Belp (not sure if actually before undergrad though!). Did this experience prepare you for university? If so, how? Do you think you learned skills that could be applicable to successfully completing project work in industry?
- Johnson Electric
        - How might a company, like Johnson Electric, benefit from partnering with a university?
    - How do you see larger companies, such as Johnson Electric, participating?
    - Try describing projects in terms of consulting; off the critical path...do you have any interesting questions students could work on?
- ImmoScout 24
    - Are any of the following project topics well suited for ImmoScout 24 or a different branch of Scout24? Emphasis on supply chain because theirs is all within Europe.
- Alumni Relations Questions:
    - As a part of our project we are also providing the HEG with recommendations on how to strengthen their alumni network?
    - Can you tell us about your involvement as an alumnus of Universität Lugano and the University of Applied Sciences Fribourg?
    - If involved, what are your motivations for staying connected to your university?
    - What type of benefits, if any exist for Alumni?
    - Is there a networking platform that you use to stay connected to alumni?
    - Do you feel connected to either of your universities? If so, why?
    - Do you think that your career benefited from alumni connections?

Appendix H: Interview Questions for Alexander Kaiser

1. Basics: When did you graduate? How long were you there? Have you attended other universities?
2. How do alumni relations differ? Do you feel more connected to one? Why?
3. Do you still feel connected to HEG-FR? Why? Was it something from undergrad?
4. Do you think your career has benefited from alumni connections?
5. Do you see alumni networks from other schools having an influence?
6. Are you still involved with the university? What are your motivations for staying involved?
7. Where do you see the most activity? (reunions)
8. Would you want to be more involved?

Appendix I: University of Applied Science-St. Gallen Interview Questions

1. Do you have any partnership relations?
2. Can you please describe your project program?
3. What skills or knowledge do you expect the students to learn from project work?
4. What skills do students need before beginning the project program?
5. Are there any preparatory classes/orientation for students before they begin a project?
6. What programs are first-year projects a part of?
7. What has gone well with these projects, what could have been better?
8. How do you approach companies regarding sponsoring projects? How often do they approach you about sponsorship?
9. What are the most common ways relationships are started? (I.e. alumni connections, personal relations, desire to give back, etc.)
10. What do you look for in a sponsor/company? Particular industry, management style, company philosophy, project structure…
11. In which ways do you see project sponsorships benefit companies (i.e. incentives)?
12. Is there anything that is initially confusing to companies (about their role in projects)? Understanding scope, definition of 'sponsorship' etc...
13. What are companies' concerns with project sponsorship?
14. What're the challenges of project sponsorship? What factors can negatively impact the experience? How have you changed the program in the last few years, specifically to address challenges?
15. How much does your sponsor list change year to year? Have you been working with the same couple companies for 20 years, or do they come and go more often?
16. Have you encountered any legal issues regarding student projects? (Employment, insurance, IP…)
17. Alumni Advisory Board: duties, goals etc?
18. What are the benefits of project-based learning? What are the challenges?
19. Are graduates more likely to be hired by a company that sponsored their project(s)?

Appendix J: Chamber of Commerce Interview Questions

1. What does the Chamber of Commerce do? We have an understanding from the US, but we don't know if it holds true in Switzerland.
2. What is your role with the Chamber?
3. What kinds of businesses are members?
4. What is your general impression of the local businesses?
5. Are there any values that are shared in the community? Is there anything people are proud of?
6. Do you see any of the companies becoming involved with a university program? Has there been a lot of cooperation with schools and universities in the past?
7. We've seen that large factors in starting and maintaining relationships like the ones we are talking about are personal connections to the school and sometimes the area.
8. Do you see a lot of pride and loyalty for the area?
9. Lastly, we'd like to know how you think the Chamber of Commerce might be involved.
10. Do you think the Chamber of Commerce would be interested in the new program? Why or why not?
11. If you think this is beneficial for the area, do you see the Chamber of Commerce having a role in the project process?
12. If you don't see this a beneficial for the area, what are your concerns?