Industrial Engineering and Management in Austria: Balancing Industry Requirements, Association Recommendations, Graduates Needs and offered Qualification Profiles on Higher Education Institutions

Diploma Thesis

by

Christoph Sadei

Graz University of Technology

Faculty of Mechanical Engineering and Economic Sciences

Institute of Business Economics and Industrial Sociology

O.Univ.-Prof. Dipl.-Ing. Dr.techn. Ulrich Bauer

Graz, April 2014

In Cooperation with:

Austrian Alumni Association of Industrial Engineering and Management
(Österreichischer Verband der Wirtschaftsingenieure - WING)

and

Institute of Business Economics and Industrial Sociology
Graz University of Technology

EIDESSTATTLICHE ERKLÄRUNG

Ich erkläre an Eides statt, dass ich die vorliegende Arbeit selbstständig verfasst, andere als die angegebenen Quellen/Hilfsmittel nicht benutzt und die den benutzten Quellen wörtlich und inhaltlich entnommene Stellen als solche kenntlich gemacht habe.

Graz, am …… ……..

(Unterschrift)

STATUTORY DECLARATION

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

…… ……..

date (signature)

Kurzfassung

Der Begriff “Wirtschaftsingenieurwesen” (WI) wird oft im Englischen unterschiedlich übersetzt. In dieser Arbeit wird der Begriff „Wirtschaftsingenieurwesen“ mit „Industrial Engineering and Management“ (IEM) ins Englische übersetzt und auch erklärt warum dies die im Rahmen dieser Arbeit geeignete Übersetzung ist. Nach einer ausführlichen Herleitung der Übersetzung, wird das Angebot der Wirtschaftsingenieurstudien an österreichischen Hochschulen analysiert. Dies ist dadurch von Bedeutung, da durch Veränderungen im europäischen Hochschulsystem das Angebot an Wirtschaftsingenieurstudien an österreichischen Hochschulen in der Vergangenheit stark gewachsen ist und somit einer gewissen Dynamik unterliegt. Durch diese Dynamik besteht die Gefahr des Überblickverlustes und einer Intransparenz der von den jeweiligen Wirtschaftsingenieurstudien vermittelten Qualifikationsprofile. Aus diesem Anlass fassten die Wirtschaftsingenieurverbände Österreichs, Deutschlands und der Schweiz in einer Dreiländererklärung einen Entschluss um ein definiertes Qualifikationsprofil und eine daraus abgeleitete hohe Vermittelbarkeit von Wirtschaftsingenieuren zu sichern. Unternehmungen und Studierende können sich somit auf die Erlangung eines definierten Qualifikationsprofils von Seiten der Wirtschaftsingenieurstudien an den österreichischen Hochschulen verlassen. Aus diesem Anlass führt der Österreichische Verband der Wirtschaftsingenieure (WING), in Kooperation mit dem Institut für Betriebswirtschaftslehre und Betriebssoziologie der TU Graz periodisch eine Erhebung durch um den Interessensgruppen an Hochschulen und in der Industrie, Transparenz und Orientierung zu bieten. Die Hauptinteressensgruppen, die in dieser Arbeit als solche angenommen und bildlich als vier ausbalancierende Kräfte dargestellt werden, sind:

1. Der Österreichische Verband der Wirtschaftsingenieure
2. Berufstätige Wirtschaftsingenieure und Wirtschaftsingenieur-Studierende
3. Hochschulen, die Wirtschaftsingenieurstudien anbieten
4. Personalmanager/innen

Nach der Definition von „IEM“ und den damit eng verbundenen Begriffen „Qualifikation“, „Qualifikationsprofil“, „Kompetenz“ und „Vermittelbarkeit“ wird in der Einleitung und im Theorieblock dieser Arbeit die Dynamik im europäischen und österreichischen Hochschulsystem sowie „warum“ es zu so einer undurchsichtigen Situation im Ausbildungsangebot an Wirtschaftsingenieurstudien kam, dargestellt. Im Methodenteil der Arbeit werden die angewandten Methoden sowie die Theorie zur Fragebogenkonstruktion erläutert. Die Ergebnisse zeigen die Schwerpunktverteilung der vermittelten Qualifikationsprofile der erhobenen Wirtschaftsingenieurstudien an österreichischen Hochschulen, eine Übersichtstabelle mit relevanten Kennzahlen und Informationen der Wirtschaftsingenieurstudien sowie die Ergebnisse der durchgeführten Umfragen unter berufstätigen Wirtschaftsingenieuren, Wirtschaftsingenieur-Studierenden und Personalmanager/innen. Zum Schluss wird das Gleichgewicht zwischen den oben genannten „vier Kräften“ evaluiert und Schlussfolgerungen für zukünftige weitere Erhebungen sowie Empfehlungen für die jeweiligen „Kräfte“ gegeben.

Abstract

There are many different translations of the German term “Wirtschaftsingenieurwesen” into English, whereat in this thesis “Wirtschaftsingenieurwesen” is translated into Industrial Engineering and Management (IEM). After an extensive explanation of the translation of “Wirtschaftsingenieurwesen” into IEM the focus will switch to the offered IEM degree programs in Austria on Higher Education Institutions (HEI) because due to changes in the higher education system in Europe, a wide range of IEM degree programs offered by Higher Education Institutions in Austria emerged. Hence a loss of transparency and overview of IEM degree programs and their provided qualification profile subsists. Therefore, the Alumni Associations of Austria, Germany and Switzerland defined a job specification for IEM degree programs in a common declaration (so called “3-countries declaration”) to ensure a defined qualification profile and therefore a high employability of IEMs in industry. Both students and enterprises can consequently rely on the acquirement of a certain qualification profile through the degree programs. Supporting the claims of the 3-countries declaration the Austrian Alumni Association of IEM (Österreichischer Verband der Wirtschaftsingenieure, called “WING”) conducts periodically surveys in cooperation with the Institute of Business Economics and Industrial Sociology at Graz University of Technology to offer orientation and transparency for stakeholders in higher education and industry. The main stakeholders assumed in this thesis are figuratively seen as four balancing forces of the IEM “world” in Austria, which are:

1. The Austrian Alumni Association of IEM
2. IEM professionals and students
3. HEIs which offer IEM degree programs
4. Human Resource managers

After the definition of IEM and the to it closely related terms “qualification”, “qualification profile”, “competence” and “employability”, the dynamics within the European and Austrian Higher Education System and the “why” it came to such an opaque situation are displayed in the introduction and literature review part. In the methods of analysis, methodologies including the survey design are illustrated. The results present the range of the qualification profile of detected IEM degree programs offered on Austrian HEIs, a synoptically table with key information of the detected IEM degree programs and the findings out of the survey among HR managers, and IEM professionals and students. Concluding the balance between the four forces will be evaluated and implications for future studies as well as recommendations to the four “forces” will be given.

Preface

This thesis is dedicated to my father and Renate, both in loving memory.

I thank my sisters, mother, relatives and good friends for the great time and support during good and hard times.

Table of Contents

1 Introduction

This thesis analyzes the "world" of "Wirtschaftsingenieurwesen" (WI), here translated into Industrial Engineering and Management (IEM), in Austria. Through the illustration of all IEM degree programs offered on Austrian Universities and Universities of Applied Sciences, together defined as Higher Education Institutions (HEI), opinions from Human Resource (HR) managers, IEM professionals and students, and recommendations of the Austrian Alumni Association of IEM, it is tried to draw a complete picture of IEM in Austria (see **Figure 1**). This complete picture should help all stakeholders to gain an overall view and transparency. The results may serve:

- Students as a guideline to choose their ideal IEM degree program
- HEI to see their position on the IEM education market
- Graduates to reflect on their future career steps
- Companies to gain an overview of the offered range of IEM qualification profiles as well as IEM professionals' fields of operation
- Alumni IEM Associations to get feedback if the recommended IEM qualification profile is still up to date

Figure 1 shows the figurative structure of this diploma thesis as four balancing forces and their feedback cycles of the IEM "world" in Austria.

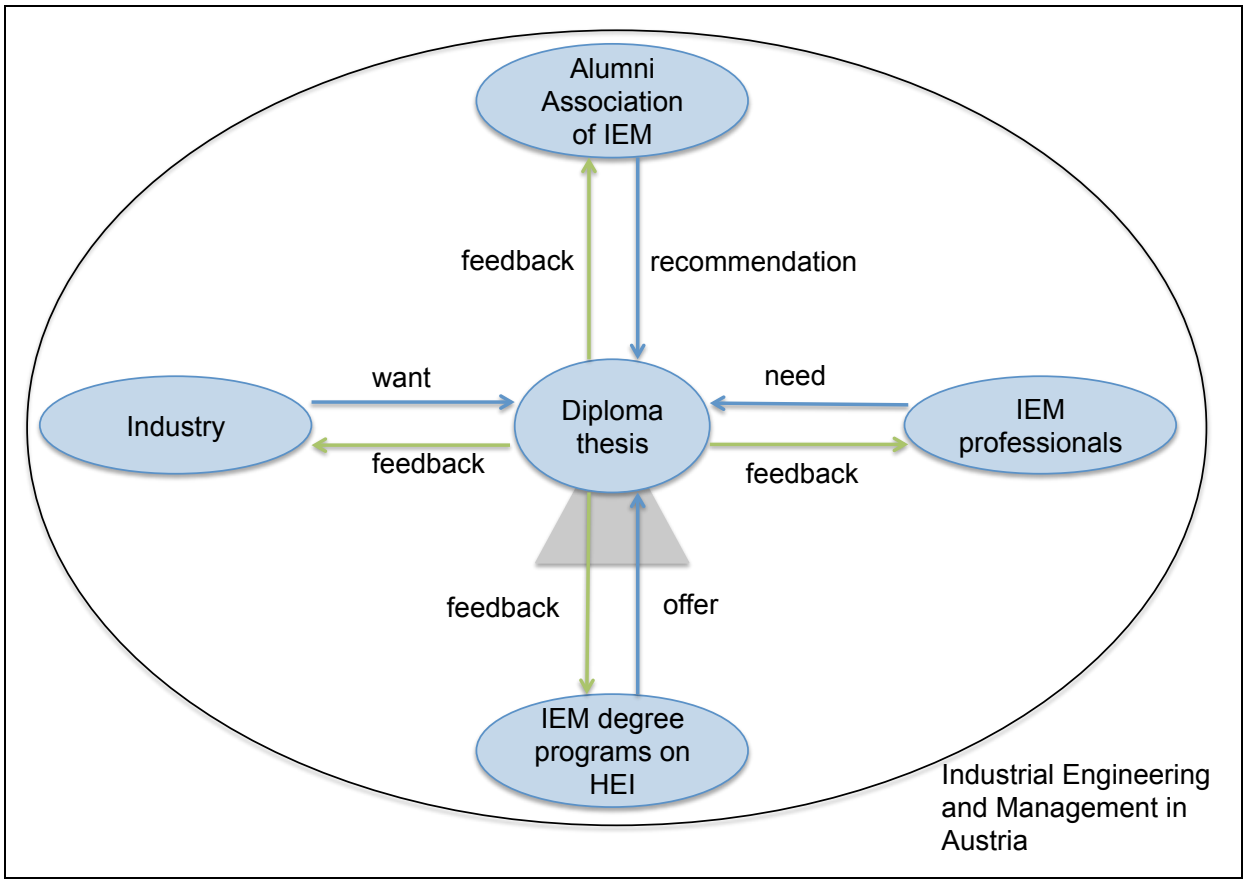

Figure 1: Four balancing feedback cycles of IEM

The results of this thesis go beyond the goals in order to provide interesting results for a positive future development of all stakeholders. But first the "why" it came to an opaque situation and therefore transparency is needed, is illustrated.

1.1 Initial Situation

Since the introduction of Industrial Engineering and Management degree programs on Austrian Higher Education Institutions in the 1950's there has been an increasing number and dynamics of IEM degree programs on HEI throughout Austria. This makes it difficult to get an overall view of the offered range of IEM degree programs.
The change in the educational system on European Union (EU) level, which started in 1990 aimed at improving the transparency and the diversification of degree programs and to support the exchange of students within the EU, is also having a big influence on the dynamics and overall view.

1.1.1 History of Industrial Engineering and Management in Europe

Succeeding the German Ministerial Decree on April 27th in 1927 a degree program called "Wirtschaft mit Technik" (so called "Economics with Engineering"), later called "Wirtschaftsingenieurwesen" (in this thesis translated into IEM and later explained why), has been established at the "Technische Hochschule zu Berlin" in Germany. Willi Prion (1879-1939) played a key role in the approval of the back then very innovative degree program and is seen as the main "Designer" of the IEM degree program. The IEM degree program continued to be unique in Germany until other HEIs started offering IEM degree programs after the Second World War. [**1**]
Already in 1932 the German Alumni Association of IEMs ("Verband Deutscher Wirtschaftsingenieure" – VWI) was founded to support graduates of the IEM degree programs and to bring them together in a professional community [**1**].
In Switzerland the first graduates of a postgraduates' degree program for Engineers to become an IEM graduate founded the Swiss Alumni Association of IEM ("Vereinigung Wirtschaftsingenieure Schweiz" – VWI CH) around 1980-1982. [**2**] [**3**]
In the Austrian reconstruction phase after the Second World War between 1946 and 1950 the former "Technische Hochschule Graz" (since 1975, "Technische Universität Graz" so called Graz University of Technology) introduced the IEM degree programs "Wirtschaftsingenieurwesen-Maschinenbau" (so called Mechanical Engineering and Business Economics) and "Wirtschaftsingenieurwesen-Bauwesen" (so called Construction Management and Civil Engineering) whereas the first Economics lecture were already offered to students in 1865. [**4**] The Vienna University of Technology offered their first IEM degree program in Business Informatics in 1992. [**5**]
Harald Wagner, Walter Veit, Horst Assam, Manfred Seiffert and Peter Yaldez, which were graduates of the former mentioned IEM degree programs in Graz, founded May 4th 1964 [**6**] the today's Austrian Alumni Association of IEM called "WING" (Österreichischer Verband der

Wirtschaftsingenieure) which since then represents the interests of the IEM professional community in Austria. [**7**]

1.1.2 Strategic change of Austrian and European Higher Education System

In order to harmonize the Austrian Higher Education Area with other European Union countries, enhance the diversification and permeability, 1990 the Austrian federal government decided to introduce by a resolution Universities of Applied Sciences with first courses starting in 1994. [**8**] Universities of Applied Sciences educate Students in specific industry related degree programs focused on Applied Sciences e.g. Industrial Management, Economics and Business, Advanced Nursing, Applied Electronics and Applied Image and Signal Processing. On the other hand Universities of Technology focus on scientific basic subjects and offer various degree programs e.g. Mechanical Engineering, Civil Engineering, Chemistry, Biotechnology, Architecture and Mathematics.
Subsequently, the so-called Bologna-Declaration with the main goal of establishing a European Higher Education Area (EHEA) until 2010 by voluntarily converge the Higher Education Systems of the signing countries, was signed in 1999 by Secretaries of Education of 30 countries. The fundamental idea was to establish a common European Higher Education Area to foster, firstly Europe as a Higher Education- and Research-location, secondly to support the internationalization and thirdly to improve the competitiveness [**9**] [**10**].

Due to the above-mentioned changes in the Higher Education System in Europe, a wide range of IEM degree programs offered by Universities and mostly by Universities of Applied Sciences were established in order to fit the needs of industry. Although this dynamic is to be welcomed some IEM degree programs on HEIs do not or fit only partially to the recommended qualification profile by their national Alumni Association of IEM. However the national Alumni Associations of IEM in Europe still have the ambition to maintain a high quality of IEM degree programs on HEIs in terms of a certain relation of subject categories to keep a high employability of IEM graduates on the labor market.

This ambition called for a transnational quality assurance measure and therefore the Austrian, German and Swiss Alumni Associations of IEM formulated a common declaration (the so called “3-countries declaration”) and a “job specification” in order to secure defined IEM qualification profiles across borders. This declaration represents the “*common will to ensure high quality and the distinctive profile of IEM graduates with the goal to foster high employability of IEMs through the establishment of a common brand*”. The core of the common brand is the following job specification: “*IEMs are economically educated engineers with an academic degree who holistically connect their technical and economical competences in their working activity”.* [**11**] [**7**]
Trough a periodical inquiry and analysis of the Austrian Higher Education Area as well as inquiring IEM professionals and Industry on relevant topics, the quality of education in means

of a provided qualification profile can be evaluated and recommendations to HEIs, students and graduates can be given.

1.2 Goals of the thesis

In total three goals should be achieved in this diploma thesis. Initially a collection of all IEM degree programs offered by HEIs in Austria should provide the missing transparency in the Austrian Higher Education Area, which leads us to the starting question what exactly do I look for? What is "Wirtschaftsingenieurwesen"? Does the translation into Industrial Engineering and Management mean the same? To reach the first goal a reflection on the prior questions and a detailed analysis of some central terms has to be drawn up in the literature review part in chapter 2.1.1. The second problem is defined by the central term of the "3 countries declaration", quality. Quality in layman's terms is when somebody gets what he/she wants and fulfills his or her expectations/needs. This leads to the second and third central terms of the "3 countries declaration" and job definition, qualification and competence. To get to know "what is wanted" the job offering part of the stakeholders who are companies respectively Human Resource (HR) Managers need to be addressed. Additionally to know which competences and qualification profile IEM graduates need throughout their professional career life, the profile of IEM professionals needs to be sharpened. Thus following three goals can be formulated:

Goal 1

- Generation of a synoptically table and a comparative chart of all IEM degree programs in Austria.

  Sub goal 1: Collection of all Industrial Engineering and Management degree programs on all Austrian Universities and Universities of Applied Sciences.

  Sub goal 2: Allocation of subjects of IEM degree programs to 3 main categories and four sub categories according to the WING model (see **Figure 4** which will be explained later).

Goal 2

- Illustration and sharpening of IEM professionals' profile in means of needed qualification profile and competences throughout their carrier paths.

Goal 3

- Illustration and sharpening the wanted or desired qualification profile and competences of IEM graduates from industries' point of view.

1.3 Tasks in order to reach the three goals of the thesis

In order to reach the defined goals in chapter 1.2 following 5 main measures with the respective sub points have to be taken (see **Figure 2**):

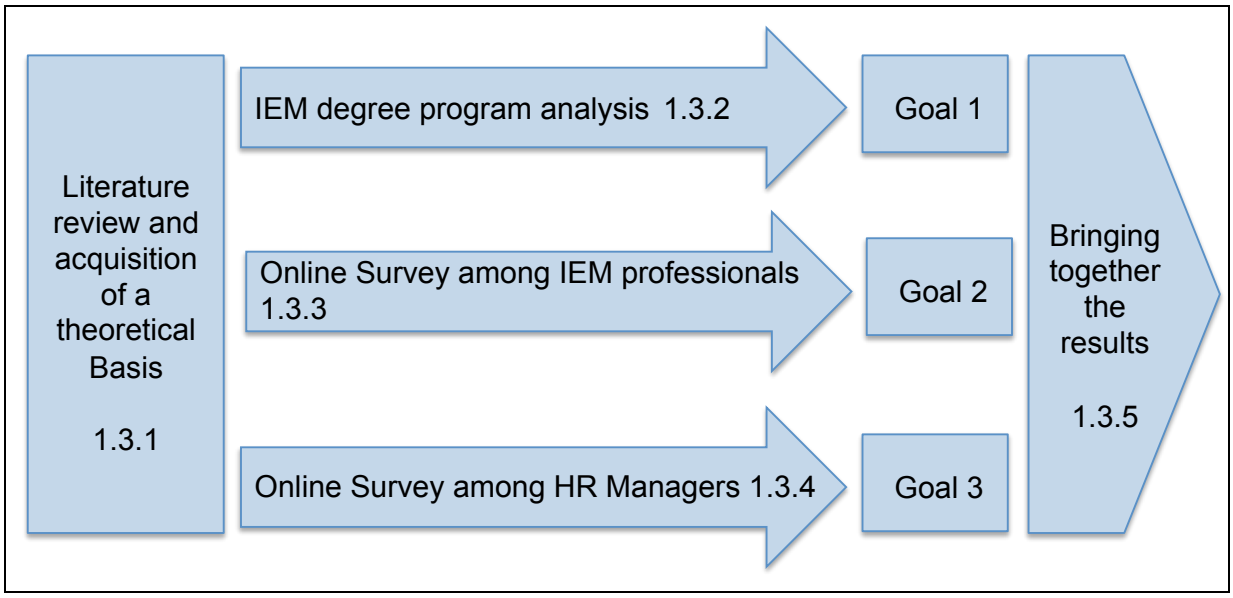

Figure 2: Five Measures to reach the three goals of the thesis

The 5 measures are going to be explained consecutively.

1.3.1 Literature review and acquisition of a theoretical basis

In order to reach the in 1.2 mentioned three goals, first our delimitation of the term IEM and the definition of IEM degree programs need to be specified. Moreover the basic principles of marketing research (primary analysis and secondary analysis), the specification of definitions like qualification, qualification profile, competence and employability and the Austrian Higher Education system need to be illustrated.

⟹ *Essential basics for Goal 1, Goal 2 and Goal 3*

1.3.2 IEM degree program analysis

After the delimitation of the Austrian understanding of an IEM qualification profile provided by IEM degree programs on Austrian HEI, firstly all in Austria accredited HEI and secondly all by them offered potential IEM degree programs need to be collected and deeper analyzed with the cooperation of the respective dean. The deeper analysis accords the subdivision into 3 main subject categories already applied in the former Austrian IEM inquiry by Bauer, Zunk and Fürst in 2010 [**11**].

⟹ *Creation of a list of IEM degree programs for the synoptically table of Goal 1*

Following information of all IEM degree programs offered on HEIs in Austria need to be collected and displayed in the synoptically table after the completion of the IEM degree program list:

- The kind of IEM degree program (Bachelor, Master or combined Bachelor + Master)
- Teaching and interrogation language
- Structure of the degree program (duration and ECTS)
- Number of students and graduates of 2011, 2012 and 2013 of whole HEI and of IEM degree program
- Academic title awarded
- Female percentage
- Information if the degree program can be attended full time/part time etc.
- Number of student places available
- Application and matriculation period
- Duration of mandatory internship

1.3.3 Online survey among IEM professionals

To reach Goal 2, a primary analysis among IEM professionals is needed in order to assess the needed qualification profile and competencies by IEM professionals throughout their career paths. This primary analysis has to incorporate students (but evaluated separately) and graduates of IEM degree programs and as results following information should be gathered:

- General information on concluded degree program, age and gender of IEM professionals
- Education information:
    - Kind of HEI
    - Specialization of the degree program
    - Specification of the ideal relation between technical and economics subjects
    - Specification of the ideal relation of expertise, methodological and social competencies
    - Specification of needed further education
    - Needed language knowledge on the job
    - International experiences
    - Extracurricular engagement
- Information about career and carrier path:
    - Initial salary
    - Professional environment: Industry, branches, headquarter and number of employees
    - Fields of operation throughout the career path (maximum 10 jobs)
    - Self assessment of career opportunities
- Retrospective assessment of chosen education and individual skills:

  - Importance of expertise contents of teaching
  - Importance of individual skills at work
- Inquiry of WING members about the offered services of the WING (not illustrated in this thesis though conducted):
  - Importance of the services in the field of networking, career support, expertise knowledge transfer and representation of interests / branding
  - Degree of fulfillment of services offered by the WING

⇒ *Leads directly to Goal 2*

1.3.4 Online survey among Human Resource Managers

In order to investigate, which qualification profile and competencies are wanted speak demanded from IEM graduates by the labor market and to finally assess the system balance among the four driving forces of the IEM "world" in Austria, a primary analysis among HR managers is crucial.

⇒ *Leads directly to Goal 3*

Therefore the results of the main questions have to be comparable with the results from the IEM professionals' survey. Following information need to be gained out of this survey:

- Companies details:
  - Professional environment: Industry, branch, headquarter and number of employees
  - Age, gender and field of operation of the questioned person

- Specification of the wanted IEM qualification profile:
  - Specification of the ideal relation between technical and economics subjects
  - Specification of the ideal relation of expertise, methodological and social competencies
  - Importance of expertise contents of teaching
  - Query of acceptance of the Bachelor title in industry
  - Importance of students' employability factors (HEI, duration, specialization, thesis topic, grades etc.)
  - Query of the preference of graduates of certain HEIs
- Specification of wanted skills from IEM graduates:
  - Importance of individual skills at work
  - Importance of international experience
  - Importance of extracurricular engagement
  - Wanted knowledge of languages
  - Importance of work and individual related critical factors for success
- Specification of IEM career opportunities

- Job market for IEM in general
- Preferred recruiting strategies
- Initial salary for IEM graduates
- Preferred Fields of Operation IEM graduates are employed
- Assessment of career development of IEMs

1.3.5 Bringing together the results

After all goals have been reached and thus the results displayed, an interpretation of all results combined is needed because the essence of this thesis is the comparison of the results among each other. The results separated from each other make it possible to give feedback to the respective stakeholder, but put into relation state the balancing situation and as final result some implications can be given if the system is outbalanced.

1.4 Areas of examination

For the IEM degree program analysis the area of examination is restrained on Austrian HEIs because the goal is to assess the current situation in Austria.
The area of examination for the online survey among HR managers are randomly selected HR managers / companies in Austria.
WING members, students and graduates of Graz and Vienna University of Technology form the area of investigation for the online survey among IEM professionals and students (students will be evaluated separately).

Now that the goals and tasks are defined, the areas of examination are defined, the crucial terms used until now need to be explained and connected in order to gain a common language and a common framework.

2 Literature review and definitions

Before the collection of data through primary and secondary analysis can be started, a common language, some analysis structures and a theoretical basis have to be established. The common language refers to the definition of central terms in this thesis, the analysis structures refer to the framework and the theoretical basis refers to the used methodology.

Figure 3 shows the literature review structure in order to gain an overview of this chapter but first some central terms need to be defined to get an insight into the topic of IEM and the closely related terms. Afterwards all the terms will be bound together and describe the Bologna Process and its most important projects, the European Qualification Framework (QF) and the European Higher Education Area. Subsequently, the Austrian National Qualification Framework as a mosaic stone of the European Qualification Framework in which the focus will lay on the Higher Education Institutions will be illustrated (see **Figure 3**).

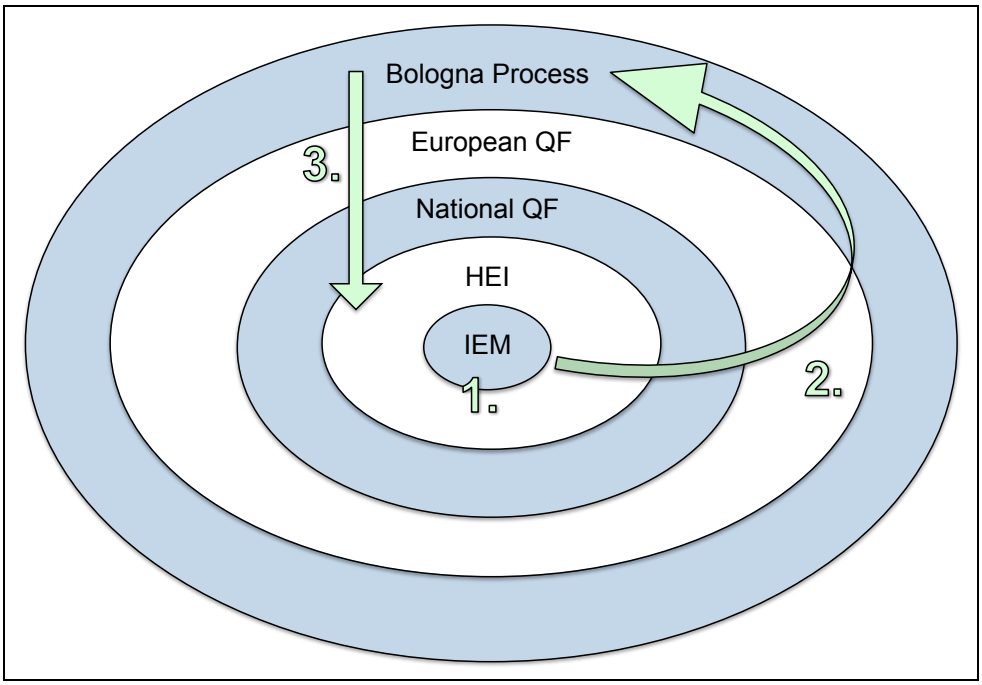

Figure 3: Literature review structure

2.1 Definition of central terms

As already mentioned in 1.2, the terms **quality, qualification, qualification profile, competences and employability <u>are the central terms</u>**, which in this thesis are always connected to the term Industrial Engineering and Management. Therefore this term needs to be defined first for the understanding of the general focus of this thesis and what it is all about.

2.1.1 Industrial Engineering and Management

In the accompanying "job definition" of the "3-countries declaration" the part of *"IEMs are economically educated engineers with an academic degree…"* [**7**] already gives a hint how IEM is defined by the Austrian Alumni Association of IEMs but let's start from the scratch.

As already mentioned, the central topic of this thesis is the German term "Wirtschaftsingenieurwesen", which is mostly translated as "Industrial Engineering and Management" but e.g. also as "Industrial Engineering and Business Management", "Industrial Engineering" and "Engineering and Business Economics". Although the composing terms of WI and IEM have a different scientific focus we will stick to the translation into IEM. To understand why we still stick to this translation the differences and the why need to be illustrated.

Basically Industrial Engineering and Management consists of two terms, which are "Industrial Engineering" (IE) and "Management" (M) which differentiate from the terms "Wirtschaft" (so called "Economics") and "Ingenieurwesen" (so called "Engineering") out of "Wirtschaftsingenieurwesen". To illustrate the basic differences between these terms they need to be defined:

Engineering activities are defined as followed [**12**]: *"An engineering activity is based on combined, interdisciplinary technological knowledge, mathematical-natural-scientific and normative basics as well as their interconnections, which establishes engineering activities in the end. Engineering activity serves the generic goal to improve the livelihood of humans through development and the adoption of technical means".*
This definition puts the technological knowledge into the focus as the main driving force of engineering activity. Economics on the other hand can be defined as *"the study of the way in which economies work, for example, the way in which they make money and produce and distribute goods and services"* [**13**]. On the other hand the term "management" in terms of science is defined as [**13**]: *"Management science is concerned with designing and developing new and better models of organizational excellence"*.

According to the official definition by the Institute of Industrial Engineering (IIE) the term Industrial Engineering (IE) *"is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy. It draws upon specialized knowledge and skills in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems".* [**14**]
Furthermore, the Industrial Engineering Standards in Europe (IESE) analyzed IE degree programs in six European countries, compared the countries average subjects of study distribution according to their proposed curriculum model. The proposed curriculum model as a reference IE syllabus by Industrial Engineering Standards in Europe consists of following eight core subject categories [**15**]: Engineering Basics, IE Fundamentals, Operations

Research, Management Systems, Innovation and Technology, Environment/Sustainability, Manufacturing Systems and Human Factors Engineering.

The European Students of Industrial Engineering and Management (ESTIEM) define the combined term Industrial Engineering and Management as *"IEM integrates technological knowledge and management skills, helping students to cope with competitive business challenges while comprehending the underlying technology. The focus of IEM studies lies in providing students valuable engineering knowledge as well as practical management experience. Throughout Europe, IEM has many different names - and many different faces."* [**16**]

If the two definitions "Industrial Engineering" and "Management" are logically added, the total scientific content is much wider and blurred than if only the two terms "Engineering" and "Economics" are added. On the other hand the IEM definition by ESTIEM focuses on the two terms "Engineering" and "Management" and in Austria the WING subordinates the "Management" to "Economics" and "Integration". Although the definition of IEM provided by ESTIEM is not exactly what the WING understands under IEM according the job definition but it comes quite close.

ESTIEM states that, "*Throughout Europe, IEM has many different names - and many different faces"* [**16**], therefore Industrial Engineering and Management is not the exact but a really good translation of the term "Wirtschaftsingenieurwesen" because both definitions incorporate the Engineering and Economical/Managerial scientific content, focus on the holistically usage of both skills and leave a leeway of the engineering focus whereas Industrial Engineering "…*is concerned with the design, improvement and installation of integrated systems of people, materials, information, equipment and energy"* [**14**] what suggests the focus on production and process management and what can also be deduced from the reference syllabus by IESE.

Now that IEM in Austria can be accepted as the translation of WI, the Austrian precise definition of IEM can be formulated. The "3-countries declaration" comprehended besides the "job definition" and the core statement also the qualification profile specification of IEM degree programs on HEIs.
This qualification profile specification recommends for IEM degree programs in Germany and Switzerland following relation of subject categories: 40 % technical subjects, 20 % economics and 10 % integration subjects. [**17**]

Because the Austrian Alumni Association of IEM (WING) wants to foster the Engineering part of the IEM definition they recommend a slightly deviating qualification profile in the "3-countries declaration" as followed [**17**] [**11**]:

- **Minimum 50 % technical subjects as a knockout-criterion**
- **20 % economics subjects**
- **10 % integration subjects**

To sum up, the Austrian Alumni Association of IEM recommends the above-mentioned relation of subject categories for IEM degree programs on an Austrian HEI and defines this recommended relation as a **quality definition**.

The three main categories “Natural Science and Engineering”, “Integration” and “Economics” build the WING model, which shapes the figurative face of IEM degree programs on Austrian HEIs (see **Figure 4**).

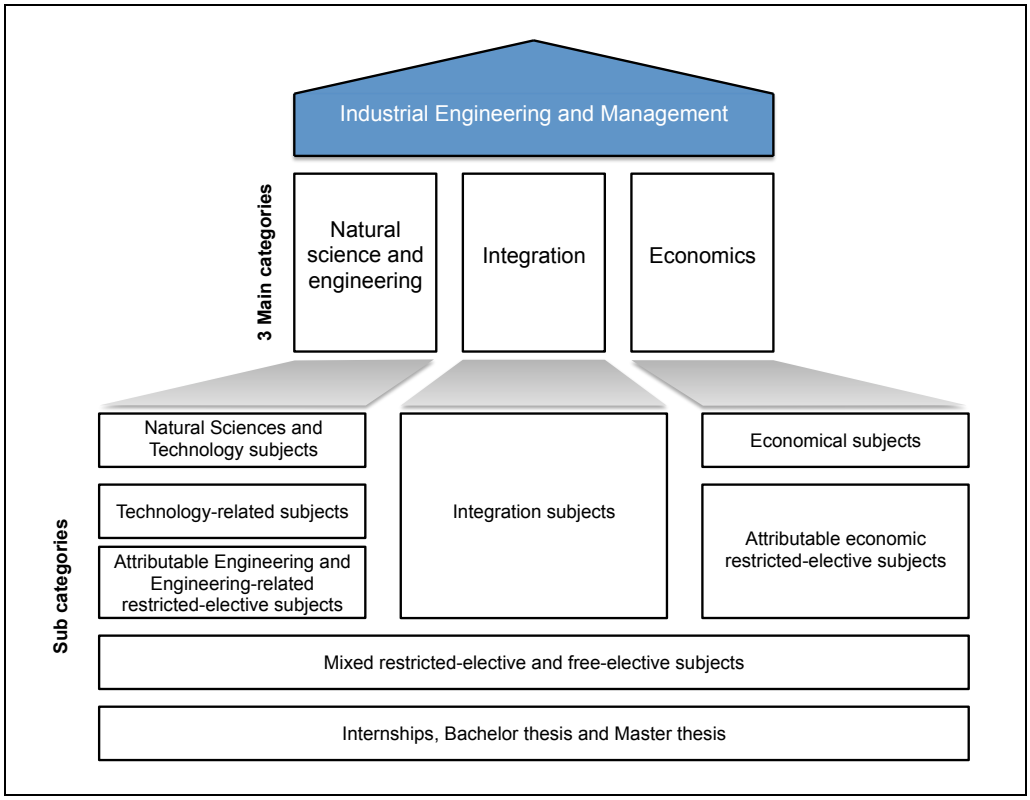

Figure 4: The three main categories of IEM in Austria (WING model) [**11**]

The WING model categorizes subjects into three main categories and four sub categories which accord to the two composing definitions of IEM in Austria (Engineering and Economics) and are defined as followed:

Natural science and technology subjects (main category) are bindingly defined by the “engineering and technology” specialization according to the revised field of science (see OECD [**18**]) of the analyzed degree program. E.g. for subjects: Simulation, designing, chemistry, software engineering, mechanical technology, fluid dynamics, CAX, machine elements, building, mechanics of materials. [**11**]

Technology-related subjects (sub category) are subjects where the technological basis predominates. E.g. Recycling, industrial engineering, infrastructure management, methods of engineering, production management, quality management, technical project management, sustainability in engineering, traffic planning. [**11**]

Economics (main category) are subjects with economics core content. E.g. business studies, business intelligence, change management, information management, investment and financing, supply chain management, marketing, personnel management, management accounting, general management and organization, macroeconomics. [**11**]

Integration subjects (main category) are subjects with interdisciplinary questions, which have to be analyzed and solved with scientific and methodic approaches through the combination of different mindsets from different disciplines [**17**]. E.g. Ethics, Social- and Employment law, civil- and corporate law, Ergonomics and job design, communication, creativity techniques, team -building and -training, knowledge- and time management.

Furthermore both "**attributable**" **(sub categories)** subjects (see **Figure 4**) have to be seen as restricted-elective subjects of the respective subject main categories only if the catalogue from whom they have to be chosen is only composed of subjects attributable to one subject main category.

Mixed-elective and free-elective subjects (sub category) are subjects, which either can be chosen out of a catalogue with subjects attributable to more main categories (e.g. 5 subjects out of 10 are attributable to economics and the other 5 subjects are attributable to technical subjects) or are free-elective and therefore con not be attributed to one subject category because no general statement is possible.

Internships, Bachelor thesis and Master thesis can be seen as a neutral category because for the subject analysis only the subjects need to be attributed to their respective category and therefore the sum of subjects is seen as the main unit. But to gain an overview of the degree program they still have to be considered in the analysis of the degree programs.

This study is based on the understanding that **technical subjects** are considered as **natural science and technology subjects and technology-related subjects.**

Newly applied standards for an IEM degree program in Austria deviating from the WING recommendation:

In this study the new **knockout-barriers** of **minimum 50 % and maximum 80 % technical subjects** were set in the analysis of IEM degree programs. These 50 % to 80 % technical subjects have to be attributable to a revised field of science classified under Engineering and Technology by the OECD [**18**] e.g. Civil-, Mechanical-, Electrical-, and Materials-Engineering. The remaining percentage of minimum 20 % and maximum 50 % has to be constituted as sum of economics and integration subjects.

Now that the focus of this thesis has been illustrated, IEM as term has been defined and narrowed down to clear qualification profile barriers as knockout-criteria, which

simultaneously refer as quality measures, some more terms in this thesis closely connected to IEM need to be looked at.

2.1.2 Qualification and Qualification Profile

Qualification is defined by the European Commission in the context of the European Qualification Framework and shared by all EU Member States as [**19**]:

"'Qualification means a formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards"

Therefore in this thesis the term "Qualification Profile" is described as the learning outcomes in percentage, classified into the three main categories, "Natural Science and Engineering", "Integration" and "Economics" of the WING model described before (see **Figure 4**).

2.1.3 Competence

The OECD's Definition and Selection of Competencies (DeSeCo) project provides a framework that extended the Program for International Student Assessment (PISA) into new competency domains. The outcome of the DeSeCo Project was a list of key competences considering individual and collective goals as well as common values. Among the definition of the term "competence" (see below) following key competencies, which help to face complex challenges of today's world as both individual and society resulted [**20**]:

- **Competence Category 1: Using Tools Interactively**
  - The ability to use language, symbols and text interactively
  - The ability to use knowledge and information interactively
  - The ability to use technology interactively
- **Competence Category 2: Interacting in Heterogeneous Groups**
  - The ability to relate well to others
  - The ability to cooperate
  - The ability to manage and resolve conflicts
- **Competence Category 3: Acting Autonomously**
  - The ability to act within the big picture
  - The ability to form and conduct life plans and personal projects
  - The ability to assert rights, interests, limits and needs

As easy to recognize, not all key competencies as well as other competencies can be provided by initial or higher education. The development of competencies is closely connected with lifelong learning because some competencies will grow through experience, age and change of life values and situations. [**20**]

Therefore, "*A competence is defined as the ability to successfully meet complex demands in a particular context. Competent performance or effective action implies the mobilization of knowledge, cognitive and practical skills, as well as social and behavior components such as attitudes, emotions, and values and motivations*". [**20**] [**21**]

Another overlapping definition of "Competence" provides the European Commission in the context of the European Qualification Framework (see 2.2.2) [**19**]:
"'Competence means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy."

Anyhow the up to date and wanted competences on the job market can be easily seen in job ads because often-new fashionable competence types arise. Competences along with qualification in terms of a diploma and specific qualification profiles in terms of degree program absolved lead to better job opportunities thus to a higher employability, which is going to be defined in the following chapter.

2.1.4 Employability

One often cited and easy to understand definition of employability is the one from Hillage and Pollard, who say that *"In simple terms, employability is about being capable of getting and keeping fulfilling work. More comprehensively employability is the capability to move self-sufficiently within the labor market to realize potential through sustainable employment. For the individual, employability depends on the knowledge, skills and attitudes they possess, the way they use those assets and present them to employers and the context (e.g. personal circumstances and labor market environment) within which they seek work."* [**22**]

In order to keep path with the increasing knowledge, skills and individual competencies demand, it is obvious that lifelong learning is crucial especially for people in advanced age in order to improve their employability.

If only the Higher Education Area is considered, to improve employability it *„... will involve the responsibilities of all stakeholders. Governments and Higher Education Institutions will need to communicate more with employers and other stakeholders on the rationale for their reforms. The European Union urges institutions to further develop partnerships and cooperation with employers in the ongoing process of curriculum innovation based on learning outcomes"* [**23**]

Employability refers to skills, knowledge, competences, lifelong learning, qualification and quality education in terms of specific qualification profiles, many terms, which already have been explained and defined. All these key terms put into a global European educational

strategy describe the best the ongoing Bologna Process, which was initiated by the Bologna Declaration signed by ministers of 30 Countries, 1999 June 19th in Bologna (Italy). [**24**]

2.2 The Analysis Framework

As already mentioned IEM and the central terms of this thesis bounded together already link to the Bologna Process as a global strategy, which is described next and step by step broken down to the Austrian Higher Education Institutions. This approach to first describe the central terms bind them together and begin again at a more global level like the Bologna Process in order to reach step by step the Austrian HEI is intended because through this pathway the connections between the thesis goals and the European "higher" goals can be easier followed and understood. This pathway is put down into a graphic in **Figure 5**.

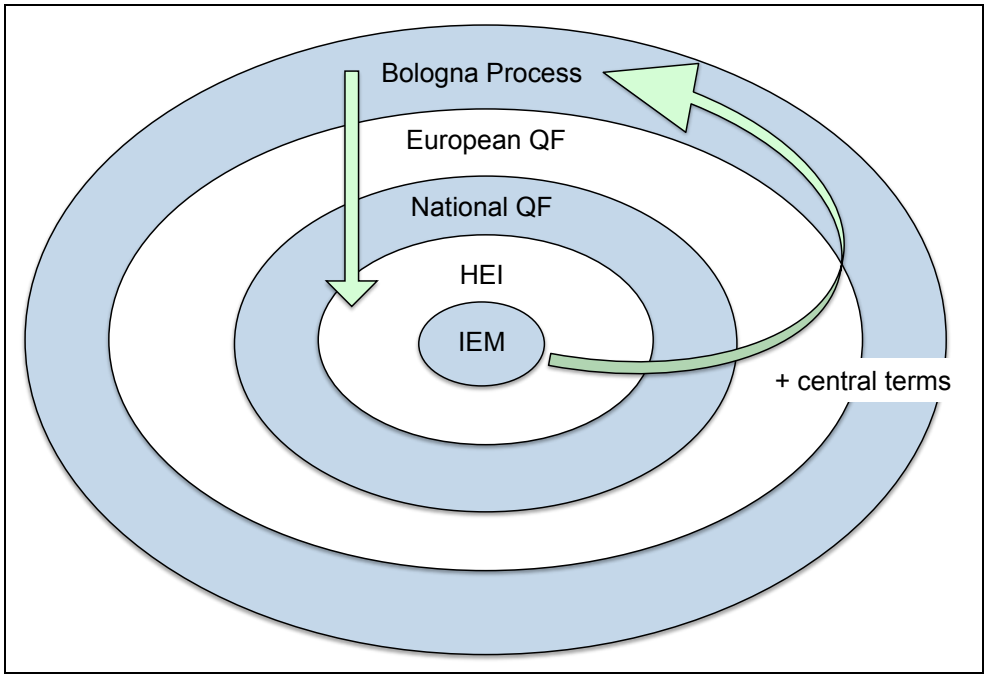

Figure 5: Analysis pathway

2.2.1 The Bologna Process

One year before the Bologna Declaration initiated the Bologna Process the Sorbonne declaration was signed in 1998, by the ministers of four European Countries. The aim of the declaration was the commitment to encourage a common frame of reference within the intended European Higher Education Area (EHEA). In this EHEA the mobility of students, graduates, teachers and researchers should be promoted as well as their employability. [**25**]

The already mentioned Bologna Declaration was signed 1999 by 30 countries with the following objectives, which were considered as primary relevance in order to establish the EHEA until 2010 and to promote the European system of higher education worldwide [**24**]:

- **Easy readable and comparable degrees** to improve the international competitiveness of the European higher education system and to promote European citizens employability
- A system essentially based on **two main cycles**, undergraduate (Bachelor) and graduate (Master). Completion of first cycle, lasting minimum three years is prerequisite for second.
- Establishment of a **system of credits** such as the European Credits Transfer System (ECTS)
- **Promotion of mobility** of students, teachers and researchers by elimination of all obstacles to free movement
- **Cooperation in quality assurance** with the aim to developing comparable criteria and methodologies
- Promotion of the **necessary European dimension in higher education**, regarding curricular development, cooperation among institutions, training and research

All measures set by the Bologna Declaration were voluntarily and therefore neither imposed as binding clauses of the contract nor imposed on the national governments or universities. [**24**]

After the Bologna Declaration, Ministerial Conferences have taken place every two years and ministers expressed their will through the respective Communiqués. [**25**]

The **Prague Communiqué of 2001** May 19th where the number of member countries was enlarged to 33, added the following actions to the objectives of the Bologna Process [**26**]:

- **Lifelong learning** as an essential element of the EHEA to increase economic competitiveness as a knowledge-based society and economy in Europe
- **Involvement of Universities**, other higher education institutions and students in the establishment and shaping of a EHEA
- **Promoting the attractiveness of the EHEA** among students from Europe and other parts of the World

Also, the participating countries, represented by ministers of education, committed themselves to ensure the further development of quality assurance and development of national qualification frameworks, which as objective was correlated to the lifelong learning one. [**25**]

At the **Berlin Conference in 2003**, already 40 ministers responsible for higher education signed a communiqué that promoted the linking of EHEA to European Research Area (ERA) in the Bologna Process. The importance of research, research training and the promotion of interdisciplinary research to maintain and improve the quality of higher education were underlined. They requested increased mobility at doctorate and post-doctorate level and animated the Higher Education Institutions to enhance their cooperation in the area of doctorate studies and training of young researchers [**27**]. Moreover Ministers encouraged the

member states to elaborate a framework of comparable and compatible qualifications for their higher education systems, which should seek to describe qualifications in terms of workload, level, learning outcomes, competences and profile in order to increase the transparency of qualifications [**28**]. So the European Qualification Framework (EQF) development started in 2004. "*The EQF meets one of the objectives of the "Lisbon Strategy of employment by 2010" with a view to the transition to a knowledge society*". [**29**]

Simultaneously with the EQF the Joint Quality Initiative (JQI) as part of the Bologna Process suggested the "Dublin descriptors" for bachelor's and master`s programs in 2004. The Dublin descriptors are recognized in the EHEA and provide a general description of the accomplishments and skills expected in connection with the qualification/title that represents the completion of a Bologna cycle (bachelor, master or doctorate program). Both the EQF and the Dublin descriptors are based on learning outcomes, which means that they describe what learners should know, understand and be able to do after they completed a degree program. However the two approaches describe the learning outcomes by using a different descriptor system. But it can be said that the EQF focus lays on the lifelong learning and describes all levels of education, from primary school to PhD whereas the Dublin descriptors describe only the learning outcomes of HEI in terms of bachelor, master and PhD qualifications. [**30**] [**31**]

The **Bergen Communiqué of 2005** noted that valuable progress had been made concerning the objectives of the Bologna Process. The ministers stated that they would like to have progress in the following areas until 2007 [**32**]:

- Implementing references and guidelines to guarantee quality and to enhance mutual recognition of accreditation of member countries
- Introduction of National Qualification Frameworks
- Recognizing and awarding joint degrees also on doctoral level
- Create opportunities of flexible pathways in higher education
- The continuing commitment to the social dimension of making quality higher education equally accessible to all people

Furthermore in Bergen it was decided to add the Doctoral program as third cycle to the Bachelor and Master program whereat the Bachelor program typically includes 180 to 240 ECTS credits, the Master program typically includes 90 to 120 ECTS credits whereat one ECTS is equivalent to 25-30 hours of work. Every year has two semesters with 30 ECTS per semester. For the third cycle (Doctoral program) no time extend was specified. [**32**] [**33**] [**34**]

Two years later in **2007 the London Communiqué** focused on evaluating the progress made since the Bologna Declaration in 1999. In the London conference, where 46 countries participated the conference, the focus for the following two years switched to [**23**]:

- The promotion of mobility of students and stuff and the development of measures for the evaluation of mobility

- The evaluation of effectiveness of national strategies on social dimension in education
- The development of indicators and data for measuring the progress regarding social dimension and mobility
- The examination of possibilities to improve the employability linked to the three-cycle degree system introduced in Bergen (Bachelor, Master and Doctoral program)
- The improvement of the dissemination of information about the EHEA and its recognition throughout the world
- Continuing to take stock and the qualitative analysis of the progress steps towards the EHEA

In the **Leuven/Louvain-la-Neuve Communiqué of 2009** the progress achieved and that the EHEA has well developed since the Bologna Declaration has been noted. However, some targets still needed to be realized and properly applied at European, national and institutional levels. The Communiqué also noted that the Bologna Process would be continued beyond 2010 with following priorities for the new decade until 2020 [**35**]:

- Provide **equal opportunities to quality education**; participation in higher education should be expanded and especially underrepresented groups by providing necessary conditions to participate
- Widening **participation in lifelong learning**; accessibility, quality as well as transparency of information on lifelong learning must be ensured
- **Promoting Employability**. Stakeholders should cooperate to raise initial qualification as well as maintaining and renewing a skilled workforce. Stakeholders also should improve the provision, accessibility and quality of their careers and employment related guidance services to students and alumni. Work placements embedded in study programs as well as on the job learning
- Development of **Student-centered learning and the teaching mission in higher education**; Improving the teaching quality of HEIs degree programs at all levels
- **Education, research and innovation**; Number of persons with research competences should be increased; better integration of research within doctoral programs; the career development of early researchers should be made more attractive
- **More international collaboration of HEIs**
- **Increasing the opportunities for and the quality of mobility**; by 2020, 20 % of all graduates should have spent some study or training period abroad
- **Improving the data collection**; data for monitoring and evaluating the process made on the objectives should be collected
- **Development of multidimensional transparency tools**; to acquire detailed information about HEIs and their degree programs, transparency tools should be developed together with stakeholders; tools should provide comparable data and proper indicators as well as quality assurance and the recognition of principles of the Bologna Process

- **Funding**; Greater attention should be paid to seeking new and diversified funding sources and methods

The following Ministers of education Conference took place in **Budapest-Vienna** only one year after the Leuven/Louvain-la-Neuve Conference, to be precise, in 2010. In this Anniversary Conference where a decade of Bologna Process was celebrated, the European Higher Education Area was officially launched. [**25**]

Two years later in **2012 on the Bucharest Ministerial Conference**, Ministers stated that Higher Education reform could help to get Europe back on track and generate sustainable growth and jobs. Therefore the Ministers focus on three main goals in order to face the crisis [**25**]:

- Provide quality higher education to more students
- Better equip students with employable skills
- Increase student mobility

Newly introduced (since 2009) Policy Forums coupled with the EHEA Ministerial Conferences agreed among other main issues on [**25**]:

- The importance of public investment in higher education, in spite of economic crises
- A balanced exchange of teachers, researchers and students between countries, in order to promote fair and fruitful “brain circulation”, as an alternative to brain drain

The Bologna Process today includes no fewer than 47 participating countries. [**25**] [**36**]

Now that the Bologna Process and the priorities for the development of the European Higher Education Area until 2020 have been illustrated, the field of analysis (the Austrian Higher Education Institutions) of this thesis and the global framework needs to be drawn. First the European Qualification Framework as an overarching framework in whom every Member State of the Bologna Process fits their National Qualification Framework needs to be drawn.

2.2.2 The European Qualification Framework (EQF)

A common reference framework helps member states, education institutions, employers and individuals compare qualifications across European Unions education and training systems, which provides an essential tool for the development of a European employment market and fosters transparency [**37**]. This framework, which formally entered into force in April 2008, links countries’ qualification systems together, acting as a translation device and has two principle aims [**29**]:

- Promote citizens’ mobility (workers and students) among the Member Countries
- Facilitate their lifelong learning by promoting the validation of non-formal (e.g. seminars, courses and sport clubs) and informal learning (e.g. learning by solving a problem in specific life situations)

Until 2010 it was recommended to countries to relate their national qualification system to the EQF and until 2012 to ensure that individual qualification certificates bear a reference to the appropriate EQF level [**29**].

The EQF is a tool based on learning outcomes not on e.g. the duration of studies. The main reference level descriptors are [**29**]:

- Skills
- Competences
- Knowledge

This shows that qualifications capture a broad scope of learning outcomes, including theoretical knowledge, practical and technical skills and social competences where the ability to work in teams will be crucial [**29**].
The eight reference levels confine the full scale of qualifications from basic level like school certificates to advanced levels like Doctorates. The eight reference levels as a core element describe [**29**]:

- What the learner knows
- What the learner understands
- What the learner is able to do, regardless of the system under which a particular qualification was awarded

Each of the 8 levels is defined by a set of descriptors indicating the learning outcomes relevant to qualifications at that level in any system of qualifications (see **Table 1**) [**29**].

Whereat "knowledge" *"…means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualification Framework, knowledge is described as theoretical and/or factual".* Skills*" means the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualification Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments)* [**29**].

		Knowledge	Skills	Competence
Level 1	The learning outcomes relevant to Level 1 are	• Basic general knowledge	• Basic skills required to carry out simple tasks	• Work or study under direct supervision in a structured context
Level 2	The learning outcomes relevant to Level 2 are	• Basic factual knowledge of a field of work or study	• Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	• Work or study under supervision with some autonomy
Level 3	The learning outcomes relevant to Level 3 are	• Knowledge of facts, principles, processes and general concepts, in a field of work or study	• A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	• Take responsibility for completion of tasks in work or study • Adapt own behavior to circumstances in solving problems
Level 4	The learning outcomes relevant to Level 4 are	• Actual and theoretical knowledge in broad contexts within a field of work or study	• A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	• Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change • Supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities

Table 1: The eight European Qualification Framework Cycles **[29]**

Level 5	The learning outcomes relevant to Level 5 are	• Comprehensive, specialized, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	• A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	• Exercise management and supervision in contexts of work or study activities where there is unpredictable change • Review and develop performance of self and others
Level 6	The learning outcomes relevant to Level 6 are	• Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	• Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialized field of work or study	• Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts • Take responsibility for managing professional development of individuals and groups
Level 7	The learning outcomes relevant to Level 7 are	• Highly specialized knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research • Critical awareness of knowledge issues in a field and at the interface between different fields	• Specialized problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	• Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches • Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
Level 8	The learning outcomes relevant to Level 8 are	• Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	• The most advanced and specialized skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	• Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

The EQF is an ambitious and extensive instrument, which affects implications for education and training systems, the labor market, industry, commerce and citizens [**29**].

It is easy to explain why it affects the aforementioned stakeholders and why the EQF is a logical step within the Bologna Process and therefore so important for the future of Europe. The Bologna Process fosters the mobility of students, researchers etc. and therefore the relocation of people within Europe independent which educational background they have because nowadays and especially in the future there is and will be a demographical disequilibrium within Europe. This implicates that in order to reestablish equilibrium, people have to relocate and in order to do so, they need to get their awarded education recognized by the new employer e.g. an Italian engineer graduated from the Politecnico di Milano, wants to work in France for a French company, he knows perfectly French but in order to keep his employability, he needs to prove that his awarded degree is equivalent to a degree of the École polytechnique. Here the EQF will help in the future because on every awarded degree there will be a reference to the awarded EQF level according to, in this case, the Italian NQF which is the same level that a graduate of the École polytechnique awards, and therefore the Italian Engineer will not have any trouble to find equivalent job opportunities within Europe and therefore keep his employability. This should also work in future for non-academic qualification like vocational qualification.
Because the EQF bases the prerequisites for the awarding of a level not on degrees but on skills, competences and knowledge, further levels should be awardable also through non-formal and informal learning therefore the EQF is closely connected to lifelong learning.

The EQF as a framework implies that Member Countries reference their education system to the EQF in an official report, the National Qualification Framework. This implicates not a replacement of the National Qualification Systems by the EQF but it helps the member states by facilitating cooperation between them through a common reference covering both education and training, founded on transparency and trust [**29**].

Now that the whole EQF as the overarching framework of the educational system in Europe has been drawn a closer look into the Austrian education system can be taken, to be precise only into Austrian Higher Education and its Higher Education Institutions as it is the area of examination for goal 1.

2.2.3 The National Qualification Framework (NQF) in Austria

In Austria the significance of a National Qualification Framework for education policy was emphasized in a national consultation process and the need of implementation of the NQF was laid down in the Government Program of the 24th legislation period (2008-2013). The NQF and the EQF referencing report were developed with shared responsibility between the Austrian Federal Ministry for Education, the Arts and Culture and the Federal Ministry of Science and Research. [**30**]

The NQF comprises eight levels overall, whereas for the Austrian NQF the qualifications of level 6 to 8 according to the Bologna architecture acquired at Higher Education Institutions (Bachelor, Master and PhD) are classified according to the Dublin descriptors because they are tailored specifically to this sector and are additionally compatible with the EQF. All the other qualifications build upon the EQF descriptors. The contents of the two descriptors are doubtlessly comparable and compatible whereas the EQF descriptors are defined in broader, more general and more comprehensive terms than the Dublin descriptors. The comparability of the Bologna cycles and the EQF levels in Austria is illustrated in **Table 2**. [**30**]

EQF levels	Bologna cycles
5	Short cycle within the first cycle
6	First cycle (Bachelor)
7	Second cycle (Master)
8	Third cycle (Doctoral Program)

Table 2: EQF levels and Bologna cycles in Austria [**30**]

In order to notice the "difference" of the EQF and the Dublin descriptors, they are compared in **Table 3**.

EQF level	Dublin descriptors [31]	EQF descriptors [29]
6	Qualifications that signify completion of the first cycle are awarded to students who: have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study; • Can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study; • Have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues;	The learning outcomes relevant to Level 6 are: • Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles • Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialized field of work or study • Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts • Take responsibility for managing professional development of individuals and groups

	• Can communicate information, ideas, problems and solutions to both specialist and non-specialist audience; • Have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.	
7	Qualifications that signify completion of the second cycle are awarded to students who: • Have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with Bachelor's level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context; • Can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study; • Have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments; • Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously; • Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.	The learning outcomes relevant to Level 7 are: • Highly specialized knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research • Critical awareness of knowledge issues in a field and at the interface between different fields • Specialized problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields • Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches • Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
8	Qualifications that signify completion of the third cycle are awarded to students who: • Have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field;	The learning outcomes relevant to Level 8 are: • Knowledge at the most advanced frontier of a field of work or study and at the interface between fields

	• Have demonstrated the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity; • Have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication; • Are capable of critical analysis, evaluation and synthesis of new and complex ideas; • Can communicate with their peers, the larger scholarly community and with society in general about their areas of expertise; • Can be expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge-based society.	• The most advanced and specialized skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice • Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

Table 3: Comparison of Dublin descriptors and EQF descriptors [**30**]

2.2.3.1 The Higher Education System in Austria

The focus in this chapter and also in this thesis lays on the higher education system, therefore only the tertiary education sector with its Higher Education Institutions is described. The HEIs can be assigned to the following categories (see **Figure 6**) [**30**]:

- **Public universities** – funded by the state
- **Private universities** – funded by private or public providers (except the state) with state accreditation
- **Universities of Applied Sciences (Fachhochschulen)**, which are funded by providers that are either public or organized according to public law and which are funded by the public in the form of subsidies for study places
- **University collage education** (not considered in this thesis because they do not offer IEM degree programs)
- **The Institute for Science and Technology – Austria** (not considered because offers only Doctoral programs)

Figure 6 gives an overview of HEIs of the tertiary education sector and the academic degrees awarded by them. As displayed in **Figure 6** the area of examination comprises Universities and Universities of applied sciences only on the level of Bachelor, Master and Diplom degree programs which award the academic degrees of Bachelor, Master or “Diplom

Ingenieur" in their different kinds e.g. Bachelor of arts, Bachelor of science, Master of science, Diplom Ingenieur.

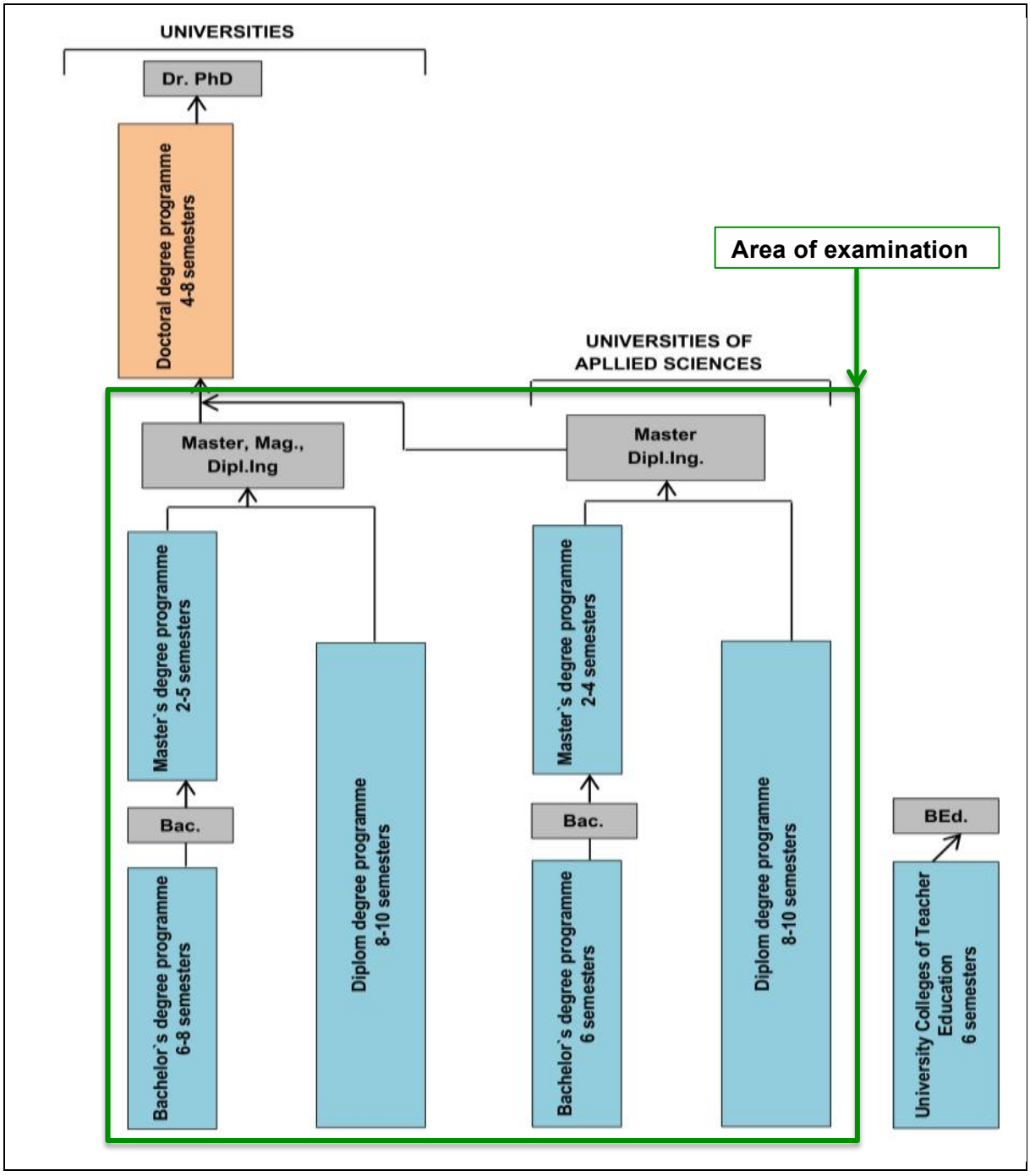

Figure 6: Overview of Austrian HEIs and the academic degrees awarded by them [**30**]

The prerequisites for admission to a regular bachelor's degree program on Austrian HEIs are the general higher education entrance qualifications i.e. upper secondary school-leaving certificate awarded in Austria or an equivalent from another country. People without the upper secondary school-leaving certificate who acquired a qualification through other job-specific programs or non-occupational pathways have the chance to take a "Studienberechtigungsprüfung" which is an exam that proves their knowledge on relevant topics of the upper secondary school. [**30**]

The prerequisite for admission to a master's program is a completion of a relevant bachelor's program. This means that it could happen to students to have to take more exams in the master program because the absolved bachelor program is not connected to the master program. [**30**]

It is also important to mention that despite to other countries, in Austria there is basically a free Higher Education access at public universities. [**30**]

Now that the area of examination, all the central terms and their connection to a global European strategy has been described, it is needed to describe the methodology of the analysis of HEI degree programs and the primary analysis of relevant topics to IEM professionals and IEM students as well as to HR managers.

3 Method

As method applied to determine (i) the qualification profile of IEM professionals, their career paths and relevant opinions, (ii) analyze IEM degree programs on Austrian HEIs and to determine (iii) what kind of qualification profile, competences and skills HR managers want from IEM graduates the marketing research in form of a primary (online survey) and secondary research has been chosen.
"Marketing research is the planning, collection and analysis of data relevant to marketing decision making and the communication of the result of this analysis to management". Marketing research plays among other functional roles a descriptive role for gathering and presentation of statements of facts. [**38**]

In chapter 3.1 the marketing research process is briefly described. The first four marketing process steps out of eight applied in this thesis are already described in chapter 3.1. Due to the application of different research methods, samples and data collection types for the achievement of the three goals, firstly the theory of the data collection types will be illustrated in detail (see chapter 3.2 and chapter 3.3) and secondly the concrete methodology applied for the analysis in order to reach the three goals will be displayed in chapter 3.4.

3.1 The Marketing Research Process

The marketing research is briefly explained in an eight-step process focusing on the relevant tools applied in this thesis. Steps 1 to 4 are identical for all 3 goals. In step 5 the applied methods of research are the same for the online surveys for IEMs and HR managers but different for the IEM degree program analysis. In step 6 the sampling procedure differs for every goal. The collection of data in step 7 is described as theory in chapter 3.2 and 3.3, and as part of the methodology applied in chapter 3.4. The results in step 8 will be displayed in chapter 4. The eight steps of marketing research applied and consecutively briefly explained are [**38**] (see **Figure 7**):

Step 1: Situation analysis
Step 2: Setting up marketing research problem
Step 3: Setting up marketing research objectives
Step 4: Creation of research design
Step 5: Choice of method of research
Step 6: Selecting the sampling procedure
Step 7: Collecting of data
Step 8: Analyzing data and results

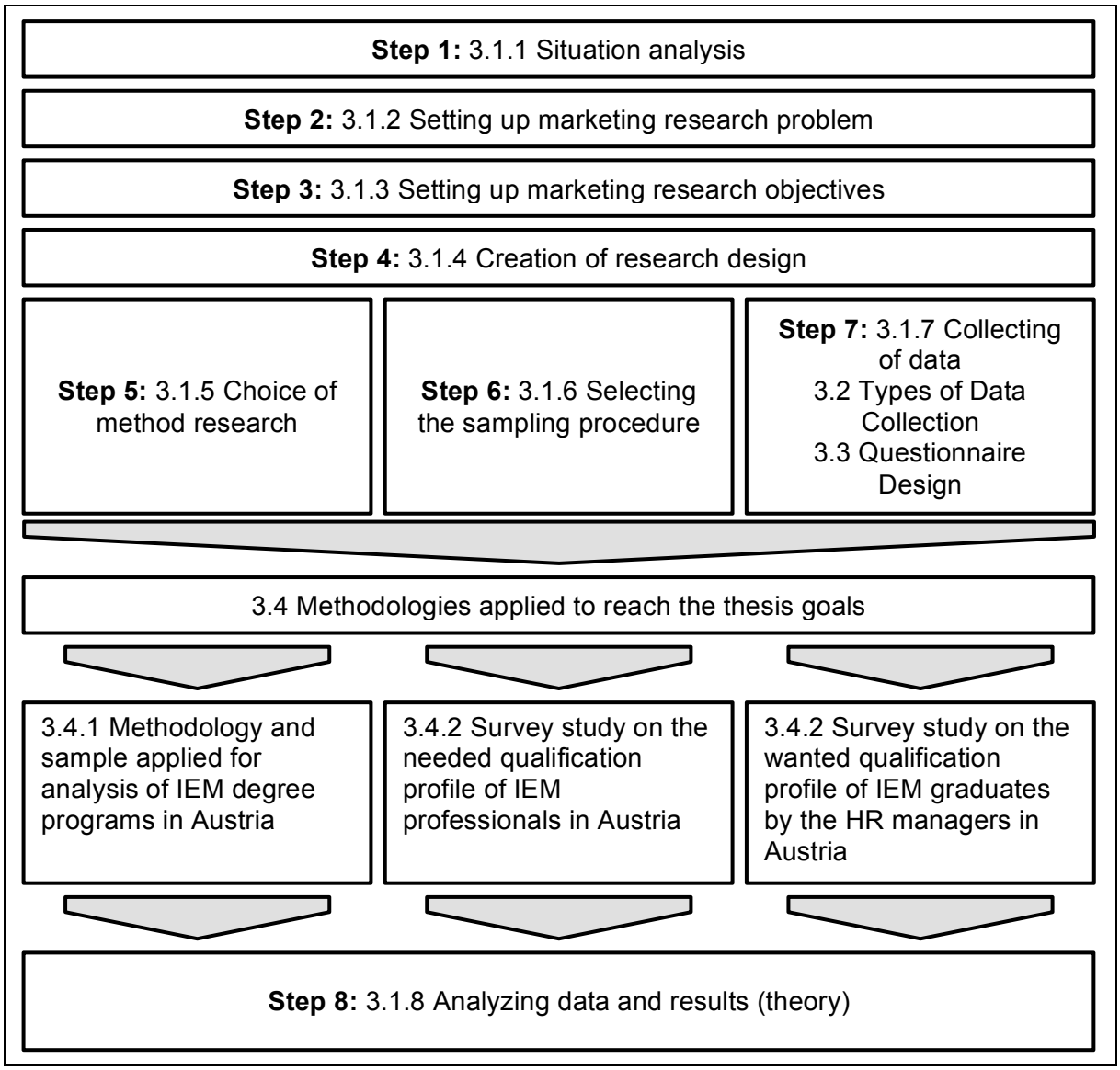

Figure 7: The marketing research process structure in this thesis

3.1.1 Situation analysis

The situation analysis within which marketing research takes place is in our case the area of IEM in Austria and already defined and described in chapter 2.1.1.
In the situation analysis an exploratory research is very common, which is defined as a "preliminary research conducted to increase understanding of a concept, to clarify the exact nature of the problem to be solved, or to identify important variables to be studied". Among other types of exploratory research, an experience survey and or a secondary data analysis can be conducted. In experience surveys discussions with knowledgeable individuals, both inside and outside the organization, who may provide insights into the problem are held. [**38**]

Secondary data analysis uses already collected and stored data but edited and analyzed for a given purpose of investigation. Secondary analysis is also called "Desk research" because the research is conducted on the researchers desk mostly by using the personal computer. [**39**]

3.1.2 Setting up marketing research problem

Generally speaking, a marketing research problem is a statement specifying the type of information needed by the decision maker (e.g. chief executive officer) to help solve the decision problem (e.g. whether to place a product or not) and how that information can be obtained efficiently and effectively. [**38**]

In this thesis the research problem is the missing transparency and missing overview of the IEM "world" in Austria. The results of this thesis provide information of and for the 4 main stakeholders of IEM in Austria and their interconnected balancing situation. The decision makers in the end will be all stakeholders who decide whether or not the results of this thesis provide an overview, transparency and how to react to these.

3.1.3 Setting up marketing research objectives

The marketing research objective is the goal statement, defining the specific information needed to solve the marketing research problem. Research objectives must be as specific and unambiguous as possible. Often researchers also state a research objective in form of a hypothesis, which is a statement about the relationship between two or more variables that can be tested with empirical data. [**38**]

The research objectives have been already formulated in chapter 1.2 as the three goals of this thesis, which are again:

- **Goal 1:** Generation of a synoptically table and a comparative chart of all IEM degree programs in Austria.
- **Goal 2:** Illustration and sharpening of IEM professionals' profile in means of needed qualification profile and competences throughout their carrier paths.
- **Goal 3:** Illustration and sharpening the wanted or desired qualification profile and competences of IEM graduates from industries' point of view.

3.1.4 Creation of research design

The research design is a plan for addressing the research objectives or hypotheses, where the researcher develops a framework to answer a specific problem. Every design offers different choices with certain advantages and disadvantages. A type of design is the descriptive study, which is conducted to answer who, what, when, where and how questions thus applied in this thesis. Other research designs are e.g. experimental-, correlational-, and review-design. [**38**]

The research design for all three goals of this thesis is the descriptive study.

3.1.5 Choice of method of research

The next step is to select a mean to collect data. There are three basic research methods [**38**]:

- Surveys, as face to face interviews or online surveys for data gathering
- Observations to examine patterns of behavior
- Experiments

Surveys, to be precise, online surveys, were chosen to reach goal 2 and goal 3. Whereat to reach goal 1 the secondary research method, and the primary research method in form of Email interviews were applied. All the chosen and applied methods of research appertain to the descriptive study field.

3.1.6 Selecting the sampling procedure

A sample is a subset from a larger population of interest. There exist two types of samples, a probability sample and a nonprobability sample. The probability sample is a subset of population where every element in the population has a known nonzero chance of being selected. A nonprobability sample is a subset of a population in which the chances of selection for the various elements in the population are unknown. [**38**]
A sampling plan calls for three decisions [**40**]:

1. **Sampling unit:** Whom should we survey? After the determination of the sampling unit, a sampling frame must be developed so everyone in the target population has an equal or known chance of being sampled.
2. **Sample size:** How many people should be surveyed? Large samples give more reliable results, but it is not necessary to survey the whole target population in order to get reliable results. Often samples less than 1 percent of a population provide good reliability, with a credible sampling procedure.
3. **Sampling procedure:** How should we choose the respondents? Probability sampling allows calculating e.g. confidence limits for sampling errors.

3.1.7 Collecting the data

Most survey-based data are collected nowadays on the Internet. Interviews are mostly used to collect data in marketing research field services. [**38**] Different data collecting methods are explained much more in detail in chapter 3.2.

3.1.8 Analyzing the data and results (theory)

After data have been collected, data needs to be analyzed. The purpose of analyzing data is to interpret and draw conclusions from the amount of collected data. Many techniques of data analysis may be used, beginning with simple frequency analysis up to multivariate techniques. [**38**] In this thesis the in-depth techniques of data analysis were not used.

Techniques used to analyze the data in this thesis were simple arithmetic mean, median, quartile, frequency and percentage analysis as descriptive analysis.

After the analysis of data, results will be displayed in chapter 4.

3.2 Types of Data Collection

After the introduction and short description of the eight main process steps of marketing research, all data collection methods applied in this thesis are described in detail in this chapter. The term marketing research has been described because it can be seen as framework of the whole thesis, whereas the different data collection types have been adopted to collect data for the respective goal. After the detailed illustration of the secondary and primary research applied, the concrete methodology applied to reach the goals will be displayed in chapter 3.4.

3.2.1 Secondary research

Secondary research consists of collecting secondary data, which consists of information that already has been gathered and might be relevant to the problem at hand. [**38**]

3.2.1.1 Advantages of secondary research

The primary advantages of secondary research are the collection of data at a fraction of cost, time and inconvenience associated with primary research. Additional advantages of secondary research include the following [**38**]:

- Secondary data may help to clarify and redefine the problem during the exploratory research
- Secondary data may already provide a solution to the problem
- Secondary data may provides primary research method alternatives
- Secondary data may indicate to potential problems and/or difficulties
- Secondary data may provide background information
- Secondary data may provide the sample frame

3.2.1.2 Limitations of secondary research

Despite many advantages of secondary research, secondary data also poses some danger. The main disadvantages of secondary data are [**38**]:

- **Lack of availability**; for some research questions there might be no available data
- **Lack of relevance**; data might be outdated or displayed in different units or measures that can not be used by the researcher
- **Inaccuracy**; the accuracy of data should always be assessed
- **Insufficiency**; available data might be relevant and accurate but still not sufficient to make decisions or draw conclusions out of it.

A few guidelines for determining the accuracy of secondary data are as followed [**38**]:

- **Who gathered the data?** The source of secondary data is a key to their accuracy, for instance state agencies and commercial marketing research can be counted on to have conducted their research as professionally as possible.
- **What was the purpose of the study?** Data are always collected for some reasons. By understanding the motivation behind this reasons can provide clues to the quality of the data.
- **What information was collected?** It should always be identified exactly what information was gathered and from whom.
- **When was the information collected?** The timing of information gathering can often be crucial e.g. collection of information before an election or after an election as well as surveys at 8 am or 3 pm in shopping malls can generate different outcomes.
- **How was the information collected?** Were the data collected by mail, telephone, face-to-face interview, or online? Each of these techniques offers different advantages and disadvantages.
- **Is the information consistent with other information?** If there is an inconsistency between secondary data sets, caution should prevail. The possible causes of data discrepancy should be assessed.

3.2.2 Qualitative and quantitative measures in primary research

In general, marketing researchers have a choice of three main research instruments for collecting primary data, which are: quantitative measures in form of questionnaires, qualitative measures and technological devices. [**40**]

- Quantitative research uses mathematical analysis. [**38**]
- "*Qualitative research is a term used loosely to refer to research whose findings are not subject to quantification or quantitative analysis."* [**38**]
- Technological devices like Galvanometers, which can measure the interest or emotions aroused by exposure to a specific ad or picture. [**40**]

The main differences between qualitative research and quantitative research are listed in **Table 4**.

	Qualitative Research	Quantitative Research
Types of questions	Probing	Limited probing
Sample size	Small	Large
Amount of information from each respondent	Substantial	Varies
Requirements for administration	Interviewer with special skills	Interviewer with fewer special skills or no interviewer
Types of analysis	Subjective, interpretative	Statistical, summation
Hardware	Sound recorders, projection devices, video recorders, pictures, discussion guides	Questionnaires, computers, printouts, mobile devices
Degree of replication	Low	High
Research training	Psychology, sociology, social psychology, consumer behavior, marketing, marketing research	Statistical, decision models, decision support systems, computer programing, marketing, marketing research
Type of research	Exploratory	Descriptive or casual

Table 4: Qualitative Research versus Quantitative Research [**38**]

3.2.3 Primary research as online survey research

The Internet has forever changed the way survey research is conducted because the number of Internet users around the world continues to explode. As number of users grows worldwide, characteristics of a country's population and Internet user characteristics tend to melt. The advantages of online survey outnumber the disadvantages. The specific advantages of online surveys include the following [**38**]:

- **Rapid deployment and real –time reporting**. Online surveys can be broadcast to thousands of potential respondents simultaneously and therefore results can be gained in less time than in a traditional survey on paper.
- **Reduced costs**. The use of electronic survey methods can cut costs up to 40 % and provide results in less than half the time it takes to do traditional telephone surveys. Online surveys eliminate almost all the labor costs, training, telecommunication and management costs. Traditional survey techniques costs rise in proportion to the number of interview desired while electronic solicitation can grow in volume with less increase in project costs.
- **Ready personalization**. Internet can be highly personalized to each respondent's own situation thus speeding up the respondents process. Respondents appreciate

personalized questions and the possibility to pause and then resume the survey as needed with the option to see previous responses and to correct inconsistencies.

- **High response rate.** Online surveys take less time than telephone interview and can be accomplished at the respondent's convenience and are much more stimulating and engaging. Graphics, interactivity and link to incentives sites make the interview more enjoyable and can increase the response rate significantly.
- **Ability to contact the hard to reach.** Certain groups are among the most difficult to reach e.g. doctors, CEO's, high-income professionals. Most of them anyhow are well represented online and the Internet survey provides a convenient access anytime and anywhere that makes it possible for busy professionals to participate.
- **Simplified and enhanced panel management.** Internet panels are electronic databases, linked via the Internet, that are committed to providing feedback to the researcher. Once a panel is created and a questionnaire is finalized, surveys can be deployed, data are collected and results can be reported within days.
- **External Internet panels simplify life for research suppliers.** Huge Internet panels are available and maintained by organizations, which make the sampling process much easier for researchers. An Internet panel is a group of individuals who have agreed to receive invitations to do online surveys from a particular panel organization. The panel organization charges organizations doing surveys for access to the panel.
- **Web survey Software.** Web survey software includes software systems designed for web questionnaire construction and delivery. It helps the researcher to construct a survey through an easy-to-use edit feature by using a visual interface. The webserver distributes the questionnaire and files responses in a database.

Although online surveys have many advantages, some disadvantages have to be mentioned or better said which problems need to be considered while concreting an online survey. A problem exists when an unrestricted Internet sample is set up on the Internet, which means that anyone who wishes to complete the questionnaire is able to do so. A bigger problem arises if the same Internet user can complete the questionnaire as many times he or she wants, which automatically leads to false results. [**38**]

Another problem can arise if the sample frame, speak the addressed persons are not available on the Internet e.g. customers of a specific restaurant in Vienna. [**38**]
Not only problems due to researchers' mistakes but also technical problems can arise like lack of bandwidth so the completing of the questionnaire gets slow and people might loose their patience. Technical problems can always arise and often cannot be predicted in advance therefore the researcher should concentrate on creating an easy comprehendible, clearly arranged and all in all provide a good experience for the respondents. The following tips can help creating a better experience for the interviewee [**38**]:

- Use **language** that is **easy comprehendible** and less "research-ese".
- **Be honest about the time required** to complete a questionnaire.
- Provide, if possible, opportunities for participants to **provide open-ended answers** and truly express themselves.

- Ensure that all possible answer choices are given; **try to avoid "others"**.
- Keep the **survey less than 20 minutes in length** and provide participants with progress information as they advance in the survey.
- Consider **using graphics** when possible and appropriate to make the experience more visually engaging.
- Explore **new ways to facilitate interaction** between respondent and researcher
- Make studies more **informative**; participants are more motivated when they can gain new knowledge
- Offer participants the opportunity to be contacted again and to receive updates on projects or results of the study.

3.2.4 Types of measurement scales

"A scale is a set of symbols or numbers so constructed that the numbers can be assigned by a rule to the individuals (or their behaviors or attitudes) to whom the scale is applied. The assignment on the scale is indicated by the individuals possession of whatever the scale is supposed to measure". [**38**] Thus, a person who knows that he or she does her job proper would sign "10" on the scale from 1 to 10 related to the question "How do you do your job?" The creation of a measurement scale begins with determining the level of measurement that is desirable or possible. There are four basic levels of measurement [**38**]:

1. Nominal
2. Ordinal
3. Interval
4. Ratio

The **nominal level of measurement** is commonly used in marketing research. *"A nominal scale partitions data into categories that are mutually exclusive and collectively exhaustive, implying that every bit of data will fit into one and only one category and that all data will fit somewhere on the scale".* [**38**]
The term nominal means "name-like" indicating that numbers assigned to an object do not reflect their own number value but just naming or classifying the object. The numbers cannot be ordered, added or divided; they are just labels and nothing else. Examples two nominal scales are [**38**]:

Gender:	(1) Male	(2) Female	
Geographic area:	(1) Urban	(2) Rural	(3) Suburban

The only quantification in nominal scales is the number and percentage in each category e.g. 40 male and 60 female corresponds to 40 % male and 60 % female of the sample. [**38**]

*"The **ordinal scales** have the labeling characteristics of nominal scales plus an ability to order data. Ordinal measurement is possible when the transitivity postulate can be applied".* [**38**]

A postulate is an essential assumption in order to carrying out an operation or a line of thinking e.g. bad and good. The transitivity postulate is described by the thought that “if a is greater than b, and b is greater than c, then a is greater than c”. [**38**]
An example for an ordinal scale follows:

Please rank the following car rental services from 1 to 5, with 1 being the most preferred and 5 the least preferred:

Hertz	_____
Avis	_____
Europecar	_____
Sixt	_____
Buchbinder	_____

Ordinal scales are strictly used to indicate rank order. The numbers do not indicate absolute quantities or that the intervals between the numbers are equal. Therefore common arithmetic operations such as addition and multiplication cannot be used with ordinal scale. The mode or the median is appropriate measures for ordinal scales. [**38**]

A yet rather common use of ordinal scales is to rate various characteristics e.g. certainty, likely. In this case the researcher assigns numbers to a logical notion line, then uses this numbers to interpret relative distance. If a researcher can justify the assumption that all distances are equivalent within the scale, the more powerful statistical tests can be applied [**38**].
An example of an **equidistant scale** follows:

(1) Strongly disagree	(2) Disagree	(3) Agree	(4) Strongly agree

*“**Interval scales** contain all the features of ordinal scales with the added dimension that the intervals between the points on the scale are equal.”* [**38**]
As example the concept of temperature is based on equal intervals. Researchers prefer **interval scales** to ordinal scales because they can measure how much of a trait a person has over another. Furthermore interval scales enable the calculation of arithmetic mean, standard deviation and other statistical coefficients and tests can be applied.

Ratio scales have all the characteristics of the scales previously discussed as well as a meaningful absolute zero, because there is a universal agreement to the location of the zero point. Comparisons among the magnitude of ratio-scaled values are possible. Thus, a ratio scale reflects the actual amount of a variable. Typical ratio-scaled values are e.g. age, weight, height, distance, and money-values and return rates. An existence of an absolute zero on the ratio scale implies that all arithmetic operations are possible, including multiplication and division. [**38**]

3.3 Questionnaire design

The questionnaire is a method of research within the marketing research process. Every form of survey research relies on the usage of a questionnaire, which is designed to generate the necessary data to accomplish the objectives of the research project. It is a formalized questionnaire for collecting information from respondents. Creating a good questionnaire is more an art than science and requires both, hard work and imagination. An elaborate sampling plan, proper statistical analysis techniques, and good editing and coding are all for naught if the questionnaire is poorly designed. The questionnaire must translate the objectives into specific questions to solicit the required information from respondents. [**38**]

Designing a questionnaire involves a series of consecutive and logical steps. Those are [**38**]:

1. Determining survey objectives
2. Determine data collection method
3. Determine the question response format
4. Decide on the question wording
5. Establish questionnaire flow and layout
6. Evaluate the questionnaire
7. Obtain approval of all relevant parties
8. Pretest and revise
9. Prepare final copy
10. Implement the survey

3.3.1 Determining survey objectives

Every questionnaire has two main goals. The first one is to keep respondents on task, hold their attention as they move through the questionnaire, to keep them focused. The second is to generate data that fully addresses the study's objectives. [**38**]
Survey objectives should be as clearly and precisely as possible. If this step is completed carefully and thoroughly, the rest of the process will follow more smoothly and efficiently. *"A survey objective is an outline of the decision making information sought through a questionnaire".* [**38**]

3.3.2 Determine data collection method

There exist a variety of ways in which survey data can be collected, such as via telephone, Internet or mail. The chosen research method will have an impact on the questionnaire design. The design needs to be adjusted to the type of data collection method.

3.3.3 Determine the question response format

Once the data collection method is chosen, a decision must be made regarding the types of questions to be used in the questionnaire. Two main types of questions are relevant for a

questionnaire, which are Closed-End-Questions and Open-End-Questions. Subtypes of the two aforementioned types of questions, their description and examples are illustrated in **Table 5** and **Table 6**.

Closed-End-Questions		
Name	**Description**	**Example**
Dichotomous	A question with two possible answers.	In arranging this trip, did you personally phone American? Yes No
Multiple choice	A question with three or more answers.	With whom are you traveling on this flight? □ No one □ Children only □ Spouse □ Business friends □ Spouse and children
Likert scale	A statement with which the respondent shows the amount of agreement / disagreement.	Small airlines generally offer better service than large ones. Strongly disagree Disagree Neutral Agree Strongly agree 1_____ 2_____ 3_____ 4_____ 5____
Semantic differential	A scale connecting two bipolar words. The respondent selects the point that represents his or her opinion.	American Airlines Large_____Small Experienced_____Inexperienced Modern_____Old-fashioned
Importance scale	A scale that rates the importance of some attribute	Airline in-flight service to me is Extremely important Very important Somewhat important Not very important Not at all important 1_____ 2_____ 3_____ 4_____ 5____
Rating scale	A scale that rates some attribute from “poor” to “excellent”.	American in-flight service is Excellent Very Good Good Fair Poor 1_____ 2_____ 3_____ 4_____ 5____
Intention-to-buy scale	A scale that describes the respondents intention to buy	If an in-flight telephone were available on a long flight, I would Definitely buy Probably buy Not sure Probably not buy Definitely not buy 1_____ 2_____ 3_____ 4_____ 5_____

Table 5: Closed-End-Questions [**40**]

Open-End-Questions		
Name	**Description**	**Example**
Completely unstructured	A question that respondents can answer in an almost unlimited number of ways.	What is your opinion of American Airlines?
Word association	Words are presented, one at a time, and respondents mention the first word that comes to mind.	What is the first word that comes to your mind when you her the following? Airline _____ American _____ Travel _____
Sentence completion	An incomplete sentence is presented, and respondents complete the sentence.	When I chose an airline, the most important consideration in my decision is _____
Story completion	An incomplete story is presented, and respondents are asked to complete it.	"I flew American a few days ago. I noticed that the exterior and interior of the plane had very bright colors. This aroused me the following thoughts and feelings …." Now complete the story.
Picture	A picture of two characters is presented, with one making a statement. Respondents are asked to identify with the other and fill in the empty balloon.	
Thematic Apperception Test	A picture is presented and respondents are asked to make up a story about what they think is happening or may happen in the picture.	

Table 6: Open-End-Questions [**40**]

3.3.4 Decide on the question wording

When the researcher has decided the specific types of questions and the response format in form of measurement scales, the next task is to actual write the questions. The wording of specific questions can require a significant amount of time. Four general guidelines about the wording of questions are useful to keep in mind [**38**]:

1. The wording must be clear
2. The wording must not bias the respondent
3. The respondent must be able to answer the question
4. The respondent must be willing to answer the question

To underline the importance of wording, 12 dos and don'ts are illustrated as a further guideline for wording [**41**]:

1. Ensure that **questions are without bias** in order to not lead the respondent into an answer.
2. Try to make the **questions as simple as possible**. Multiple ideas or two questions in one easily confuse respondents.
3. **Make specific questions**; be specific with time periods.
4. **Avoid jargon and acronyms**.
5. **Do not use sophisticated or uncommon words**. Use only words in common speech.
6. **Do not use ambiguous words**. Words like "usually" or "frequently" have no specific meaning.
7. **Avoid questions with a negative in them like "Do you never…?"**, use "Do you ever…?" instead.
8. **Avoid hypothetical questions** because it can be difficult to answer questions about imaginary situations.
9. **Do not use words that could be misheard especially in telephone interviews** e.g. "What is your opinion of sects?".
10. **Desensitize questions by using response bands**. Offer a range of response bands instead of precise numbers e.g. employee turnover rates.
11. **Ensure that fixed responses do not overlap**.
12. **Allow but try to avoid the answer "other"** in fixed-response questions.

3.3.5 Establish questionnaire flow and layout

After the questions have been formulated they need to be put into a sequence and develop a layout for the questionnaire. There should be a logical order of questions and categories. Researchers have come to the following general guidelines concerning questionnaire flow [**38**]:

- **Use screening questions to identify qualified respondents**. Often researchers need information of qualified respondents and therefore one or more questions to filter the qualified respondents might be helpful.
- **Begin with a question that gets the respondents interest.** After some introducing comments and screening questions to find qualified respondents, the initial questions should be simple, interesting, and nonthreatening. The initial questions should be easy to answer without much thinking effort.
- **Ask general questions first.** After the opening warm-up questions, the questionnaire should proceed logically. First general questions are asked to get the person thinking about a concept and afterwards questions should get more into details of the concept.
- **Ask questions that require "work" in the middle.** At the beginning of the questionnaire the respondent will be only vaguely interested in and understanding of

the nature of the survey. As the interest-building questions appear, momentum will be build.

- **Insert "prompters" at strategic points.** Especially in longer questionnaires the interest and motivation of the respondent can sag, therefore the insertion of prompters in form of short encouraging statements can help to regain and rebuild the respondents' interest and motivation. Statements like "This next section will be easier", "there are only a few more questions to go" can be used as prompters.
- **Positive, sensitive, threatening, and demographic questions at the end.** Sometimes to reach the objectives of a study some questions on topics about which respondents may feel uncomfortable are needed. To be sure that most of the questions are answered before the respondent becomes defensive or breaks off the interview these questions should be answered near the end of the survey. Another reason to put these questions at the end is that the respondent is already in a flow of answering question and therefore the questions will be answered more likely.
- **Put instructions in capital letters.** To avoid confusion about what is a question and what is an instruction, all instructions should be in capital letters e.g. "IF 'YES' TO QUETSION 13, SKIP TO QUESTION 17". Capitalizing helps to bring the message into respondents' attention.
- **Use a proper introduction and closing.** Because every questionnaire should have an introduction and closing, the Council for Marketing and Opinion Research (CMOR) developed a model survey introduction and closing based on research findings from number of different studies CMOR recommends the following [**38**]:

  Model Introduction/Opening

  - In order to gain the trust of the respondent the researcher should provide at least his name though also the last name is recommended.
  - Provide the name of the company that the researcher represents and also the name of the client/sponsor
  - Explain the nature of the study topic or the subject matter in general
  - Provide information on the honest time needed to answer the study
  - Inform how data is stored (anonymous or not)
  - Reinforce the fact that the respondent's time is appreciated and valued
  - Invite the respondent to participate in the survey and offer a decent time frame to compile the questionnaire e.g. two weeks

  Model Closing

  - Thank the respondent for his or her time at the conclusion
  - Express the desired intention that the respondent had a positive survey experience
  - Remind the respondent that his or her opinion do count

3.3.6 Evaluate the questionnaire

After the questionnaire has been designed the researcher should take a step back and critically evaluate it again. Although it might be seen as redundant because so much time has been spent to design the survey but the following issues should be considered: (i) Is the question necessary? (ii) Is the questionnaire too long? (iii) Will the question provide the information needed to accomplish the research objective? [**38**]

3.3.7 Obtain approval of all relevant parties

After the first draft of the questionnaire has been completed, copies should be distributed to all decision makers involved in the project. It is very important to get the final approval of the first draft even if the decision makers were already involved in the questionnaire design. [**38**]

3.3.8 Pretest and revise

After the final approval of all deciding parties the questionnaire must be pretested. No survey should be conducted without a pretest. Ideally a pretest targets respondents for the study i.e. people from the target group who are allowed to provide feedback to the researcher. In a pretest researchers test the questionnaire on misinterpretations by respondents, lack of continuity, poor skip patterns, alternatives for questions, and general respondent reaction to the questionnaire. The pretest should be conducted in the same mode as the final survey i.e. if the study is to be an Internet survey, then the pretest should be too. [**38**]

3.3.9 Prepare final copy

The final copy needs to be checked, tested and in case revised graphically. [**38**]

3.3.10 Implement the survey

The completion of the questionnaire establishes the basis for the study, which in the end just starts at this point. [**38**]

Now that the whole marketing research process has been displayed and the survey design has been illustrated in depth, the methodologies applied for gathering data from HEI, HR managers and professional IEMs can be presented.

3.4 Methodologies applied to reach the thesis goals

In chapter 3.1 the marketing research process as the methodological framework of this thesis has already been described. This chapter displays the applied types of data collection to reach the three goals step by step. First the methodology and sample for analysis of IEM degree programs to reach goal 1 is described. Subsequently the methodology and sample of the survey study among IEM professionals and students in Austria to reach goal 2 and the methodology and sample of the survey study among HR managers in Austria to reach goal 3 are described.

3.4.1 Methodology and sample for analysis of IEM degree programs in Austria

To analyze the different degree programs of Universities and Universities of Applied Sciences in Austria, a 4-step analyzing approach, that follows the "top-down"-approach of system engineering [**42**] was used. These 4-steps are described in chronological order (see **Figure 8**).

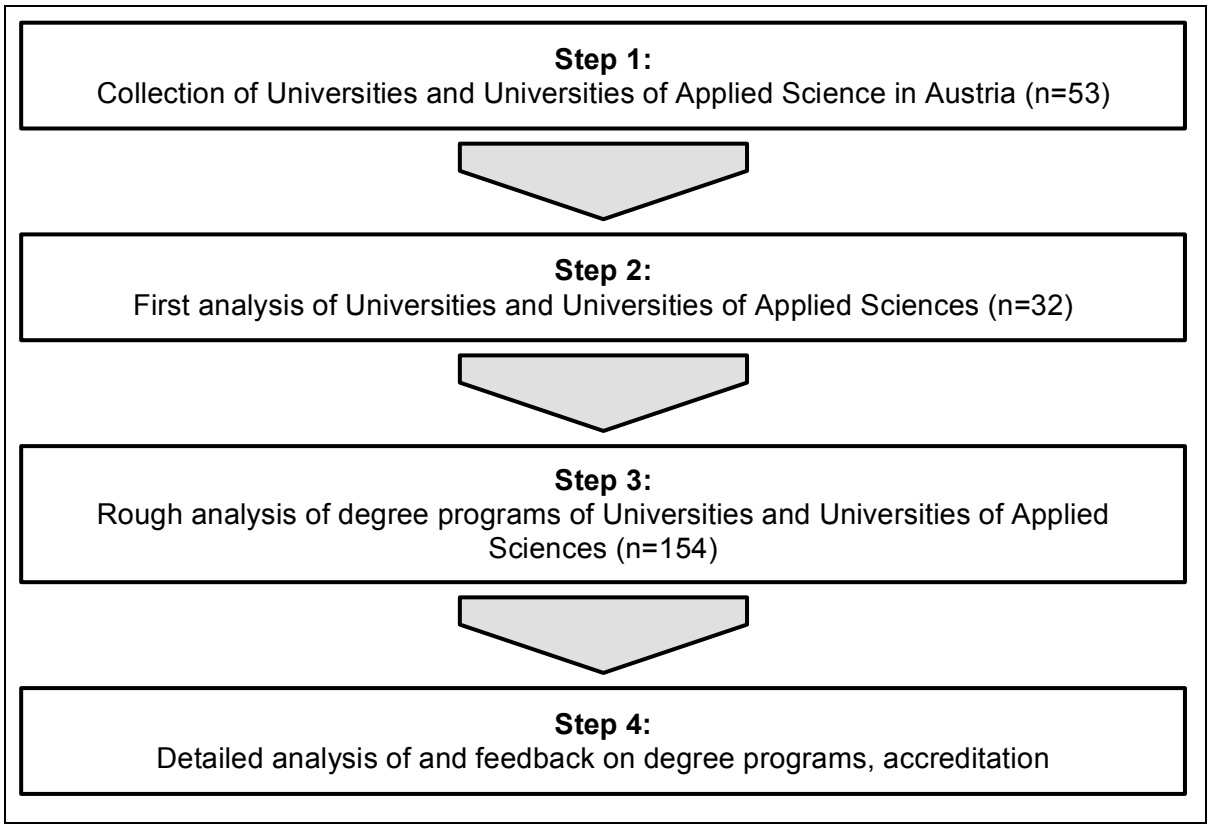

Figure 8: Methodology applied for analyzing IEM degree programs

Step 1 - Collection of Universities and Universities of Applied Sciences in Austria:
To identify possible IEM degree programs in the first step all accredited public and private Universities and Universities of Applied Sciences (in sum called: HEIs) in Austria were collected. Provided that these HEIs are registered in Austria, we presume that foreign

Universities, which are registered in Austria, should be taken into account in their home country studies. Moreover theological, religious and military colleges were not taken into consideration. This first analysis of 53 HEI, where it was tried to identify potential IEM degree programs because of the appellation or description of the HEI, leaded to a list of 32 HEIs that had to be further analyzed in step 2.

Step 2 - First analysis of Universities and Universities of Applied Sciences:
Based on step 1 a deeper analysis whether the identified 32 HEIs theoretically offer an IEM degree program either provided by them or supported by another University or University of Applied Sciences was conducted. After checking the offered degree programs of all remaining HEIs the result of this step was a list of 23 HEIs that offer at least one potential IEM degree program.

Step 3 - Rough analysis of degree programs of Universities and Universities of Applied Sciences:
In order to gain an insight into all potential IEM degree programs offered by the HEIs detected in step 2, all compulsory subjects and restricted-elective subjects of 154 potential IEM degree programs (57 Bachelor-, 63 Master- degree programs and 34 combinations as Bachelor + Master program) were categorized in technical subjects and "Economical + Integration" subjects. The limits adopted for passing to step 4 were a minimum of 50 % and maximum of 80 % plus/minus 4 % technical subjects. These limits were chosen because of the rough pre-analysis in order to obtain all potential IEM degree programs.

Step 4 – Detailed analysis of and feedback on degree programs, accreditation:
After rechecking the accordance to the relevant OECD revised field of science of potential IEM degree programs and asking the respective deans or the dean of an IEM degree program of the respective HEI if they commit to the IEM job specification and the "3-countries declaration" for their degree program, all new and already by the WING accredited degree programs of HEIs were precisely investigated by sending a pre-filled Excel spread sheet (all ECTS of the subjects of the related degree program were already allocated to the eight categories of the WING model displayed in **Figure 4**, and percentages were calculated) to the dean of each degree program. After the correction of the Excel spread sheet by the dean, the Excel spreadsheet was checked on plausibility and if misunderstandings occurred a second correction of the Excel spread sheet by the dean was carried out. Deans were given feedback on their degree programs and the degree programs were proposed to become accredited in the future by the WING as IEM degree programs or not. For an accreditation of a kind of IEM degree program, following options and prerequisites are given:

Accreditation of a Bachelor IEM degree program: Minimum 50 % technical subjects, Minimum 20 % Economics + Integration subjects.

Accreditation of a Master IEM degree program: A clear definition of the required Bachelor education as prerequisite for the Master degree program is obliged (Bachelor has to have a

technical focus in order to obtain a min. of 50 % technical qualification profile). The relative sum of the required Bachelor qualification profile and the Master qualification profile has to fulfill the min. 50 % technical subjects and the min. 20 % Economics + Integration subjects prerequisite.

Accreditation of a combined (Bachelor + Master) IEM degree program: The sum of both degree programs has to have min. 50 % technical subjects and min. 20 % Economics + Integration subjects. The prerequisites for the Master degree program have to be the same as the qualification profile provided by the connected Bachelor degree program.

All options of IEM degree programs have to be attributable to the “OECD revised field of science and technology” to “Engineering and technology” [**18**].

The complete Excel-Table with the results of the aforementioned 4 steps is displayed in **Appendix A**.

3.4.2 Methodology and sample of the survey study among IEM professionals and students in Austria

In order to perform a detailed analysis of the recommended ideal qualification profile by IEM graduates, the fields of operation, the employability of IEMs in Austria and other relevant information, a quantitative study was conducted. Because of the large and spread target group, all WING members, alumni and students of IEM degree programs of Graz and Vienna University of Technology should be interrogated, it was decided to use an online survey designed with the tool LimeSurvey that consisted of the following five question categories:

1. Education
2. Career entry and career path
3. Further education
4. Competences needed on the job / adjustment requirements of education
5. Benefits of the WING (Internal survey for WING members only)

After the online survey design the questionnaire for IEM professionals and students comprises 609 questions. The high number of questions results from the high dynamic of the questionnaire i.e. dependent on the answers given from a respondent the pathway through the questionnaire differed. The best association for the questionnaire is a tree, which has many ends but starts from one trunk. The survey structure for IEM professionals and students is illustrated in **Appendix B**. The survey structure displays questions, answer possibilities and dependencies among each other as a flow chart. The questions and answers are displayed in German language.

In order to send out a high-quality questionnaire, 14 people from the target group (2 students and 12 IEM professionals) previously described were asked to participate in a pre-test and to give feedback on the questionnaire. This feedback was then incorporated in the final

questionnaire. In the next step 1234 WING members (both graduates and students of IEM degree programs) were invited via email to participate the study. Furthermore in a next step the same questionnaire was sent out by email to 827 alumni and 2548 students of Graz University of Technology (TUG). To avoid redundancies only TUG alumni and students who are not WING members were taken into account. In a last step the questionnaire was sent out again by email to 140 alumni and 900 students (higher than 3rd semester students) of Vienna University of Technology (TUW), but once more WING members were not part of that sample. To prevent multiple compiling by the same respondents, the feature of LimeSurvey, which implements cookies on the respondents' computer, has been activated. The survey was sent out as an anonymous survey. The survey has been carried out from August 7th 2013 to October 14th 2013 whereat the target group has been invited three times to participate the study.

To sum up, the total sample size of the quantitative survey mounted up to 5649 IEM alumni and students, from this sample 1031 questionnaires were filled out (805 fully and 226 partially filled out questionnaires), so this represents an overall response rate of 18,25 %.

3.4.3 Methodology and sample of the survey study among HR managers in Austria

In order to perform a detailed analysis of the wanted qualification profile of IEM graduates by HR managers, the preferred fields of operation for IEM graduates, the employability of IEMs in Austria and other relevant information, also a quantitative study was conducted. The target group was defined of members of the Austrian HR manager Association called "Personalist.at" (www.personalist.at). Because of the large target group, 1294 members of "Personalist.at", it was decided again to use an online survey designed with the tool LimeSurvey that consisted of the following four question categories:

1. General information of the company
2. The IEM education in Austria
3. Individual competencies of IEM graduates
4. Career opportunities of IEM graduates and professionals

After the online survey design the questionnaire for IEM professionals and students comprises 44 questions whereat dependent on the answers given from a respondent the pathway through the questionnaire differed slightly. The survey structure for HR managers is illustrated in **Appendix C**. The survey structure displays questions, answer possibilities and dependencies among each other. The questions and answers are displayed in German language.

In order to send out a high-quality questionnaire, seven HR managers were asked to participate in a pre-test and to give feedback on the questionnaire. This feedback was then incorporated in the final questionnaire. In the next step, an Email including the Link to the

questionnaire and the invitation to participate the study has been sent to 1294 members of "Personalist.at" by the "Personalist.at" office in an own newsletter. The invitation to participate the study was sent out on December 5th 2013. Until December 22nd 2013 only 20 questionnaires had been completed. Because of the bad response rate and "personalist.at" wanted to charge 600 € for sending out a second invitation it was decided to invite following new HR managers to participate the study:

- 85 HR manager who participated the job fair called "Teconomy" of Graz University of Technology in April 2013,
- 187 HR manager who are members of the "HR-lounge.at" (HR manager Association),
- 7874 HR manager out of the organization database called HEROLD.at,
- 965 IEM professionals WING members were asked to forward the invitation Email to their HR managers

To prevent multiple compiling by the same respondents, the feature of LimeSurvey, which implements cookies on the respondents' computer, has been activated. The survey was sent out as an anonymous survey. The survey has been carried out on the second round from January 21st 2014 to February 18th 2014 whereat the target group has been invited one time to participate the study.

To sum up, the total sample size of the quantitative survey mounted up to 9111 HR managers, from this sample 311 questionnaires were filled out (289 fully and 22 partially filled out questionnaires), so this represents an overall response rate of 3,41 %.

4 Results

As already in the methodology, also the results will be separated into three parts. First the results of the Austrian IEM degree program analysis, second the results of the conducted survey among IEM professionals and students and third among HR managers will we displayed and finally brought together and discussed in the conclusion part.

The findings out of the IEM degree program analysis and the two online surveys directly lead to the attainment of the three goals. After the successive eradication of the four analysis steps of the IEM degree program analysis, first the range of qualification profiles of IEM degree programs in Austria will be displayed as 2D figure and secondly the synoptically table with relevant information of all IEM degree programs in Austria can be illustrated.

The findings out of the two conducted online surveys will be illustrated as figures subordinated to the respective question categories in order to keep a logical sequence of information. Dependent on the profoundness of the questions more detailed information will be provided. **All graphics, tables illustrated in this thesis can be found as complete tables in the attached Compact Disk (CD).**

4.1 Results of the IEM degree program analysis in Austria

The result after the analysis in Step 1, collection of Universities and Universities of Applied Sciences in Austria, was a list of 20 Universities of Applied Sciences, 22 public Universities and 11 private Universities. After looking through all offered degree programs by the HEIs left after step 1, in step 2 (First analysis of Universities and Universities of Applied Sciences) four Universities of Applied Sciences out of 19, one public University out of nine and four of four private Universities were not taken into step 3 (Rough analysis of degree programs of Universities and Universities of Applied Sciences).

Resulting after step 3, 23 combined potential IEM degree programs (Bachelor + Master), five potential Bachelor IEM degree programs and three potential Master IEM degree programs from two public Universities, three public Universities of Technology and 11 Universities of Applied Sciences were analyzed. Since the former WING study in 2010 [**11**] two degree programs analyzed in 2010 changed their nomenclature and five degree programs on three HEIs do not exist anymore. These results confirm the dynamics of IEM degree programs mentioned in the introduction and justify an inquiry every three to four years.

Resulting after step 4 (Detailed analysis of and feedback on degree programs, accreditation), 21 combined IEM degree programs (Bachelor + Master), five Bachelor IEM degree programs and one Master IEM degree programs from two public Universities, three public Universities of Technology and 11 Universities of Applied Sciences were identified.

The analysis resulted in a subdivision of percentages of all subject categories shown in the WING model in **Figure 4**. In order to give an overview and to be able to compare the different IEM degree programs, the seven subject categories (ECTS for Internships, Bachelor- and Master- thesis were not considered) were synthesized into two categories as followed:

Percentage "Technical subjects" = % of "Natural science and Technology subjects" + % of "Technology-related subjects" + % of "Attributable Technology and Technology-related restricted-elective subjects" + half of the % of "Mixed restricted-elective and Free-elective subjects".

Percentage "Economic and Integration subjects" = % of "Integration subjects" + % of "Economics subjects" + % of "Attributable economic restricted-elective subjects" + half of the % of "Mixed restricted-elective and Free-elective subjects".

Figure 9 shows the results of the analyzed IEM degree programs of HEIs in Austria. Like highlighted in **Figure 9**, it can be seen that the IEM degree program qualification profile of Universities of Technology is concentrated between 65 % and 80 % of technical subjects though one University of Technology offers one combined degree program with 51 % technical subjects, whereas Universities of Applied Sciences are dispersed throughout the whole range between 50 % and 77 % of technical subjects. The index table lists the analyzed HEIs, the corresponding "OECD revised field of science and technology" attributable to the respective IEM degree program and the kind of degree program (Bachelor (BA), Master (MA) or combined (BA + MA)).

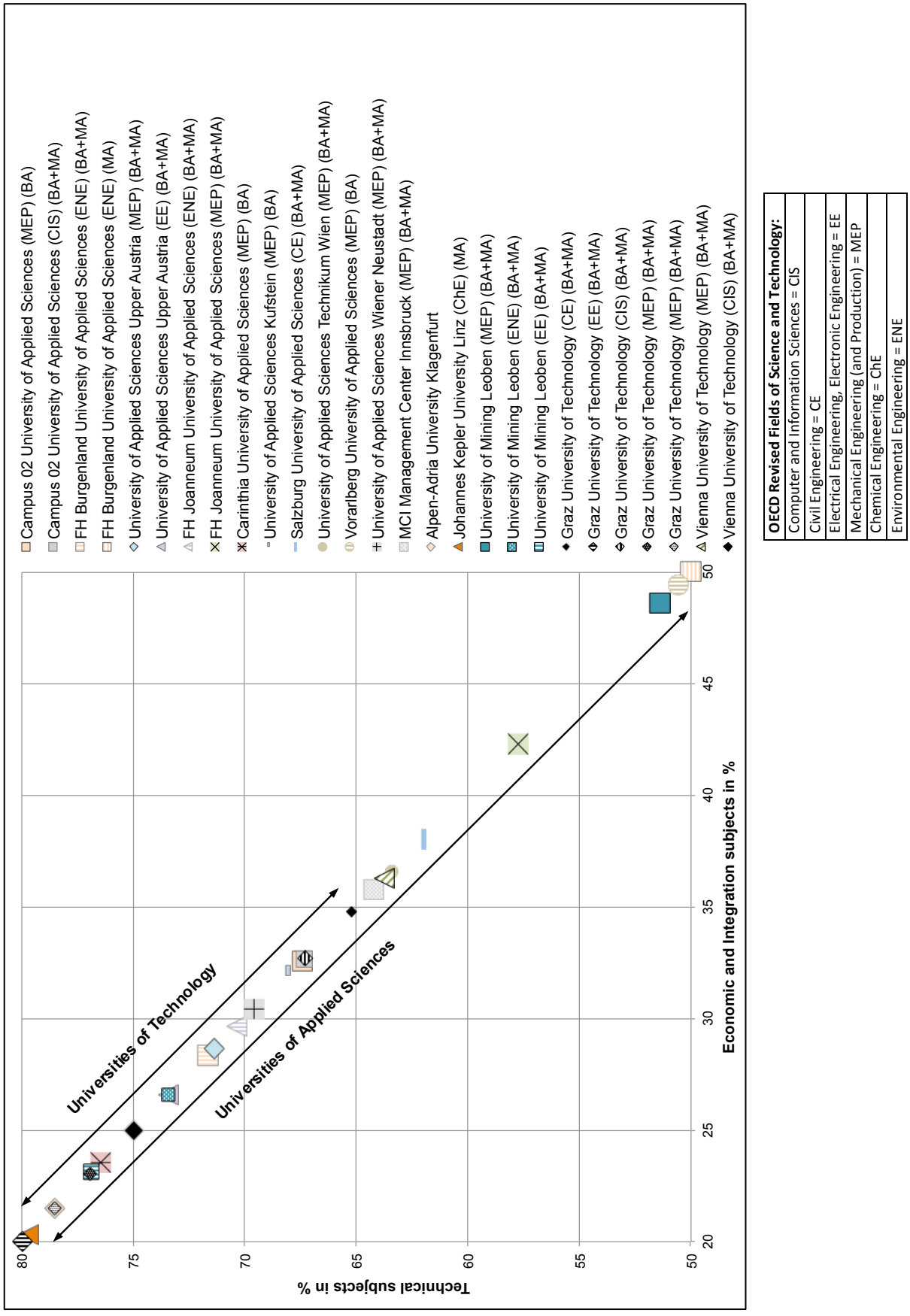

Figure 9: Comparison of Qualification Profiles of IEM degree programs in Austria

Table 7 shows the specific values and the concrete IEM degree program (German nomenclature) displayed in **Figure 9**. Deans of degree programs with a "*" after the degree program specification in **Table 7** did not correct the subjects allocation.

Higher Education institution	Degree Program	Type	Higher Education Institution + OECD revised field of science	Economic and Integration subjects in %	Technical subjects in %
Campus 02 University of Applied Sciences	Wirtschaftsinformatik + IT & Wirtschaftsinformatik	BA+MA	Campus 02 University of Applied Sciences (CIS) (BA+MA)	32,65	67,35
Campus 02 University of Applied Sciences	Innovationsmanagement	BA	Campus 02 University of Applied Sciences (MEP) (BA)	32,56	67,44
FH Burgenland University of Applied Sciences	Energie- und Umweltmanagement	BA+MA	FH Burgenland University of Applied Sciences (ENE) (BA+MA)	28,35	71,65
FH Burgenland University of Applied Sciences	Nachhaltige Energiesysteme	MA	FH Burgenland University of Applied Sciences (ENE) (MA)	50	50
University of Applied Sciences Upper Austria	Innovations- und Produkt- m. + Innovation Product Man.	BA+MA	University of Applied Sciences Upper Austria (MEP) (BA+MA)	28,64	71,36
University of Applied Sciences Upper Austria	Mechatronik/Wirtschaft	BA+MA	University of Applied Sciences Upper Austria (EE) (BA+MA)	26,59	73,41
FH Joanneum University of Applied Sciences	Energie-, Verkehrs- und Umweltmanagement + Energy and T. M.	BA+MA	FH Joanneum University of Applied Sciences (ENE) (BA+MA)	29,63	70,37
FH Joanneum University of Applied Sciences	Industriewirtschaft / Ind. Man. + International Ind. Man.	BA+MA	FH Joanneum University of Applied Sciences (MEP) (BA+MA)	42,27	57,73
Carinthia University of Applied Sciences	Wirtschaftsingenieurwesen	BA	Carinthia University of Applied Sciences (MEP) (BA)	23,55	76,45
University of Applied Sciences Kufstein	Wirtschaftsingenieurwesen	BA	University of Applied Sciences Kufstein (MEP) (BA)	31,94	68,06
Salzburg University of Applied Sciences	Holztechnologie- & Holzbau & Holzwirtschaft	BA+MA	Salzburg University of Applied Sciences (CE) (BA+MA)	38,02	61,98
University of Applied Sciences Technikum Wien	Internationales Wirtschaftsingenieurwesen	BA+MA	University of Applied Sciences Technikum Wien (MEP) (BA+MA)	36,6	63,4
Vorarlberg University of Applied Sciences	Wirtschaftsingenieurwesen	BA	Vorarlberg University of Applied Sciences (MEP) (BA)	49,41	50,59
University of Applied Sciences Wiener Neustadt	Wirtschaftsingenieur	BA+MA	University of Applied Sciences Wiener Neustadt (MEP) (BA+MA)	30,41	69,59
MCI Management Center Innsbruck	Wirtschaftsingenieurwesen	BA+MA	MCI Management Center Innsbruck (MEP) (BA+MA)	35,78	64,22
Alpen-Adria University Klagenfurt	Wirtschaftsingenieurwesen	BA	Alpen-Adria University Klagenfurt	21,48	78,52
Johannes Kepler University Linz	Wirtschaftsingenieurwesen - Technische Chemie *	MA	Johannes Kepler University Linz (ChE) (MA)	20,3	79,7
University of Mining Leoben	Industrielogistik	BA+MA	University of Mining Leoben (MEP) (BA+MA)	48,59	51,41
University of Mining Leoben	Petroleum Engineering + P.E. - I.M.a.B.A.	BA+MA	University of Mining Leoben (ENE) (BA+MA)	26,56	73,44
University of Mining Leoben	Industrielle Energietechnik	BA+MA	University of Mining Leoben (EE) (BA+MA)	23,11	76,89
Graz University of Technology	Bauingenieurwissenschaften + Wirtschaftsingenieurwesen	BA+MA	Graz University of Technology (CE) (BA+MA)	25	75
Graz University of Technology	Elektrotechnik + Elektrotechnik Wirtschaft	BA+MA	Graz University of Technology (EE) (BA+MA)	20,04	79,96
Graz University of Technology	Softwareentwicklung-Wirtschaft	BA+MA	Graz University of Technology (CIS) (BA+MA)	32,71	67,29
Graz University of Technology	Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	Graz University of Technology (MEP) (BA+MA)	23,06	76,94
Graz University of Technology	Wirtschaftsingenieurwesen-Maschinenbau + Production Science and Management	BA+MA	Graz University of Technology (MEP) (BA+MA)	21,5	78,5
Vienna University of Technology	Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	Vienna University of Technology (MEP) (BA+MA)	36,27	63,73
Vienna University of Technology	Wirtschaftsinformatik + Business Informatics *	BA+MA	Vienna University of Technology (CIS) (BA+MA)	34,8	65,2

Table 7: Specification, values and attribution of the IEM degree programs displayed in **Figure 9**

Detailed illustration of the subjects' allocations for every degree program listed in **Table 7** and **Table 8** can be found in **Appendix D**.

In **Table 8** all important and interesting numbers for every detected and analyzed IEM degree program in Austria are displayed. These numbers were collected mainly from the homepages of the respective HEIs but also from other sources like “Statistik Austria”, “Studium.at” and annual reports. In order to check if the numbers are right, the table was sent to every dean of the respective IEM degree program with the request to check and correct the numbers. After the correction of the numbers by the deans the synoptically table was finalized. The fields with “n.s.” mean that the value was “not specified” either by the dean or could not be found.

Higher Education Institution	IEM degree program	Degree Program	Kind (BA or MA)	Province	City	Duration in semesters	Extent (ECTS)	Full time	Part time / extra-occupational	Dual	Student places available per application period	Number of applicants in winter semester 2012	Application period (Start)	Academic title	Total number of Students on Higher Education Institution			Total number of Students in the IEM degree program			Number of graduates of the IEM degree program			Actual female percentage in IEM degree program	Main taching and interrogation language	Mandatory second teaching and interrogation language	Percentage of mandatory second teaching and interrogation language	Duration of mandatory inernship
															2011	2012	2013	2011	2012	2013	2010/2011	2011/2012	2012/2013					
Vienna University of Technology	Combination BA+MA	Wirtschaftsingenieurwesen-Maschinenbau	Bachelor	Vienna	Vienna	6	180	Yes	No	No	unlimited	-	July till September	BSc	29.088	27.923	28.199	1320	1458	1571	38	62	84	15,80%	German	None	-	0
		Wirtschaftsingenieurwesen-Maschinenbau	Master	Vienna	Vienna	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	29.088	27.923	28.199	362	356	369	55	56	45	11,83%	German	None	-	0
	Combination BA+MA	Wirtschaftsinformatik	Bachelor	Vienna	Vienna	6	180	Yes	No	No	unlimited	-	July till September	BSc	29.088	27.923	28.199	945	824	729	52	65	54	20,66%	German	None	-	0
		Business Informatics	Master	Vienna	Vienna	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	29.088	27.923	28.199	329	333	332	56	40	26	15,11%	English	None	-	0
Graz University of Technology	Combination BA+MA	Bauingenieurwissenschaften, Umwelt und Wirtschaft	Bachelor	Styria	Graz	6	180	Yes	No	No	unlimited	-	July till September	BSc	12.413	12.692	15.091	949	994	1045	79	96	85	20,29%	German	None	-	0
		Wirtschaftsingenieurwesen Bauingenieurwissenschaften	Master	Styria	Graz	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	12.413	12.692	15.091	107	130	129	28	29	18	27,13%	German	None	-	0
	Combination BA+MA	Elektrotechnik	Bachelor	Styria	Graz	6	180	Yes	No	No	unlimited	-	July till September	BSc	12.413	12.692	15.091	651	732	901	53	47	57	7,55%	German	None	-	0
		Elektrotechnik Wirtschaft	Master	Styria	Graz	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	12.413	12.692	15.091	47	45	50	3	8	9	8%	German	None	-	0
	Combination BA+MA	Softwareentwicklung-Wirtschaft	Bachelor	Styria	Graz	6	180	Yes	No	No	unlimited	-	July till September	BSc	12.413	12.692	15.091	686	653	656	62	54	49	14,79%	German	None	-	0
		Softwareentwicklung-Wirtschaft	Master	Styria	Graz	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	12.413	12.692	15.091	184	173	191	43	50	41	11%	German	None	-	0
	Combination BA+MA	Wirtschaftsingenieurwesen-Maschinenbau	Bachelor	Styria	Graz	6	180	Yes	No	No	unlimited	-	July till September	BSc	12.413	12.692	15.091	864	930	933	42	79	94	8,68%	German	None	-	0
		Wirtschaftsingenieurwesen-Maschinenbau	Master	Styria	Graz	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	12.413	12.692	15.091	664	535	441	65	81	83	3,17%	German	None	-	0
	MA	Production Science and Management	Master	Styria	Graz	4	120	Yes	No	No	unlimited	-	July till September	MSc / Dipl.-Ing.	12.413	12.692	15.091	116	102	94	15	11	11	13,83%	**English**	None	-	0
University of Mining Leoben	Combination BA+MA	Industrielogistik	Bachelor	Styria	Leoben	7	210	Yes	No	No	unlimited	-	June till September	BSc	3.135	3.330	3.465	356	357	324	30	15	26	27,47%	German	None	-	16
		Industrielogistik	Master	Styria	Leoben	3	90	Yes	No	No	unlimited	-	June till September	Dipl.-Ing.	3.135	3.330	3.465	31	31	39	16	18	19	18%	German	English	23%	0
	Combination BA+MA	Petroleum Engineering	Bachelor	Styria	Leoben	7	210	Yes	No	No	unlimited	-	June till September	BSc	3.135	3.330	3.465	372	421	448	17	18	16	15,40%	German	English	43%	16
		Petroleum Engineering - Industrial Management and Business Administration	Master	Styria	Leoben	3	90	Yes	No	No	unlimited	-	June till September	Dipl.-Ing.	3.135	3.330	3.465	12	28	31	5	3	4	22,60%	German	English	18%	4
	Combination BA+MA	Industrielle Energietechnik	Bachelor	Styria	Leoben	7	210	Yes	No	No	unlimited	-	June till September	BSc	3.135	3.330	3.465	0	65	131	0	0	0	17,60%	German	None	-	16
		Industrielle Energietechnik	Master	Styria	Leoben	4	120	Yes	No	No	unlimited	-	June till September	Dipl.-Ing.	3.135	3.330	3.465	36	48	51	1	3	6	23,50%	German	None	-	8
Johannes Kepler University Linz	Combination BA+MA	Technische Chemie	Bachelor	Upper Austria	Linz	6	180	Yes	No	No	unlimited	-	July till September	BSc	16.937	17.752	n.s.	98	145	190	n.s.	n.s.	n.s.	49%	German	English	3%	0
		Wirtschaftsingenieurwesen - Technische Chemie	Master	Upper Austria	Linz	4	120	Yes	No	No	unlimited	-	July till September	Dipl.-Ing.	16.937	17.752	n.s.	1	1	2	n.s.	n.s.	n.s.	50%	German	English	25%	0
Alpen-Adria University Klagenfurt	BA	Wirtschaftsingenieurwesen - Informationstechnik	Bachelor	Carinthia	Klagenfurt	6	180	Yes	No	No	unlimited	-	July till September	BSc	9.980	10.812	10.222	n.s.	n.s.	33	0	0	0	n.s.	German	None	-	0
MCI Management Center Innsbruck	Combination BA+MA	Wirtschaftsingenieurwesen	Bachelor	Tyrol	Innsbruck	6	180	Yes	Yes	No	40	135	February till June	BSc	1748	1867	1977	23	72	126	0	0	0	13%	German	English	10%	12
		Wirtschaftsingenieurwesen	Master	Tyrol	Innsbruck	4	120	No	Yes	No	25	44	February till June	MSc	482	620	712	65	71	80	0	34	23	15%	German	English	33%	0
University of Applied Sciences Upper Austria	Combination BA+MA	Innovations- und Produktmanagement	Bachelor	Upper Austria	Wels	6	180	Yes	No	No	30	106	June	BSc	4.559	4.638	4.778	105	101	96	30	26	27	34,41%	German	English	6%	10
		Innovation and Product Management	Master	Upper Austria	Wels	4	120	Yes	No	No	23	260	June	MSc	4.559	4.638	4.778	53	57	68	26	26	16	43,33%	**English**	None	-	0
	Combination BA+MA	Mechatronik/Wirtschaft	Bachelor	Upper Austria	Wels	6	180	No	Yes	No	65	n.s.	June	BSc	4.559	4.638	4.778	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	5%	10
		Mechatronik/Wirtschaft	Master	Upper Austria	Wels	4	120	No	Yes	No	45	n.s.	June	MSc	4.559	4.638	4.778	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	4%	0
University of Applied Sciences Wiener Neustadt	Combination BA+MA	Wirtschaftsingenieur	Bachelor	Lower Austria	Wr. Neustadt	6	180	Yes	Yes	No	50	n.s.	June	BSc	2.986	3.228	3.230	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	6%	n.s.
		Wirtschaftsingenieur	Master	Lower Austria	Wr. Neustadt	4	120	Yes	Yes	No	50	n.s.	June	MSc	2.986	3.228	3.230	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	3%	n.s.
Vorarlberg University of Applied Sciences	BA	Wirtschaftsingenieurwesen	Bachelor	Vorarlberg	Dornbirn	6	180	No	Yes	No	30	63	May	BSc	1013	1025	1133	99	99	96	32	29	28	< 10%	German	None	-	0
University of Applied Sciences Technikum Wien	Combination BA+MA	Internationales Wirtschaftsingenieurwesen	Bachelor	Vienna	Vienna	6	180	No	Yes	No	75	n.s.	May	BSc	3.160	3.382	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	13%	0
		Internationales Wirtschaftsingenieurwesen	Master	Vienna	Vienna	4	120	No	Yes	No	55	n.s.	May	MSc	3.160	3.382	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	18%	0
Salzburg University of Applied Sciences	Combination BA+MA	Holztechnologie & Holzbau	Bachelor	Salzburg	Kuchl	6	180	Yes	No	No	52	n.s.	June	BSc	2.286	2.389	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English + 2nd foreign language	11%	0
		Holztechnologie & Holzwirtschaft	Master	Salzburg	Kuchl	4	120	Yes	No	No	25	n.s.	June	Dipl.-Ing.	2.286	2.389	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	None	-	0
University of Applied Sciences Kufstein	BA	Wirtschaftsingenieurwesen	Bachelor	Tyrol	Kufstein	6	180	Yes	No	No	35	n.s.	June	BSc	1.269	1.399	1511	67	86	67	0	0	31	8%	German	English	5%	10
Carinthia University of Applied Sciences	BA	Wirtschaftsingenieurwesen	Bachelor	Carinthia	Villach	6	180	No	Yes	No	30	60	January till August	BSc	1.924	1.941	2042	0	32	42	0	0	0	33	German	English	6%	0
FH Joanneum University of Applied Sciences	Combination BA+MA	Energie-, Verkehrs- und Umweltmanagement	Bachelor	Styria	Kapfenberg	6	180	Yes	No	No	32	65	June	BSc	3.580	3703	ca. 4000	33	35	34	22	28	26	24%	German	English	5%	>10
		Energy and Transport Management	Master	Styria	Kapfenberg	4	120	Yes	Yes	No	30	39	June	MSc	3.580	3703	ca. 4000	35	33	20	0	0	24	29%	**English**	None	-	0
	Combination BA+MA	Industriewirtschaft / Industrial Management	Bachelor	Styria	Kapfenberg	6	180	Yes	Yes	No	80	144	June till September	BSc	3.580	3703	ca. 4000	64	83	81	47	32	41	ca. 35%	German	English + 2nd foreign language	10%	>12
		International Industrial Management	Master	Styria	Kapfenberg	4	120	Yes	Yes	No	40	82	June till September	Dipl.-Ing.	3.580	3703	ca. 4000	49	35	46	0	0	42	ca. 35%	**English**	German	50%	0
FH Burgenland University of Applied Sciences	Combination BA+MA	Energie- und Umweltmanagement	Bachelor	Burgenland	Pinkafeld	6	180	Yes	Yes	No	90	n.s.	march	BSc	1.584	1.567	1.721	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	6%	14
		Energie- und Umweltmanagement	Master	Burgenland	Pinkafeld	4	120	Yes	No	No	15	n.s.	May	MSc	1.584	1.567	1.721	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	13%	0
	MA	Nachhaltige Energiesysteme	Master	Burgenland	Pinkafeld	4	120	No	Yes	No	40	n.s.	May	MSc	1.584	1.567	1.721	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	17%	0
Campus 02 University of Applied Sciences	BA	Innovationsmanagement	Bachelor	Styria	Graz	6	180	No	Yes	No	45	n.s.	August	BSc	1.151	1.167	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	9%	0
	Combination BA+MA	Wirtschaftsinformatik	Bachelor	Styria	Graz	6	180	No	Yes	No	38	n.s.	August	BSc	1.151	1.167	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English	5%	0
		IT & Wirtschaftsinformatik	Master	Styria	Graz	3	90	No	Yes	No	38	n.s.	August	Dipl.-Ing.	1.151	1.167	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	German	English + 2nd foreign language	11%	0

Table 8: Synoptically table of all detected IEM degree programs in Austria

4.2 Results of the online survey among IEM professionals and students

1031 respondents, which were composed of IEM professionals, IEM professionals already retired and IEM students, compiled the questionnaire. After the first rough “cleaning” of the gathered data whereat all respondents data who did not compile the first compulsory question were erased, the questionnaires leftover considered during the whole evaluation of the survey is composed of 805 fully compiled and 142 partially compiled questionnaires. The sum of the fully and partially compiled questionnaires is 947, which results in a total response rate of 16,76 %.

The results of the online survey among IEM professionals and students will be separated in this chapter in order to not confuse minds. Though results of IEM professionals still on the job and results of IEM professionals already retired are put together and only separated when their opinions diverge or to analyze if the “old school” has a different opinion than the “freshman” in some relevant topics which easily change over time.

The overall respondents are composed of 388 (40,97 %) students, 507 (53,54 %) IEM professionals and 52 (5,49 %) IEM professionals retired (see **Table 9**).

Respondents	**Frequency**	**Percentage**
Student	388	40,97%
IEM professional (on the job)	507	53,54%
IEM professional (retired)	52	5,49%
Sum	**n=947**	**100,00%**

Table 9: Overall respondents of the IEM professionals and students survey **(n=947)**

As aforementioned first the results of both IEM professionals on the job and retired survey part and subsequently the results of the IEM students survey part will be illustrated.

4.2.1 Results of the online survey among IEM professionals on the job and retired

The results focusing on both IEM professionals on the job and retired, together called as IEM professionals, are illustrated according to the question sequence in the online survey. The results like the questions try to follow a timeline as followed:

1. Initial questions
2. Education
3. Career entry and career path
4. Further education
5. Competences needed on the job / adjustment requirements of education
6. Benefits of the WING (Internal survey for WING members only)

It needs to be mentioned that the results of the conducted internal survey for WING members are not illustrated in this thesis.

4.2.1.1 Initial questions

The respondent IEM professionals on the job consist of 39 (7,69 %) female and 468 (92,31 %) male respondents (see **Table 10**).

Sex	Frequency	Percentage
female	39	7,69%
male	468	92,31%
Sum	**n=507**	**100,00%**

Table 10: Sex of IEM professionals on the job respondents **(n=507)**

The average age of IEM professionals on the job is 40,69 years, with a standard deviation of 10 years whereat the youngest respondent is 24 and the oldest respondent is 72 years old (see **Table 11**). The standard deviation estimates half of the interval width which comprises approximately two third of the given values. The needed prerequisite is a normal distributed data set. [**43**]

Statistical values	Years
Average	40,69
Standard deviation	10,05
Minimum	24
Maximum	72

Table 11: Age of IEM professionals on the job respondents **(n=507)**

The respondent IEM professionals retired consist of one (1,92 %) female and 51 (98,08 %) male respondents (see **Table 12**).

Sex	Frequency	Percentage
female	1	1,92%
male	51	98,08%
Sum	**n=52**	**100,00%**

Table 12: Sex of IEM professionals retired respondents **(n=52)**

The average age of IEM professionals retired is 68,53 years, with a standard deviation of 6,18 years whereat the youngest respondent is 44 and the oldest respondent is 78 years old (see **Table 13**).

Statistical values	Years
Average	68,53
Standard deviation	6,18
Minimum	44
Maximum	78

Table 13: Age of IEM professionals retired respondents **(n=52)**

Now that the sex and age of both IEM respondents on the job and retired has been provided a step back into their education is taken in the following chapter.

4.2.1.2 Education

In the “Education” part of the survey both IEM professionals on the job and retired were asked to specify their academic degrees.

Overall view of the respondents’ academic degrees

The respondents specified their academic degree and the amount (maximum two degrees) like illustrated in **Table 14**. 83,2 % of the respondents (n=559) has a “Dipl.-Ing.” title and 19,1 % has a “Doctor” title. In total only 2,8 % of the respondents has two degrees of the same kind (see **Table 14**).

Academic degree	Frequency	Percentage (n=559)
One Bachelor degree	50	8,9%
Two Bachelor degrees	2	0,4%
One Master degree	52	9,3%
Two Master degrees	5	0,9%
One Magister degree	10	1,8%
Two Magister degrees	0	0,0%
One Dipl.-Ing. (FH) degree	28	5,0%
Two Dipl.-Ing. (FH) degrees	1	0,2%
One Dipl.-Ing. degree	465	83,2%
Two Dipl.-Ing. degrees	7	1,3%
One Doctor degree	107	19,1%
Two Doctor degrees	0	0,0%

Table 14: Academic degrees of both IEM professionals on the job and retired **(n=559)**

Now that an overview of the respondents academic degrees has been provided the following information of every academic degree category, whereat all degrees (single and double) in one category are summed up, will be illustrated:

- Overview of the distribution between graduates of Universities of Applied Sciences and Universities
- Academic degrees obtained on Universities of Applied Sciences (UAS):
    - Focus of the University of Applied Sciences
    - Scientific discipline chosen
    - Geographical study place and if in Austria, also the respective HEIs

- Academic degrees obtained on Universities:
    - Type of University
    - Scientific discipline chosen
    - Geographical study place and if in Austria, also the respective HEIs

Analysis of the Bachelor academic degrees

- **Overview**

22,22 % of the IEM professionals who completed a Bachelor degree program graduated on Universities of Applied Sciences and 77,78 % graduated on Universities (see **Table 15**).

Type of HEI	Frequency	Percentage
University of Applied Sciences	12	22,22%
University	42	77,78%
Sum	**n=54**	**100,00%**

Table 15: Types of HEIs where IEM professionals completed their Bachelor degree program **(n=54)**

- **University of Applied Sciences**

The aforementioned 22,22 % (12 respondents) of IEM professionals who completed the Bachelor on a University of Applied Sciences, absolved their Bachelor degree program on Universities of Applied Sciences which have different focuses. 66,67 % of the IEM professionals who completed a Bachelor program on UAS, graduated on UAS with technical and economics focus, and 16,67 % graduated on both UAS with technical focus and economics focus (see **Table 16**).

Focus of University of Applied Sciences	Frequency	Percentage
Technical focus	2	16,67%
Economics focus	2	16,67%
Technical and economics focus	8	66,67%
Sum	**n=12**	**100,00%**

Table 16: Focus of Universities of Applied Sciences (Bachelor degree) **(n=12)**

IEM professionals chose different scientific disciplines in their Bachelor degree program on UAS. Half of the respondents completed the Bachelor in an engineering discipline, 33,8 % in a business administration discipline and 16,6 % in an interdisciplinary discipline (see **Table 17**).

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Machanical Engineering and Economics (IEM)	6	50,0%
Business Administration	Business Studies	3	25,0%
	Purchasing an Supply Management	1	8,3%
Interdisciplinary Sciences	Logistics/Traffic	1	8,3%
	Other educational direction	1	8,3%
Sum		**n=12**	**100,0%**

Table 17: Scientific disciplines chosen by IEM professionals in their Bachelor degree program on Universities of Applied Sciences **(n=12)**

Now that the scientific discipline distribution has been illustrated the remaining question is where these disciplines have been completed. **Table 18** illustrates the geographical locations of UAS where IEM professionals completed their Bachelor degree program. 91,6 % of IEM professionals completed their Bachelor degree program on an Austrian UAS. 41,7 % of IEM professionals completed their Bachelor degree program on the UAS Technikum Wien and 25 % on the UAS Wiener Neustadt.

Place	Country	University of Applied Sciences (UAS)	Frequency	Percentage
Europe	Austria	FH Joanneum UAS	1	8,3%
		UAS Upper Austria	1	8,3%
		UAS Technikum Wien	5	41,7%
		Vorarlberg UAS	1	8,3%
		UAS Wiener Neustadt	3	25,0%
	Netherlands	-	1	8,3%
Sum			**n=12**	**100,0%**

Table 18: Geographical locations where IEM professionals completed their Bachelor degree program on Universities of Applied Sciences **(n=12)**

- **Universities**

38 of the 42 IEM professionals who completed their Bachelor degree program on a University completed their Bachelor degree program on a University of Technology and 4 on other types of Universities (see **Table 19**).

Type of University	Frequency	Percentage
University of Technology	38	90,5%
University (other)	4	9,5%
Sum	**n=42**	**100,00%**

Table 19: Type of Universities (Bachelor degree) **(n=42)**

85,7 % of IEM professionals completed their Bachelor degree program on a University in an Engineering discipline, whereat Mechanical Engineering and Business Economics represent the highest share within with 52,4 %. Other disciplines completed by IEM professionals in their Bachelor degree program on Universities are Business Administration, Natural sciences and Mathematics and Interdisciplinary sciences. (See **Table 20**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Civil Engineering	3	7,1%
	Computer Sciences (incl. Software development)	1	2,4%
	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	8	19,0%
	Mechanical Engineering	2	4,8%
	Machanical Engineering and Economics (IEM)	22	52,4%
Business Administration	Business Studies	3	7,1%
	Other educational direction	1	2,4%
Natural Sciences and Mathematics	Other educational direction	1	2,4%
Interdisciplinary Sciences	Other educational direction	1	2,4%
Sum		**n=42**	**100,0%**

Table 20: Scientific disciplines chosen by IEM professionals in their Bachelor degree program on Universities **(n=42)**

Table 21 illustrates the geographical locations of Universities where IEM professionals completed their Bachelor degree program. 92,9 % of IEM professionals in Austria completed their Bachelor degree program on an Austrian University. 52,4 % of IEM professionals completed their Bachelor degree program on Graz University of Technology and 31 % on Vienna University of Technology. Furthermore 4,8 % completed their Bachelor degree program in Asia and 2,4 % in Africa

Place	Country	University	Frequency	Percentage
Europe	Austria	University of Graz	4	9,5%
		Graz University of Technology	22	52,4%
		Vienna University of Technology	13	31,0%
Asia	Other country	-	2	4,8%
Africa	-	-	1	2,4%
Sum			**n=42**	**100,0%**

Table 21: Geographical locations where IEM professionals completed their Bachelor degree program on Universities **(n=42)**

Analysis of the Master academic degrees of IEM professionals

24,19 % of the IEM professionals who completed a Bachelor degree program graduated on Universities of Applied Sciences and 75,81 % graduated on Universities (see **Table 22**).

Type of HEI	Frequency	Percentage
University of Applied Sciences	15	24,19%
University	47	75,81%
Sum	**n=62**	**100,00%**

Table 22: Types of HEIs where IEM professionals completed their Master degree program **(n=62)**

- **University of Applied Sciences**

15 IEM professionals who completed the Master degree program on a University of Applied Sciences, absolved their Bachelor degree program on Universities of Applied Sciences which have different focuses. 53,33 % of the IEM professionals who completed a Master program on UAS, graduated on UAS with technical and economics focus, 33,33 % graduated on a UAS with technical focus and 6,67 % graduated on a UAS with economics focus. One IEM professional completed the Master degree program on an UAS with another focus. (See **Table 23**)

Focus of University of Applied Sciences	Frequency	Percentage
Technical focus	5	33,33%
Economics focus	1	6,67%
Technical and economics focus	8	53,33%
Other focus	1	6,67%
Sum	**n=15**	**100,00%**

Table 23: Focus of Universities of Applied Sciences (Master degree) **(n=15)**

Out of the IEM professionals who completed their Master degree program on UAS 73,4 % chose an Engineering discipline whereat within Mechanical Engineering and Business Economics is the most represented chosen educational direction with 40 %. Other mentioned scientific disciplines are Business Administration with 6,7 % and Interdisciplinary sciences with 20% of the respondents of this question. (See **Table 24**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Electrical Engineering	1	6,7%
	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	1	6,7%
	Mechanical Engineering	1	6,7%
	Machanical Engineering and Economics (IEM)	6	40,0%
	Other educational program	2	13,3%
Business Administration	Controlling, Accounting and Finance	1	6,7%
Interdisciplinary Sciences	Interdisciplinary Management degree program (e.g. Production, Traffic)	2	13,3%
	Other educational program	1	6,7%
Sum		**n=15**	**100,0%**

Table 24: Scientific disciplines chosen by IEM professionals in their Master degree program on Universities of Applied Sciences **(n=15)**

All inquired IEM professionals who completed their Master degree program on a UAS, completed it in Austria. 53,3 % of the respondent completed their Master degree program on the UAS Technikum Wien, 20 % on the UAS Wiener Neustadt, 13,3 % on the FH Joanneum UAS and 6,7 % on the MCI in Innsbruck. (See **Table 25**)

Place	Country	University of Applied Sciences (UAS)	Frequency	Percentage
Europe	Austria	FH Joanneum UAS	2	13,3%
		UAS Technikum Wien	8	53,3%
		Vorarlberg UAS	1	6,7%
		UAS Wiener Neustadt	3	20,0%
		MCI Management Center Innsbruck	1	6,7%
Sum			**n=15**	**100,0%**

Table 25: Geographical locations where IEM professionals completed their Master degree program on Universities of Applied Sciences **(n=15)**

- **Universities**

35 of the 47 IEM professionals who completed their Master degree program on a University completed their Master degree program on a University of Technology and 12 on other types of Universities (see **Table 26**).

Type of University	Frequency	Percentage
University of Technology	35	74,5%
University (other)	12	25,5%
Sum	**n=47**	**100,00%**

Table 26: Type of Universities (Master degree) **(n=47)**

63,9 % of IEM professionals completed their Master degree program on a University in an Engineering discipline, whereat the educational direction Mechanical Engineering and Business Economics represents the highest share within with 36,2 % and Information Technology and Business Economics represents the second highest share wit 12,8 %. Other disciplines completed by IEM professionals in their Master degree program on Universities are Business Administration (25,5 %), Social sciences (4,2 %) and Interdisciplinary sciences (6,3 %). (See **Table 27**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Civil Engineering	3	6,4%
	Computer Sciences (incl. Software development)	6	12,8%
	Mechanical Engineering	2	4,3%
	Process Engineering	1	2,1%
	Civil Engineering and Economics (IEM)	1	2,1%
	Machanical Engineering and Economics (IEM)	17	36,2%
Business Administration	Business Studies	7	14,9%
	Controlling, Accounting and Finance	1	2,1%
	Other educational program	4	8,5%
Social Sciences	Pedagogics	1	2,1%
	Other educational program	1	2,1%
Interdisciplinary Sciences	Interdisciplinary Management degree program (e.g. Production, Traffic)	1	2,1%
	Environment Protection/Recycling/Disponsal Engineering	1	2,1%
	Other educational program	1	2,1%
Sum		**n=47**	**100,0%**

Table 27: Scientific disciplines chosen by IEM professionals in their Master degree program on Universities **(n=47)**

89,4 % of IEM professionals who completed their Master degree program on a University studied in Austria whereat 38,3 % completed their Master degree program on Graz University of Technology and 27,7 % on Vienna University of Technology. One IEM professional completed the Master degree program in United Kingdom and 4 IEM

professionals completed their Master degree program in the United States of America. (See **Table 28**)

Place	Country	University	Frequency	Percentage
Europe	Austria	University of Innsbruck	1	2,1%
		University of Mining Leoben	2	4,3%
		Graz University of Technology	18	38,3%
		Vienna University of Technology	13	27,7%
		Danube University Krems, University for Continuing Education	3	6,4%
		Vienna University of Economics and Business	1	2,1%
		Other private University	2	4,3%
		Other public University	2	4,3%
	United Kingdom	-	1	2,1%
North America	United States of America	-	4	8,5%
Sum			**n=47**	**100,0%**

Table 28: Geographical locations where IEM professionals completed their Master degree program on Universities **(n=47)**

Analysis of the Magister academic degrees of IEM professionals

The 10 IEM professionals, who completed their Magister degree program, completed it on Universities. None of the respondent completed a Magister degree program on a University of Applied Sciences. (See **Table 29**)

Type of HEI	Frequency	Percentage
University of Applied Sciences	0	0,00%
University	10	100,00%
Sum	**n=10**	**100,00%**

Table 29: Types of HEIs where IEM professionals completed their Magister degree program **(n=10)**

All respondents concluded their Magister degree program on other types of Universities than Universities of Technology.

50 % of IEM professionals completed their Magister degree program on a University in a Business Administration discipline. The 50 % share of Business Administration is composed of 40 % Business Studies and 10 % Macroeconomics as subordinated educational directions. Other disciplines completed by IEM professionals in their Master degree program on Universities are Law (40 %) and Social Sciences (10 %). (See **Table 30**)

Scientific discipline	Educational direction	Frequency	Percentage
Business Administration	Business Studies	4	40,0%
	Macroeconomics	1	10,0%
Law	-	4	40,0%
Social Sciences	Pedagogics	1	10,0%
Sum		**n=10**	**100,0%**

Table 30: Scientific disciplines chosen by IEM professionals in their Magister degree program on Universities **(n=10)**

All IEM professionals who completed the Magister degree program on a University studied in Austria, 30 % on the University of Graz, 30 % on the Vienna University of Economics and Business, 10 % on the University Linz and 30 % on other public Universities. (See **Table 31**)

Place	Country	University	Frequency	Percentage
Europe	Austria	Johannes Kepler University Linz	1	10,0%
		University of Graz	3	30,0%
		Vienna University of Economics and Business	3	30,0%
		Other public University	3	30,0%
Sum			**n=10**	**100,0%**

Table 31: Geographical locations where IEM professionals completed their Magister degree program on Universities **(n=10)**

Analysis of the Dipl.-Ing.(FH) academic degrees of IEM professionals

73,33 % of the IEM professionals who completed a Master program on UAS, graduated on UAS with technical and economics focus, 20 % graduated on a UAS with technical focus and 6,67 % graduated on a UAS with economics focus. (See **Table 32**)

Focus of University of Applied Sciences	Frequency	Percentage
Technical focus	5	20,00%
Economics focus	1	6,67%
Technical and economics focus	8	73,33%
Sum	**n=30**	**100,00%**

Table 32: Focus of Universities of Applied Sciences (Dipl.-Ing. (FH) degree) **(n=30)**

Out of the 30 IEM professionals who completed their Diploma degree program on UAS, 63,3 % chose an Engineering discipline whereat within Mechanical Engineering and Business Economics is the by far most represented chosen educational direction with 40 %. Other mentioned scientific disciplines are Business Administration with 10 % and Interdisciplinary sciences with 16,7 % of the respondents of this question. (See **Table 33**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Electrical Engineering and Economics (IEM)	1	3,3%
	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	2	6,7%
	Mechanical Engineering	1	3,3%
	Mechatronics	1	3,3%
	Civil Engineering and Economics (IEM)	1	3,3%
	Machanical Engineering and Economics (IEM)	12	40,0%
	Other educational program	4	13,3%
Business Administration	Business Studies	2	6,7%
	Purchasing an Supply Management	1	3,3%
Interdisciplinary Sciences	Industrial Economics (IEM)	3	10,0%
	Interdisciplinary Management degree program (e.g. Production, Traffic)	2	6,7%
Sum		**n=30**	**100,0%**

Table 33: Scientific disciplines chosen by IEM professionals in their Diploma degree program on Universities of Applied Sciences **(n=30)**

Over 90 % of IEM professionals who completed their Diploma degree program on UAS, completed it on an Austrian UAS. 50 % of these IEM professionals completed their Diploma degree program on FH Joanneum UAS and 10 % on UAS Wiener Neustadt. 2 IEM professionals completed their studies on a German UAS and 1 on a Swiss UAS. (See **Table 34**)

Place	Country	University of Applied Sciences (UAS)	Frequency	Percentage
Europe	Austria	FH Joanneum UAS	15	50,0%
		Carinthia University of Applied Sciences	1	3,3%
		UAS Technikum Wien	2	6,7%
		Vorarlberg UAS	1	3,3%
		FH Wien University of Applied Sciences	2	6,7%
		UAS Wiener Neustadt	3	10,0%
		Other UAS in Austria	2	6,7%
		No answer	1	3,3%
	Germany	North Rhine-Westphalia	1	3,3%
		Saxony	1	3,3%
	Switzerland	St. Gallen	1	3,3%
Sum			**n=15**	**100,0%**

Table 34: Geographical locations where IEM professionals completed their Diploma degree program on Universities of Applied Sciences **(n=30)**

Analysis of the "Dipl.-Ing." academic degrees of IEM professionals

The most specified academic degree is the "Dipl.-Ing." degree. 479 of 559 IEM professionals absolved a Diploma degree program on a University. 473 (98,7 %) completed the Diploma degree program on a University of Technology and 5 (1 %) completed the Diploma degree on other Universities. One respondent who specified to hold a "Dipl.-Ing." title did not specify the type of University he or she completed. (See **Table 35**)

Type of University	Frequency	Percentage
University of Technology	473	98,7%
University (other)	5	1,0%
No answer	1	0,2%
Summe	**n=479**	**100,00%**

Table 35: Type of Universities (Dipl.-Ing. degree) **(n=479)**

87,7 % of IEM professionals completed their Diploma degree program on a University in an Engineering discipline, whereat the educational direction Mechanical Engineering and Business Economics represents again the highest share within with 61 %, Civil Engineering and Business Economics holds a share of 9,4 % and Mechanical Engineering holds a share of 9 %. Other disciplines completed by IEM professionals in their Diploma degree program on Universities are Business Administration (7,3 %), Natural sciences and Mathematics (0,4 %) and Interdisciplinary sciences (4,6 %). (See **Table 36**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Civil Engineering	18	3,8%
	Electrical Engineering	2	0,4%
	Electrical Engineering and Economics (IEM)	2	0,4%
	Computer Sciences (incl. Software development)	2	0,4%
	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	1	0,2%
	Mechanical Engineering	43	9,0%
	Mechatronics	1	0,2%
	Telematics	1	0,2%
	Process Engineering	8	1,7%
	Civil Engineering and Economics (IEM)	45	9,4%
	Machanical Engineering and Economics (IEM)	292	61,0%
	Other educational program	5	1,0%
Business Administration	Business Studies	13	2,7%
	Controlling, Accounting and Finance	1	0,2%
	Marketing	1	0,2%
	Other educational program	20	4,2%
Natural Sciences and Mathematics	Chemistry	2	0,4%
Interdisciplinary Sciences	Industrial Economics (IEM)	7	1,5%
	Interdisciplinary Management degree program (e.g. Production, Traffic)	2	0,4%
	Manufacturing-/Industrial Engineering	2	0,4%
	Other educational program	11	2,3%
Sum		**n=479**	**100,0%**

Table 36: Scientific disciplines chosen by IEM professionals in their Diploma degree program on Universities **(n=479)**

99,6 % of IEM professionals who completed their Diploma degree program on a University studied in Austria whereat 80,2 % completed their Master degree program on Graz University of Technology and 16,5 % on Vienna University of Technology. One IEM professional completed the Diploma degree program in Germany (Bavaria) and 1 IEM professional completed the Diploma degree program in France. (See **Table 37**)

Place	Country	University	Frequency	Percentage
Europe	Austria	Alpen-Adria University Klagenfurt	1	0,2%
		Johannes Kepler University Linz	8	1,7%
		University of Graz	4	0,8%
		University of Mining Leoben	1	0,2%
		Graz University of Technology	384	80,2%
		Vienna University of Technology	79	16,5%
	Germany	Bavaria	1	0,2%
	France	-	1	0,2%
Sum			**n=479**	**100,0%**

Table 37: Geographical locations where IEM professionals completed their Diploma degree program on Universities **(n=479)**

Analysis of the Doctor academic degrees of IEM professionals

107 IEM professionals hold a Doctor title, which corresponds to 19,14 % of the respondent IEM professionals (n=559). 86,9 % wrote the doctoral thesis while a University employed them. 11,2 % wrote the doctoral thesis on the job in a company. (See **Table 38**)

Organization (writing place)	Frequency	Percentage
University of Applied Sciences	1	0,9%
University	93	86,9%
Company	12	11,2%
Other Organization	1	0,9%
Sum	**n=107**	**100,00%**

Table 38: Types of Organizations where IEM professionals wrote their doctoral theses **(n=107)**

94,4 % of IEM professionals completed their doctoral program on Universities of Technology and 5,6 % on other Universities. (See **Table 39**)

University kind (Doctoral program)	Frequency	Percentage
University of Technology	101	94,4%
University (other)	6	5,6%
Summe	**n=107**	**100,00%**

Table 39: Types of University where IEM professionals completed the doctoral program **(n=107)**

91,5 % of inquired IEM professionals completed the doctoral program in Austria whereat 74,8 % completed the doctoral program on Graz University of Technology, 10,3 % on Vienna University of Technology and 2,9 % on University Linz. 1,8 % completed the doctoral program in Germany, 4,6 % in Switzerland, one IEM professional in Latvia and one IEM professional even in Japan. (See **Table 40**)

Place	Country	University	Frequency	Percentage
Europe	Austria	Alpen-Adria University Klagenfurt	1	0,9%
		Johannes Kepler University Linz	3	2,8%
		University of Mining Leoben	1	0,9%
		Graz University of Technology	80	74,8%
		Vienna University of Technology	11	10,3%
		Paris Lodron University of Salzburg	1	0,9%
		Other public University	1	0,9%
	Germany	Bavaria	1	0,9%
		Mecklenburg-West Pomerania	1	0,9%
	Switzerland	Zurich	3	2,8%
		Ticino	1	0,9%
		No answer	1	0,9%
	Latvia	-	1	0,9%
Asia	Japan	-	1	0,9%
Sum			**n=107**	**100,0%**

Table 40: Geographical locations and Universities where IEM professionals completed their doctoral program **(n=107)**

4.2.1.2.1 Foreign study experiences of IEM professionals

21,7 % of all inquired IEM professionals spent one or more semester abroad during their study period for study reason. (See **Figure 10**)

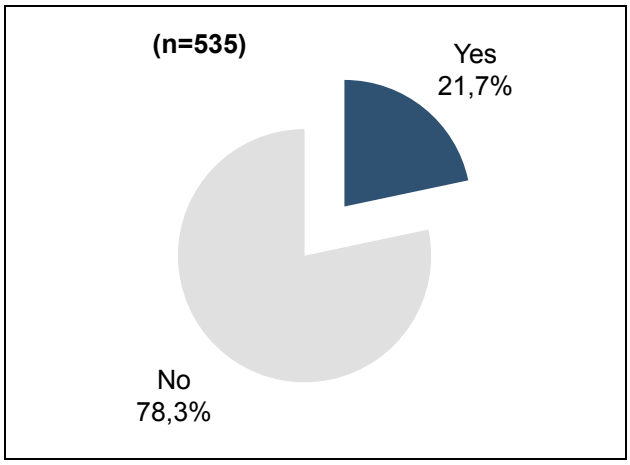

Figure 10: Percentage of IEM professionals who studied one or more semester abroad **(n=535)**

Figure 11 displays the specified assessment of statements relating study experiences abroad. IEM professionals stated that they definitely developed personally, partially broadened their expertise knowledge, partially built up an own network, partially had some advantages in their first application because of the study period abroad, do not need the established network at work, neither it often helped but still fully recommend it to students.

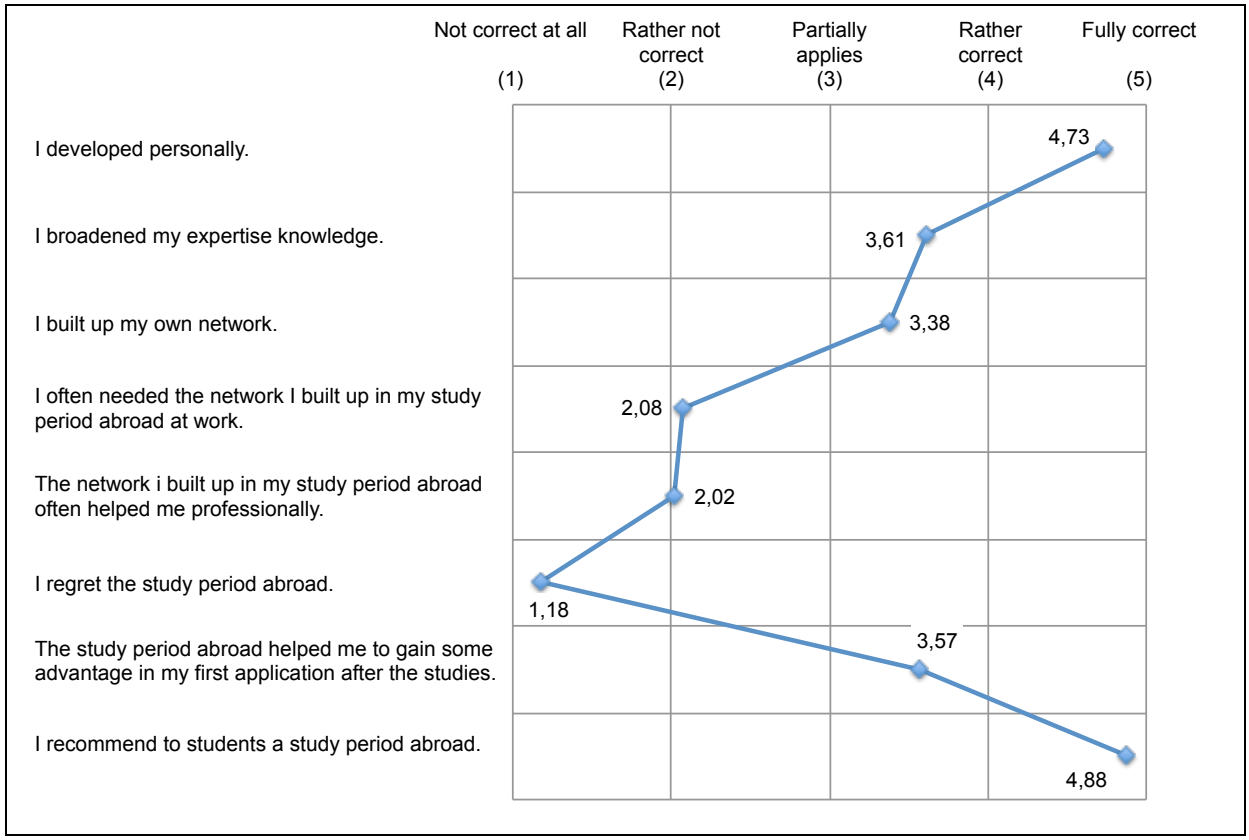

Figure 11: Assessment of statements relating IEM professionals study experiences abroad **(n=535)**

Like **Figure 11** shows, a study experience abroad can be helpful in the first application process for an IEM graduate. To analyze how IEM professionals got their first job they have been asked about their first kind of career entry step and how they got into contact with their first employer.

4.2.1.3 Career entry and career path

The largest part, which in numbers is 67,6 % of IEM professionals jumped into the working world through a direct hire of their first employer. Around 12 % got their first employment right after and through their Diploma thesis and 8,2 % through their Doctoral program or research project. Noticeable is the low percentage (4,5 %) of IEM professionals which first career entry step was a trainee program because nowadays especially from large companies it is a common kind of first application. (See **Table 41**)

Kind of Career Entry	Frequency	Percentage
Direct hire in Industry / Commerce / Trade	361	67,6%
Through Diploma thesis a direct hire resulted	65	12,2%
Through a doctoral study / Research project	44	8,2%
Others	26	4,9%
Trough a Trainee program	24	4,5%
Foundation of an own Organization	14	2,6%
Sum	**n=534**	**100,0%**

Table 41: Kind of career entry of IEM professionals on their first job **(n=534)**

In the category others respondents had the possibility to write their own kind of career entry step whereat among others the compulsory internship of their degree program has been mentioned.

If respondents answered “Direct hire in Industry / Commerce / Trade” or “Through a Trainee program” a list of kinds of first contacts appeared. The respondents’ specifications to the kind of first contact are displayed in **Table 42**. Surprisingly 25,8 % of IEM professionals’ first contact was through job ads in print media and 22,7 % of IEM professionals got hired after a spontaneous application. Only 6,8 % of the respondents got in contact with their first employer through an online application. 17,4 % got their first job through personal contacts.

Kind of First Contact	Frequency	Percentage
Job application through ad in print media	99	25,8%
Spontaneous application	87	22,7%
Personal contact	67	17,4%
Other kind of first contact	34	8,9%
Contact through friends / family	27	7,0%
Previous internship in Organization	26	6,8%
Online application	26	6,8%
Job fair at University	13	3,4%
Headhunter in social networks	3	0,8%
Federal employment office	2	0,5%
Sum	**n=384**	**100,0%**

Table 42: Kind of first contacts of IEM professionals who got directly hired or hired through a trainee program **(n=384)**

Now that the kinds of both entry steps and first contacts have been illustrated and after this question the respondents already were in thoughts in their first job, the respondents were asked to specify the number of jobs they had until now (maximum 10) and to specify the respective field of operation for every job as well as their first annual gross salary and year of entry in every job.

Fields of operation of IEM professionals in past and actual jobs

On the left side of **Figure 12**, the fields of operation (FOO) are listed, always indicating two bars per FOO. The first bar corresponding to the FOO shows how many people worked in that FOO (displayed in percentage). The second bar attached below, which always corresponds to the same FOO without any percentage indicated, illustrates how many people working in this FOO had a leading position. In total 510 IEM professionals answered this question.

510 IEMs had 703 FOOs in their first job. This means that every third IEM had 2 FOOs. This number stays the same in the second, third and fourth job and increases from the 5th job to the 9th job where every respondent dresses two FOOs (see **Table 43**).

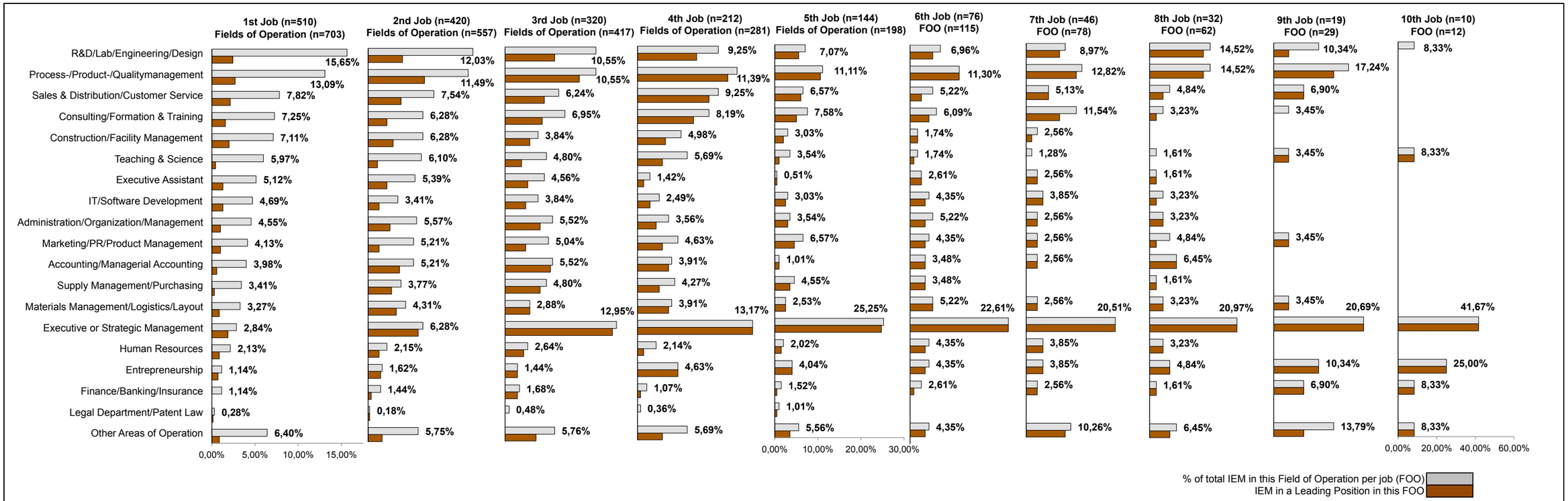

Figure 12: Fields of operation per workplace of professional IEMs in Austria

	1st Job	2nd Job	3rd Job	4th Job	5th Job	6th Job	7th Job	8th Job	9th Job	10th Job
Ratio between number of FOO and number of Jobs	1,4	1,3	1,3	1,3	1,4	1,5	1,7	1,9	2,1	1,2
Total percentage of leading positions	18%	46%	70%	74%	80%	82%	84%	87%	77%	89%

Table 43: Ratio of number of FOO and number of Jobs and total percentage of leading positions IEM professional dress in the respective job

In their first job, most IEMs start in Engineering, R&D, Process- Product- and Quality Management, with only a few people starting directly in an executive or strategic management position. In their first job, 18,3 % of the 510 IEMs had a leading position (see **Figure 12**). This number rises dramatically in the second job where 46,5 % of the 420 IEMs had a leading position (see **Table 43**). It is noticeable that in their second job, the number of IEMs working as an executive or strategic manager, as book keeper and PR or product manager increases, with a decreasing number of FOO in R&D, Engineering and Process. In their third job, 70 % of the 320 IEMs already hold a leading position and FOO in executive and strategic management rise to almost 13 %. In their fourth job, 74 % of the 212 IEMs have a leading position and along with the increase of jobs in the executive and strategic management, an increase in the entrepreneurship and in consulting can also be seen. In the 5th job the share of IEMs working as executive or in the strategic management almost doubles to 25,25 % and in total already 80 % of the IEMs have a leading position. A constant increasing of entrepreneurship activity is noticeable because the share of IEMs working as entrepreneurs doubles from 22,61 % in the 6th job to 41,67 % in the 10 job although it needs to be considered that consecutively the number of IEMs decreases the higher the amount of jobs. (See **Figure 12**)

Out of the analysis of the years where IEMs entered in new jobs, surprisingly result almost an equidistant average time spent in a job. The median stays constant at 3 years time spent in a job starting from the first until the 7th job and then decreases on 2 years for the 8th and 9th job. The average years spent on the first job is 4,7, which constantly decreases to 4 years spent on the 3rd and 4th job and continues to decrease till the 9th job on 2,8 years. It needs to be considered that the time spent on the "last" job of IEMs working life is not displayed because data of IEM professionals on the job and retired is mixed and it was not asked to respondents which year they retired. (See **Table 44**)

	1st Job	2nd Job	3rd Job	4th Job	5th Job	6th Job	7th Job	8th Job	9th Job
Average (Years)	4,7	4,2	4,0	4,0	3,4	3,4	3,4	2,9	2,8
Median (Years)	3	3	3	3	3	3	3	2	2

Table 44: Median and average years spent by IEMs in one job

Initial annual gross salaries of IEM graduates over time

The respondents were asked to specify the amount, currency and the variable percentage of their initial annual gross salary. The analysis of the data resulted to the acknowledgment that the question was not detailed enough because it was meant to collect initial salary data from full time jobs (not communicated in the question) but respondents often specified monthly salary as well as salary which was to little for the whole year and to high for a monthly salary. Therefore only data was selected that corresponded to a reasonable amount for an initial annual gross salary, which resulted in little frequencies in the respective years. In **Figure 13** the yearly average of the specified initial annual gross salary and the respective frequency of data is displayed in the stacked line, whereat the corresponding development of the Euro Stoxx 50 is displayed as the continuous blue line as monthly closing prices in Euro.

A correlation is visible but caution needs to be taken in the analysis because in some specific years the frequency of initial gross salaries of IEM graduates is very low.

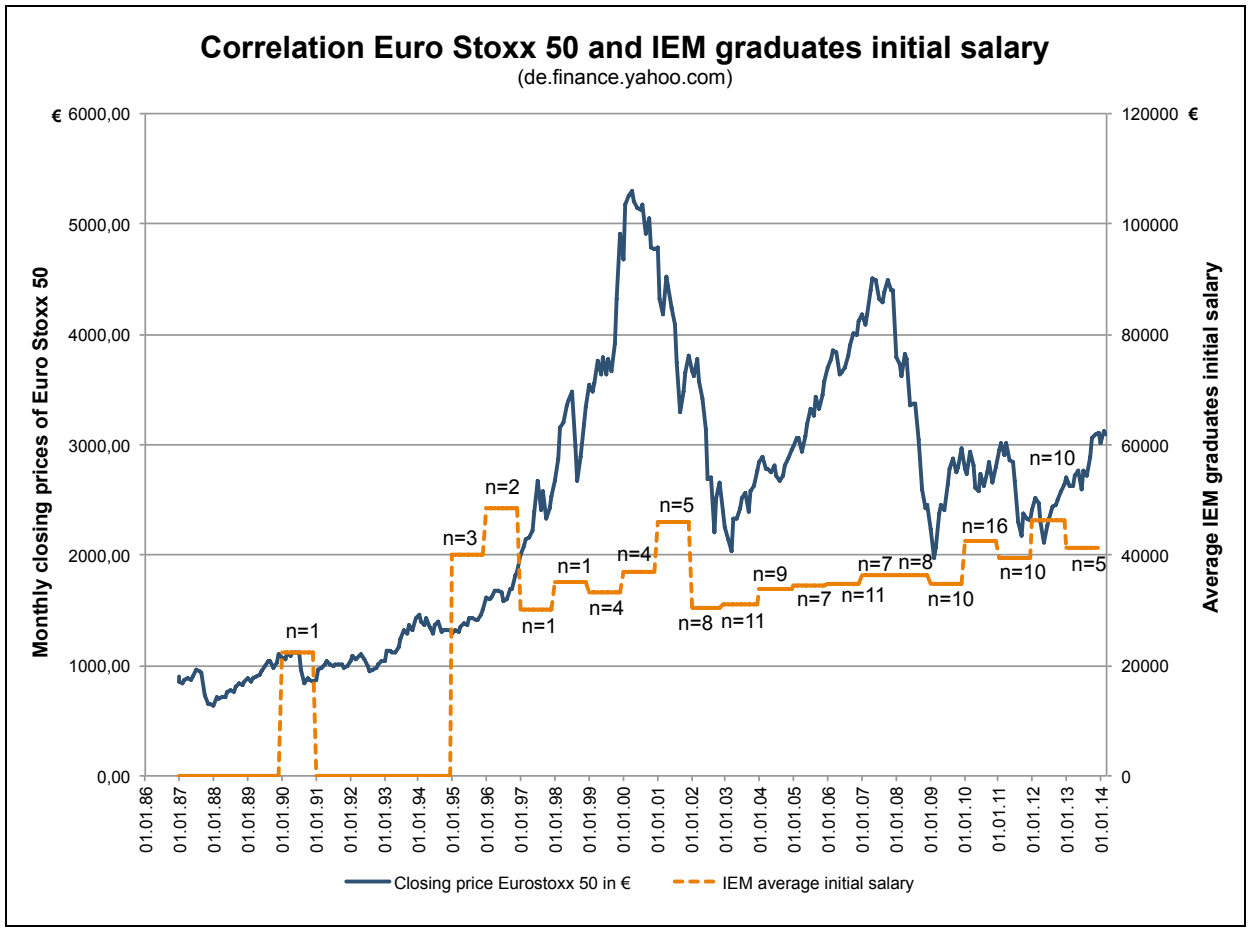

Figure 13: Correlation of IEMs initial annual gross salaries their frequencies and the Euro Stoxx 50

Information of whole organizations IEM professionals are employed at

Now that the fields of operation and average salaries have been illustrated it might be interesting to know in which organizations IEM professionals work. Thus IEM professionals were asked to specify information of the whole organization in which they work. The distribution of the organizations headquarters in which organizations the respondents work is concentrated with 92,68 % in Europe and 5,89 % in North America (see **Table 45**).

Geografical place of Headquarter	Frequency	Percentage
Europe	456	92,68%
North America	29	5,89%
Asia	3	0,61%
Africa	2	0,41%
South America	0	0,00%
Australia	0	0,00%
No answer	2	0,41%
Sum	**n=492**	**100,00%**

Table 45: Geographical place of headquarters **(n=492)**

Geografical place of Headquarter	Country	Province	Frequency	Percentage
Europe (93,06 %)	Austria	Styria	124	25,31%
		Vienna	84	17,14%
		Upper Austria	52	10,61%
		Carinthia	25	5,10%
		Lower Austria	19	3,88%
		Vorarlberg	16	3,27%
		Tyrol	11	2,24%
		Salzburg	11	2,24%
	Germany	Baden-Württemberg	16	3,27%
		Bavaria	33	6,73%
		Berlin	2	0,41%
		Hamburg	3	0,61%
		Hesse	6	1,22%
		Lower Saxony	3	0,61%
		North Rhine-Westphalia	7	1,43%
		Rhineland-Palatinate	1	0,20%
		Saxony	1	0,20%
		Schleswig-Holstein	1	0,20%
	Switzerland	Zurich	4	0,82%
		Bern	3	0,61%
		Lucerne	2	0,41%
		Fribourg	1	0,20%
		Basel-Stadt	2	0,41%
	Finnland	-	4	0,82%
	Italy	-	2	0,41%
	Liechtenstein	-	4	0,82%
	Luxembourg	-	1	0,20%
	Netherlands	-	6	1,22%
	Sweden	-	3	0,61%
	Spain	-	1	0,20%
	Czech Republic	-	1	0,20%
	Turkey	-	2	0,41%
	Hungary	-	1	0,20%
	United Kingdom	-	2	0,41%
	No Answer	-	2	0,41%
North America (5,92 %)	Canada	-	9	1,84%
	United States of America	-	20	4,08%
Asia (0,61%)	**Japan**	**-**	**2**	**0,41%**
	Other country	-	1	0,20%
Africa (0,41 %)	-	-	2	0,41%
Sum			**n=490**	**100,00%**

Table 46: Geographical location of headquarters in Countries **(n=490)**

Table 46 displays the specific countries where the organization's headquarters are located. As easily recognizable most of the headquarters of organizations in which IEM professionals in Austria work for are located in Austria (69,79 %) and 42,45 % of all mentioned headquarters are located in sum in Styria and Vienna.

In **Figure 14** the organizations allocated to their number of employees are displayed. The specified number of employees comprises all national and international headquarter and subsidiaries. Out of this figure it can be recognized that 71,5 % of IEM professionals work or worked for a large organization. 11,1 % work or worked for a medium-sized organization and 17,5 % for a small-sized organization. [**44**]

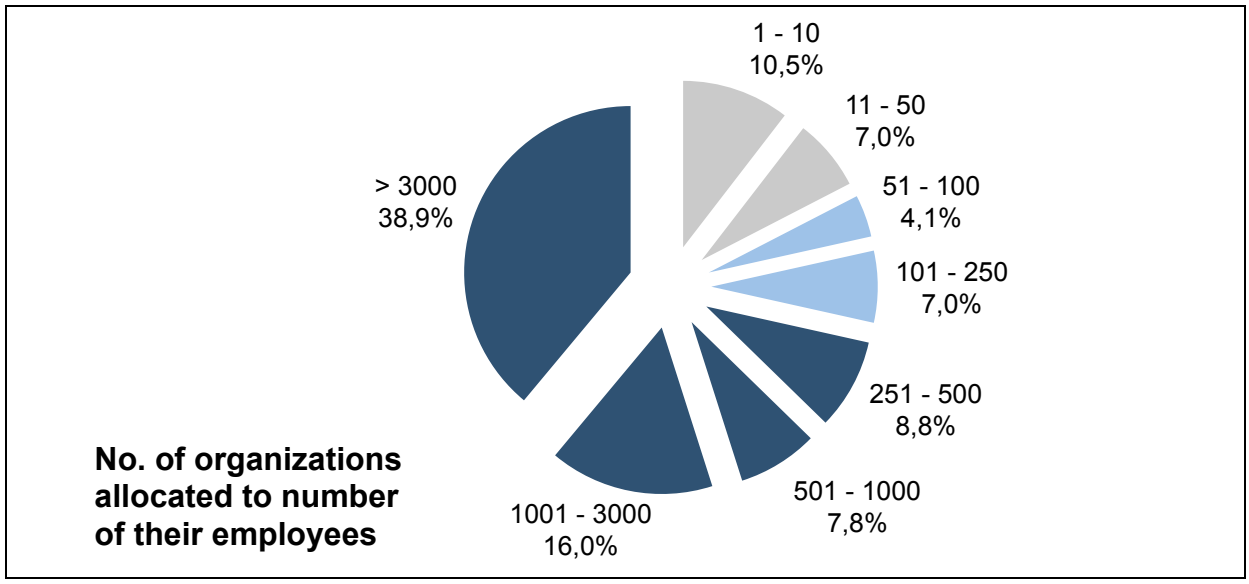

Figure 14: All represented organizations allocated to their number of employees (whole organization) **(n=490)** [**44**]

Table 47 lists all the industries in which the whole organizations IEM professionals work at, are active. In the first three industries 72,95 % of the whole organizations are economically active, which are "manufacturing", "professional, scientific and technical activities" and "science and education". This result signals that the organizations are mainly technology, and R&D focused.

	n=488	
Industry	**Frequency**	**Percentage**
Manufacturing	215	44,06%
Professional, scientific and technical activities	76	15,57%
Science and education	65	13,32%
Energy supply	47	9,63%
Construction	44	9,02%
Information and communication	25	5,12%
Other service activities	22	4,51%
Transport and warehousing	20	4,10%
Administrative and support service activities	18	3,69%
Financial and insurance activities	15	3,07%
Commerce; Service and repairing of motor vehicles	13	2,66%
Public administration and defence; compulsory social security	13	2,66%
Human health and social work activities	13	2,66%
Water supply; waste water treatment; removal of environmental pollution	9	1,84%
Mining and winning of rocks and minerals	8	1,64%
Real estate, renting and business services	6	1,23%
Accomodation and gastronomy	2	0,41%
Arts, entertainment and recreation activities	2	0,41%
Extra-territorial organisations and bodies	2	0,41%
Agricolture; forestry; fishery	1	0,20%
Sum	**n=616**	**-**

Table 47: Allocation of the whole organizations where IEMs work to the respective industries **(n=488)** [**45**]

Information of organizations where IEM specifically work

Above information of the whole organizations where IEM professionals are employed has been illustrated. Now one step deeper needs to be taken in order to illustrate where exactly the respondent IEM professionals work.

The respondent IEM professionals' work places are allocated to international and national headquarters and to subsidiaries like followed (see **Figure 15**):

- 47,6 % of the respondent IEM professionals work place is situated in the international headquarter,
- 33,9 % of the respondent IEM professionals work place is situated in the national headquarter, and

- 18,5 % of the respondent IEM professionals' work place is situated in a subsidiary.

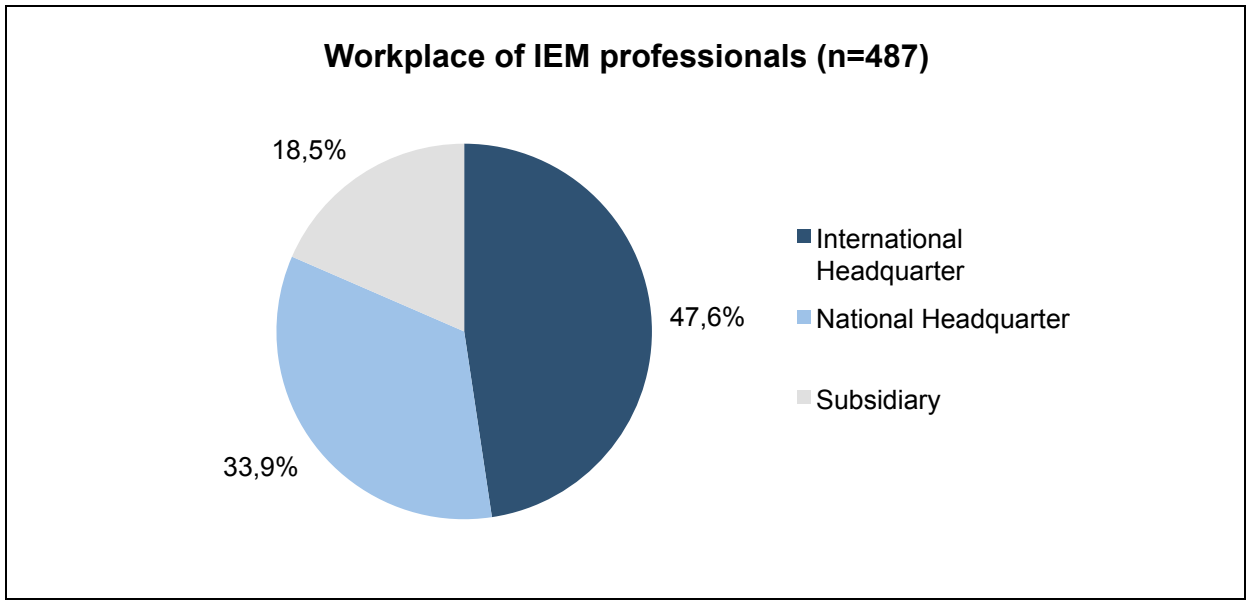

Figure 15: Specific work places of IEM professionals **(n=487)**

The geographical work places related to the international and national headquarters as well as to subsidiaries are illustrated in **Table 48**.
87,27 % of the respondent IEM professionals work place is geographically located in Austria, 11,29 % is geographically located in other European countries, 0,82 % in North America and 0,63 % in Asia (see **Table 48**). The high allocation of work places in Austria means that those respondents also have their center of life in Austria and almost 13 % of the inquired IEM professionals have their at least temporary center of life outside of Austria.

Geografical place of Workplace	Country	Province	Frequency	Percentage
Europe (98,56 %)	Austria	Styria	155	31,83%
		Vienna	105	21,56%
		Upper Austria	58	11,91%
		Carinthia	28	5,75%
		Burgenland	1	0,21%
		Lower Austria	32	6,57%
		Vorarlberg	16	3,29%
		Tyrol	15	3,08%
		Salzburg	15	3,08%
	Germany	Baden-Württemberg	9	1,85%
		Bavaria	11	2,26%
		Brandenburg	1	0,21%
		Hamburg	3	0,62%
		Hesse	1	0,21%
		Lower Saxony	2	0,41%
		North Rhine-Westphalia	6	1,23%
	Switzerland	Zurich	3	0,62%
		Bern	2	0,41%
		Ticino	1	0,21%
		Basel-Stadt	1	0,21%
	Bosnia and Herzegovina	-	2	0,41%
	Italy	-	3	0,62%
	Liechtenstein	-	1	0,21%
	Montenegro	-	1	0,21%
	Slovakia	-	1	0,21%
	Spain	-	1	0,21%
	Turkey	-	2	0,41%
	Hungary	-	2	0,41%
	United Kingdom	-	1	0,21%
	No Answer	-	1	0,21%
North America (0,82 %)	United States of America	-	3	0,62%
	Other country	-	1	0,21%
Asia (0,63%)	Russia	-	1	0,21%
	China		1	0,21%
	Other country	-	1	0,21%
Sum			**n=487**	**100,00%**

Table 48: Specific geographical location of IEM professionals' work places

Now that the geographical location, where the respondent IEM professionals work has been illustrated, the allocation of organizations where the respondent IEM professionals work to their number of employees is displayed in **Figure 16**.

The organization size respectively employees where IEM professionals have their work place differs from the size of the whole organization. Whereas about 75 % of the whole

organizations are large companies (see **Figure 14**), about 55 % of IEM professionals have their work place in a large company. 25 % have their work place in small-sized organizations and 20 % in medium-sized organizations. (See **Figure 16**)

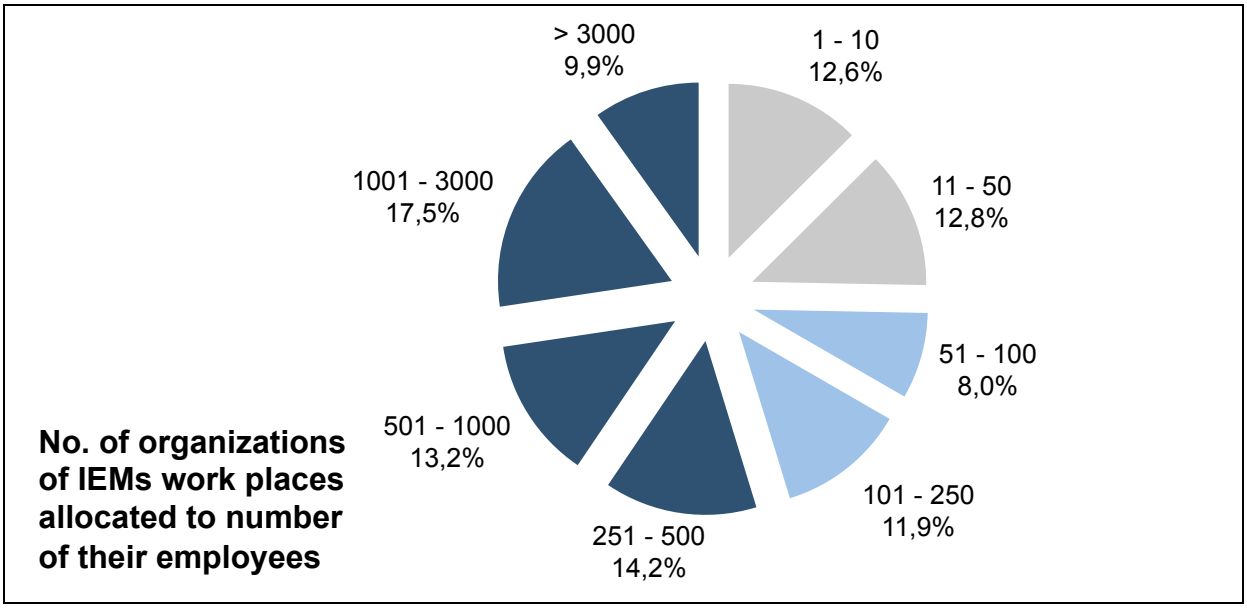

Figure 16: Organizations of IEM professionals' work places allocated to their number of employees **(n=487)** [**44**]

The last information missing is the industry and industry branches in which these organizations, where IEM professionals work, are economically active. **Table 49** illustrates all specified industries and industry branches. As predictable from the results in **Table 47** most of the organizations are economically active in the "manufacturing" (40,66 %), "professional, scientific and technical activities" (18,28 %) and "science and education" (12,53 %) industry.

Due to the illustrated results in **Table 47** result out of the specified answers to a multiple choice question, the share of industries is not the share sum of the subordinated industry branches because those were also multiple choice questions. **Table 47** can be interpreted like following example: 40,6 % of the organizations where IEMs have their work places are economically active in the "manufacturing" industry and 14,78 % of these companies are economically active in the industry branche "manufacture of machinery and equipment".

		n=487	
Industry	**Branche of Industry**	**Frequency**	**Percentage**
Agricolture; forestry; fishery (0,21 %)	Forestry and logging	1	0,21%
Mining and winning of rocks and minerals (1,23 %)	Coal mining	2	0,41%
	Ore mining	1	0,21%
	Other mining and quarrying	5	1,03%
	Mining support service activities	1	0,21%
Manufacturing (40,66 %)	Manufacture of food products	5	1,03%
	Manufacture of beverages	3	0,62%
	Manufacture of Textiles	1	0,21%
	Manufacture of wearing apparel	1	0,21%
	Manufacture of wood and of products of wood and cork, except furniture	1	0,21%
	Manufacture of pulp, paper and paper products	4	0,82%
	Publishing, printing and reproduction of recorded media	1	0,21%
	Manufacture of chemicals and chemical products	9	1,85%
	Manufacture of basic pharmaceutical products and pharmaceutical preparations	8	1,64%
	Manufacture of rubber and plastic products	9	1,85%
	Manufacture of rubber and plastic products, Manufacture of other non-metallic mineral products	7	1,44%
	Metals production and metals processing	21	4,31%
	Manufacture of basic metals, Manufacture of fabricated metal products	51	10,47%
	Manufacture of computer, electronic and optical products	13	2,67%
	Manufacture of electrical equipment,	16	3,29%
	Manufacture of machinery and equipment	72	14,78%
	Manufacture of motor vehicles, trailers and semitrailers	33	6,78%
	Construction of rail vehicles and components, ship, rail, aircraft and spacecraft	12	2,46%
	Manufacture of jewellery, bijouterie and related articles	7	1,44%
	Repair and installation of machinery and equipment	8	1,64%
Energy supply (8,62 %)	-	42	8,62%
Water supply; waste water treatment; removal of environmental pollution (1,23 %)	Water supply	5	1,03%
	Wastewater treatment	4	0,82%
	Collection, transport, recovery or disposal of waste	1	0,21%
Construction (8,83 %)	Building above ground level	33	6,78%
	Underground construction	28	5,75%
	Site preparation, building installation, building completion	20	4,11%
Commerce; Service and repairing of motor vehicles (3,70 %)	Wholesale and retail trade and repair of motor vehicles and motorcycles	6	1,23%
	Wholesale trade, except of motor vehicles and motorcycles	10	2,05%
	Retail trade, except of motor vehicles and motorcycles	3	0,62%
Transport and warehousing (3,29 %)	Land transport and transport via pipelines (Railway, bus, funicular)	12	2,46%
	Warehousing and support activities for transportation	3	0,62%
	Postal and courier activities	3	0,62%
Information and communication (4,72 %)	Telecommunication	3	0,62%
	Computer programming, consultancy and related activities	19	3,90%
	Information service activities (Hosting, web portals, news service)	4	0,82%
Financial and insurance activities (2,87 %)	Supplying financial services	8	1,64%
	Insurance, reinsurance and pension funding, except compulsory social security	2	0,41%
	Services auxiliary to financial services and insurance services	6	1,23%
Real estate, renting and business services (1,23 %)	-	6	1,23%
Professional, scientific and technical activities (18,28 %)	Legal and accounting activities	3	0,62%
	Activities of head offices; management consultancy activities	38	7,80%
	Architectural and engineering activities; technical testing and analysis	21	4,31%
	Research and development	23	4,72%
	Advertising and market research	1	0,21%
	Other professional, scientific and technical activities	24	4,93%
Administrative and support service activities (2,67 %)	Rental and leasing activities	2	0,41%
	Labour recruitment and provision of personnel	3	0,62%
Public administration and defence; compulsory social security (2,46 %)	-	12	2,46%
Science and education (12,53 %)	Further education and vocational colleges	7	1,44%
	Tertiary and post-secondary, non-tertiary education	46	9,45%
	Other education	11	2,26%
Human health and social work activities (1,44 %)	Health care	6	1,23%
	Human health and social work activities, Residential care activities	1	0,21%
	Social work activities without accommodation	1	0,21%
Arts, entertainment and recreation activities (0,41 %)	Creative, arts and entertainment activities	1	0,21%
	Gambling and betting activities	1	0,21%
Other service activities (3,49 %)	Lobby, membership organizations	5	1,03%
	Repair of computers and personal and household goods	4	0,82%
Extra-territorial organisations and bodies (0,62 %)	-	3	0,62%
Sum		**n=723**	**-**

Table 49: Industry and industry branches of organizations where IEMs have their work place [**45**]

The career entry, career path, initial annual salary and work place related information have been displayed. The next chapter of this thesis and also it was in the questionnaire is the analysis of undertaken further education.

4.2.1.4 Further education

Like for every professional group, further education is crucial for a successful individual and professional development in life. The assessment of undertaken further education of IEM professionals throughout their work and career life is an important information for all HEIs where IEM degree programs are taught.

478 IEM professionals specified their undertaken further education. The first question regarding further education was to specify which kind of further education they apprehended until now. **Figure 17** displays the results related to the aforementioned multiple-choice question. 57,1 % of the IEM professionals undertook further economics education, 51,9 % further individual or other education, 47,9 % further technical education, 37,2 % further linguistic education and 17,8 % further integration education.

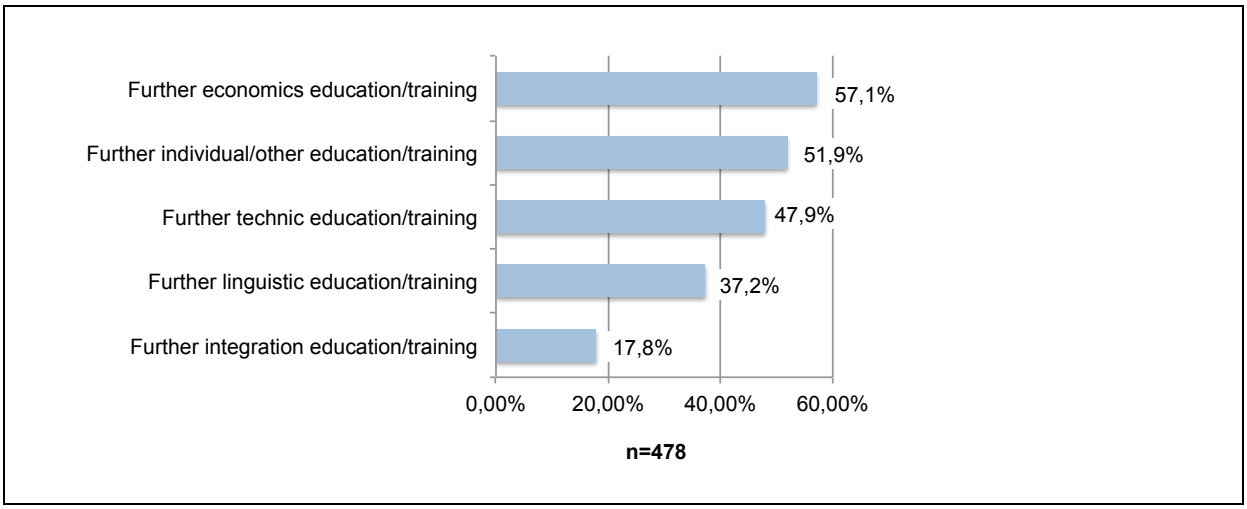

Figure 17: Undertaken types of further education of IEM professionals **(n=478)**

After the respondents specified their undertaken further education, they were asked if they could address the 3 most important undertaken further educations in the field of the specified further education undertaken by typing in the further education as free text. The results of these questions were 366 specified technic further educations, 433 specified further economics educations, 138 integration further educations and 427 individual and other types of further education, in total four types because linguistic further education was asked separately.

Out of the specified lists of the respective further education types, the most quoted further educations are listed in **Table 50** and **Table 51**. The color-coded specified further educations in every column are by far the most quoted ones. Out of the 4 further education types “Lean

management", "Project Management" and "Leadership and Communication" were mentioned in every type of further education.

Most quoted further technic education/training:	Most quoted economics education/training:
Statistics (Six Sigma, Design of Experiments)	Managerial accounting
Production (Industrial Engineering, Lean management, Value management, new technologies)	Leadership / Communication
Specialized Softwares (Simulations software etc.)	Project Management
Project management	Marketing
IT, programing	Business economics (Financing etc.)
Post gradual degree programs	Cost management
Design skills and programs (CAX)	Law courses (contracting, fiscal etc.)
Norms	General Management and Organization
Product related topics	MBA
Quality related topics (Six Sigma, TQM, FMEA)	Accounting
Process related topics	Management trainings
Doctoral program	Doctoral program
Specialized conferences and trainings	Business strategies
Patent law, IPR	Strategic management
Innovation management	Human Ressource management
Material specific education	Process management
Creativity techniques	
Risk management	

Table 50: Most quoted technic and economics further education/training

Most quoted integration education/training:	Most quoted individual/other education/training:
Leadership	Personality development
Communication	Project management
Management trainings	Leadership
Law (Company, patent etc.)	Conflict management
Rhetorics and presentation techniques	Communication
Conflict management	Linguistic trainings
Negotiation	Rhetoric and presentation/moderation
Creativity techniques	Group dynamics
Change management	Coaching
Time management	Teambuilding / Cross cultural / Leading teams
	Law trainings
	Mediator
	Time management
	Argumentation
	Sales training / Negotiation
	Programing languages
	Creativity techniques
	Career management
	Knowledge management
	Social competencies

Table 51: Most quoted integration and individual or other further education/training

The assessment of the most used foreign languages throughout a career has been conducted as a multiple-choice question whereat the respondents were asked to specify the on the job most needed foreign languages throughout their career path. **Table 52** lists the specified most needed languages throughout IEMs career paths. 100 % of the respondents mentioned English, as the most needed foreign business language in their career. This means that every respondent needed English in his or her career path at work. This goes hand in hand with the results of the aforementioned question where IEMs were asked to type in the most needed further educations. Specialized English courses were mentioned very often.

The results in this inquiry and listed in **Table 52** are consistent with the results of the inquiry of 2010 where following languages were quoted [11]: 79,2 % English, 8,7 % French, 5,7 % Spanish/Italian, 3,8 % Russian and 2,6 % Slovenian/Croatian. Therefore the needed linguistic skills on the job remained the same since 2010.

Language	Frequency	Percentage
English	468	100,00%
French	41	8,76%
Spanish	34	7,26%
Italian	31	6,62%
Russian	10	2,14%
Portuguese	8	1,71%
Chinese	7	1,50%
Hungarian	7	1,50%
Croatian	5	1,07%
Slovenian	4	0,85%
Slovakian	3	0,64%
Arabic	2	0,43%
Norse	2	0,43%
Turkish	2	0,43%
Polish	1	0,21%
Swedish	1	0,21%
Czech	1	0,21%
Finnish	0	0,00%
Indian	0	0,00%
Other Languages	9	1,92%
Sum	**636**	**-**

Table 52: Most needed foreign languages throughout careers **(n=468)**

Furthermore IEM professionals were asked to specify integration subjects to add and which according to them have to be removed from an IEM syllabus. Again the most quoted specifications are color-coded. The most quoted integration topics to be expanded were at the forefront English and subjects in English. The biggest reason mentioned was that Austrian HEI provides excellent education, which is internationally competitive but loses a lot because graduates are not able to communicate in English. Law, Ethic and sustainability cross subject projects were mentioned very often as well as case studies, strategic management and rhetoric and presentation. (See **Table 53**)
Law and accounting as integration subjects to reduce or even to cancel were mentioned. The argumentation behind was that these subjects are not relevant for an IEM because there exist specialists who cover these topics because when needed, specialists are crucial. Many respondents constituted that no subject should be canceled because knowledge never can be enough. Other subjects mentioned in a negative way were technical subjects with the argumentation that specialized engineering subjects can be deepened at work whereat soft skills and other social competences will never be asked by others to be deepened, it rather yields to isolation.

Most quoted integration topics to expand in syllabus:	Most quoted integration topics to reduce/cancle in syllabus:
English on high level	None
More subjects in English	Law
Communication	Accounting
Leadership	
Rhetoric and presentation	
Strategic management	
Ethic	
Business economics (Finance, Business valuation etc.)	
Law	
Case studies	
Cross cultural competencies	
Cross subject projects	
Mediation techniques	
Sustainability	
Creativity techniques	
SAP	
Production (Lean management)	
Marketing	
Conflict management	
Business planning	
Personality development	
Knowledge and Time management	
Change management	
Social competencies	
Negotiation techniques	
Project management	
More international aspects in subjects	

Table 53: Integration subjects to expand and to reduce in IEM degree programs according IEM professionals

Further education of IEM professionals has been reflected quite deeply, which again induces to the reflection what kind of competences IEM professionals need on their job and how adjustment of education can be done in order to ideally prepare IEM graduates for their future professional pathway.

4.2.1.5 Competences needed on the job / adjustment requirements of education

Before IEMs were asked about their needed competencies in their actual working position, respondents were asked to assess the career opportunities for IEMs considering their experiences. 70,3 % of the respondents indicated positive career and promotion opportunities for IEMs in general whereat 8,33 % indicated a negative one.

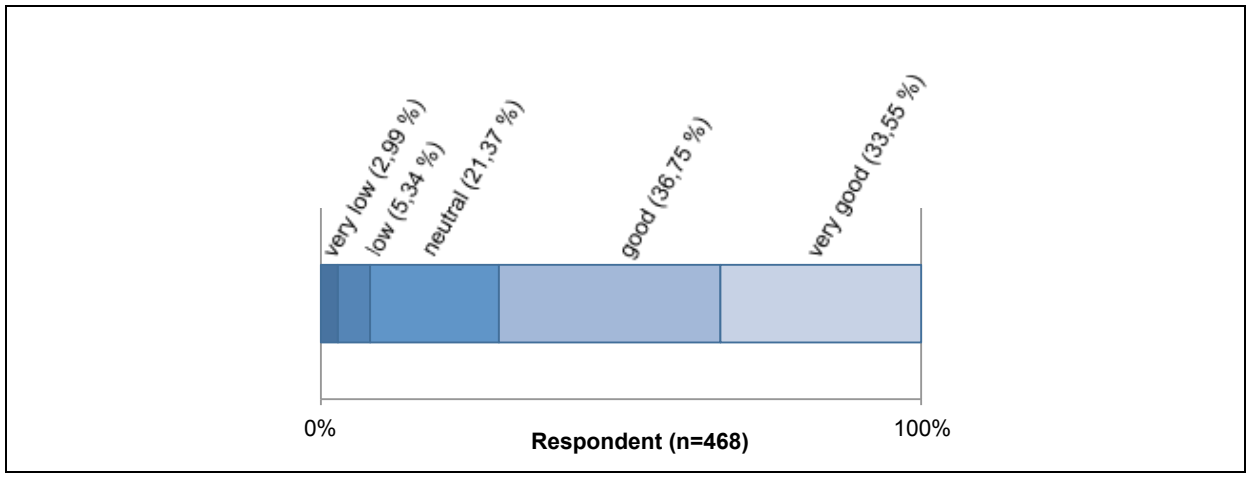

Figure 18: Career and promotion opportunities for IEMs according to IEMs **(n=468)**

As **Figure 9** shows the range of qualification profiles of all IEM degree programs of HEIs in Austria and in order to check if the offered IEM degree programs provide the by stakeholder requested qualification profiles, the WING recommended qualification profile is still corresponding to markets needs, IEM graduates have been asked about their ideal recommended IEM qualification profile. The average share between technic and economics subjects for an IEM degree program according to IEM professionals and their professional background experience results as 61,5 % technic subjects and 38,5 % economics subjects. The relative distribution among the specified answers and the resulting average are displayed in **Figure 19**.

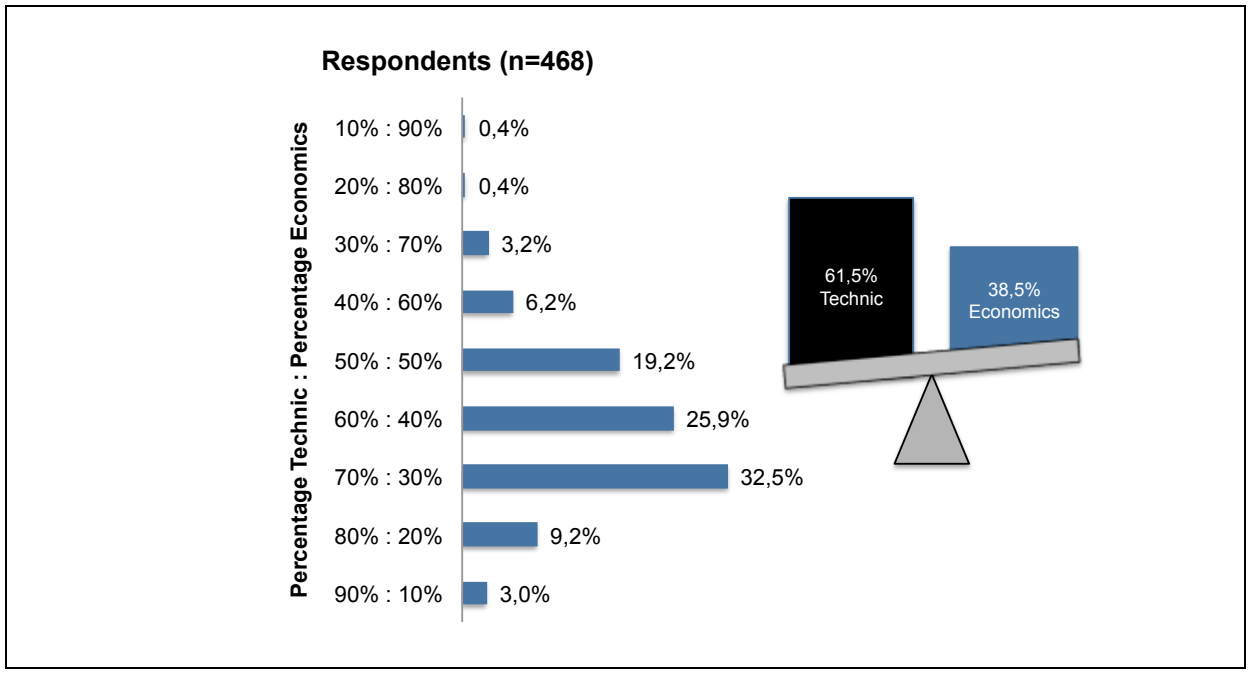

Figure 19: Ideal share of technic and economic subjects of a IEM degree program according to IEM professionals **(n=468)**

IEM professionals also were invited to assess the ideal distribution of social and methodological competencies and expertise according their actual job. Here a split evaluation is provided in order to assess if the ratio between the aforementioned competencies changes throughout the career path. Therefore a separated evaluation of IEM professionals on the job and IEM professionals retired has been made. IEM professionals specified an almost exact equal share among the aforementioned competencies as ideal for their current job position. (See **Figure 20**)

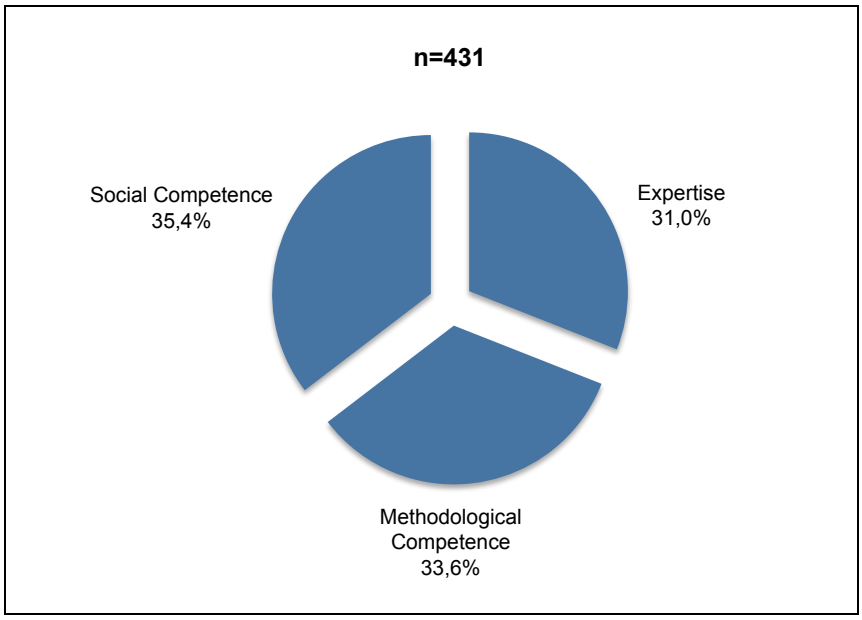

Figure 20: Ideal ratio of social and methodological competencies and expertise – IEMs on the job **(n=431)**

As the IEM professionals on the job, IEM professionals retired specified the same equal distribution of competences needed in their last job position (see **Figure 21**). Thus an equal importance of social and methodological competencies and expertise can be stated as constant throughout an IEM professional career path. Results on the same topic from the year 2005 and 2010 from the IEM study conducted by Bauer, Zunk and Fürst [11] state also an equal importance of the aforementioned competencies (2010 / 2005: 34,8 % / 33 % Social Competence, 32,2 % / 31 % Methodological Competence and 33,1 % / 36 % Expertise). Thus the ideal share of social and methodological competencies and expertise for an IEM professional is not only constant throughout the career path but also throughout time, at least the last 10 years.

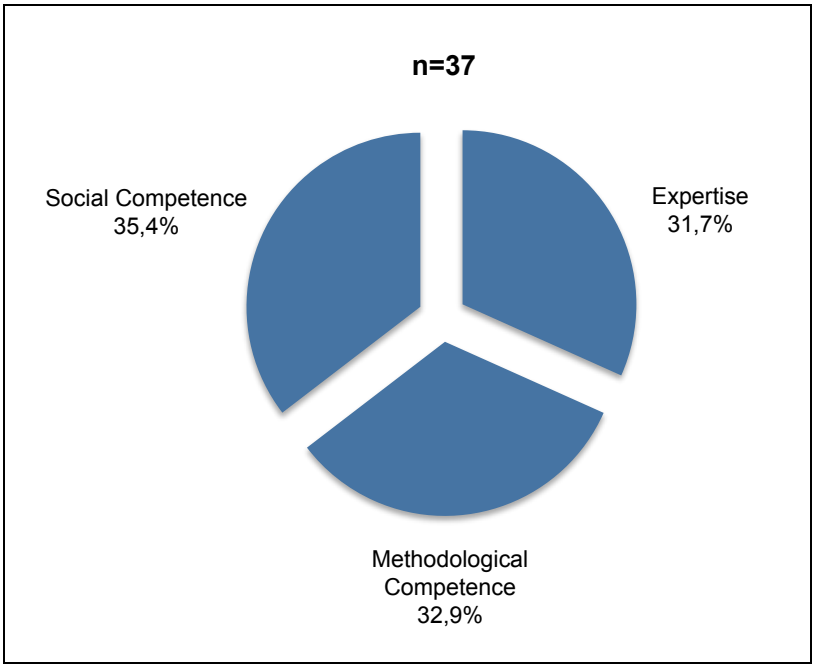

Figure 21: Ideal ratio of social and methodological competencies and expertise – IEMs retired **(n=37)**

The next question related to the importance assessment of specific technic-economics subjects. The results of these questions are displayed in **Figure 22**. IEM professionals were asked to assess the importance according to their professional experiences, which resulted that the subjects, project and general management and general business economics are considered by IEM professionals as important subjects. These results confirm the results of the further education inquiry listed in **Table 50** and **Table 51** and the most quoted integration subjects to expand in IEM education in **Table 53**.

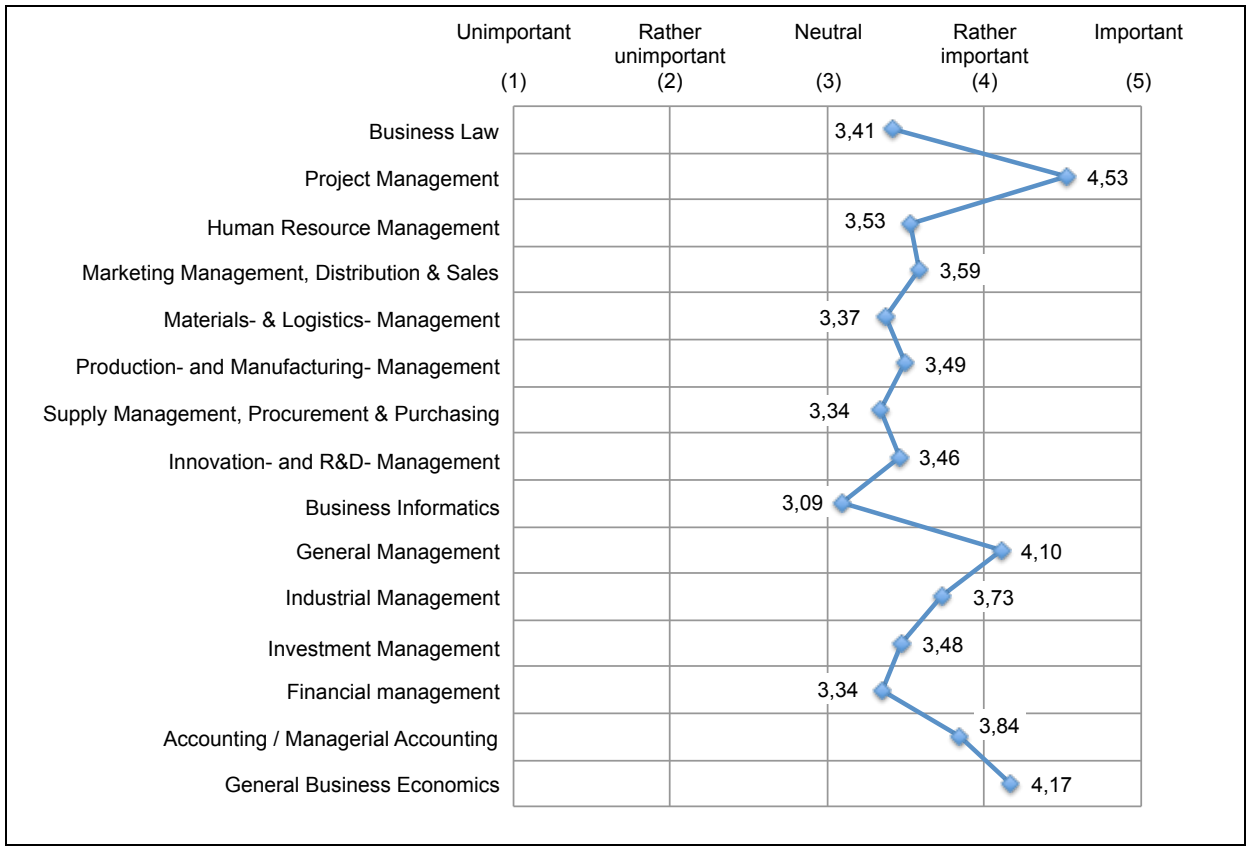

Figure 22: Importance of technic-economics subjects according IEM professionals **(n=468)**

The last question for IEM professionals before the last part, the inquiry among WING members dealt with the importance assessment of individual / person related competencies in their current job. Due to the common knowledge that individual competencies importance evolves and shifts focus depending on the job and career development, it was intended to display this focus shifting according to the career path. Therefore data of IEM professionals who started their first job within the last 5 years (since 2009; n=56), data of all IEM professionals on the job (n=431) and data of IEM professionals retired (n=37) has been collected and evaluated separately in order to assess if a focus shifting of needed individual competencies is given or not.

The results displayed in **Figure 23** show a clear shift from the left green line which represents IEM professionals who started their first job since 2009 to the average opinion of all IEMs on the job (blue line in the middle) up to IEMs retired, the outer purple line. The results display that the ability to delegate, leadership and ecological and sustainable thinking are not important competencies for a fresh IEM graduate but become more and more important while advancing along the career path. Almost all other illustrated individual competencies become also more important throughout the career path, except the only competence, which becomes less throughout the career path is the independent working. Furthermore the ability to communicate is the only competence, which keeps the same importance throughout the career path.

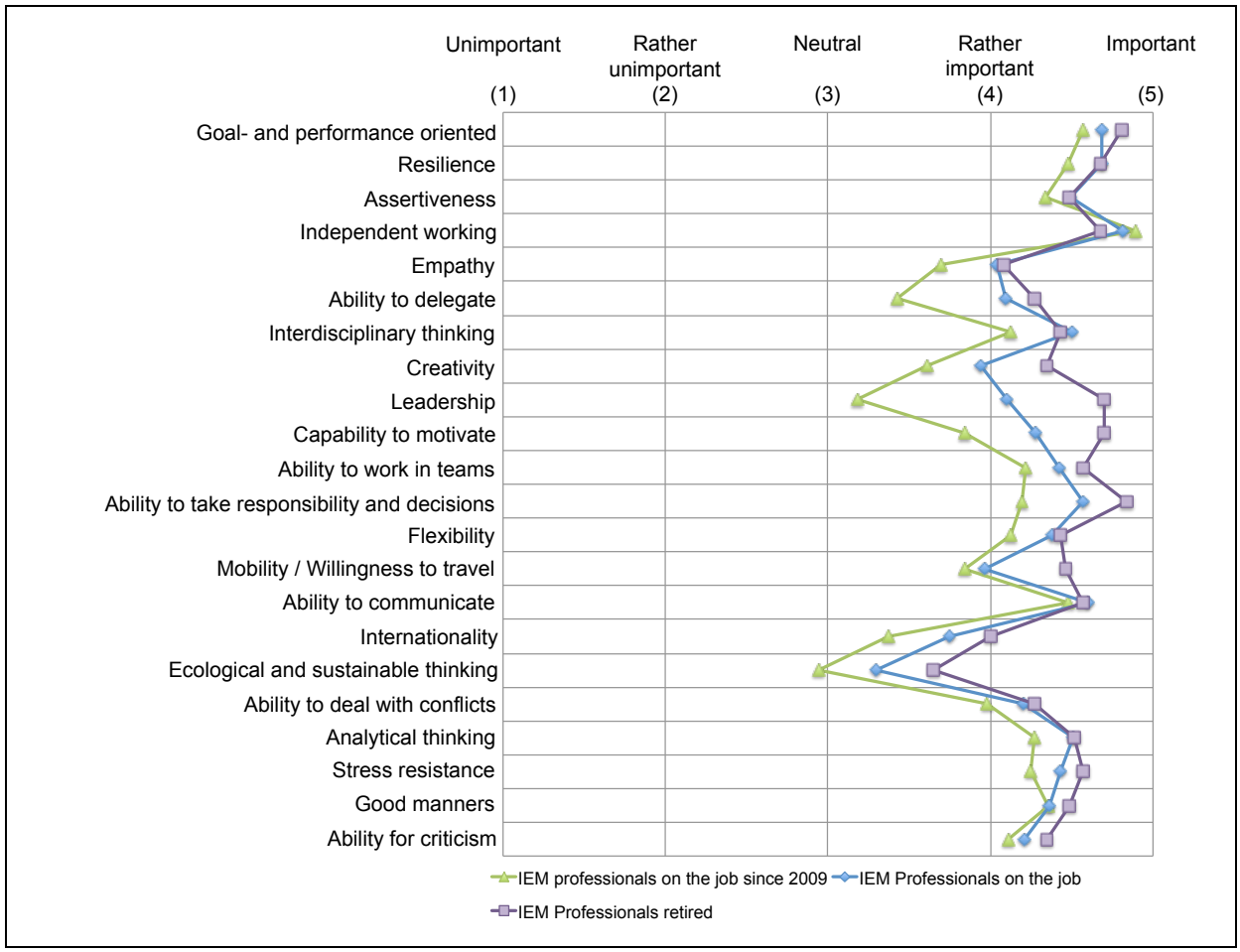

Figure 23: Importance of individual competencies throughout IEMs career path

After this deep insight into many topics and the related IEM professionals' opinions and specified information, the insight into IEM student's opinions and information is missing. Thus this leakage will be closed in the following chapter.

4.2.2 IEM Students

The focus group of the students survey was the student members of the Austrian alumni association of IEM (WING) and students of Graz and Vienna University of Technology.

The purpose of the survey among students is the inquiry of dynamics within the Bachelor and Master program, which means the change of HEIs after the Bachelor degree program, the willingness to spend one or more semesters abroad for study reason, the willingness to attend a Doctoral program after the Master degree and their opinion about their ideal IEM degree program.

4.2.2.1 Initial questions

The inquired IEM students are composed of 14,95 % female and 85,05 % male respondents, which in total amount to 388 respondents. (See **Table 54**)

Sex	Frequency	Percentage
female	58	14,95%
male	330	85,05%
Sum	**n=388**	**100,00%**

Table 54: Sex of IEM student respondents **(n=388)**

The average age of IEM student respondents is 24,51 years. The youngest respondent is 18 and the oldest is 57 years old (who was checked for plausibility; completed the whole students survey, therefore accepted). The 25 % Quartile is 22 years, which means that 25 % of all respondents is younger than 22 years old. The 50 % Quartile, which at the same time is the Median is 24 years and signifies that 50 % of the respondents is younger and 50 % is older than 24 years old. (See **Table 55**)

Statistical values	Years
Average	24,51
Standard deviation	4,32
Minimum	18
Quartile 25%	22
Quartile 50%	24
Quartile 75%	26
Maximum	57

Table 55: Age of IEM student respondents **(n=388)**

As already mentioned, the survey tries to display the dynamics among IEM students, which will happen in the next chapter called “Education”.

4.2.2.2 Education

In the "Education" part of the survey IEM students were asked to specify their actual main attended degree program.

Overall view of the respondents' main attended degree programs

Among the IEM students' respondents, 243 (65,5 %) attend a Bachelor, 101 (27,2 %) attend a Master and 27 (7,3 %) attend a Diploma degree program.

Degree program	Frequency	Percentage
Bachelor´s program	243	65,5%
Master program	101	27,2%
Magister program	0	0,0%
Diploma program	27	7,3%
Diploma (FH/UAS) program	0	0,0%
Sum	**n=371**	**100,0%**

Table 56: Main attended degree program by IEM students **(n=371)**

The following information of every degree program will be illustrated:

- Overview of the distribution between attendants of Universities of Applied Sciences and Universities
- Degree programs attended on Universities of Applied Sciences:
  - Focus of the University of Applied Sciences
  - Scientific discipline chosen
  - Geographical study place and if in Austria, also the respective HEIs
  - Relevant information on dynamics

- Degree programs attended on Universities:
  - Type of University
  - Scientific discipline chosen
  - Geographical study place and if in Austria, also the respective HEIs
  - Relevant information on dynamics

Analysis of the attended Bachelor degree programs

- **Overview**

Out of the 241 attendants of a Bachelor degree program (2 students did not answer this question), 6 (2,5 %) attend their Bachelor program on a University of Applied Sciences and 235 (97,5 %) on a University (see **Table 57**).

Type of HEI	Frequency	Percentage
University of Applied Sciences	6	2,5%
University	235	97,5%
Sum	**n=241**	**100,0%**

Table 57: Types of HEIs where IEM students attend their Bachelor degree program **(n=241)**

- **Bachelor on Universities of Applied sciences**

The aforementioned 6 students, who attend their Bachelor degree program on an University of Applied Sciences, attend their Bachelor degree program on Universities of Applied Sciences with different focuses. 2 attend their Bachelor degree program on a University of Applied Sciences with technical, 1 with economics and 3 with technical and economics focus. (See **Table 58**)

Focus of University of Applied Sciences	Frequency	Percentage
Technical focus	2	33,33%
Economics focus	1	16,67%
Technical and economics focus	3	50,00%
Sum	**n=6**	**100,00%**

Table 58: Focus of Universities of Applied Sciences where IEM students attend their Bachelor degree program **(n=6)**

All 6 respondents attend a educational direction in an engineering discipline. (See **Table 59**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	1	16,7%
	Civil Engineering and Economics (IEM)	1	16,7%
	Machanical Engineering and Economics (IEM)	3	50,0%
	Other degree program	1	16,7%
Sum		**n=6**	**100,0%**

Table 59: Scientific disciplines attended by IEM students in their Bachelor degree program on Universities of Applied Sciences **(n=6)**

5 of the 6 IEM students attend their Bachelor degree program on Austrian Universities of applied Sciences and one attends the Bachelor degree program on a University of Applied Sciences in Turkey (see **Table 60**).

Place	Country	University of Applied Sciences (UAS)	Frequency	Percentage
Europe	Austria	Carinthia University of Applied Sciences	1	16,7%
		University of Applied Sciences Kufstein	2	33,3%
		UAS Technikum Wien	1	16,7%
		MCI Management Center Innsbruck	1	16,7%
	Turkey	-	1	16,7%
Sum			**n=6**	**100,0%**

Table 60: Geographical location of Universities of Applied Sciences where students attend their IEM Bachelor degree program **(n=6)**

2 IEM students (33,3 %) who attend their Bachelor degree program on a University of Applied Sciences already spent one or more semester abroad for study reason. (See **Figure 24**)

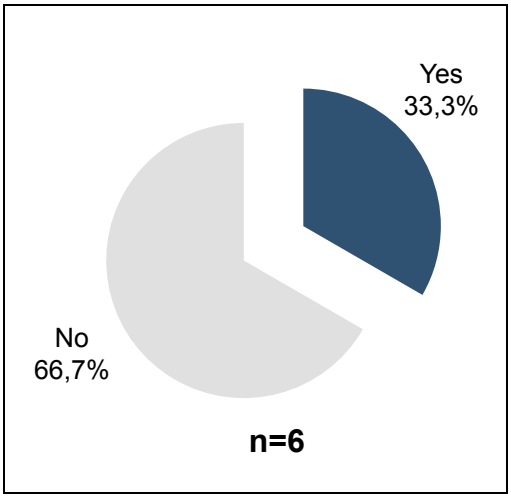

Figure 24: Share of IEM students attending their Bachelor degree program on an University of Applied Sciences and spent one or more semesters abroad **(n=6)**

Table 61 shows the willingness of IEM students who attend their Bachelor degree program on a University of Applied Sciences on specific topics. In **Table 61** the color-coded fields signal that respondents who gave those answers passed to the question below. If no field is color-coded all respondents passed to the next question below. The 4 students who did not spend one or more semesters abroad were asked if they do want to spend one or more semesters abroad, 3 gave a positive and 1 gave a negative answer. 4 of the 6 inquired students will probably attend a Master program after they concluded the Bachelor program and 2 were not so sure about it. 2 of 6 respondents want to attend the Master program on the same University of Applied Sciences whereat 1 gave a light negative answer and 3 were uncertain. The uncertainty of the 2 respondents jumped also to the answer of the following question whether or not they want to attend the Master degree program on an Austrian University. 1 of these respondents specified a positive will to attend a Master program abroad.

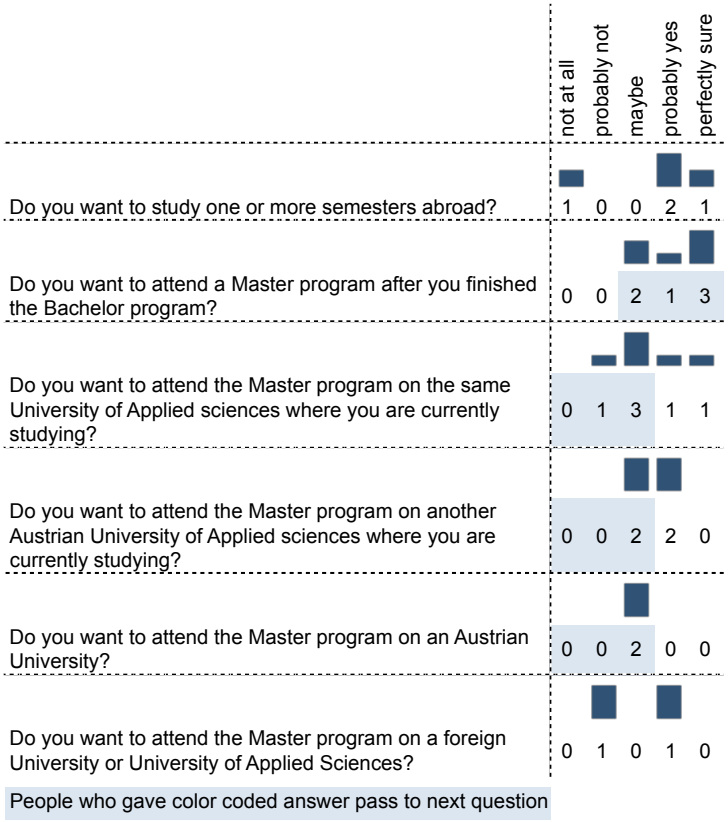

Table 61: Dynamics of IEM students who attend a IEM Bachelor degree program on Universities of Applied Sciences **(n is the sum of the respective row)**

- **Bachelor on Universities**

99,6 % of the respondent students attend their Bachelor degree program on a University of Technology and 0,4 % on another University (see **Table 62**).

Type of University	Frequency	Percentage
University of Technology	234	99,6%
University (other)	1	0,4%
Sum	**n=235**	**100,00%**

Table 62: Type of Universities where IEM students attend their Bachelor degree program **(n=235)**

93,6 % of the respondents attend their bachelor degree program on a University in an Engineering discipline, 3,8 % in a Business Administration discipline, 1,3 % in a Natural Sciences and mathematics discipline, 0,4 % in Humanities and 0,8 % in a Interdisciplinary sciences discipline. These results are surprising compared to the specifications made in the question before and displayed in **Table 62**. One reason for the answers given could be that the respondents specified their specialization within an educational direction.

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Computer Sciences (incl. Software development)	3	1,3%
	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	27	11,5%
	Mechanical Engineering	27	11,5%
	Machanical Engineering and Economics (IEM)	162	68,9%
	Civil Engineering and Economics (IEM)	1	0,4%
Business Administration	Business Studies	2	0,9%
	Controlling, Accounting and Finance	1	0,4%
	Marketing	1	0,4%
	Mathematical Economics	2	0,9%
	Other educational program	3	1,3%
Natural Sciences and Mathematics	Mathematics	1	0,4%
	Other educational program	2	0,9%
Humanities	Linguistics	1	0,4%
Interdisciplinary Sciences	Industrial Economics (IEM)	1	0,4%
	Other educational program	1	0,4%
Sum		**n=235**	**100,0%**

Table 63: Scientific disciplines attended by IEM students in their Bachelor degree program on Universities **(n=235)**

The above initiated discussion seems to be plausible because 233 (99,1 %) respondents specified again that they attend their Bachelor degree program in sum on Graz and Vienna University of Technology. One respondent (0,4 %) attend the Bachelor degree program on University of Graz and one respondent on a University of Technology in Turkey. (See **Table 64**)

Place	Country	University	Frequency	Percentage
Europe	Austria	University of Graz	1	0,4%
		Graz University of Technology	115	48,9%
		Vienna University of Technology	118	50,2%
	Turkey	-	1	0,4%
Sum			**n=235**	**100,0%**

Table 64: Geographical location of Universities where students attend their IEM Bachelor degree program **(n=235)**

6 % of the students who attend their Bachelor degree program on a University already spent one or more semester abroad for study reason. (See **Figure 25**)

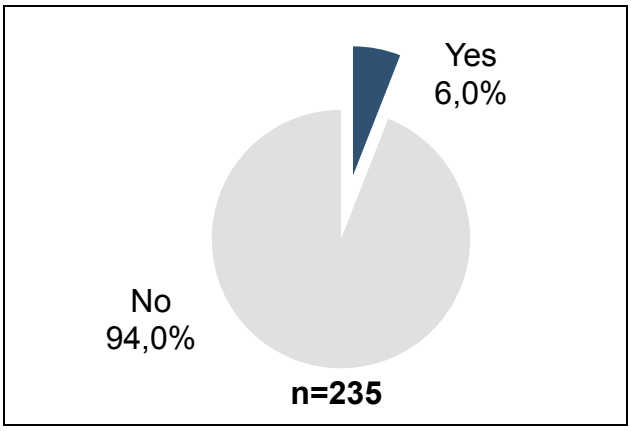

Figure 25: Share of students attending their Bachelor degree program on a University and spent one or more semesters abroad **(n=235)**

The 94 % of students who attend their IEM Bachelor degree program on a University and did not spend one or more semesters abroad were asked if they are willing to go abroad for study reasons in the future. 164 gave a positive or unsecure answer and 57 gave a negative answer.

Only 2 students of the 235 will probably not attend a Master degree program after they completed the Bachelor degree program. 176 out of 233 students want to attend the Master degree program on the same University, 18 do not want to attend the Master degree program on the same University and 39 students are uncertain.

5 students would like to switch for their Master program to another Austrian University and 47 students would like to attend their Master on a HEI abroad. (See **Table 65**)

	not at all	probably not	maybe	probably yes	perfectly sure
Do you want to study one or more semesters abroad?	11	46	86	44	34
Do you want to attend a Master program after you finished the Bachelor program?	0	2	15	44	174
Do you want to attend the Master program on the same University you are currently studying?	6	12	39	106	70
Do you want to attend the Master program on another Austrian University than you are currently studying on?	11	21	20	5	0
Do you want to attend the Master program on an Austrian University of Applied Sciences?	34	12	6	0	0
Do you want to attend the Master program on a foreign University or University of Applied Sciences?	3	2	21	21	5

People who gave color coded answer pass to next question

Table 65: Dynamics of IEM students who attend a IEM Bachelor degree program on Universities **(n is the sum of the respective row)**

Analysis of the attended Master degree programs

The prerequisite for a Master degree program is a completed Bachelor degree program, therefore the respective Bachelor degree program of the students attending a Master degree program needs to be inquired. This has been done separately to the students who attend a Bachelor degree program.

As mentioned above first the concluded Bachelor degree program related to the attended Master is inquired whereat the Bachelor degree program on Universities and Universities of Applied Sciences needs again to be separately analyzed.

- **Overview concluded Bachelor for Master**

Out of the 101 attendants of a Master degree program, 8 (7,9 %) concludes their Bachelor degree program on a University of Applied Sciences and 93 (92,1 %) on a University (see **Table 66**).

Type of HEI	Frequency	Percentage
University of Applied Sciences	8	7,9%
University	93	92,1%
Sum	**n=101**	**100,0%**

Table 66: Types of HEIs where IEM students concluded the respective Bachelor degree program for the Master degree program **(n=101)**

Bachelor for Master on Universities of Applied Sciences

The aforementioned 8 students, who concluded their Bachelor degree program on Universities of Applied Sciences, concluded their Bachelor degree program on Universities of Applied Sciences with different focuses. 4 concluded their Bachelor degree program on a University of Applied Sciences with technical, 1 with economics and 3 with technical and economics focus. (See **Table 67**)

Focus of University of Applied Sciences	Frequency	Percentage
Technical focus	4	50,00%
Economics focus	1	12,50%
Technical and economics focus	3	37,50%
Sum	**n=8**	**100,00%**

Table 67: Focus of Universities of Applied Sciences where IEM students concluded their Bachelor degree program for attending the Master program **(n=8)**

Students who now attend a Master degree program on a HEI concluded their Bachelor degree program in different scientific disciplines. 7 students (87,5 %) concluded their Bachelor on a UAS in an engineering discipline and one student (12,5 %) concluded its Bachelor on a UAS in the interdisciplinary science discipline. (See **Table 68**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Civil Engineering	2	25,0%
	Electrical Engineering and Economics (IEM)	1	12,5%
	Mechanical Engineering	1	12,5%
	Civil Engineering and Economics (IEM)	1	12,5%
	Machanical Engineering and Economics (IEM)	1	12,5%
	Other educational program	1	12,5%
Interdisciplinary Sciences	Industrial Economics (IEM)	1	12,5%
Sum		**n=8**	**100,0%**

Table 68: Scientific disciplines concluded by IEM students in their Bachelor degree program on Universities of Applied Sciences **(n=8)**

Seven out of eight respondents concluded their Bachelor degree program in Austria and one in Italy. Out of the seven respondents who concluded their Bachelor degree program in Austria, 1 attended the University of Applied Sciences FH Joanneum in Graz and 6 attended the University of Applied Sciences Technikum Wien.

Bachelor for Master on Universities

100 % of the respondent students concluded their Bachelor degree program on a University of Technology. (See **Table 69**)

Type of University	Frequency	Percentage
University of Technology	93	100,0%
University (other)	0	0,0%
Sum	**n=93**	**100,00%**

Table 69: Types of Universities where IEM students concluded their Bachelor degree program for attending their Master program **(n=93)**

93,5 % of the respondent students concluded their Bachelor degree program in educational directions on a University in the engineering discipline, 3,3 % in the business administration discipline, 1,1 % in the natural sciences and mathematics discipline and 2,2 % in the interdisciplinary sciences discipline. (See **Table 70**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	3	3,2%
	Mechanical Engineering	5	5,4%
	Machanical Engineering and Economics (IEM)	65	69,9%
	Civil Engineering and Economics (IEM)	1	1,1%
	Civil Engineering	12	12,9%
	Other educational program	1	1,1%
Business Administration	Business Studies	1	1,1%
	Other educational program	2	2,2%
Natural Sciences and Mathematics	Mathematics	1	1,1%
Interdisciplinary Sciences	Architecture	1	1,1%
	Materials Science	1	1,1%
Sum		**n=93**	**100,0%**

Table 70: Scientific disciplines concluded by IEM students in their Bachelor degree program on Universities **(n=93)**

According to the specification made by the respondents, 97,8 % of the students in a Master program concluded their Bachelor degree program on an Austrian University, 1,1 % on a Turkish University and 1,1 % on an Asian University. (See **Table 71**)

Place	Country	University	Frequency	Percentage
Europe	Austria	University of Graz	1	1,1%
		Graz University of Technology	52	55,9%
		Vienna University of Technology	38	40,9%
	Turkey	-	1	1,1%
Asia	-	-	1	1,1%
Sum			**n=93**	**100,0%**

Table 71: Geographical location of Universities where students concluded their IEM Bachelor degree program for attending the Master program **(n=93)**

The Bachelor degree programs as prerequisite for attending the Master degree program have been described. Now the same analysis among the Master program is needed in order to assess the dynamics within the Bachelor and Master degree programs.

- **Overview of attended Master degree programs**

6 respondent students (5,9 %) attending the Master degree program, attend it on a University of Applied Sciences and 95 respondent student (94,1 %) attend it on a University (see **Table**

72). Already at this point by comparing **Table 72** with **Table 66** a net student stream of two students who concluded the Bachelor degree program on Universities of Applied Sciences towards Universities for attending the Master degree program is noticeable. A more in detail illustration of the dynamics is provided in the respective sub points.

Type of HEI	Frequency	Percentage
University of Applied Sciences	6	5,9%
University	95	94,1%
Sum	**n=101**	**100,0%**

Table 72: Types of HEIs where IEM students attend their Master degree program **(n=101)**

Master on University of Applied Sciences

2 students attend their Master degree program on Universities of Applied Sciences with technical focus, 3 students on UAS with economics focus and 1 student on a UAS with other focus. (See **Table 73**)

Focus of University of Applied Sciences	Frequency	Percentage
Technical focus	2	33,33%
Economics focus	3	50,00%
Other focus	1	16,67%
Sum	**n=6**	**100,00%**

Table 73: Focus of Universities of Applied Sciences where IEM students attended their Master program **(n=6)**

3 (50 %) of the respondent students attend their Master degree program in educational directions on Universities of Applied Sciences in the engineering discipline, 1 (16,7 %) in the business administration discipline and 1 (16,7 %) in the interdisciplinary sciences discipline. (See **Table 74**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Mechanical Engineering	1	16,7%
	Civil Engineering and Economics (IEM)	1	16,7%
	Other educational program	1	16,7%
Business Administration	Other educational program	1	16,7%
Interdisciplinary Sciences	Interdisciplinary Management degree program (e.g. Production, Traffic)	1	16,7%
	Industrial Economics (IEM)	1	16,7%
Sum		**n=6**	**100,0%**

Table 74: Scientific disciplines attended by IEM students in their Master degree program on Universities of Applied Sciences **(n=6)**

Dynamics of students who attend the Master degree program on UAS

- Four of 6 respondents who attend their Master program on a University of Applied Sciences attend their Master degree program on the same UAS where they concluded their Bachelor.
- 2 respondents changed after the conclusion of the Bachelor program on an Austrian University of Applied Sciences with technical focus to another Austrian University of Applied Sciences with economics focus for the Master program.

One of the 6 respondents who attend their Master program on a University of Applied Sciences spent one or more semester abroad for study reason.

The other 5 students who until jet did not spend one or more semesters abroad where asked whether or not they are willing to do so in the future. 4 respondents answered negative and one respondent gave an uncertain answer. (See **Table 75**)

	not at all	probably not	maybe	probably yes	perfectly sure
Do you want to study one or more semesters abroad?	1	3	1	0	0

Table 75: Will of students of Master programs on UAS to spend one or more semesters abroad **(n=5)**

Master program on Universities

All 95 respondent students attend their Master degree program on a University of Technology. (See **Table 76**)

Type of University	Frequency	Percentage
University of Technology	95	100,0%
Sum	**n=95**	**100,00%**

Table 76: Type of Universities where IEM students attended their Master program **(n=95)**

85 (89,5 %) of the 95 respondent students attend their Master degree program in educational directions on Universities in the engineering discipline, 5 (5,3 %) in the business administration discipline, 2 (2,2 %) in the natural sciences and mathematics discipline and 3 (3,2 %) in the interdisciplinary sciences discipline. (See **Table 77**)

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Civil Engineering	2	2,1%
	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	4	4,2%
	Mechanical Engineering	3	3,2%
	Civil Engineering and Economics (IEM)	11	11,6%
	Machanical Engineering and Economics (IEM)	63	66,3%
	Other educational program	2	2,1%
Business Administration	Business Studies	2	2,1%
	Other educational program	3	3,2%
Natural Sciences and Mathematics	Mathematics	1	1,1%
	Physics	1	1,1%
Interdisciplinary Sciences	Interdisciplinary Management degree program (e.g. Production, Traffic)	2	2,1%
	Materials Science	1	1,1%
Sum		**n=95**	**100,0%**

Table 77: Scientific disciplines attended by IEM students in their Master degree program on Universities **(n=95)**

97,9 % of the students attending their Master degree program on Universities, study on Austrian Universities of Technology and 2,1 % of the students attend the Master program on a University located in the Netherlands. (See **Table 78**)

Place	Country	University	Frequency	Percentage
Europe	Austria	Graz University of Technology	53	55,8%
		Vienna University of Technology	40	42,1%
	Netherlands	-	2	2,1%
Sum			**n=95**	**100,0%**

Table 78: Geographical location of Universities where students attend their Master degree program **(n=95)**

Dynamics of students who attend the Master degree program on Universities

- 2 students who now attend their Master program on an Austrian University of Technology concluded their Bachelor on an Austrian University
- 2 students who concluded the Bachelor program on an Austrian University of Technology are now attending their Master program on Universities in the Netherlands
- 1 student who concluded the Bachelor program on a foreign UAS, attends the Master program on an Austrian University of Technology
- 1 student who concluded the Bachelor program on an Austrian UAS, attends the Master program on an Austrian University of Technology
- 1 student who concluded the Bachelor program on an Austrian University of Technology, attends the Master program on another Austrian University of Technology
- 2 students who concluded the Bachelor program on a foreign University, attend the Master program on an Austrian University of Technology

27 (28,4 %) of the respondent 95 students attending a Master degree program on a University already spent one or more semesters abroad for study reasons. (See **Figure 26**)

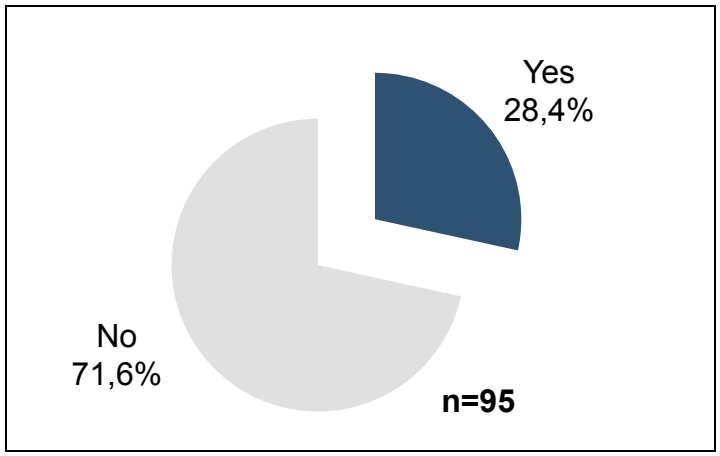

Figure 26: Share of students attending their Master degree program on a University and spent one or more semesters abroad **(n=95)**

The 68 (71,6 %) students who until now did not spend one or more semesters abroad were asked whether or not they are willing to do so in the future. 51 respondents answered negative, 8 positive and 9 respondents gave an uncertain answer.

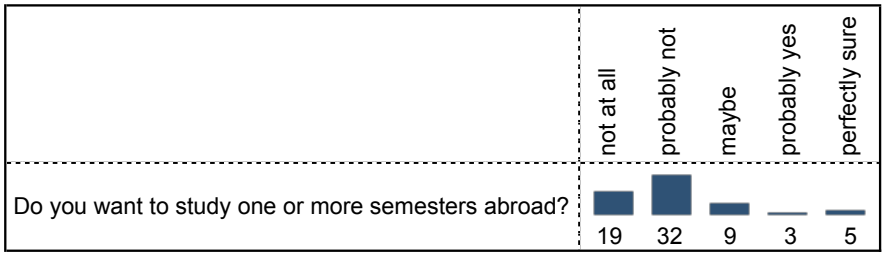

Table 79: Will of students of Master programs on Universities to spend one or more semesters abroad **(n=95)**

Analysis of the attended Diploma (Dipl.-Ing.) degree programs

All 27 students attend a Diploma degree program on a University of Technology. (See **Table 80**)

Type of University	Frequency	Percentage
University of Technology	27	100,0%
Sum	**n=27**	**100,00%**

Table 80: Type of Universities where IEM students attended their Diploma program **(n=27)**

88,9 % of the students attend a educational direction in the engineering discipline, 7,4 % in the business administration discipline and 3,7 % in the interdisciplinary sciences discipline. (See **Table 81**) These results are again a little surprising because still 2 people mentioned that their scientific discipline they attend is business administration although they attend this discipline on a University of Technology. This again leads to the presumption that students specified their field of specialization like for the Master program on Universities.

Scientific discipline	Educational direction	Frequency	Percentage
Engineering	Computer Sciences and Economics (incl. Software development and Economics) (IEM)	1	3,7%
	Mechanical Engineering	1	3,7%
	Civil Engineering and Economics (IEM)	1	3,7%
	Machanical Engineering and Economics (IEM)	21	77,8%
Business Administration	Business Studies	2	7,4%
Interdisciplinary Sciences	Other educational program	1	3,7%
Sum		**n=27**	**100,0%**

Table 81: Scientific disciplines attended by IEM students in their Diploma degree program on Universities of Technology **(n=27)**

All respondent students attend the Diploma program on an Austrian University of Technology. 74,1 % attends the Diploma program on Graz University of Technology and 25,9 % of the respondent students on Vienna University of Technology.

Place	Country	University	Frequency	Percentage
Europe	Austria	Graz University of Technology	20	74,1%
		Vienna University of Technology	7	25,9%
Sum			**n=27**	**100,0%**

Table 82: Geographical location of Universities where students attend their Diploma degree program **(n=27)**

18,5 % of the respondent students who attends a Diploma degree program on Austrian Universities of Technology already spent one or more semesters abroad for study reason. (See **Figure 27**)

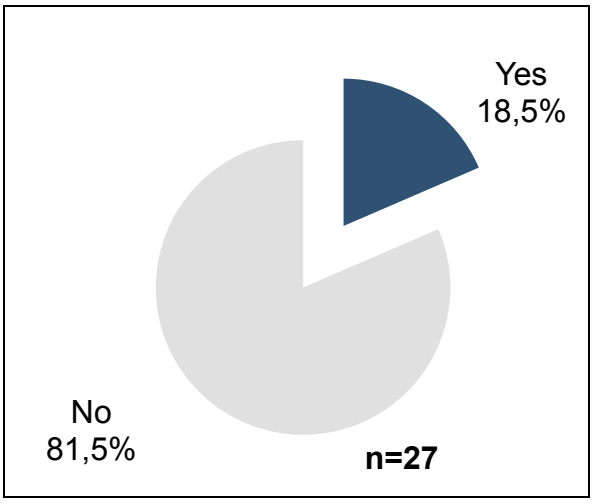

Figure 27: Share of students attending their Diploma degree program on a University of Technology and spent one or more semesters abroad **(n=27)**

The 22 (81,5 %) students who until now did not spend one or more semesters abroad were asked whether or not they are willing to do so in the future. 18 respondents answered negative and 4 respondents gave an uncertain answer. (See **Table 83**)

	not at all	probably not	maybe	probably yes	perfectly sure
Do you want to study one or more semesters abroad?	8	10	4	0	0

Table 83: Will of students of Diploma programs on Universities of Technology to spend one or more semesters abroad **(n=22)**

Summary over all responses assessing the will of students to spend one or more semesters abroad for study reason

Out of the 388 respondent students 68 already spent one or more semesters abroad for study reason, which results in a total share of 17,52 %.

Table 84 illustrates the overall will of students to study abroad among those who did not spend any time abroad for study reason until jet. 59 (28 %) respondent students specified a positive will to study abroad, 131 (41 %) specified a negative will to study abroad and 100 (31 %) are still indecisive.

	not at all	probably not	maybe	probably yes	perfectly sure
Overall intention to study one or more semester abroad	40 13%	91 28%	100 31%	49 15%	40 13%

Table 84: Will of all inquired degree programs students on HEIs to spend one or more semesters abroad **(n=320)**

Students of Master and Diploma degree programs have additionally been asked to assess their will to attend a Doctoral program within 5 years after they graduated. 5 % of the respondent specified a strong positive will to do so, 25 % specified a positive will, 56 % specified a negative will and 13 % of the respondents specified a strong negative will.

	not at all	probably not	probably yes	perfectly sure
Overall intention to attend a Doctoral program within 5 years after graduation	17 13%	72 56%	32 25%	7 5%

Table 85: Overall intention of Master and Diploma students on HEIs to attend a Doctoral program within 5 years after graduation **(n=128)**

If the respondents who specified a positive will to attend a Doctoral program within 5 years after their graduation, who amount to 30 % of the respondents really do so, it will result in an increase of the average Doctoral graduates among IEMs, which currently is 19,14 % (see **Table 14**). This development would on the other hand lead to a decreasing value of the Diploma titles. Therefore this development needs to be analyzed and observed also in the next IEM surveys and inquires.

4.2.2.3 Assessment of education

Before IEM Students were asked about their ideal qualification profile that should be provided by their degree program, students were asked to assess the general career opportunities for IEMs. 92,11 % of the respondent students assess positive career and promotion opportunities for IEMs in general whereat 1,13 % indicated a negative one. (See **Figure 28**)

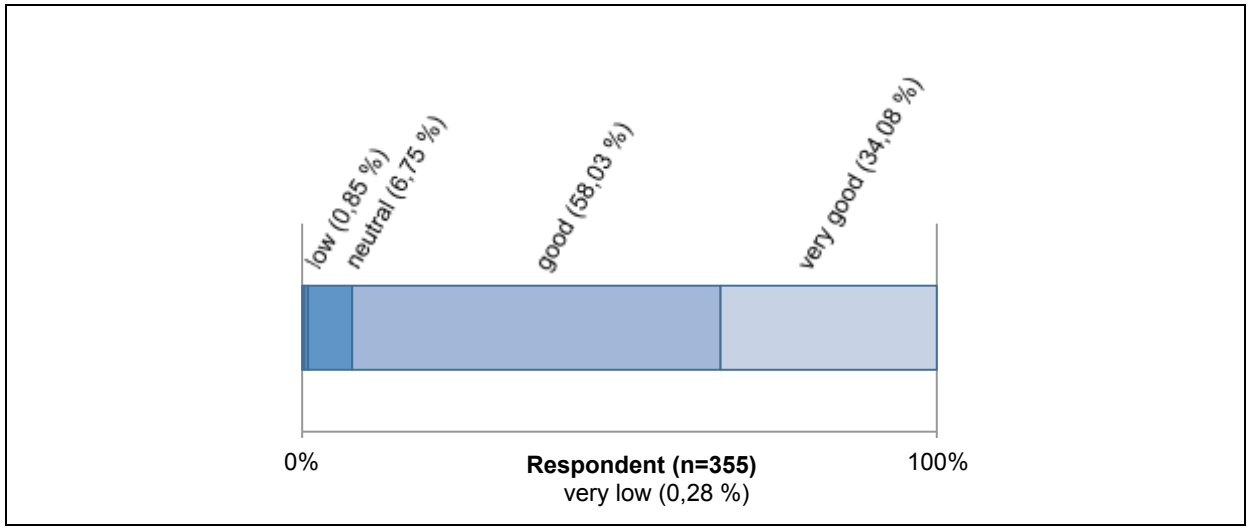

Figure 28: Assessment of Career and promotion opportunities for IEMs according to IEM students **(n=355)**

In order to assess the ideal qualification profile according to IEM students a IEM degree program should provide, they were asked to specify the ideal ratio for their attended IEM degree program in order to fulfill their qualification profile expectations.

The average ideal share between technic and economics subjects for an IEM degree program according to IEM students is 63 % technic subjects and 37 % economics subjects. The relative distribution among the specified answers and the resulting average are displayed in **Figure 29**.

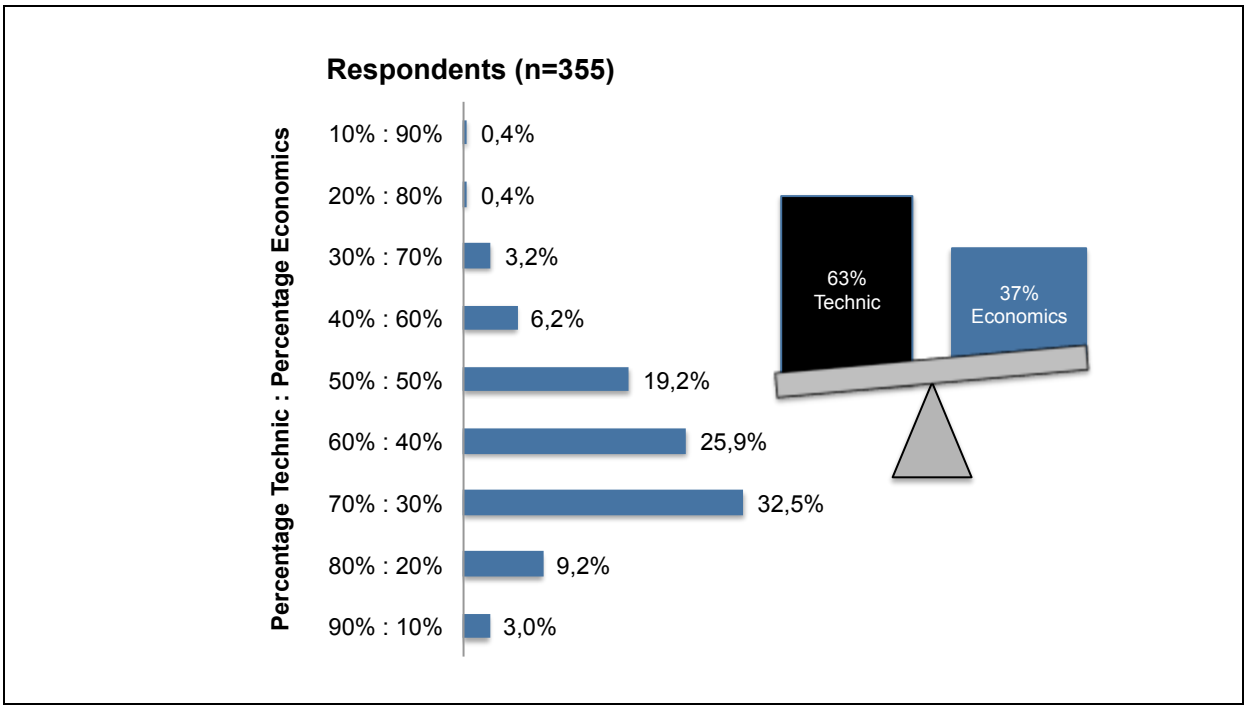

Figure 29: Ideal share of technic and economic subjects of an IEM degree program according IEM students **(n=355)**

Furthermore IEM students like IEM professionals were asked to specify integration subjects to add and which according to them should be removed from an IEM syllabus. Again the most quoted specifications are color-coded. (See **Table 86**)

Surprisingly students mention almost the same subjects or topics like IEM professionals did which should be added and removed from an IEM syllabus. Many students wish to learn more linguistic skills, especially English. They would like more subjects to be taught in English. Many students mentioned business studies as preferred subject to be taught in English. Project management, rhetoric and presentation, leadership, controlling, macroeconomics, soft skills in general and law subjects as well as some others should be added to the syllabus or at least offered in a specific elective course catalogue whereat students have to conclude a prescribed number of ECTS.

Many IEM students like IEM professionals stated that none subjects should be removed from catalogues or syllabuses. However still many students mentioned business economics topics to be removed or at least compressed. The main reasons mentioned were that economics subjects do not go into depth, therefore it is a waste of time and lots of topics are often repeated in different subjects. According to some students law subjects should be reduced because in future if this topic is needed professionals need anyhow to be addressed.

Students stated also the wish to attend more cross subject projects where more institutes collaborate and support projects where students get taught the linkages between different subjects.

Most quoted integration topics to expand in syllabus (Students opinion):	Most quoted integration topics to reduce/cancle in syllabus (Students opinion):
Ethics	None
Personal coaching	Controlling, Financing, Accounting, Cost Accounting
Linguistic skills (Subjects in english)	Law
Law	
Rhetoric and presentation techniques	
Leadership	
Controlling, Cost calculation, Financing	
Soft skills	
Project management	
Cross subject projects	
Lean management	
Negotiation techniques	
Case studies	
Knowledge management	
Languages	
Teambuilding	
Entrepreneurship	
Conflict management	
Marketing	
International relations	
Risk management	
General management	
Macroeconomics	

Table 86: Integration subjects to expand and to reduce in IEM degree programs according IEM students

Already the three driving forces, the Austrian Alumni association of IEM, the Higher Education Institutions in Austria and IEM professionals and students of the IEM “world” in Austria have already been deeply analyzed. The only balancing force left, the HR managers, which are crucial in order to assess the balancing situation of IEM in Austria is going to be analyzed in deep in the next chapter.

4.3 Results of the Online Survey among HR managers

The results subsequently displayed in this chapter represent the opinion of maximum 3,41 % of the sample size therefore all results displayed in this chapter do not have any substantial statement which represents the opinion of all companies in Austria. The word representative is intentionally not used because it is not a definition, which is recognized in statistics. The results have not been checked with statistical calculations and tests because it would have exceeded by far the framework of this thesis. The results have to be seen and accepted as an inquiry and therefore as resulting statements of the respondents. The structure of this chapter is equal to the structure of the online survey listed in chapter 3.4.3.

4.3.1 Opening questions

Sex and Age:

The questionnaire has been answered by 311 people whereat 46,62 % of the respondents were female and respectively 53,38 % were male. The average of the respondents age is 44,78 years with a standard deviation of 10,24 years. The 25 %-Quartile has the value 38 years, which means that 25 % of the respondents are less than 38 years old. The 50 %-Quartile has the value 46 years, which means that 50 % of the respondents is younger than 46 years. Finally the 75 %-Quartile has the value of 52 years, which means that 25 % of the respondents is older than 52 years.

4.3.2 General information of the company

Location of working place:

On the question about the geographical location of the working place, respondents answered as followed:

- 96,14% work in Austria (n=299)
- 2,57% work in Germany (n=8)
- 0,64% work in the UK (n=2)
- 0,32% work in Italy (n=1)
- 0,32% work in Slovakia (n=1)

Four of the 8 people working in Germany work in Baden-Württemberg, 3 in Bavaria and 1 in North Rhine-Westphalia.

In Austria the distribution of working places of HR managers among provinces is concentrated with 24,08 % in Upper Austria, 20,74 % in Styria, 19,73 % in Vienna and with 14,38 % in Lower Austria (see **Table 87**).

Working Place of HR manager	Frequency	Percentage
Upper Austria	72	24,08%
Styria	62	20,74%
Vienna	59	19,73%
Lower Austria	43	14,38%
Carinthia	16	5,35%
Vorarlberg	16	5,35%
Tyrol	15	5,02%
Salzburg	12	4,01%
Burgenland	4	1,34%
Sum	**n=299**	**100,00%**

Table 87: Working place location in Austria of HR manager

Company size:

Figure 30 shows the classification of the companies in which the HR managers work. It can be seen that 65,3 % of the represented companies have between 1 and 250 employees. According to the classification of the European Commission, which classifies among other influencing factors the companies with less than 50 employees as small-sized companies and with between 50 and 250 employees as medium-sized companies. [44] Companies with more than 250 employees are considered as large companies. Therefore with this definition an additional classification can be made, which is displayed as color-coding and results in:

- 38,3 % are small-size companies (light grey)
- 27 % medium-sized companies (light blue)
- 34,8 % large companies (dark blue)

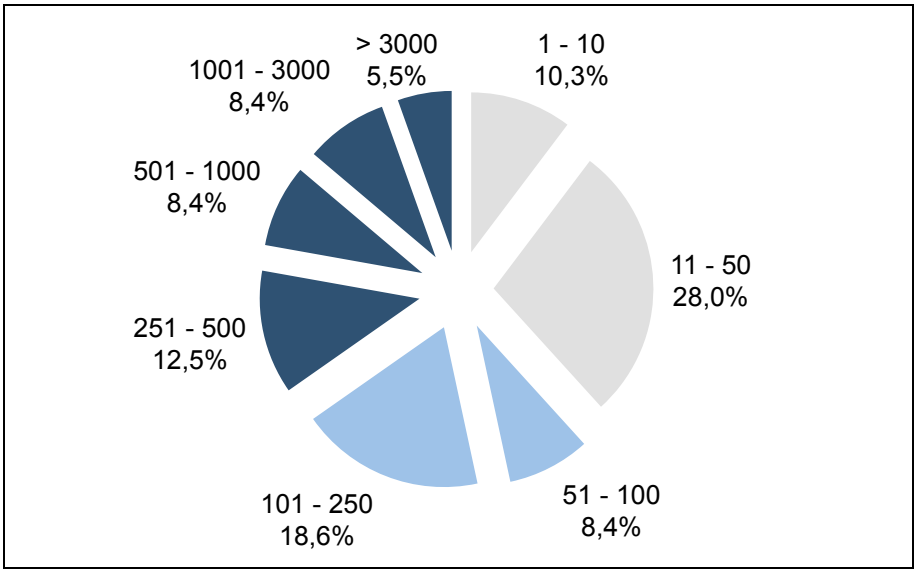

Figure 30: All represented companies allocated to their number of employees **(n=311)**

Allocation to industry classification of companies and to IEM graduates employment intention

In total 311 HR manager allocated the company in which they work to the respective industry whereat the Austrian NACE code [**44**] acted as classification framework. Comparing the 364 specified allocations to the 311 respondents it can be deduced that 17 % of the represented companies carry out economical activities in more than one industry.
The column "Total answers" in **Table 88** shows all industries in which the represented companies carry out economical activities from top to bottom starting with the largest represented industry. Manufacturing is the largest represented industry with 30,77 % leading after Commerce, Service and repairing of motor vehicles with 11,26 % and Construction with 10,99 % (calculation e.g. for manufacturing 112/364=30,77 %)
After the allocation the respondents were asked if they think that they will employ IEM graduates within the next 5 years thus a subdivision has been achieved into industries which do not need IEM graduates within the next 5 years and those who do.

	Total answers (n=311)		Do not employ IEMs until 2019 (n=169)	
Industry	**Frequency**	**Percentage**	**Frequency**	**Relative Percentage**
Manufacturing	112	30,77%	37	33,04%
Commerce; Service and repairing of motor vehicles	41	11,26%	31	75,61%
Construction	40	10,99%	31	77,50%
Professional, scientific and technical activities	32	8,79%	14	43,75%
Energy supply	25	6,87%	10	40,00%
Information and communication	21	5,77%	8	38,10%
Administrative and support service activities	13	3,57%	7	53,85%
human health and social work activities	13	3,57%	12	92,31%
Transport and warehousing	12	3,30%	10	83,33%
Financial and insurance activities	10	2,75%	8	80,00%
Water supply; waste water treatment; removal of environmental pollution	7	1,92%	2	28,57%
Real estate, renting and business services	7	1,92%	5	71,43%
Science and education	6	1,65%	4	66,67%
public administration and defence; compulsory social security	6	1,65%	2	33,33%
Agricolture; forestry; fishery	5	1,37%	4	80,00%
Accomodation and gastronomy	5	1,37%	5	100,00%
Other service activities	5	1,37%	3	60,00%
Mining and winning of rocks and minerals	3	0,82%	2	66,67%
Activities of households as employers;undifferentiated goods- and services-producing activities of households for own use	1	0,27%	1	100,00%
Summe	**n=364**	**100,00%**	**n=196**	**-**

Table 88: Allocation to industry classifications of companies and in which industry IEM graduates are not employed until 2019 [**45**]

141 HR managers stated their intention to employ IEM graduates and 169 stated that they do not intend to employ IEM graduates within the next 5 years, which results in a 45 % to 55 % ratio (1 respondent did not answer this question).

The column “Do not employ IEMs until 2019” in **Table 88** shows in which industries of the represented companies IEM graduates are not going to be employed within the next 5 years and the relative percentage to the total answers in the respective industry. Thus can be seen that in the industries “Activities of households as employers”, “Accommodation and gastronomy”, “Human health and social work activities”, “Agriculture, forestry and fishery”, “Financial and insurance activities”, “Transport and warehousing”, “Construction” and “Commerce” more than 80 % of the total respondents stated that no IEM graduates are intended to be employed until 2019. (Calculation e.g. for manufacturing 37/112=33,04 %)
The results displayed in **Table 88** do not imply that **no** IEM graduate will be needed or employed in these industries within the next 5 years in whole Austria.

To complete the information where IEM graduates will not be employed within the next 5 years, the allocation to the company size / numbers of employees is needed. **Figure 31** shows the allocation of the companies who do not intend to employ IEM graduates within the next 5 years according to their number of employees.

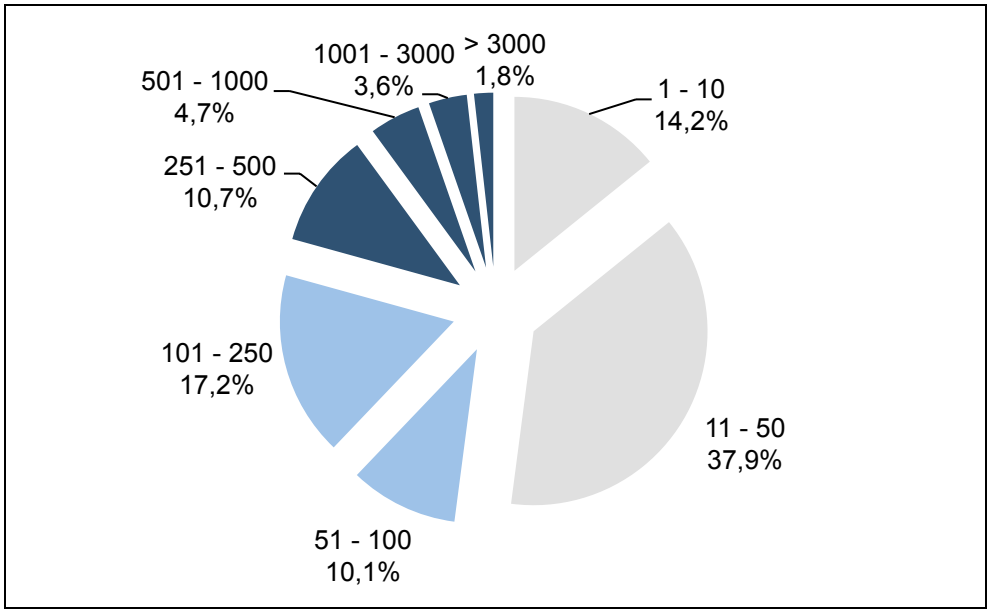

Figure 31: Companies allocated to their number of employees, which do not intend to employ IEM graduates until 2019 **(n=169)** [**44**]

In **Figure 31** it can be seen that 52,1 % of the companies who will not employ IEM graduates are small-sized companies (light grey), 27,3 % are medium-sized companies (light blue) and 20,8 % are large companies (dark blue). It has to be advised that the values are rounded and therefore a sum error of 0,2 % subsists.

Allocation of companies to industries, industry branches and employee number of companies who intend to employ IEM graduates within the next 5 years

The column “Employ IEMs until 2019” in **Table 89** shows in which industries of the represented companies IEM graduates are going to be employed within the next 5 years and the relative percentage to the total answers in the respective industry.
Table 89 shows that about 70 % of the represented companies active in the “manufacturing” industry think that they will employ IEM graduates within the next 5 years. The “manufacturing” industry is followed by the “Information and communication”, “Energy supply”, “Professional, scientific and technical activities”, “Administrative support service activities”, “Water supply” and also “Public administration” industry.

	Total answers (n=311)		Employ IEMs until 2019 (n=141)	
Industry	**Frequency**	**Percentage**	**Frequency**	**Relative Percentage**
Manufacturing	112	30,77%	75	66,96%
Commerce; Service and repairing of motor vehicles	41	11,26%	10	24,39%
Construction	40	10,99%	9	22,50%
Professional, scientific and technical activities	32	8,79%	18	56,25%
Energy supply	25	6,87%	15	60,00%
Information and communication	21	5,77%	13	61,90%
Administrative and support service activities	13	3,57%	6	46,15%
human health and social work activities	13	3,57%	1	7,69%
Transport and warehousing	12	3,30%	2	16,67%
Financial and insurance activities	10	2,75%	2	20,00%
Water supply; waste water treatment; removal of environmental pollution	7	1,92%	4	57,14%
Real estate, renting and business services	7	1,92%	2	28,57%
Science and education	6	1,65%	2	33,33%
public administration and defence; compulsory social security	6	1,65%	4	66,67%
Agricolture; forestry; fishery	5	1,37%	1	20,00%
Other service activities	5	1,37%	2	40,00%
Mining and winning of rocks and minerals	3	0,82%	1	33,33%
Summe	**n=364**	**100,00%**	**n=167**	**-**

Table 89: Allocation to industry classification of companies who think they will employ IEM graduates till 2019 [**45**]

In the “manufacturing” industry companies who think they will employ IEM graduates till 2019 are active in following branches with the respective percentage distribution shown in **Table 90**. The branches “Machine construction” and “Manufacture of fabricated metal products” sum up to 43,7 % of the relative frequency, which again means that out of the 75 companies economically active in the “Manufacturing” industry, are active in 119 branches of the “Manufacturing” industry and 43,7 % of all companies active in this industry are economically active in the branches “Machine construction” and “Manufacture of fabricated metal

products". Summing up, these two branches are the ones where the most IEM graduates are needed.

Branches of "Manufacturing" Industry	Frequency	Percentage
Machine construction / Mechanical Engineering	27	22,7%
Manufacture of fabricated metal products	25	21,0%
Metals production and metals processing	15	12,6%
Production of vehicles and vehicle components	11	9,2%
Manufacture of electrical equipment	6	5,0%
Manufacture of chemicals and chemical products	5	4,2%
Manufacture of rubber and plastic products	5	4,2%
Repair and installation of machinery and equipment	5	4,2%
Manufacture of pulp, paper and paper products	3	2,5%
Construction of rail vehicles and components, ship, rail, aircraft and spacecraft	3	2,5%
Manufacture of basic pharmaceutical products and pharmaceutical preparations	2	1,7%
Manufacture of computer, electronic and optical products	2	1,7%
Manufacture of furniture	2	1,7%
Manufacture of other articles (Coins, jewellery etc.)	2	1,7%
Manufacture of food products	1	0,8%
Manufacture of beverages	1	0,8%
Manufacture of wearing apparel	1	0,8%
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1	0,8%
Publishing, printing and reproduction ofrecorded media	1	0,8%
Manufacture of other non-metallic mineral products	1	0,8%
Sum	**n=119**	**100,0%**

Table 90: Branches of "Manufacturing" Industry where companies need IEM graduates **(n=75)** [**45**]

In the "Professional, scientific and technical activities" industry companies who think they will employ IEM graduates till 2019 are active in following branches with the respective percentage distribution shown in **Table 91**. This table shows that the most companies who think to employ IEM graduates within the next 5 years are active in "Research & Development" and "Architectural and engineering activities; technical testing and analysis".

Branches of "Professional, scientific and technical activities" Industry	Frequency	Percentage
Research & Development	8	44,4%
Architectural and engineering activities; technical testing and analysis	5	27,8%
Activities of head offices; management consultancy activities	3	16,7%
Other professional, scientific and technical activities	2	11,1%
Sum	**n=18**	**100,0%**

Table 91: Branches of „Professional, scientific and technical activities“ Industry where companies need IEM graduates [**45**]

All 141 companies who think they will employ IEM graduates within the next 5 years are allocated according their numbers of employees like shown in **Figure 32**. In **Figure 32** it can be seen that 21,3 % of the companies who want to employ IEM graduates are small-sized companies (light grey), 27 % are medium-sized companies (light blue) and 51,8 % are large companies (dark blue). It has to be advised that the values are rounded and therefore a sum error of 0,1 % subsists. [**44**]

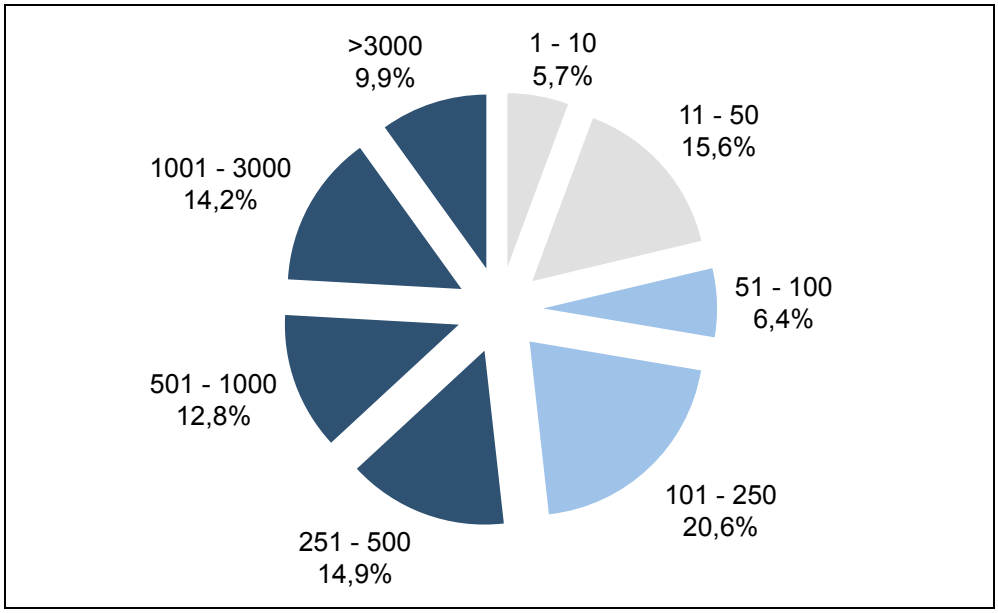

Figure 32: Companies allocated to their number of employees, which intend to employ IEM graduates until 2019 **(n=141)** [**44**]

The 141 respondents who represent companies who want to employ IEM graduates till 2019 work in the Fields of Operation (FOO) listed in **Table 92**. In total 141 people work in 223 FOOs, which means that almost 60 % of the respondents work in 2 FOOs simultaneously. 36,8 % of the respondents work in “HR management” 18,8 % are Executive manager or work in the strategic management, which in sum are 55,6 % of the respondents FOOs.

Field of Operation	Frequency	Percentage
Human Resources	82	36,8%
Executive Management/Strategic Management	42	18,8%
Sales & Distribution/Customer Service	15	6,7%
Administration/Organization/Management	11	4,9%
Formation & Training (In-house)	7	3,1%
Executive Assistant	6	2,7%
Consulting/Formation & Training (Outside the company)	6	2,7%
Process-/Product-/Qualitymanagement	6	2,7%
Accounting/Managerial Accounting	6	2,7%
Supply Management/Purchasing	5	2,2%
Marketing/PR/Product Management	5	2,2%
Finance/Banking/Insurance	4	1,8%
Health Care/Industrial Safety	4	1,8%
IT/Software Development	4	1,8%
Entrepreneurship	4	1,8%
Customer Service/Support	3	1,3%
Materials Management/Logistics/Layout	3	1,3%
Construction/Facility Management	3	1,3%
Teaching & Science	3	1,3%
R&D/Lab/Engineering/Design	2	0,9%
Legal Department/Patent Law	2	0,9%
Sum	**n=223**	**100,0%**

Table 92: Fields of Operation of respondents who represent companies who want to employ IEM graduates till 2019 **(n=141)**

Now that the general information about the respondents have been provided and it resulted that about 55 % of the respondent work in the field of HR management and Executive-, Strategic management the following results in the next subchapters will be addressed as results obtained by the “respondents” not anymore as results obtained by “HR manager”.

4.3.3 The IEM education in Austria

Assessment of the Bachelor degree

In this subchapter the respondents answered questions related to the IEM education in Austria. In order to assess the acceptance of the Bachelor degree the respondents were asked to assess the statements in **Figure 33**. According to the first two answers to the related statements respondents categorized the Bachelor degree between the fully-fledged final degree and the secondary school level, which reflects the intended position of the Bachelor degree as an undergraduate degree. Respondents also stated that they partially favor to employ IEM Bachelor graduates who aspire a Master degree than those who don't. A more clear answer was given related to the favor of Master graduates over Bachelor graduates in an employment process, here respondents rather confirmed the favor of Master graduates.

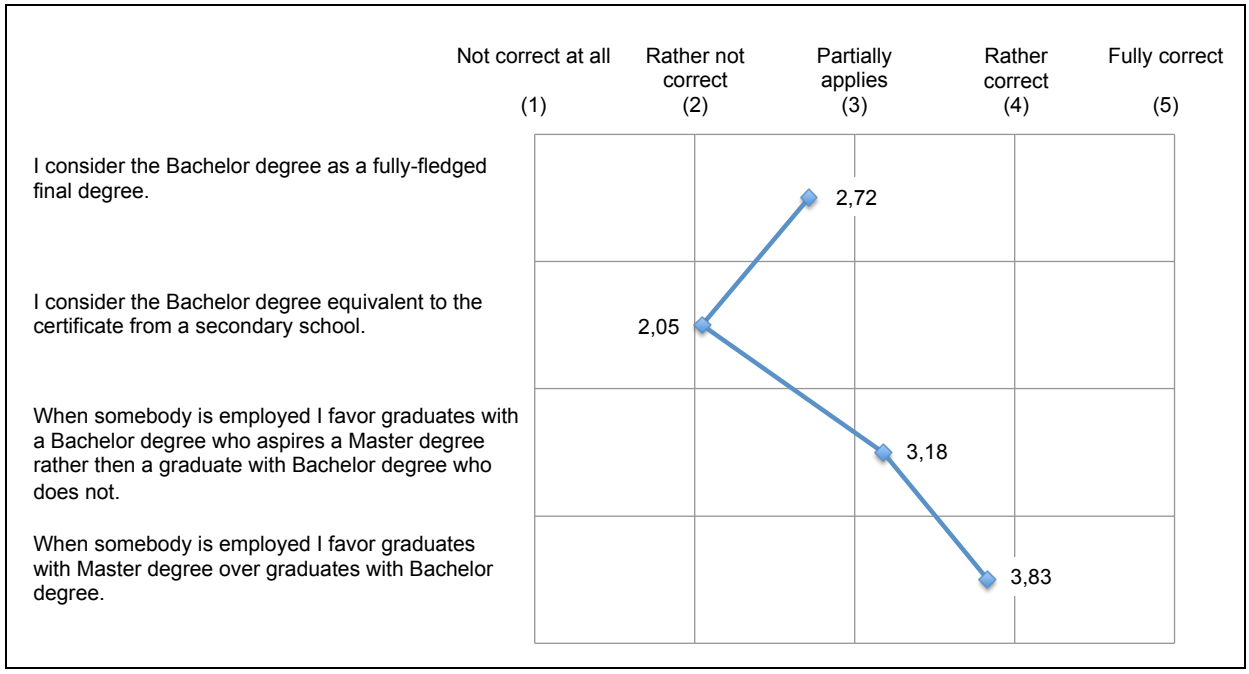

Figure 33: Assessment of the Bachelor degree **(n=127)**

The ideal technical and economics ratio and the importance of selected techno-economics subjects according organization representatives

According to the respondents the ideal ratio of technical subjects and economics subjects whereat the integration subjects are included in the economics subjects part is 62,2 % technical subjects and 37,8 % economics subjects (including integration subjects). The distribution reflects the ideal ratio of the two subjects categories for an IEM graduate for 127 representatives of companies who compiled the questionnaire. Furthermore the percentage distribution among all the given answers is displayed.

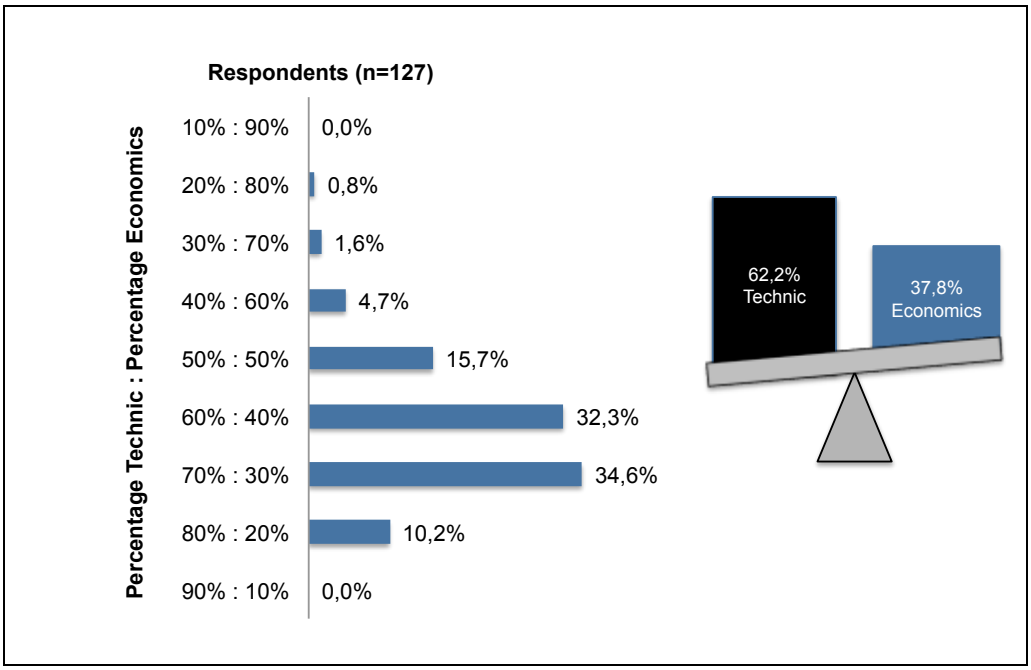

Figure 34: Ideal ratio of technical and economics (incl. integration) subjects **(n=127)**

Figure 35 shows the assessed importance of the listed techno-economics subjects. The results display that company representatives think that the subjects “project management” and “General business economics” are more than rather important for an IEM graduates qualification profile.

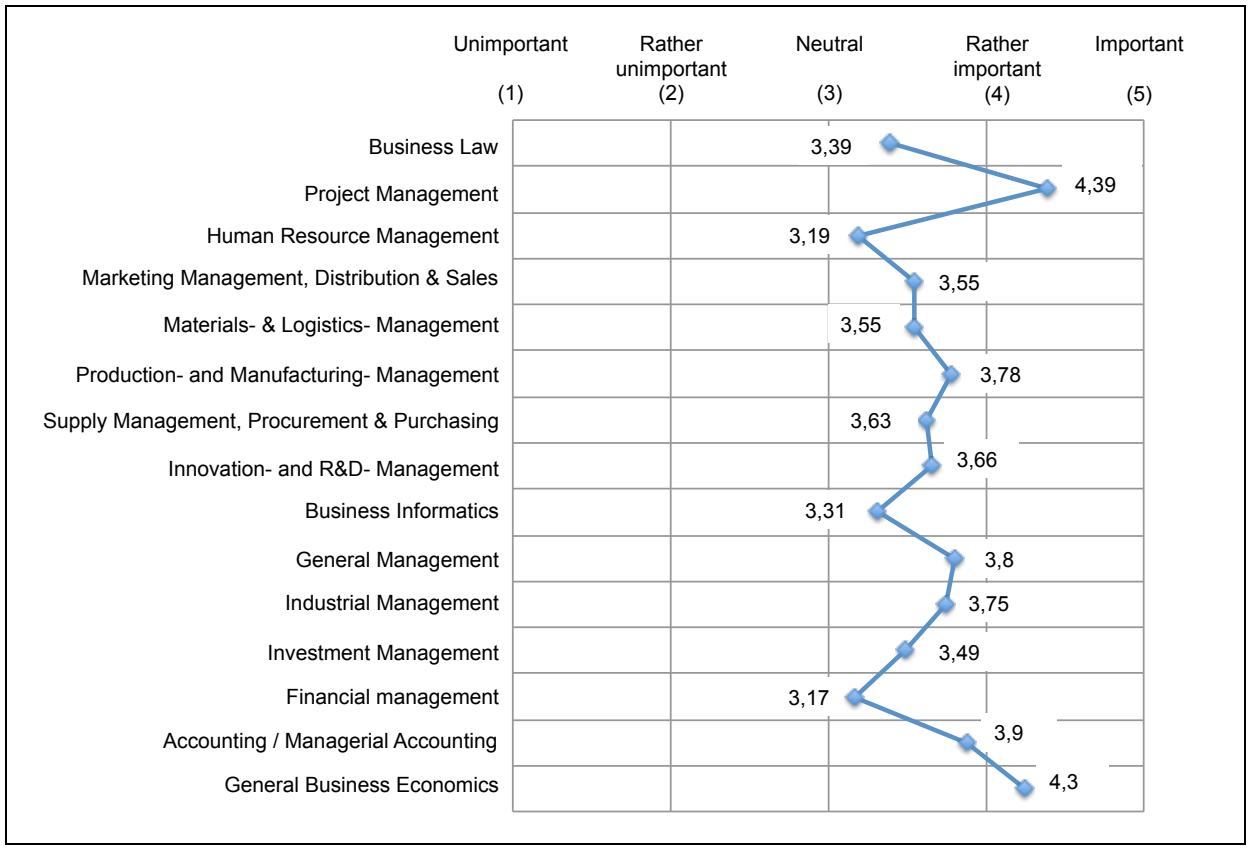

Figure 35: Importance assessment of techno-economics subjects by company representatives **(n=127)**

Requested language skills by organizations for a professional career in the next 5 to 10 years

Table 93 lists the desired language skills of employees by organizations within the next 5 to 10 years for a professional career. The results are listed according to the frequency (i.e. the amount of given answers) and the relative percentage. The question was set as a multiple-choice question. The table displays that English is the predominant required language for a future professional career according the respondents. Interesting is that Russian and Chinese are the distant followers. But even more interesting is that Spanish takes the 4th place with 7,19 % considering the actual economic situation in Spain.

Language	Frequency	Percentage
English	122	39,87%
Russian	29	9,48%
Chinese	28	9,15%
Spanish	22	7,19%
French	17	5,56%
Slovenian	12	3,92%
Croatian	11	3,59%
Italian	9	2,94%
Czech	8	2,61%
Hungarian	8	2,61%
Polish	7	2,29%
Portuguese	7	2,29%
Other Languages	7	2,29%
Slovakian	6	1,96%
Turkish	5	1,63%
Arabic	4	1,31%
Indian	2	0,65%
No foreign language	2	0,65%
Finnish	0	0,00%
Norse	0	0,00%
Swedish	0	0,00%
Sum	**n=306**	**100%**

Table 93: Desired language skills of employees by organizations for a professional career within the next 5 to 10 years **(n=127)**

HEIs with which graduates organizations had good experiences in the last 5 years

Table 94 lists the HEIs with which graduates the respondents had good experiences in the last 5 years. The table shows that respondents had good experiences with graduates from 2 Universities and the 3 Universities of Technology and also with the University of Applied sciences Upper Austria and FH Joanneum. This question was a multiple-choice question.

Higher Education Institution	Frequency	Percentage
Graz University of Technology	78	15,1%
Vienna University of Technology	51	9,9%
University of Applied Sciences Upper Austria	41	7,9%
University of Mining Leoben	41	7,9%
Johannes Kepler University Linz	33	6,4%
University of Graz	32	6,2%
FH Joanneum University of Applied Sciences	30	5,8%
Vienna University of Economics and Business	30	5,8%
University of Applied Sciences Technikum Wien	20	3,9%
University of Applied Sciences Wiener Neustadt	20	3,9%
Campus 02 University of Applied Sciences	16	3,1%
University of Applied Sciences FH Campus Wien	14	2,7%
MCI Management Center Innsbruck	10	1,9%
IMC University of Applied Sciences Krems	9	1,7%
Alpen-Adria University Klagenfurt	8	1,6%
FH Burgenland University of Applied Sciences	8	1,6%
Carinthia University of Applied Sciences	8	1,6%
University of Applied Sciences Kufstein	7	1,4%
Salzburg University of Applied Sciences	7	1,4%
FH Wien University of Applied Sciences	7	1,4%
University of Innsbruck	7	1,4%
Paris Lodron University of Salzburg	6	1,2%
St. Pölten University of Applied Sciences	5	1,0%
Vorarlberg University of Applied Sciences	5	1,0%
University of Applied Sciences BFI Vienna	2	0,4%
Other Public Universities	8	1,6%
Other Public Universities of Applied Sciences	13	2,5%
Sum	**n=516**	**100,0%**

Table 94: Good experiences with HEI graduates in the last 5 years **(n=127)**

The results reflects almost the latest ranking of the best Universities of Applied Sciences (UAS) 2014 by "INDUSTRIE MAGAZIN" in Austria where the winner was FHW Vienna (not listed in our study), 2nd UAS Upper Austria, 3rd MCI Innsbruck, 4th UAS Technikum Wien, 5th UAS FH Campus Wien and 6th FH Joanneum UAS. [**46**]

Relevant for the interpretation is the distribution of the working places of the respondents. In **Table 95** the distribution of the respondents, which companies intend to employ IEM graduates within the next 5 years is listed. The number of respondents is 131 and compared to the 127 respondents of the HEI list in **Table 94**, 4 respondents counted in the results of **Table 95** did not answer the relative question for **Table 94**. This small divergence does affect the results in **Table 95** but not substantially. Like displayed in the table below, Upper Austria, Styria and Vienna in sum represent 71 % of the respondents, which of course can bias the results in **Table 94** and therefore needs to be considered.

Working Place	Frequency	Percentage
Upper Austria	38	29,01%
Styria	34	25,95%
Vienna	21	16,03%
Lower Austria	17	12,98%
Carinthia	7	5,34%
Tyrol	6	4,58%
Vorarlberg	5	3,82%
Salzburg	2	1,53%
Burgenland	1	0,76%
Sum	**n=131**	**100,00%**

Table 95: Working place of respondents who need IEM graduates within the next 5 years **(n=131)**

4.3.4 Individual competencies of IEM graduates

Importance of Social and Methodological competencies and Expertise

According to the respondents the ideal ratio of social and methodological competencies and expertise of IEM graduates is quite equally shared. Competencies of an IEM graduate should ideally be split into 34,3 % Social competencies, 31,9 % Methodological competencies and 33,8 % Expertise (see **Figure 36**), which results at the and into a simple statement that all three competencies are equally important. The study of Zunk, Fürst and Bauer from 2010 [**11**] displays the same results for 2005 and 2010, which again means that the opinion upon the ideal ratio of the aforementioned competencies has been constant over a decade.

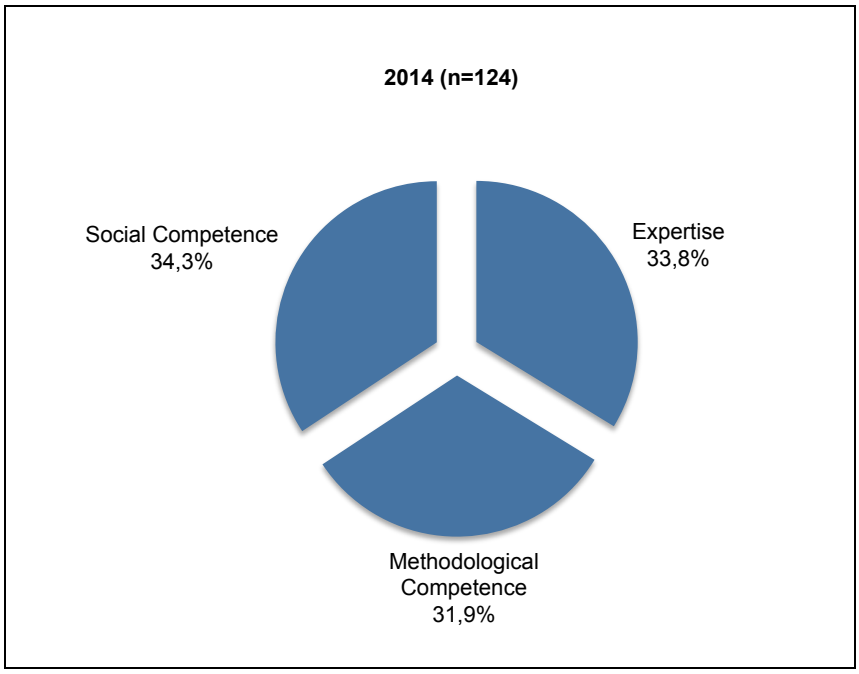

Figure 36: Ideal ratio of social and methodological competencies and expertise for IEM graduates

Importance of individual / person related competencies and study related competencies in an application procedure for IEM graduates

Figure 37 displays the importance of individual / person related competencies for IEM graduates according to the company representatives. The most important individual competence results as being independent working, followed by goal- and performance orientation and the ability to work in teams. Whereat the internationality (is the ability to work with and to move in different cultures), the ecological and sustainable thinking, leadership and the ability to delegate is though a little bit important but not as much as the aforementioned leading requested individual competencies.

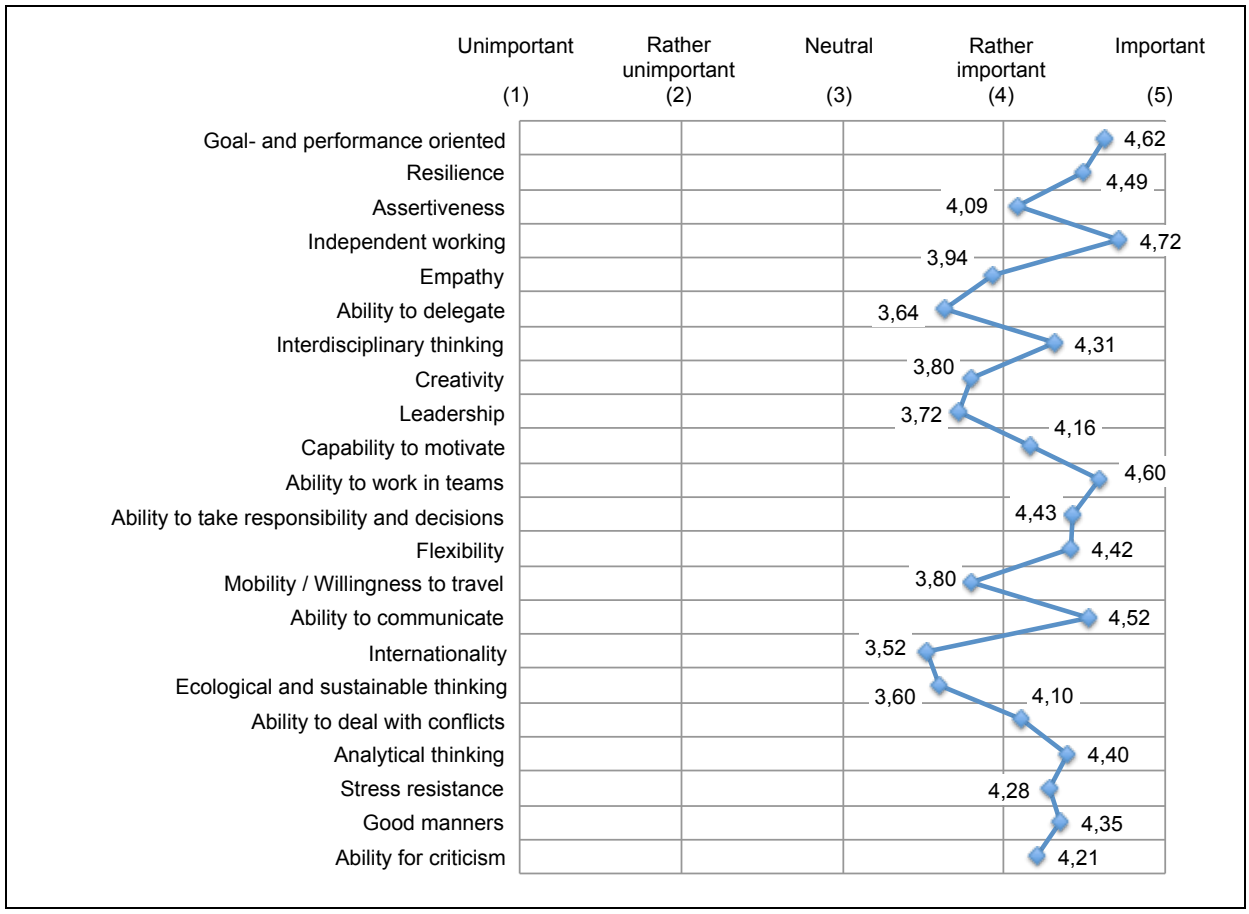

Figure 37: Importance of individual / person related competencies of IEM graduates **(n=124)**

According to the respondents the personal characteristics as well as practical experiences are much more important in an application procedure than the HEI where the graduate absolved his or her degree program (see **Figure 38**). Additional qualifications like other language skills and specific computer programs and experiences abroad are also considered as rather important in the application process.

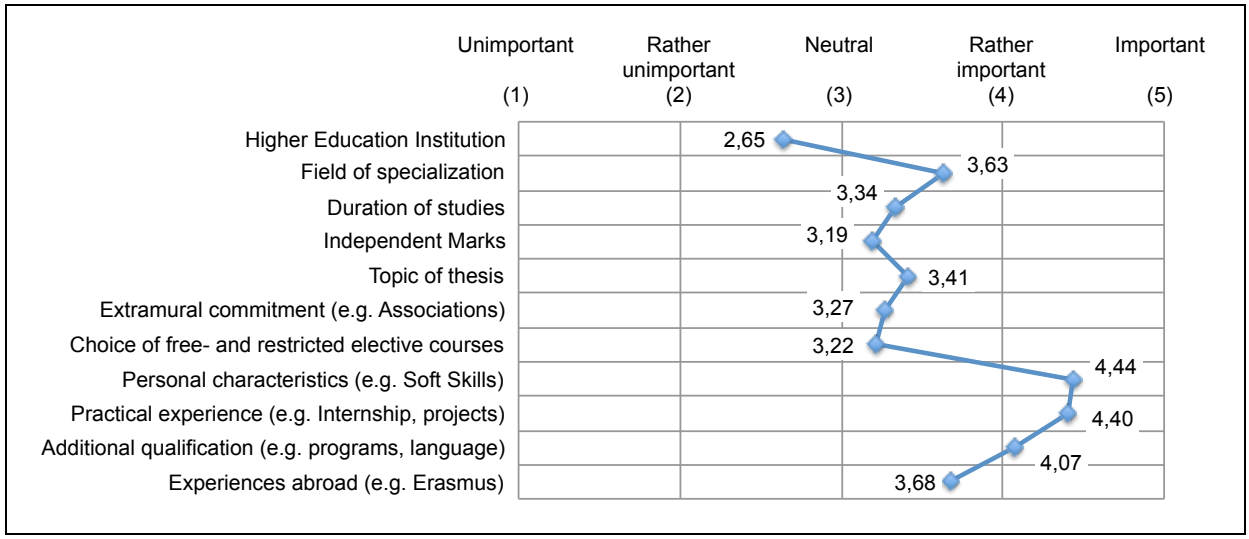

Figure 38: Importance of study and individual related success factors in an application procedure **(n=124)**

4.3.5 Career opportunities of IEM graduates and professionals

Contact methods used by companies to approach HEI graduates

Table 96 lists the communication channels use of all companies and large companies inquired, their relative frequencies of usage and the percentages. This table displays that 90,08 % (Frequency=109) of all 121 inquired companies and 83,33 % (60 out of 72 large companies) of the large companies use online job advertisement to reach HEI graduates. The frequency difference indicates the channels used by small and medium sized companies the higher the difference the more the respective channel is used by small and medium sized companies to approach HEI graduates. Out of these explanations can be read that Online job advertisement, offer of internship possibility and job fairs are also used by small and medium sized companies. The more expensive ways to approach HEI graduates like the support of Bachelor and Master and PhD thesis, physical presentation of the company on HEIs, Newsletter ads and lecture hall sponsoring are mainly used by large companies.

	All answers n=121		Large companies n=72		Frequency difference
Communication Channel	**Frequency**	**Percentage**	**Frequency**	**Percentage**	
Online job advertisement	109	90,08%	60	83,33%	49
Internship possibility in the Organisation	88	72,73%	53	73,61%	35
Job fairs on Universities and Universities of Applied Sciences	74	61,16%	54	75,00%	20
Ads on printmedia	72	59,50%	39	54,17%	33
Diploma-, Master- and Bachelor thesis	62	51,24%	43	59,72%	19
Physical presentation of the company on Universities / Universities of Applied Sciences	43	35,54%	35	48,61%	8
Support of PHD thesis or Research projects	37	30,58%	28	38,89%	9
Presentation of the company on Universities / Universities of Applied Sciences in form of Print- and Onlinemedia (e.g. Uniscreen)	37	30,58%	26	36,11%	11
Federal employment office	30	24,79%	16	22,22%	14
Offer of trainee programs	28	23,14%	21	29,17%	7
Headhunter in social networks (e.g. XING, Linkedin, Facebook)	28	23,14%	12	16,67%	16
Newsletter of graduates/professionals Associations (e.g. WING, Alumni-networks)	17	14,05%	10	13,89%	7
Lecture hall sponsoring	6	4,96%	6	8,33%	0
Other communication channels	38	31,40%	19	26,39%	19
Until now never had any need to get in contact with HEI graduates	2	1,65%	1	1,39%	1
Sum	**671**	**-**	**423**	**-**	**-**

Table 96: Communication channels used by companies to get in contact with HEIs graduates

Fields of operation of IEM graduates in which an organization can imagine to employ an IEM within the next 5 years

Table 97 lists the Fields of Operation in which the respondent could imagine to employ an IEM within the next 5 years. About 50 % of the respondents can imagine employing an IEM

in the Process-/Product-/Quality management, Sales & Distribution/Customer Service, R&D/Lab/Engineering/Design and Materials Management/Logistics/Layout. The Fields of Operation Finance/Banking/Insurance, Health Care/Industrial Safety, Legal Department/Patent Law, Human Resources and Formation & Training (In-house) are seen as not as suitable for IEMs.

	n=121	
Field of Operation	**Frequency**	**Percentage**
Process-/Product-/Qualitymanagement	59	48,76%
Sales & Distribution/Customer Service	58	47,93%
R&D/Lab/Engineering/Design	58	47,93%
Materials Management/Logistics/Layout	51	42,15%
Supply Management/Purchasing	50	41,32%
Executive Assistant	43	35,54%
Executive Management/Strategic Management	31	25,62%
IT/Software Development	29	23,97%
Marketing/PR/Product Management	27	22,31%
Administration/Organization/Management	18	14,88%
Customer Service/Support	18	14,88%
Accounting/Managerial Accounting	17	14,05%
Construction/Facility Management	14	11,57%
Business Intelligence/Data management	13	10,74%
Consulting/Formation & Training (Outside the company)	11	9,09%
Formation & Training (In-house)	10	8,26%
Human Resources	7	5,79%
Legal Department/Patent Law	5	4,13%
Health Care/Industrial Safety	4	3,31%
Teaching & Science	3	2,48%
Finance/Banking/Insurance	2	1,65%
Editorial department	0	0,00%
Other field of operation	12	9,92%
Sum	**540**	**-**

Table 97: Fields of operation of IEM graduates, which an organization can imagine to employ an IEM within the next 5 years **(n=121)**

Initial annual gross salary of IEM graduates

Table 98 lists the statistical evaluation of the mentioned initial annual gross salary for IEM graduates whereat 102 respondents answered this question. It must be mentioned that some respondent did not fill in the annual gross salary but the monthly gross salary. In order to calculate some statistical factors the assumption of 14 salaries per year was set. The average annual gross salary resulted as € 43.007 and the average without the minimum and maximum specified annual gross salary amounts to € 42.639. The maximum annual gross salary specified was € 100.000 and the minimum was € 30.000. The Quartile 25 % results as € 37.800, which means that 25 % of the specified annual gross salaries are below this value. Same explanation can be given to the Quartile 50 % (is equal to the Median) and to Quartile 75 %. The average variable quota is 5,8 % but the maximum specified was 100% and the second highest was 50% (both specified only ones in the results). As the quartile analysis displays 75 % of the salaries include variable quota of less than 10 %.

IEM graduates initial gross annual salary data (n=102)	
Average	€ 43.077
Median	€ 40.300
Minimum	€ 30.000
Maximum	€ 100.000
Average without maximum and minimum	€ 42.639
Quartile 25%	€ 37.800
Quartile 50%	€ 40.300
Quartile 75%	€ 45.000
Average variable quota	5,80%
Quartile 25% variable quota	0 %
Quartile 50% variable quota	0 %
Quartile 75% variable quota	10 %

Table 98: IEM initial annual gross salary offered by organizations **(n=102)**

Compared to the Austrian average annual gross income for all employees, young and old, which for men is € 39.848 and for women € 32.540 (numbers from year 2012; Only full time employed (without apprentice); Part time salaries and not year round salaries excluded) [**47**] the average initial gross annual salary for IEM graduates (Master graduates; without maximum and minimum) is 7 % higher.
Without the above-mentioned exclusions the average annual gross income of employees is € 25.373.

Important:

Resulting out of the calculation that in average fresh IEM graduates earn 7% more than the Austrian average the presumption persists that the question might be misunderstood by respondents thus not the initial annual gross salary but a salary after more years of professional experience has been specified. Therefore the results have to be accepted with reservation.

In **Table 99** the **single** initial annual gross salaries above € 50.000 with the respective **single** company information (variable quota, location, size, industry and branch of industry) are listed.
Due to the above-mentioned possible incorrect data, no specific initial annual gross salary is displayed.

Variable salary quota in %	Place	Province	Number of employees	Industry	Branch of industry
n.s.	Austria	Vienna	101 - 250	Manufacturing	Manufacture of rubber and plastic products
20	Austria	Vienna	11 - 50	Manufacturing	Repair and installation of machinery and equipment
				Commerce; Service and repairing of motor vehicles	Wholesale trade, except of motor vehicles and motorcycles
10	Austria	Vorarlberg	101 - 250	Manufacturing	Manufacture of fabricated metal products
0	Austria	Carinthia	251 - 500	Science and education	Tertiary and post-secondary, non-tertiary education
20	Austria	Upper Austria	11 - 50	Commerce; Service and repairing of motor vehicles	Wholesale and retail trade and repair of motor vehicles and motorcycles
10	Austria	Upper Austria	101 - 250	Manufacturing	Machine construction / Mechanical Engineering
0	Germany	Baden-Württemberg	> 3000	Manufacturing	Metals production and metals processing
					Manufacture of fabricated metal products
					Machine construction / Mechanical Engineering
					Production of vehicles and vehicle components
				Professional, scientific and technical activities	Research & Development
20	United Kingdom	-	101 - 250	Information and communication	Computer programming, consultancy and related activities
8	Germany	Bavaria	> 3000	Manufacturing	Manufacture of chemicals and chemical products
10	Austria	Vienna	101 - 250	Information and communication	Computer programming, consultancy and related activities
3	Austria	Styria	1001 - 3000	Manufacturing	Manufacture of fabricated metal products
					Repair and installation of machinery and equipment
					Machine construction / Mechanical Engineering
10	Austria	Upper Austria	501 - 1000	Manufacturing	Manufacture of basic pharmaceutical products and pharmaceutical preparations
0	Austria	Carinthia	11 - 50	Construction	Construction above ground
				Financial and insurance activities	Services auxiliary to financial services and insurance services
				Real estate, renting and business services	
10	Austria	Styria	> 3000	Mining and winning of rocks and minerals	Coal mining
					Ore mining
					Other mining and quarrying
				Manufacturing	Machine construction / Mechanical Engineering
					Repair and installation of machinery and equipment
n.s	Austria	Styria	1001 - 3000	Manufacturing	Machine construction / Mechanical Engineering
15	Germany	Bavaria	251 - 500	Manufacturing	Machine construction / Mechanical Engineering
0	Austria	Styria	11 - 50	Energy supply	

Table 99: Information to the locations, industries, branches and company sizes of **single** companies with annual gross salaries above € 50.000 for fresh IEM graduates

Opportunities for advancement of IEM graduates in organizations

The last question to the representatives of companies in the inquiry was to specify the opportunities of advancement of IEM graduates in the company in which they work. 25,64 % of the respondent specified the opportunities of advancement in their organization as “very good”, 58,12 % as good, 14,53 % as neutral and only 1,71 % as low (see **Figure 39**).
Summing up the positive responses 83,78 % of the respondents see good or very good opportunities for advancement of IEM graduates in their organization.

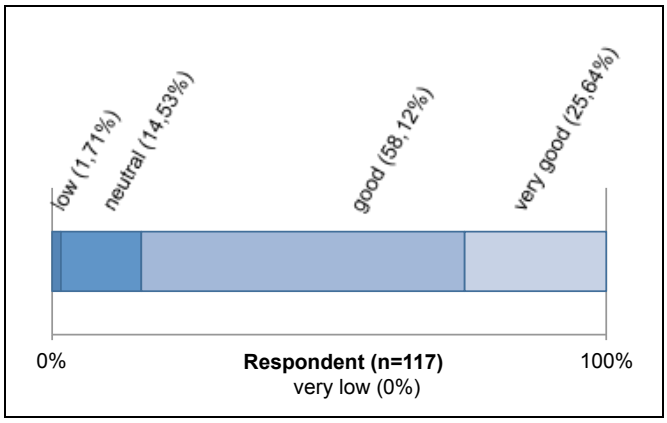

Figure 39: Opportunities for advancement of IEM in organizations **(n=121)**

Now that all results have been displayed singularly and in deep the missing conjunction needs to be displayed, further possibilities of analysis advised and recommendations for future development of this thesis given in the conclusion and discussion part.

5 Conclusion

Due to many different existing translations of the German term “Wirtschaftsingenieurwesen” into English, a derivation of the translation into the term “Industrial Engineering and Management” (IEM) has been provided and therefore seen as the most suited equivalent English term.

The first goal of the thesis was to generate a synoptically table and a comparative chart of all IEM degree programs in Austria. Though this goal required an inquiry of all IEM degree programs on HEIs in Austria, which as intended side effect lead to obtain transparency among the offered IEM degree programs on HEIs in Austria. To obtain the resulting list of all IEM degree programs in Austria some constraints had to be applied in the analysis steps in order to fulfill specific quality demands by the Austrian Alumni Association of IEM (WING) in terms of a specific recommended qualification profile. The analysis of IEM degree programs resulted as a complex topic because opposed to Universities of Applied Sciences, Universities often offer mixed restricted-elective subject catalogues which led to the decision to split those percentages 50/50 and to attribute them in the same scale to technical subjects and economics + integration subjects. Arguing that deans had experienced students mostly either choosing economic or integration subjects from these catalogues, and that the BA and MA thesis always implied technical, economic and integration aspects justified this procedure. In order to gain more transparency when revising future degree programs, it is highly recommended to offer clearly defined restricted-elective catalogues attributable to one specific category of subjects.

Many degree programs defined as an IEM degree program by deans who are committed to the job specification and the “3 countries declaration” differ slightly from the recommendation made by the WING. This should not be seen as a reason for excluding the IEM definition and community in Austria if the degree program offers a qualification profile between 50 % and 80 % of technical subjects, because the commitment to the IEM community, the “3-countries declaration” and to the job specification is definitely more important. The qualification profile recommendations made by the WING have to be seen as a framework and as a direction to follow if degree program structures are going to be revised in the future. However the minimum of 50 % technical subjects of the degree program have to be provided as prerequisite.

Furthermore, the variety of qualification profiles of IEM degree programs on HEIs in Austria can be used as a statement for positioning and profile formation for stakeholders and students alike, enabling industry to choose which qualification profile they want and need. The clear profile of Universities of Technology, who have the highest concentrated share of technical subjects in their syllabus, leads to the conclusion that Universities of Technology put their focus on a profound technical and engineering education, which on the other hand is recognized by the industry. In any case, transparency is important for HEIs, students, industry and all other stakeholders.

The results of the ideal qualification profile recommended by (i) IEM professionals, (ii) IEM students and (iii) HR managers aptly reflects the recommended qualification profile by the WING and hence it is proven that it is still up to date and should be kept as a reference. Therefore to proper balance the qualification profile HR managers want from IEM graduates, IEM professionals need throughout their career path, HEIs provide in their IEM degree programs and the WING recommends is completely provided. Thus the "world" of IEM in Austria is balanced.

IEM degree programs on HEIs in Austria provide graduates not only with a specific qualification profile but also with a specific employability. The provided employability consists of the qualification profile and the competences acquired during the completion of the degree program. The employability of a graduate is higher and lasts longer if the demanded social and methodological skills and expertise fulfill the job markets needs. Through the analysis of IEMs:

- Types of further education undertaken,
- Recommendations of subjects which should be added or expanded in IEM syllabuses,
- Specified importance of technic-economics subjects,
- Career paths, and
- Specified importance of individual competencies throughout their career path

The subjects/topics "project management", "leadership and motivation", "business economics", "general management", "social skills", "personal development" and "linguistic skills", "presentation, rhetoric and communication" could be individuated as crucial for a positive professional career development of IEMs.

The same results could be noticed in the HR manager inquiry, which also specified the importance of skills and competences in the aforementioned subjects/topics for IEM graduates. Not only IEM professionals and HR managers specified the importance of these subjects/topics but strangely students specified the exact same subjects/topics to be expanded in their ideal syllabus, at least as Restricted-elective subjects.

Thus the implication for Austrian HEIs, which offer IEM degree programs, can be given to try to offer the above-mentioned subjects/topics to students according to the HEIs envisaged positioning profile. This implication should not be seen as a golden rule to success because many companies also need more technical focused IEM graduates, therefore a potential adaption of curricula need to be streamlined to the overall educational strategy of the HEIs.

In a future repetition of the inquiry conducted within the framework of this thesis the questions regarding the types of career entry of, the further education undertaken by, and the initial gross salary questions to IEM professionals need to be revised. A future study could also be conducted through the collaboration with an institute of psychology. By doing so a in-depth analysis with all statistical and psychological analysis methods could be achieved.

For future research, the sample size of IEM graduates could be defined more precisely as there are no statistics that could indicate any numbers. It was therefore relied upon WING members, IEM students and registered alumni IEMs. Furthermore, now that all IEM degree programs on HEIs in Austria have been detected and therefore transparency subsists, students and graduates of these IEM degree programs should be invited to the future inquiry.

Also the deans of the detected IEM degree programs should be comprised in the WING and invited to specify the fulfillment of IEM quality standards according to the WING on all official public relation media. On the other hand, the WING should publish the specific IEM degree programs on its homepage, best by publishing the synoptically table with all relevant information of the IEM degree programs and links to the respective homepages.

During this study it was difficult to find the specific 3-countries declaration with the quality recommendations in form of specific percentages of subject categories. It is also advised to publish all these relevant information together with all declarations and the job specification on public media, best on the WING homepage.

The establishment of a common belonging to the IEM society/professional community should be fostered among all detected IEM degree program students and graduates in order to improve the WING as representing organ.

The focus of the IEM professionals and students survey was on Austrian IEMs, but in future, this survey could also be conducted across borders to make comparisons possible. Having appraised current IEM degree programs in Austria, defined the WING model as an analysis tool, set rules and limits within a still dynamic “degree program market”, conducting a future study in other countries could result in a map of “many different names – and many different faces” [**16**] of IEM degree programs to help gain transparency throughout Europe. Furthermore this would go along with the European strategy to cooperate in quality assurance topics, which could build the basis for future exchange of researchers, doctoral students and cross border cooperation in research.

6 Bibliography

[1] ZADEK, H.; RISSE, J.: Führungskräfte für ein integriertes Management, Berlin 2002

[2] NEUE ZÜRCHER ZEITUNG: Wirtschaftsingenieur - Generalist mit Marktübersicht, http://www.nzz.ch/aktuell/startseite/articleEJ6ZJ-1.66579, retrieved: 10.01.2014

[3] DIE VEREINIGUNG WIRTSCHAFTSINGENIEURE SCHWEIZ: Die Vereinigung Wirtschaftsingenieure Schweiz,. http://www.wi-tag.ch/index.php/die-vereinigung, retrieved: 10.01.2014

[4] WALLNER, W.; 200 Jahre TU Graz, 2nd Edition, Graz 2013

[5] UNIVERSITÄTSARCHIV TU WIEN: Kurze Geschichte der Technischen Universität Wien, http://www.tuwien.ac.at/dle/archiv/geschichte_der_tu_wien/, retrieved: 10.01.2014

[6] LANDESPOLIZEIDIREKTION STEIERMARK: Historischer Vereinsregisterauszug vom "Österreichischer Verband der Wirtschaftsingenieure", Graz 2014

[7] ÖSTERREICHISCHE VERBAND DER WIRTSCHAFTSINGENIEURE (WING): WING - die Wirtschaftsingenieure, http://www.wing-online.at/, retrieved: 10.01.2014

[8] JUNGWIRTH, W.; HOLZINGER, H.: 15 Jahre Fachhochschule in Österreich, 1st Edition, Vienna 2009

[9] BUNDESMINISTERIUM FÜR WISSENSCHAFT UND FORSCHUNG - ÖSTERREICH: Europäische Prioritäten in der Hochschulbildung bis 2020, http://www.bmwf.gv.at/startseite/studierende/studieren-im-europaeischen-hochschulraum/bologna-prozess/europaeische-prioritaeten-in-der-hochschulbildung-bis-2020/schwerpunkte-2012-2015/, retrieved: 12.01.2014

[10] EUROPEAN HIGHER EDUCATION AREA: The Bologna Declaration of 19 June 1999, http://www.ehea.info/Uploads/Declarations/BOLOGNA_DECLARATION1.pdf, retrieved: 12.01.2014

[11] BAUER, U.; FÜRST, A.; ZUNK, B., M.: Ausbildungslandschaft, Berufsbild, Karriereweg und Qualifikationsprofil von Wirtschaftsingenieuren, Graz 2010.

[12] CZICHOS, H.: Die Ingenieurwissenschaft - Ihr Profil in Technik und Gesellschaft, Studium und Beruf, 32nd Edition, Heidelberg 2004

[13] COMBLEY, R.: Cambridge Business English Dictionary, Cambridge (UK) 2011.

[14] INSTITUTE OF INDUSTRIAL ENGINEERS: About IIE, http://www.iienet2.org/details.aspx?id=282, retrieved: 13.01.2014

[15] ROKKJAER, O. et al.: Industrial Engineering Standards in Europe, Proceedings of WEE2011, Lisbon 2011.

[16] EUROPEAN STUDENTS OF INDUSTRIAL ENGINEERING AND MANAGEMENT: About ESTIEM, https://www.estiem.org/default.aspx?PageId=523, retrieved: 13.01.2014

[17] SCHUCHARDT, C. et al.: Qualifikationsrahmen Wirtschaftsingenieur, 2012.

[18] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT - OECD: Revised Field of Science and Technology (FOS) Classification in the Frascati Manual, 2007

[19] EUROPEAN COMMISSION: European Qualification Framework - Key Terms, http://ec.europa.eu/eqf/terms_en.htm, retrieved: 13.01.2014

[20] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT - OECD: The Definition and Selection of Key Competencies, Executive Summary, 2003

[21] RYCHEN, D., S.; SALGANIK, L., H.: Key competencies for a successful life and a well-functioning society, Göttingen 2003

[22] HILLAGE, J.; POLLARD, E.: Employability: Developing a Framework for Policy Analysis, Research Brief No.85, UK 1998

[23] LONDON COMMUNIQUÉ: Towards the European Higher Education Area: responding to challanges in a globalised world, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/MDC/London_Communique18May2007.pdf, retrieved: 14.01.2014

[24] EUROPEAN HIGHER EDUCATION AREA: The Bologna Declaration of 19 June 1999, http://www.ehea.info/Uploads/Declarations/BOLOGNA_DECLARATION1.pdf, retrieved: 12.01.2014

[25] EUROPEAN HIGHER EDUCATION AREA: Bologna Process - European Higher Education Area / History, http://www.ehea.info/article-details.aspx?ArticleId=3, retrieved: 14.01.2014

[26] COMMUNIQUÉ OF THE MEETING OF EUROPEAN MINISTERS IN CHARGE OF HIGHER EDUCATION, PRAGUE, 19 MAY 2001: Towards the European Higher Education Area, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/MDC/PRAGUE_COMMUNIQUE.pdf, retrieved: 14.01.2014

[27] EUROPA - SUMMARIES OF EU LEGISLATIONS: The Bologna process: setting up the European Higher Education Area, http://europa.eu/legislation_summaries/education_training_youth/general_framework/c11088_en.htm, retrieved: 14.01.2014

[28] COMMUNIQUÉ OF THE CONFERENCE OF MINISTERS RESPONSIBLE FOR HIGHER EDUCATION: Realising the European Higher Education Area, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/MDC/Berlin_Communique1.pdf, retrieved: 14.01.2014

[29] EUROPEAN COMMISSION: The European Qualification Framework for Lifelong Learning (EQF), Report ISBN 978-92-79-08474-4, Luxembourg 2008.

[30] BUNDESMINISTERIUM FÜR WISSENSCHAFT UND FORSCHUNG: Austrian EQF Referencing Report, 2011

[31] EUROPEAN HIGHER EDUCATION AREA: EHEA Archive, http://archive.ehea.info/folder?year_selected=4&issued_by=349, retrieved: 14.01.2014

[32] COMMUNIQUÉ OF THE CONFERENCE OF EUROPEAN MINISTERS RESPONSIBLE FOR HIGHER EDUCATION, BERGEN, 19-20 MAY 2005: The European Higher Education Area - Achieving the Goals, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/MDC/050520_Bergen_Communique1.pdf, retrieved: 15.01.2014

[33] EUROPEAN COMMISSION: Education and Training, http://ec.europa.eu/education/tools/ects_en.htm, retrieved: 15.01.2014

[34] EUROPEAN HIGHER EDUCATION AREA: The fremework of qualifications for the European Higher Education Area, http://www.ehea.info/Uploads/Documents/QF-EHEA-May2005.pdf, retrieved: 15.01.2014

[35] COMMUNIQUÉ OF THE CONFERENCE OF EUROPEAN MINISTERS RESPONSIBLE FOR HIGHER EDUCATION, LEUVEN AND LOUVAIN-LA-NEUVE, 28-29 APRIL 2009: The Bologna Process 2020 - The European Higher Education Area in the new decade, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/conference/documents/Leuven_Louvain-la-Neuve_Communiqu%C3%A9_April_2009.pdf, retrieved: 15.01.2014

[36] EUROPEAN HIGHER EDUCATION AREA: Members, http://www.ehea.info/members.aspx, retrieved: 15.01.2014

[37] EUROPA - SUMMARIES OF EU LEGISLATION: European Qualification Framework, http://europa.eu/legislation_summaries/education_training_youth/vocational_training/c11104_en.htm, retrieved: 15.01.2014

[38] MCDANIEL, JR. C.; GATES, R.: Marketing Research Essentials, 8th Edition, USA 2012

[39] KUß, A.; EISEND, M.: Marktforschung - Grundlagen der Datenerhebung und Datenanalyse, 3rd Edition, Wiesbaden 2010

[40] KOTLER, P.; KELLER, K., L.: Marketing Management, 14th Edition, Harlow (UK) 2012

[41] HAGUE, P.; JACKSON, P.: Merket Research: A Guide to Planning, Methodology, and Evaluation, 2nd Edition, London (UK) 1999

[42] HABERFELLNER, R.; FRICKE, E.; DE WECK, O.; VÖSSNER, S.: Systems Engineering: Grundlagen und Anwendung, Zürich (CH) 2012

[43] KUCKARTZ, U.; RÄDIKER, S.; EBERT, T.; SCHEHL, J.: Statistik - Eine verständliche Einführung, 1st Edition, Wiesbaden 2010

[44] EUROPEAN COMMISSION: Enterprise and Industry, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm, retrieved: 20.01.2014

[45] WIRTSCHAFTSKAMMER ÖSTERREICH: ÖNACE 2008 - Neue Klassifikation der Wirtschaftstätigkeiten, https://www.wko.at/Content.Node/Interessenvertretung/ZahlenDatenFakten/OeNACE_2008_-_Neue_Klassifikation_der_Wirtschaftstaetigkei.html, retrieved: 15.06.2013

[46] INDUSTRIE MAGAZIN: Die besten Fachhochschulen 2014, http://www.industriemagazin.at/rankings/fh, retrieved: 10.03.2014

[47] STATISTIK AUSTRIA: Jährliche Personeneinkommen, http://www.statistik.at/web_de/statistiken/soziales/personen-einkommen/jaehrliche_personen_einkommen/, retrieved: 01.03.2014

Table of Figures

List of Tables

List of abbreviations

BA	Bachelor degree program
Bac.	Bachelor
BFI	Berufsförderungsinstitut
BSc	Bachelor of Science title
ca.	Circa
CAX	Computer-aided x
CE	Civil engineering
CEO	Chief executive officer
ChE	Chemistry engineering
CIS	Computer and Information Sciences
DeSeCo	Definition and selection of competencies
Dipl.-Ing.	Diplomingenieur title
Dipl.-Ing. (FH)	Diplomingenieur title of a University of Applied Sciences
Dr.	Doctor title
e.g.	Example given
ECTS	European credit transfer system
EE	Electrical/Electronic engineering
EHEA	European higher education area
ENE	Environmental engineering
EQF	European qualification framework
ERA	European research area
ESTIEM	European students of industrial engineering and management
etc.	Etcetera
EU	European Union
FH	Fachhochschule (University of Applied Sciences in German)
FHW	Fachhochschule Wien
FMEA	Failure mode and effect analysis

FOO	Fields of operation
HEI	Higher education institution
HR	Human ressource
i.e.	Id est (that is)
I.M.a.B.A.	Industrial management and business administration
IE	Industrial engineering
IEM	Industrial engineering and management
IESE	Industrial engineering standards in Europe
IIE	Institute of industrial engineering
incl.	Including
IPR	Intellectual property rights
IT	Information technology
JQI	Joint quality institute
M	Management
MA	Master degree program
Mag.	Magister title
MBA	Master of business administration
MCI	Management center Innsbruck
MEP	Mechanical engineering and production
MSc	Master of Science title
n.s.	Not specificated
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne
NQF	National qualification framework
OECD	Organisation for economic co-operation and development
P.E.	Petroleum engineering
PhD	Doctor of philosophy
PISA	Program for international student assessment

PR	Public relations
QF	Qualification framework
R&D	Research and development
TQM	Total quality management
TUG	University of Technology Graz
TUW	University of Technology Vienna
UAS	University of Applied Sciences
UK	United Kingdom
USA	United States of America
VWI	German alumni association of IEM
VWI CH	Swiss alumni association of IEM
WI	Wirtschaftsingenieurwesen
WING	Austrian alumni association of IEM

Appendix

Appendix A: Methodological steps and results of the IEM degree program Analysis

The Excel-Sheet is incorporated in the printed version of the thesis on the back cover as DIN A0 format as well as PDF on the attached CD on the penultimate page.

Criteria and Informations for the respective phase	Austrian accredited Universities and Universities of Applied Sciences	
	In Austria registered foreign Universities and their degree programs were not taken into consideration because they should be taken into consideration in their homecountry studies.	
	No pedagogical, theological, religious and military colleges and academies considered.	
	HEI excluded because of their nomenclature which refers neither to a technical nor to a technical-economics HEI.	n = 21
	HEI which can not be classified by their nomenclature and have to be taken into analysis-phase 2	n = 13
	HEI which already have been analyzed in the study of 2010 or potentially have IEM degree programs	n = 19

Step 1

Higher Education Institutions in Austria (German nomenclature)	Type of Higher Education Institution
Campus 02 Fachhochschule der Wirtschaft	University of Applied Sciences, **n = 20**
Fachhochschule Burgenland	University of Applied Sciences
Fachhochschule Campus Wien	University of Applied Sciences
Fachhochschule des bfi Wien	University of Applied Sciences
Fachhochschule FHWien	University of Applied Sciences
Fachhochschule Joanneum	University of Applied Sciences
Fachhochschule Kärnten	University of Applied Sciences
Fachhochschule Kufstein Tirol	University of Applied Sciences
Fachhochschule Salzburg	University of Applied Sciences
Fachhochschule St. Pölten	University of Applied Sciences
Fachhochschule Technikum Wien	University of Applied Sciences
Fachhochschule Vorarlberg	University of Applied Sciences
Fachhochschule Wiener Neustadt für Wirtschaft und Technik	University of Applied Sciences
Ferdinand Porsche Fern-FH (FFH)	University of Applied Sciences
Fachhochschule Gesundheitsberufe Oberösterreich	University of Applied Sciences
Fachhochschule Oberösterreich	University of Applied Sciences
FHG-Zentrum für Gesundheitsberufe Tirol	University of Applied Sciences
IMC Fachhochschule Krems	University of Applied Sciences
Lauder Business School	University of Applied Sciences
MCI Management Center Innsbruck	University of Applied Sciences
Akademie der bildenden Künste Wien	Public University, **n = 22**
Alpen-Adria Universität Klagenfurt	Public University
Donau-Universität Krems, Universität für Weiterbildung	Public University
Johannes Kepler Universität Linz	Public University
Medizinische Universität Graz	Public University
Medizinische Universität Innsbruck	Public University
Medizinische Universität Wien	Public University
Montanuniversität Leoben	Public University
Technische Universität Graz	Public University
Technische Universität Wien	Public University
Universität für angewandte Kunst Wien	Public University
Universität für Bodenkultur Wien	Public University
Universität für künstlerische und industrielle Gestaltung Linz	Public University
Universität für Musik und darstellende Kunst Graz	Public University
Universität für Musik und darstellende Kunst Wien	Public University
Universität Graz	Public University
Universität Innsbruck	Public University
Universität Mozarteum Salzburg	Public University
Universität Salzburg	Public University
Universität Wien	Public University
Veterinärmedizinische Universität Wien	Public University
Wirtschaftsuniversität Wien	Public University
Danube Private University	Private University, **n = 11**
Anton Bruckner Privatuniversität Linz	Private University
Katholisch-Theologische Privatuniversität Linz	Private University
Konservatorium Wien Privatuniversität	Private University
Modul University Vienna	Private University
New Design University - Privatuniversität der Kreativwirtschaft	Private University
Paracelsus Medizinische Privatuniversität	Private University
Private Universität für Gesundheitswissenschaften, Medizinische Informatik und Technik (UMIT)	Private University
Privatuniversität Schloss Seeburg	Private University
Sigmund Freud Privat Universität	Private University
Webster University Vienna Privatuniversität	Private University
n = 53	

Translation of Higher Education Institution Nomenclatures

Higher Education Institutions (German)	Higher Education Institutions (Englisch)	Type of Higher Education Institution
Campus 02 Fachhochschule der Wirtschaft	Campus 02 University of Applied Sciences	University of Applied Sciences
Fachhochschule Burgenland	FH Burgenland University of Applied Sciences	University of Applied Sciences
Fachhochschule Campus Wien	University of Applied Sciences FH Campus Wien	University of Applied Sciences
Fachhochschule des bfi Wien	University of Applied Sciences BFI Vienna	University of Applied Sciences
Fachhochschule FHWien	FH Wien University of Applied Sciences	University of Applied Sciences
Fachhochschule Joanneum	FH Joanneum University of Applied Sciences	University of Applied Sciences
Fachhochschule Kärnten	Carinthia University of Applied Sciences	University of Applied Sciences
Fachhochschule Kufstein Tirol	University of Applied Sciences Kufstein	University of Applied Sciences
Fachhochschule Salzburg	Salzburg University of Applied Sciences	University of Applied Sciences
Fachhochschule St. Pölten	St. Pölten University of Applied Sciences	University of Applied Sciences
Fachhochschule Technikum Wien	University of Applied Sciences Technikum Wien	University of Applied Sciences
Fachhochschule Vorarlberg	Vorarlberg University of Applied Sciences	University of Applied Sciences
Fachhochschule Wiener Neustadt für Wirtschaft und Technik	University of Applied Sciences Wiener Neustadt	University of Applied Sciences
Ferdinand Porsche Fern-FH (FFH)	Ferdinand Porsche Fern-FH	University of Applied Sciences
Fachhochschule Gesundheitsberufe Oberösterreich	University of Applied Sciences for Health Professions Upper Austria	University of Applied Sciences
Fachhochschule Oberösterreich	University of Applied Sciences Upper Austria	University of Applied Sciences
FHG-Zentrum für Gesundheitsberufe Tirol	University of Applied Sciences Tyrol	University of Applied Sciences
IMC Fachhochschule Krems	IMC University of Applied Sciences Krems	University of Applied Sciences
Lauder Business School	Lauder Business School	University of Applied Sciences
MCI Management Center Innsbruck	MCI Management Center Innsbruck	University of Applied Sciences
Akademie der bildenden Künste Wien	Academy of fine arts vienna	Public University
Alpen-Adria Universität Klagenfurt	Alpen-Adria University Klagenfurt	Public University
Donau-Universität Krems, Universität für Weiterbildung	Danube University Krems, University for Continuing Education	Public University
Johannes Kepler Universität Linz	Johannes Kepler University Linz	Public University
Medizinische Universität Graz	Medical University of Graz	Public University
Medizinische Universität Innsbruck	Medical University of Innsbruck	Public University
Medizinische Universität Wien	Medical University of Vienna	Public University
Montanuniversität Leoben	University of Mining Leoben	Public University
Technische Universität Graz	Graz University of Technology	Public University
Technische Universität Wien	Vienna University of Technology	Public University
Universität für angewandte Kunst Wien	University of Applied Arts Vienna	Public University
Universität für Bodenkultur Wien	University of Natural Resources and Life Sciences, Vienna	Public University
Universität für künstlerische und industrielle Gestaltung Linz	The University of Art and Design Linz	Public University
Universität für Musik und darstellende Kunst Graz	University of Music and Performing Arts Graz	Public University
Universität für Musik und darstellende Kunst Wien	University of Music and Performing Arts Vienna	Public University
Universität Graz	University of Graz	Public University
Universität Innsbruck	University of Innsbruck	Public University
Universität Mozarteum Salzburg	Mozarteum University Salzburg	Public University
Universität Salzburg	Paris Lodron University of Salzburg	Public University
Universität Wien	University of Vienna	Public University
Veterinärmedizinische Universität Wien	University of Veterinary Medicine, Vienna	Public University
Wirtschaftsuniversität Wien	Vienna University of Economics and Business	Public University
Danube Private University	Danube Private University	Private University
Anton Bruckner Privatuniversität Linz	Anton Bruckner Private University	Private University
Katholisch-Theologische Privatuniversität Linz	Catholic-Theologic Privat University Linz	Private University
Konservatorium Wien Privatuniversität	Konservatorium Wien University	Private University
Modul University Vienna	Modul University Vienna	Private University
New Design University - Privatuniversität der Kreativwirtschaft	New Design University St.Pölten	Private University
Paracelsus Medizinische Privatuniversität	Paracelsus Medical University in Salzburg	Private University
Private Universität für Gesundheitswissenschaften, Medizinische Informatik und Technik (UMIT)	UMIT - The Health & Life Sciences University	Private University
Privatuniversität Schloss Seeburg	Privat University Schloss Seeburg	Private University
Sigmund Freud Privat Universität	Sigmund Freud University Vienna	Private University
Webster University Vienna Privatuniversität	Webster University Vienna	Private University

HEI has to be a technical HEI or the degree program has to be supported by a technical HEI, therefore all degree programs from technical, economical and techno-economical HEI have to be checked.

HEI which did not have any potential IEM degree program	n=9
HEI which have potential IEM degree programs	n=23

Step 2

Higher Education Institutions in Austria (German nomenclature)	Type of Higher Education Institution	Comment
Campus 02 Fachhochschule der Wirtschaft	University of Applied Sciences, **n = 19**	
Fachhochschule Burgenland	University of Applied Sciences	
Fachhochschule Campus Wien	University of Applied Sciences	
Fachhochschule des bfi Wien	University of Applied Sciences	No Engineering degree programs
Fachhochschule FHWien	University of Applied Sciences	No Engineering degree programs
Fachhochschule Joanneum	University of Applied Sciences	
Fachhochschule Kärnten	University of Applied Sciences	
Fachhochschule Kufstein Tirol	University of Applied Sciences	
Fachhochschule Salzburg	University of Applied Sciences	
Fachhochschule St. Pölten	University of Applied Sciences	
Fachhochschule Technikum Wien	University of Applied Sciences	
Fachhochschule Vorarlberg	University of Applied Sciences	
Fachhochschule Wiener Neustadt für Wirtschaft und Technik	University of Applied Sciences	
Ferdinand Porsche Fern-FH (FFH)	University of Applied Sciences	
Fachhochschule Oberösterreich	University of Applied Sciences	
FHG-Zentrum für Gesundheitsberufe Tirol	University of Applied Sciences	No Engineering degree programs
IMC Fachhochschule Krems	University of Applied Sciences	
Lauder Business School	University of Applied Sciences	No Engineering degree programs
MCI Management Center Innsbruck	University of Applied Sciences	
Alpen-Adria Universität Klagenfurt	Public University, **n = 9**	
Donau-Universität Krems, Universität für Weiterbildung	Public University	Only postgraduale Edcuation
Johannes Kepler Universität Linz	Public University	
Montanuniversität Leoben	Public University	
Technische Universität Graz	Public University	
Technische Universität Wien	Public University	
Universität Innsbruck	Public University	
Universität Salzburg	Public University	
Universität Wien	Public University	
Danube Private University	Private University, **n = 4**	No Engineering degree programs
Modul University Vienna	Private University	No Engineering degree programs
Privatuniversität Schloss Seeburg	Private University	No Engineering degree programs
Webster University Vienna Privatuniversität	Private University	No Engineering degree programs
n = 32		

Degree programs whose nomenclature implie a possible IEM degree program according to the WING job definition of IEM and the OECD engineering and technology field of science

Degree program or combination of BA + MA which does not fullfill the minimum quality requirement of min. 50% technical- and min. 20% economics- subjects	n = 48
Degree program or BA + MA combination, which is +/- 4% distant to the quality limit of 50 % or 80% technical subjects	n = 45
Degree program or BA + MA combination, which fulfills the minimum quality requirement of min. 50% technical- and min. 20% economics-subjects	n = 61

Step 3

	Higher Education Institution	Degree program	BA/MA	Percent technical subjects	Percent Economics and Integration subjects	Comment
Universities of Applied Sciences, n = 15	Campus 02 University of Applied Sciences	Automatisierungstechnik	BA	84	16	Goes to step 4
		Automatisierungstechnik	MA	50	50	Goes to step 4
		Automatisierungstechnik	BA+MA	73,2	26,8	Goes to step 4
		Wirtschaftsinformatik	BA	80	20	Goes to step 4
		IT & Wirtschaftsinformatik	MA	56,7	43,3	Goes to step 4
		Wirtschaftsinformatik + IT & Wirtschaftsinformatik	BA+MA	73,5	26,5	Goes to step 4
		Innovationsmanagement	BA	73	27	Goes to step 4
		Innovationsmanagement	MA	16,5	83,5	Own degree program, not connected to BA degree program, dean did not want to analyze it
		Innovationsmanagement	BA+MA	57,4	42,6	Doe to the MA was not analyzed, the combination becomes irrelevant
	FH Burgenland University of Applied Sciences	IT Infrastruktur-Management	BA	85,5	14,5	
		Information, Medien & Kommunikation	BA			No IEM degree program, to much focus on media/publishing
		Information Medien Kommunikation	MA			No IEM degree program, to much focus on media/publishing
		Energie- und Umweltmanagement	BA	86,3	13,7	Goes to phase 4 because is combined with MA Energie- und Umweltmanagement
		Energie- und Umweltmanagement	MA	64,6	35,4	Goes to step 4
		Energie- und Umweltmanagement	BA+MA	78,3	21,7	Goes to step 4
		Gebäudetechnik und Gebäudemanagement	MA	60,7	39,3	Goes to step 4
		Nachhaltige Energiesysteme	MA	62,4	37,6	Goes to step 4
		Business Process Engineering & Management	MA	72,9	27,1	Dean accepts also BA economics programs as prerequisite for MA -> no IEM degree program
	University of Applied Sciences, FH Campus Wien	Clinical Engineering	BA	79	21	In internal meeting decided to not analyze because to much focus in hospital management
		High Tech Manufacturing	BA	81,6	18,4	Dean said, it is not seen as IEM degree program
		High Tech Manufacturing	MA	75,2	24,8	Dean said, it is not seen as IEM degree program
		High Tech Manufacturing	BA+MA	78,7	21,3	Dean said, it is not seen as IEM degree program
		Informationstechnologien und Telekommunikation	BA	93,3	6,7	
		Embedded Systems Engineering	MA	89,1	10,9	
		Health Assisting Engineering	MA			No IEM degree program, to much focus on medical science
		Technisches Management	MA	60,6	39,4	Goes to step 4
		Bauingenieurwesen - Baumanagement	BA	77,9	22,1	Dean said, it is not seen as IEM degree program
		Green Building	BA	90,8	9,2	
		Bautechnische Abwicklung internationaler Großprojekte	MA	60,2	39,8	Dean said, it is not seen as IEM degree program
		Nachhaltigkeit in der Bautechnik	MA	65,5	34,5	Dean said, it is not seen as IEM degree program
		IT-Security	MA	81,5	18,5	Not considered because to technical focus together with bachelor
	FH Joanneum University of Applied Sciences	Software Design	BA	83,7	16,3	Dean said, it is not seen as IEM degree program
		Informationsmanagement	BA	87,2	12,8	Dean said, it is not seen as IEM degree program
		Informationsmanagement	MA	70,5	29,5	Dean said, it is not seen as IEM degree program
		Informationsmanagement	BA+MA	80,1	19,9	Dean said, it is not seen as IEM degree program
		Digitale Persönliche Assistenzsysteme	BA	86,8	13,2	
		Advanced Security Engineering	MA	97,8	2,2	
		Produktionstechnik und Organisation	BA	93,8	6,2	
		Elektronik und Technologiemanagement	BA	89,1	10,9	
		Advanced Electronic Engineering	MA	88,4	11,6	
		Engineering and Production	MA	73,5	26,5	Dean said, it is not seen as IEM degree program
		Bauplanung und Bauwirtschaft	BA	88,6	11,4	Dean said, it is not seen as IEM degree program
		Energie-, Verkehrs- und Umweltmanagement	BA	76	24	Goes to step 4
		Baumanagement und Ingenieurbau	MA	71,2	28,8	Dean said, it is not seen as IEM degree program
		Energy and Transport Management	MA	51,1	48,9	Goes to step 4
		Industriewirtschaft / Industrial Management	BA	58,6	41,4	Goes to step 4
		International Industrial Management	MA	42,2	57,8	Goes to phase 4 because is combined with BA Industriewirtschaft / Industrial Management
	Carinthia University of Applied Sciences	Systems Engineering	BA	88,1	11,9	
		Wirtschaftsingenieurwesen	BA	66,9	33,1	Goes to step 4
		Communication Engineering	MA	81,5	18,5	Dean said, it is not seen as IEM degree program
		Electrical Engineering & Mobility Systems	MA	100	0	
		Spatial Information Management	MA	91,8	8,2	
		Systems Design	MA	91,6	8,4	
	University of Applied Sciences Kufstein	Wirtschaftsingenieurwesen	BA	68	32	Goes to step 4
	Salzburg University of Applied Sciences	Holztechnologie & Holzbau	BA	79,8	20,2	Goes to step 4
		Holztechnologie & Holzwirtschaft	MA	59,7	40,3	Goes to step 4
		Holztechnologie- & Holzbau & Holzwirtschaft	BA+MA	72	28	Goes to step 4
		Informationstechnik & System-Management	BA	84,5	15,5	In internal meeting decided to not analyze because already to much technical subjects
		Informationstechnik & System-Management	MA	80,5	19,5	In internal meeting decided to not analyze because already to much technical subjects
		Informationstechnik & System-Management	BA+MA	83	17	In internal meeting decided to not analyze because already to much technical subjects
	St. Pölten University of Applied Sciences	Industrial Simulation	BA+MA	88,8	11,2	
		IT Security	BA	75,8	24,2	Not considered because to focus is on IT and Integration subjects
		Information Security	MA	82,3	17,7	Not considered because to focus is on IT and Integration subjects
		IT Security + Information Security	BA+MA	78,2	21,8	Not considered because to focus is on IT and Integration subjects
		Eisenbah- Infrastrukturtechnik	BA+MA	77	23	Not considered because only Integration subjects, almost no economics
	University of Applied Sciences Technikum Wien	Biomedical Engineering	BA	84,4	15,6	Not considered because focus on medical science and biology
		Biomedical Engineering Sciences	MA	78	22	Not considered because focus on medical science and biology
		Biomedical Engineering + Biomedical Engineering Sciences	BA+MA	82,1	17,9	Not considered because focus on medical science and biology
		Wirtschaftsinformatik	BA	63,5	36,5	Dean said, it is not seen as IEM degree program
		Wirtschaftsinformatik	MA	79,2	20,8	Dean said, it is not seen as IEM degree program
		Wirtschaftsinformatik	BA+MA	68,4	31,6	Dean said, it is not seen as IEM degree program
		Elektronik/Wirtschaft	BA	78,6	21,4	Dean said, it is not seen as IEM degree program
		Internationales Wirtschaftsingenieurwesen	BA	68,7	31,3	Goes to step 4
		Internationales Wirtschaftsingenieurwesen	MA	65	35	Goes to step 4
		Internationales Wirtschaftsingenieurwesen	BA+MA	67,3	32,7	Goes to step 4
		Informationsmanagement und Computersicherheit	MA	83,6	16,4	Not considered because to focus is on IT and Integration subjects
		Innovations- und Technologiemanagement	MA	63,3	36,7	Dean said, it is not seen as IEM degree program
		Technisches Umweltmanagement und Ökotoxikologie	MA	85,4	14,6	
	Vorarlberg University of Applied Sciences	Wirtschaftsingenieurwesen	BA	57,7	42,3	Goes to step 4
		Elektrotechnik, Elektronik - Mechatronik	BA	93,4	6,6	
		Energietechnik und Energiewirtschaft	MA	67	33	Dean said, it is not seen as IEM degree program
	University of Applied Sciences Wiener Neustadt	Wirtschaftsingenieur	BA	80,1	19,9	Goes to step 4
		Wirtschaftsingenieur	MA	59,4	40,6	Goes to step 4
		Wirtschaftsingenieur	BA+MA	69,9	30,1	Goes to step 4
		MedTech	MA	93,3	6,7	
		Regenerative Energie-Systeme	MA	78,3	21,7	Dean said, it is not seen as IEM degree program
	Ferdinand Porsche Fern-FH (FFH)	Wirtschaftsinformatik	BA	38,9	61,1	
		Wirtschaftsinformatik	MA	19,6	80,4	
	University of Applied Sciences Upper Austria	Innovations- und Produkt- management	BA	69,8	30,2	Goes to step 4
		Innovation Product Management	MA	51,7	48,3	Goes to step 4
		Innovations- und Produkt- m. + Innovation Product Man.	BA+MA	61,5	38,5	Goes to step 4
		Internationales Logistik-Management	BA	50,7	49,3	Dean said, it is not seen as IEM degree program
		Mechatronik/Wirtschaft	BA	83,6	16,4	Goes to step 4
		Mechatronik/Wirtschaft	MA	59	41	Goes to step 4
		Mechatronik/Wirtschaft	BA+MA	76,9	23,1	Goes to step 4
		Medizin- und Bioinformatik	BA	97,1	2,9	
		Produktion und Management	BA	60,5	39,5	In internal meeting decided to not analyze because no IEM, no engineering focus, only technology-related subjects
		Operations Management	MA	58,3	41,7	In internal meeting decided to not analyze because no IEM, accepts economic BA as requirement
		Supply Chain Management	MA	44,8	55,2	
	IMC University of Applied Sciences Krems	Medizinische und Pharmazeutische Biotechnologie	BA	97	3	
		Medizinische und Pharmazeutische Biotechnologie	MA	83,7	16,3	Not considered because focus on medical and pharmaceutical science and biology
	MCI Management Center Innsbruck	Management, Communication & IT	BA	46,8	53,2	Dean said, it is not seen as IEM degree program
		Management, Communication & IT	MA	63,15	36,85	Dean said, it is not seen as IEM degree program
		Management, Communication & IT	BA+MA	52,3	47,7	Dean said, it is not seen as IEM degree program
		Wirtschaftsingenieurwesen	BA	76,8	23,2	Goes to step 4
		Wirtschaftsingenieurwesen	MA	37,3	62,7	Goes to step 4
		Wirtschaftsingenieurwesen	BA+MA	62,7	37,3	Goes to step 4
Public Universities, n = 8	Alpen-Adria University Klagenfurt	Informationsmanagement	BA	59,2	40,8	Dean said, it is not seen as IEM degree program
		Informationsmanagement	MA	71,4	28,6	Dean said, it is not seen as IEM degree program
		Informationsmanagement	BA+MA	63,2	36,8	Dean said, it is not seen as IEM degree program
		Wirtschaftsingenieurwesen - Informationstechnik	BA	75	25	Goes to step 4
	Johannes Kepler University Linz	Technische Chemie	BA	93,1	6,9	Goes to step 4
		Wirtschaftsingenieurwesen - Technische Chemie	MA	61,6	38,4	Goes to step 4
		Technische Chemie + Wirtschaftsingenieurwesen - Technische Chemie	BA+MA	82,8	17,2	Goes to step 4
		Management in Polymer Technologies	MA	55,1	44,9	Dean said, it is not seen as IEM degree program
	University of Mining Leoben	Industrielogistik	BA	84,4	15,6	Goea also to phase 4 because dean wanted to analyze it
		Industrielogistik	MA	85,4	14,6	Goea also to phase 4 because dean wanted to analyze it
		Petroleum Engineering	BA	88,7	11,3	Goes to step 4
		Petroleum Engineering - Industrial Management and Business Administration	MA	10,5	89,5	Goes to step 4
		Petroleum Engineering + P.E. - I.M.a.B.A.	BA+MA	76,1	23,9	Goes to step 4
		Industrielle Energietechnik	BA	84	16	Goes to step 4
		Industrielle Energietechnik	MA	73,5	26,5	Goes to step 4
		Industrielle Energietechnik	BA+MA	81	19	Goes to step 4
		Metallurgie	BA	94,1	5,9	Goea also to phase 4 because dean wanted to analyze it
		Metallurgie - Industriewirtschaft I + II	MA	75	25	Goea also to phase 4 because dean wanted to analyze it
		Metallurgie + Metallurgie - Industriewirtschaft I + II	BA+MA	90,2	9,8	Goea also to phase 4 because dean wanted to analyze it
	Graz University of Technology	Bauingenieurwissenschaften, Umwelt und Wirtschaft	BA	95,2	4,8	Goes to step 4
		Wirtschaftsingenieurwesen Bauingenieurwissenschaften	MA	39,1	60,9	Goes to step 4
		Bauingenieurwissenschaften + Wirtschaftsingenieurwesen	BA+MA	77,9	22,1	Goes to step 4
		Elektrotechnik	BA	98,2	1,8	Goes to step 4
		Elektrotechnik Wirtschaft	MA	51,3	48,7	Goes to step 4
		Elektrotechnik + Elektrotechnik Wirtschaft	BA+MA	82,7	17,3	Goes to step 4
		Softwareentwicklung-Wirtschaft	BA	76,7	23,3	Goes to step 4
		Softwareentwicklung-Wirtschaft	MA	53,2	46,8	Goes to step 4
		Softwareentwicklung-Wirtschaft	BA+MA	73,6	26,4	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau	BA	88,7	11,3	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau	MA	58,8	41,2	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	78,3	21,7	Goes to step 4
		Production Science and Management	MA	63,5	36,5	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau + Production Science and Management	BA+MA	79,9	20,1	Goes to step 4
	Vienna University of Technology	Bauingenieurwesen und Infrastrukturmanagement	BA	87,9	12,1	Dean said, it is not seen as IEM degree program
		Bauingenieurwesen - Bauwirtschaft und Geotechnik	MA	81,8	18,2	Dean said, it is not seen as IEM degree program
		Bauingenieurwesen u. Infrastrukturm. + Infrastrukturpl. u. Management	BA+MA	86	14	Dean said, it is not seen as IEM degree program
		Wirtschaftsinformatik	BA	67,1	32,9	Goes to step 4
		Business Informatics	MA	69,8	30,2	Goes to step 4
		Wirtschaftsinformatik + Business Informatics	BA+MA	67,9	32,1	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau	BA	78,9	21,1	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau	MA	62,4	37,6	Goes to step 4
		Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	74,1	25,9	Goes to step 4
	University of Innsbruck	Wirtschaftsinformatik	BA+MA			Only composed of modules, no clear statement possible
	Paris Lodron University of Salzburg	Ingenieurwissenschaften (mit TU München)	BA	94	6	
	University of Vienna	Wirtschaftsinformatik	BA	72,8	27,2	In past did not see themself as IEM but more IT graduates
		Wirtschaftsinformatik	MA	64,3	35,7	In past did not see themself as IEM but more IT graduates
		Wirtschaftsinformatik	BA+MA	69,4	30,6	In past did not see themself as IEM but more IT graduates
n = 23		n = 154				

BA	n = 57
MA	n = 63
BA+MA	n = 34

All BA+MA degree program combinations and single potential IEM degree programs who passed phase 3 and degree programs mentioned by deans of IEM degree programs already certified as IEM degree program in 2010

New IEM degree programs, from 2010 till now, already certified by WING	n = 10
Already certified IEM BA or MA degree programs by WING in the 2010 study	n = 18
New potential IEM degree program as BA or MA or as BA prerequisite to an IEM Master	n = 25
Degree program analysed in 2010 but does not exist anymore	n = 5
Combinations of BA + MA degree programs	n = 23

Step 4

	Higher Education Institution	Degree Program	BA / MA	After analysis: % Technic	After analysis: % Economics	Fulfillment of quality criterias?
Universities of Applied Sciences n = 12	Campus 02 University of Applied Sciences	Automatisierungstechnik	BA	94,34	5,66	
		Automatisierungstechnik	MA	67,96	32,04	
		Automatisierungstechnik	BA+MA	86,96	13,04	No, over 80% technic
		Wirtschaftsinformatik	BA	73,6	26,4	
		IT & Wirtschaftsinformatik	MA	50	50	
		Wirtschaftsinformatik + IT & Wirtschaftsinformatik	BA+MA	67,35	32,65	Yes
		Innovationsmanagement	BA	67,44	32,56	Yes
	FH Burgenland University of Applied Sciences	Energie- und Umweltmanagement	BA	74,3	25,7	
		Energie- und Umweltmanagement	MA	67	33	
		Energie- und Umweltmanagement	BA+MA	71,65	28,35	Yes
		Gebäudetechnik und Gebäudemanagement	MA	BA prerequisite is 30 ECTS technic		No
		Nachhaltige Energiesysteme	MA	50	50	Yes
	University of Applied Sciences, FH Campus Wien	Technisches Management	MA	Never got any response by dean		No
	FH Joanneum University of Applied Sciences	Energie-, Verkehrs- und Umweltmanagement	BA	75,36	24,64	
		Energy and Transport Management	MA	62,04	37,96	
		Energie-, Verkehrs- und Umweltmanagement + Energy and T. M.	BA+MA	70,37	29,63	Yes
		Industriewirtschaft / Industrial Management	BA	62,31	37,69	
		International Industrial Management	MA	51,11	48,89	
		Industriewirtschaft / Ind. Man. + International Ind. Man.	BA+MA	57,73	42,27	Yes
	Carinthia University of Applied Sciences	Wirtschaftsingenieurwesen	BA	76,45	23,55	Yes
	University of Applied Sciences Kufstein	Wirtschaftsingenieurwesen	BA	68,06	31,94	Yes
	Salzburg University of Applied Sciences	Holztechnologie & Holzbau	BA	70,44	29,56	
		Holztechnologie & Holzwirtschaft	MA	49,35	50,65	
		Holztechnologie- & Holzbau & Holzwirtschaft	BA+MA	61,98	38,02	Yes
	University of Applied Sciences Technikum Wien	Internationales Wirtschaftsingenieurwesen	BA	61,58	38,42	
		Internationales Wirtschaftsingenieurwesen	MA	66,67	33,33	
		Internationales Wirtschaftsingenieurwesen	BA+MA	63,4	36,6	Yes
	Vorarlberg University of Applied Sciences	Wirtschaftsingenieurwesen	BA	50,59	49,41	Yes
	University of Applied Sciences Wiener Neustadt	Wirtschaftsingenieur	BA	77,1	22,9	
		Wirtschaftsingenieur (2 specializations are similar in % distribution)	MA	58,14	41,86	
		Wirtschaftsingenieur	BA+MA	69,59	30,41	Yes
	University of Applied Sciences Upper Austria	Innovations- und Produkt- management	BA	71,03	28,97	
		Innovation Product Management	MA	71,74	28,26	
		Innovations- und Produkt- m. + Innovation Product Man.	BA+MA	71,36	28,64	Yes
		Mechatronik/Wirtschaft	BA	83,04	16,96	
		Mechatronik/Wirtschaft	MA	54,23	47,77	
		Mechatronik/Wirtschaft	BA+MA	73,41	26,59	Yes
	MCI Management Center Innsbruck	Wirtschaftsingenieurwesen	BA	69,72	30,28	
		Wirtschaftsingenieurwesen	MA	55,56	44,44	
		Wirtschaftsingenieurwesen	BA+MA	64,22	35,78	Yes
Public Universities n = 5	Alpen-Adria University Klagenfurt	Wirtschaftsingenieurwesen - Informationstechnik	BA	78,52	21,48	Yes
	Johannes Kepler University Linz	Technische Chemie	BA	92,65	7,35	
		Wirtschaftsingenieurwesen - Technische Chemie	MA	56,38	43,62	
		Technische Chemie + Wirtschaftsingenieurwesen - Technische Chemie	BA+MA	79,7	20,3	Yes
	University of Mining Leoben	Industrielogistik	BA	48,66	51,34	
		Industrielogistik	MA	48,33	51,67	
		Industrielogistik	BA+MA	51,41	48,59	Yes
		Petroleum Engineering	BA	87,72	12,28	
		Petroleum Engineering - Industrial Management and Business Administration	MA	25	75	
		Petroleum Engineering + P.E. - I.M.a.B.A.	BA+MA	73,44	26,56	Yes
		Industrielle Energietechnik	BA	81,85	18,15	
		Industrielle Energietechnik	MA	67,22	32,78	
		Industrielle Energietechnik	BA+MA	76,89	23,11	Yes
		Metallurgie	BA	90,88	9,12	
		Metallurgie - Industriewirtschaft I + II	MA	72,5	27,5	
		Metallurgie + Metallurgie - Industriewirtschaft I + II	BA+MA	86,69	13,31	No, over 80% technic
	Graz University of Technology	Bauingenieurwissenschaften, Umwelt und Wirtschaft	BA	91,17	8,83	
		Wirtschaftsingenieurwesen Bauingenieurwissenschaften	MA	40,62	59,38	
		Bauingenieurwissenschaften + Wirtschaftsingenieurwesen	BA+MA	75	25	Yes
		Elektrotechnik	BA	95,05	4,95	
		Elektrotechnik Wirtschaft	MA	51,11	48,89	
		Elektrotechnik + Elektrotechnik Wirtschaft	BA+MA	79,96	20,04	Yes
		Softwareentwicklung-Wirtschaft	BA	74,7	25,3	
		Softwareentwicklung-Wirtschaft	MA	51	49	
		Softwareentwicklung-Wirtschaft	BA+MA	67,29	32,71	Yes
		Wirtschaftsingenieurwesen-Maschinenbau	BA	86,97	13,03	
		Wirtschaftsingenieurwesen-Maschinenbau	MA	58,34	41,66	
		Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	76,94	23,06	Yes
		Production Science and Management	MA	62,78	37,22	
		Wirtschaftsingenieurwesen-Maschinenbau + Production Science and M.	BA+MA	78,5	21,5	Yes
	Vienna University of Technology	Wirtschaftsinformatik	BA	63,7	36,3	
		Business Informatics	MA	68,1	31,9	
		Wirtschaftsinformatik + Business Informatics	BA+MA	65,2	34,8	Yes
		Wirtschaftsingenieurwesen-Maschinenbau	BA	75,89	24,11	
		Wirtschaftsingenieurwesen-Maschinenbau	MA	59,12	40,88	
		Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	63,73	36,27	Yes

Degree programs analyzed in 2010, which do not exist anymore

Higher Education Institution	Degree Program	BA / MA
University of Applied Sciences Wiener Neustadt	Supply Chain Management	MA
	Produktions- und Prozessmanagement	MA
	Technisches Produktmanagement	MA
FH Joanneum University of Applied Sciences	Architektur und Projektmanagement	MA
Johannes Kepler University Linz	Wirtschaftsingenieurwesen Kunststofftechnik	MA

Degree programs analyzed in 2010, which changed nomenclature

Higher Education Institution	Degree Program	BA / MA
Campus 02 University of Applied Sciences	Informationstechnologien und IT-Marketing -> Wirtschaftsinformatik	BA
Campus 02 University of Applied Sciences	Informationstechnologien und IT-Marketing -> IT & Wirtschaftsinformatik	MA

Results

	Higher Education Institution	Degree Program	BA / MA	% Technic	% Economics
Universities of Applied Sciences n = 11	Campus 02 University of Applied Sciences	Wirtschaftsinformatik + IT & Wirtschaftsinformatik	BA+MA	67,35	32,65
		Innovationsmanagement	BA	67,44	32,56
	FH Burgenland University of Applied Sciences	Energie- und Umweltmanagement	BA+MA	71,65	28,35
		Nachhaltige Energiesysteme	MA	50	50
	FH Joanneum University of Applied Sciences	Energie-, Verkehrs- und Umweltmanagement + Energy and T. M.	BA+MA	70,37	29,63
		Industriewirtschaft / Ind. Man. + International Ind. Man.	BA+MA	57,73	42,27
	Carinthia University of Applied Sciences	Wirtschaftsingenieurwesen	BA	76,45	23,55
	University of Applied Sciences Kufstein	Wirtschaftsingenieurwesen	BA	68,06	31,94
	Salzburg University of Applied Sciences	Holztechnologie- & Holzbau & Holzwirtschaft	BA+MA	61,98	38,02
	University of Applied Sciences Technikum Wien	Internationales Wirtschaftsingenieurwesen	BA+MA	63,4	36,6
	Vorarlberg University of Applied Sciences	Wirtschaftsingenieurwesen	BA	50,59	49,41
	University of Applied Sciences Wiener Neustadt	Wirtschaftsingenieur	BA+MA	69,59	30,41
	University of Applied Sciences Upper Austria	Innovations- und Produkt- m. + Innovation Product Man.	BA+MA	71,36	28,64
		Mechatronik/Wirtschaft	BA+MA	73,41	26,59
	MCI Management Center Innsbruck	Wirtschaftsingenieurwesen	BA+MA	64,22	35,78
Public Universities n = 5	Alpen-Adria University Klagenfurt	Wirtschaftsingenieurwesen - Informationstechnik	BA	78,52	21,48
	Johannes Kepler University Linz	Technische Chemie + Wirtschaftsingenieurwesen - Technische Chemie	BA+MA	79,7	20,3
Universities of Technology n=3	University of Mining Leoben	Industrielogistik	BA+MA	51,41	48,59
		Petroleum Engineering + P.E. - I.M.a.B.A.	BA+MA	73,44	26,56
		Industrielle Energietechnik	BA+MA	76,89	23,11
	Graz University of Technology	Bauingenieurwissenschaften + Wirtschaftsingenieurwesen	BA+MA	75	25
		Elektrotechnik + Elektrotechnik Wirtschaft	BA+MA	79,96	20,04
		Softwareentwicklung-Wirtschaft	BA+MA	67,29	32,71
		Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	76,94	23,06
		Wirtschaftsingenieurwesen-Maschinenbau + Production Science and M.	BA+MA	78,5	21,5
	Vienna University of Technology	Wirtschaftsinformatik + Business Informatics	BA+MA	65,2	34,8
		Wirtschaftsingenieurwesen-Maschinenbau	BA+MA	63,73	36,27

Summary

BA	n = 5
MA	n = 1
BA+MA	n = 21
SUM	n = 27

Appendix B: Survey structure of online survey for IEM professionals and students

The survey structure of the online survey questionnaire is illustrated in the printed version of the thesis on the back cover as DIN A0 format as well as PDF on the attached CD on the penultimate page. The whole questionnaire in German language is displayed as PDF on the attached CD.

Appendix B: Survey structure of online survey for IEM professionals and students

Chapter: Initial questions

- **I am…**
  1. A: Student
  2. A: IEM professional on the job
  3. A: IEM professional retired

1 (A: Student)

- **Sex**
- **Age**

Chapter: Education

- **Specification of main attending degree program**

- A: Bachelor program

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Master program**
  - Negative → **On same UAS?**
    - Positive → **On other UAS in Austria?**
      - Positive → **On a University in Austria?**
        - Positive → **On a University or UAS abroad?**
        - Negative
      - Negative
    - Negative
  - Positive → **Assessment of will to study semester abroad**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Master program**
  - Negative → **On same University?**
    - Positive → **On other University in Austria?**
      - Positive → **On a UAS in Austria?**
        - Positive → **On a University or UAS abroad?**
        - Negative
      - Negative
    - Negative
  - Positive → **Assessment of will to study semester abroad**

- A: Diploma program

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Doctorate program within 5 years after graduation**

- A: Diploma (FH) program

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Doctorate program within 5 years after graduation**

- A: Master

- **Type of Higher Education Institution on which Bachelor (before attending Master program) has been concluded**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

- **Type of Higher Education Institution on which the main Master program is attended**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Attend MA on same UAS where BA was concluded?**
  - Yes
  - No → **Place ➔ Country ➔ If in Austria, selection of exact UAS**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Doctorate program within 5 years after graduation**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Attend MA on same University where BA was concluded?**
  - Yes
  - No → **Place ➔ Country ➔ If in Austria, selection of exact University**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Doctorate program within 5 years after graduation**

- A: Magister

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Doctorate program within 5 years after graduation**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**
- **Already spent semester abroad ?**
  - Positive → **Assessment of will to study semester abroad**
  - Negative
- **Assessment of will to attend a Doctorate program within 5 years after graduation**

1. **Assessment of career and promotion opportunities for IEMs**
1. **Ideal share of technic and economics subjects**
1. **Integration subjects to expand and to reduce in IEM degree programs**
   (Fields where respondent could type in subjects to expand and to reduce)

WING inquiry (if WING member) ➔ END

2 (A: IEM professional on the job)

- **Sex**
- **Age**

Chapter: Education

- **Specification of awarded academic degrees**
  - Bachelor ☐ (Maximum = 2)
  - Master ☐ (Maximum = 2)
  - Magister ☐ (Maximum = 2)
  - Diploma (FH) ☐ (Maximum = 2)
  - Diploma ☐ (Maximum = 2)
  - Doctorale ☐ (Maximum = 2)

Bachelor “1” (If Answer was 1 or 2 at Bachelor)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Bachelor “2” (If Answer was 2 at Bachelor)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Master “1” (If Answer was 1 or 2 at Master)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Master “2” (If Answer was 2 at Master)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Magister “1” (If Answer was 1 or 2 at Magister)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Magister “2” (If Answer was 2 at Magister)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Diploma (FH) “1” (If Answer was 1 or 2 at Diploma (FH))

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

Diploma (FH) “2” (If Answer was 2 at Diploma (FH))

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

Diploma “1” (If Answer was 1 or 2 at Diploma)

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Diploma “2” (If Answer was 2 at Diploma)

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Doctorale “1” (If Answer was 1 or 2 at Doctorate)

- **Organization (writing place)**
- **Type of University**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Doctorale “2” (If Answer was 2 at Doctorate)

- **Organization (writing place)**
- **Type of University**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

- **Studied one or more semesters abroad?**
  - No
  - Yes → **Assessment of statements relating study experience abroad**

Chapter: Career entry and career path

- **Kind of career entry ➔ Kind of first contact** (If answer was “directly hired” or “through a trainee program”)
- **Specification of number of jobs until now** ☐ (Maximum = 10)

1st job

- **Year of entry**
- **Field of operation**
- **Leading position in this job?**
- **First annual gross salary**
- **Currency**
- **Variable salary quota**

2nd to 10th job

- **Year of entry**
- **Field of operation**
- **Leading position in this job?**

- **Geographical place of headquarter ➔ Country ➔ Province**
- **Number of employees of whole organization**
- **Industry in which whole organization is economically active ➔ Industry branch**
- **Specific workplace of IEM professionals ➔ Headquarter?**
  If “No” ➔ Geographical place ➔ Country ➔ Province
- **Industry in which organization of respondents work place is economically active ➔ Industry branch**

Chapter: Further education

- **Undertaken types of further education**
  - Further economics education ➔(Field where respondent could type in the most important)
  - Further individual education ➔(Field where respondent could type in the most important)
  - Further technic education ➔(Field where respondent could type in the most important)
  - Further linguistic education
  - Further integration education ➔(Field where respondent could type in the most important)

2. **Integration subjects to expand and to reduce in IEM degree programs**
   (Fields where respondent could type in subjects to expand and to reduce)
3. **Integration subjects to expand and to reduce in IEM degree programs**
   (Fields where respondent could type in subjects to expand and to reduce)

- **Most needed foreign languages throughout career**

Chapter: Competences needed on the job / adjustment requirements of education

2. **Assessment of career and promotion opportunities for IEMs**
3. **Assessment of career and promotion opportunities for IEMs**
2. **Ideal share of technic and economics subjects**
3. **Ideal share of technic and economics subjects**
2. **Ideal ratio of social and methodological competencies and expertise**
3. **Ideal ratio of social and methodological competencies and expertise**
2. **Importance of technic-economics subjects**
3. **Importance of technic-economics subjects**
2. **Importance of individual competencies in actual job**
3. **Importance of individual competencies in last job**

WING inquiry (if WING member) ➔ END

3 (A: IEM professional retired)

- **Sex**
- **Age**

Chapter: Education

Bachelor “1” (If Answer was 1 or 2 at Bachelor)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Bachelor “2” (If Answer was 2 at Bachelor)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Master “1” (If Answer was 1 or 2 at Master)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Master “2” (If Answer was 2 at Master)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Magister “1” (If Answer was 1 or 2 at Magister)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Magister “2” (If Answer was 2 at Magister)

- **Type of Higher Education Institution**

A: University of Applied Sciences

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

A: University

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Diploma (FH) “1” (If Answer was 1 or 2 at Diploma (FH))

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

Diploma (FH) “2” (If Answer was 2 at Diploma (FH))

- **Focus of University of Applied Sciences**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact UAS**

Diploma “1” (If Answer was 1 or 2 at Diploma)

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Diploma “2” (If Answer was 2 at Diploma)

- **Type of University**
- **Scientific discipline ➔ Educational direction**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Doctorale “1” (If Answer was 1 or 2 at Doctorate)

- **Organization (writing place)**
- **Type of University**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

Doctorale “2” (If Answer was 2 at Doctorate)

- **Organization (writing place)**
- **Type of University**
- **Place ➔ Country ➔ If in Austria, selection of exact University**

- **Studied one or more semesters abroad?**
  - No
  - Yes → **Assessment of statements relating study experience abroad**

Chapter: Career entry and career path

- **Kind of career entry ➔ Kind of first contact** (If answer was “directly hired” or “through a trainee program”)
- **Specification of number of jobs until now** ☐ (Maximum = 10)

1st job

- **Year of entry**
- **Field of operation**
- **Leading position in this job?**
- **First annual gross salary**
- **Currency**
- **Variable salary quota**

2nd to 10th job

- **Year of entry**
- **Field of operation**
- **Leading position in this job?**

- **Geographical place of headquarter ➔ Country ➔ Province**
- **Number of employees of whole organization**
- **Industry in which whole organization is economically active ➔ Industry branch**
- **Specific workplace of IEM professionals ➔ Headquarter?**
  If “No” ➔ Geographical place ➔ Country ➔ Province
- **Industry in which organization of respondents work place is economically active ➔ Industry branch**

Chapter: Further education

- **Undertaken types of further education**
  - Further economics education ➔(Field where respondent could type in the most important)
  - Further individual education ➔(Field where respondent could type in the most important)
  - Further technic education ➔(Field where respondent could type in the most important)
  - Further linguistic education
  - Further integration education ➔(Field where respondent could type in the most important)

2. **Integration subjects to expand and to reduce in IEM degree programs**
   (Fields where respondent could type in subjects to expand and to reduce)
3. **Integration subjects to expand and to reduce in IEM degree programs**
   (Fields where respondent could type in subjects to expand and to reduce)

- **Most needed foreign languages throughout career**

Chapter: Competences needed on the job / adjustment requirements of education

2. **Assessment of career and promotion opportunities for IEMs**
3. **Assessment of career and promotion opportunities for IEMs**
2. **Ideal share of technic and economics subjects**
3. **Ideal share of technic and economics subjects**
2. **Ideal ratio of social and methodological competencies and expertise**
3. **Ideal ratio of social and methodological competencies and expertise**
2. **Importance of technic-economics subjects**
3. **Importance of technic-economics subjects**
2. **Importance of individual competencies in actual job**
3. **Importance of individual competencies in last job**

WING inquiry (if WING member) ➔ END

Appendix C: Survey structure of online survey for HR managers

The questionnaire in German language of the online survey for HR manager is illustrated as PDF on the attached CD on the penultimate page.

Erhebung des Ausbildungs- und Karriereprofils von Wirtschaftsingenieuren/innen in Österreich

Herzlich willkommen!

Diese Umfrage ist Teil einer **Studie**, die **Ausbildungsprofil und beruflichen Werdegang** von Wirtschaftsingenieur/innen in Österreich untersucht. Die Studie wird im Auftrag des Österreichischen Verbandes der Wirtschaftsingenieure mit Unterstützung einer am Institut für Betriebswirtschaftslehre und Betriebssoziologie der TU Graz ablaufenden Diplomarbeit durchgeführt.

Die vorliegende **Umfrage** setzt sich aus **4 Kategorien** zusammen:

Kategorie 1: Angaben zu Ihrer Organisation

Kategorie 2: Die Wirtschaftsingenieur-Ausbildung in Österreich

Kategorie 3: Persönlichkeitsbezogene Fähigkeiten von Wirtschaftsingenieur-Absolventen/innen

Kategorie 4: Karrieremöglichkeiten von Wirtschaftsingenieuren/innen

Ziel der Studie ist, Ansatzpunkte für Verbesserungen in der Wirtschaftsingenieurausbildung an österreichischen Fachhochschulen und technischen Universitäten herauszuarbeiten. Gleichzeitig soll im Rahmen dieser Umfrage durch Ihre Stellungnahme als Personalverantwortliche/r das Profil des/der berufstätigen Wirtschaftsingenieurs/in geschärft werden. Aus diesem Grund ist Ihre Stellungnahme für die Aussagekraft der Studie zentral.

Selbstverständlich werden Ihre Angaben anonymisiert und sind deshalb nicht rückverfolgbar. Dafür garantieren wir.

Abschließend danken wir Ihnen, dass Sie sich für die Bearbeitung der Umfrage Zeit nehmen.

Sie unterstützen damit einerseits meine Diplomarbeit und andererseits den Österreichischen Verband der Wirtschaftsingenieure. Zudem tragen Sie mit Ihrer Unterstützung der Umfrage auch zur Erhaltung der hohen Qualität der Wirtschaftsingenieur-Ausbildung in Österreich bei.

Christoph Sadei

Diplomand bei Vizerektor o.Univ.-Prof. Dipl.-Ing. Dr.techn. Ulrich Bauer, Vorstand des Instituts für Betriebswirtschaftslehre und Betriebssoziologie der TU Graz.

Diese Umfrage dauert 8 Minuten.

Alle mit * markierten Fragen sind Pflichtfragen.

Diese Umfrage enthält 44 Fragen.

Einstiegsfragen

[G1_Q0001]

Geschlecht: *

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ weiblich
- ○ männlich

[G1_Q0002]

Alter: *

Jede Antwort muss zwischen 16 und 110 sein

Bitte geben Sie Ihre Antwort hier ein:

Kategorie 1: Angaben zu Ihrer Organisation

[G2_Q0001]

Wo befindet sich Ihr Arbeitsplatz? *

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Europa
- ○ Asien
- ○ Nordamerika
- ○ Südamerika
- ○ Afrika
- ○ Australien

[G2_Q0002]

Wo genau in Europa befindet sich Ihr Arbeitsplatz? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Europa' bei Frage '3 [G2_Q0001]' (Wo befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Österreich
- ○ Deutschland
- ○ Schweiz
- ○ Albanien
- ○ Andorra
- ○ Belarus
- ○ Belgien
- ○ Bosnien und Herzegowina
- ○ Bulgarien
- ○ Dänemark
- ○ Estland
- ○ Finnland
- ○ Frankreich
- ○ Griechenland
- ○ Irland
- ○ Island

- Italien
- Kasachstan
- Kosovo
- Kroatien
- Lettland
- Liechtenstein
- Litauen
- Luxemburg
- Malta
- Mazedonien
- Moldawien
- Monaco
- Montenegro
- Niederlande
- Norwegen
- Polen
- Portugal
- Rumänien
- San Marino
- Schweden
- Serbien
- Slowakei
- Spanien
- Tschechien
- Türkei
- Ukraine
- Ungarn
- Vatikanstaat
- Vereinigtes Königreich

[G2_Q0003]

In welchem österreichischen Bundesland befindet sich Ihr Arbeitsplatz? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Österreich' bei Frage '4 [G2_Q0002]' (Wo genau in Europa befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Wien
- ○ Tirol
- ○ Salzburg
- ○ Burgenland
- ○ Oberösterreich
- ○ Steiermark
- ○ Niederösterreich
- ○ Kärnten
- ○ Vorarlberg

[G2_Q0004]

In welchem deutschen Bundesland befindet sich Ihr Arbeitsplatz? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Deutschland' bei Frage '4 [G2_Q0002]' (Wo genau in Europa befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Baden-Württemberg
- ○ Bayern
- ○ Berlin
- ○ Brandenburg
- ○ Bremen
- ○ Hamburg
- ○ Hessen
- ○ Mecklenburg-Vorpommern
- ○ Niedersachsen
- ○ Nordrhein-Westfalen
- ○ Rheinland-Pfalz
- ○ Saarland
- ○ Sachsen
- ○ Sachsen-Anhalt
- ○ Schleswig-Holstein
- ○ Thüringen

[G2_Q0005]

In welchem schweizer Kanton befindet sich Ihr Arbeitsplatz? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Schweiz' bei Frage '4 [G2_Q0002]' (Wo genau in Europa befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Zürich
- ○ Bern
- ○ Luzern
- ○ Uri
- ○ Schwyz
- ○ Obwalden
- ○ Nidwalden
- ○ Glarus
- ○ Zug
- ○ Freiburg
- ○ Solothurn
- ○ Basel-Stadt
- ○ Basel-Landschaft
- ○ Schaffhausen
- ○ Appenzell Ausserrhoden
- ○ Appenzell Innerrhoden
- ○ St. Gallen
- ○ Graubünden
- ○ Aargau
- ○ Thurgau
- ○ Tessin
- ○ Waadt
- ○ Wallis
- ○ Neuenburg
- ○ Genf
- ○ Jura

[G2_Q0006]

In welchem asiatischen Staat befindet sich Ihr Arbeitsplatz?

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Asien' bei Frage '3 [G2_Q0001]' (Wo befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Russland
- ○ China
- ○ Japan
- ○ Südkorea
- ○ Indien
- ○ Katar
- ○ Kuwait
- ○ Oman
- ○ Saudi Arabien
- ○ Vereinigte Arabische Emirate
- ○ Anderer Staat

[G2_Q0007]

In welchem nordamerikanischen Staat befindet sich Ihr Arbeitsplatz?

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Nordamerika' bei Frage '3 [G2_Q0001]' (Wo befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Kanada
- ○ Vereinigte Staaten
- ○ Anderer Staat

[G2_Q0008]

In welchem südamerikanischen Staat befindet sich Ihr Arbeitsplatz?

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Südamerika' bei Frage '3 [G2_Q0001]' (Wo befindet sich Ihr Arbeitsplatz?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Argentinien
- ○ Brasilien
- ○ Anderer Staat

[G2_Q0009]

Wie viele Mitarbeiter/innen sind an den Standorten Ihrer Organisation, für die Ihre Personalabteilung zuständig ist, beschäftigt?

*

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ 1 - 10
- ○ 11 - 50
- ○ 51 - 100
- ○ 101 - 250
- ○ 251 - 500
- ○ 501 - 1000
- ○ 1001 - 3000
- ○ über 3000

Erläuterung: Falls Sie Personalverantwortliche/r für den gesamten Konzern sind, dann bitte die Anzahl der Mitarbeiter/innen des gesamten Konzerns angeben.

Falls Sie Leiter/in der Regionalen Personalabteilung sind bitte die Anzahl der Mitarbeiter/innen der Organisation angeben die in dieser Region arbeiten.

Falls Sie ein/e Mitarbeier/in oder Leitende/r der Personalabteilung an einem Organisationsstandort sind und für die Mitarbeiter/innen dieses Organisationsstandortes zuständig sind, dann bitte die Mitarbeiter/innen Anzahl dieses Organisationsstandortes angeben.

[G2_Q0010]

Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?

*

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Land- und Forstwirtschaft; Fischerei
- ☐ Bergbau und Gewinnung von Steinen und Erden
- ☐ Herstellung von Waren
- ☐ Energieversorgung
- ☐ Wasserversorgung; Abwasser- und Abfallentsorgung und Beseitigung von Umweltverschmutzungen
- ☐ Bau
- ☐ Handel; Instandhaltung und Reparatur von Kraftfahrzeugen
- ☐ Verkehr und Lagerei
- ☐ Beherbergung und Gastronomie
- ☐ Information und Kommunikation
- ☐ Erbringung von Finanz- und Versicherungsdienstleistungen
- ☐ Grundstücks- und Wohnungswesen
- ☐ Erbringung von freiberuflichen, wissenschaftlichen und technischen Dienstleistungen
- ☐ Erbringung von sonstigen wirtschaftlichen Dienstleistungen
- ☐ Öffentliche Verwaltung, Verteidigung, Sozialversicherung
- ☐ Wissenschaft, Erziehung und Unterricht
- ☐ Gesundheits- und Sozialwesen
- ☐ Kunst, Unterhaltung und Erholung
- ☐ Erbringung von sonstigen Dienstleistungen
- ☐ Private Haushalte mit Privatpersonal; Herstellung von Waren und Erbringung von Dienstleistungen durch private Haushalte für den Eigenbedarf ohne ausgeprägten Schwerpunkt
- ☐ Exterritoriale Organisationen und Körperschaften (UNO, OPEC, OECD, etc.)

Liste der ÖNACE Klassifikationen der Wirtschaftszweige.

Beispiel: Ihre Organisation ist in der Papier-, und Metallverarbeitungsbranche tätig, Sie arbeiten jedoch für die Papierbranche, somit bitte **nur** Papierbranche ankreuzen.

[G2_Q0011]

Welcher genauen Branche vom Wirtschaftszweig "Land- und Forstwirtschaft; Fischerei"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Landwirtschaft, Jagd und damit verbundene Tätigkeiten
- ☐ Forstwirtschaft und Holzeinschlag
- ☐ Fischerei und Aquakultur

ÖNACE Abteilungen zu Abschnitt A

[G2_Q0012]

Welcher genauen Branche vom Wirtschaftszweig "Bergbau und Gewinnung von Steinen und Erden"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Kohlenbergbau
- ☐ Gewinnung von Erdöl und Erdgas
- ☐ Erzbergbau
- ☐ Gewinnung von Steinen und Erden, sonstiger Bergbau
- ☐ Erbringung von Dienstleistungen für den Bergbau und für die Gewinnung von Steinen und Erden

ÖNACE Abteilungen zu Abschnitt B

[G2_Q0013]

Welcher genauen Branche vom Wirtschaftszweig "Herstellung von Waren"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- [ ] Herstellung von Nahrungs- und Futtermitteln
- [ ] Getränkeherstellung
- [ ] Tabakverarbeitung
- [ ] Herstellung von Textilien
- [ ] Herstellung von Bekleidung
- [ ] Herstellung von Leder, Lederwaren und Schuhen
- [ ] Herstellung von Holz-, Flecht-, Korb- und Korkwaren (ohne Möbel)
- [ ] Herstellung von Papier, Pappe und Waren daraus
- [ ] Herstellung von Druckerzeugnissen; Vervielfältigung von bespielten Ton-, Bild- und Datenträgern
- [ ] Kokerei und Mineralölverarbeitung
- [ ] Herstellung von chemischen Erzeugnissen
- [ ] Herstellung von pharmazeutischen Erzeugnissen
- [ ] Herstellung von Gummi- und Kunststoffwaren
- [ ] Herstellung von Glas und Glaswaren, Keramik, Verarbeitung von Steinen und Erden
- [ ] Metallerzeugung und -bearbeitung
- [ ] Herstellung von Metallerzeugnissen
- [ ] Herstellung von Datenverarbeitungsgeräten, elektronischen und optischen Erzeugnissen
- [ ] Herstellung von elektrischen Ausrüstungen
- [ ] Maschinenbau
- [ ] Herstellung von Kraftwagen und Kraftwagenteilen
- [ ] Sonstiger Fahrzeugbau (Schiff-, Schienen-, Luftfahrzeugbau)
- [ ] Herstellung von Möbeln
- [ ] Herstellung von sonstigen Waren (Münzen, Schmuck, Sportgeräte, etc.)
- [ ] Reparatur und Installation von Maschinen und Ausrüstungen

ÖNACE Abteilungen zu Abschnitt C

[G2_Q0014]

Welcher genauen Branche vom Wirtschaftszweig "Wasserversorgung; Abwasser- und Abfallentsorgung und Beseitigung von Umweltverschmutzungen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Wasserversorgung
- ☐ Abwasserentsorgung
- ☐ Sammlung, Behandlung und Beseitigung von Abfällen; Rückgewinnung
- ☐ Beseitigung von Umweltverschmutzungen und sonstige Entsorgung

ÖNACE Abteilungen zu Abschnitt E

[G2_Q0015]

Welcher genauen Branche vom Wirtschaftszweig "Bau"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Hochbau
- ☐ Tiefbau
- ☐ Vorbereitende Baustellenarbeiten, Bauinstallation und sonstiges Ausbaugewerbe

ÖNACE Abteilungen zu Abschnitt F

[G2_Q0016]

Welcher genauen Branche vom Wirtschaftszweig "Handel; Instandhaltung und Reparatur von Kraftfahrzeugen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Handel mit Kraftfahrzeugen; Instandhaltung und Reparatur von Kraftfahrzeugen
- ☐ Großhandel (ohne Handel mit Kraftfahrzeugen)
- ☐ Einzelhandel (ohne Handel mit Kraftfahrzeugen)

ÖNACE Abteilungen zu Abschnitt G

[G2_Q0017]

Welcher genauen Branche vom Wirtschaftszweig "Verkehr und Lagerei"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Landverkehr und Transport in Rohrfernleitungen (Eisenbahn, Bus, Seilbahn)
- ☐ Schifffahrt
- ☐ Luftfahrt
- ☐ Lagerei sowie Erbringung von sonstigen Dienstleistungen für den Verkehr
- ☐ Post-, Kurier- und Expressdienste

ÖNACE Abteilungen zu Abschnitt H

[G2_Q0018]

Welcher genauen Branche vom Wirtschaftszweig " Beherbergung und Gastronomie"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Beherbergung
- ☐ Gastronomie

ÖNACE Abteilungen zu Abschnitt I

[G2_Q0019]

Welcher genauen Branche vom Wirtschaftszweig "Information und Kommunikation"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Verlagswesen
- ☐ Herstellung, Verleih und Vertrieb von Filmen und Fernsehprogrammen; Kinos; Tonstudios und Verlegen von Musik
- ☐ Rundfunkveranstalter
- ☐ Telekommunikation
- ☐ Erbringung von Dienstleistungen der Informationstechnologie
- ☐ Informationsdienstleistungen (Hosting, Webportale, Nachrichtenbüro)

ÖNACE Abteilungen zu Abschnitt J

[G2_Q0020]

Welcher genauen Branche vom Wirtschaftszweig "Erbringung von Finanz- und Versicherungsdienstleistungen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Erbringung von Finanzdienstleistungen
- ☐ Versicherungen, Rückversicherungen und Pensionskassen (ohne Sozialversicherung)
- ☐ Mit den Finanz- und Versicherungsdienstleistungen verbundene Tätigkeiten

ÖNACE Abteilungen zu Abschnitt K

[G2_Q0021]

Welcher genauen Branche vom Wirtschaftszweig "Erbringung von freiberuflichen, wissenschaftlichen und technischen Dienstleistungen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Rechts- und Steuerberatung, Wirtschaftsprüfung
- ☐ Verwaltung und Führung von Unternehmen und Betrieben; Unternehmensberatung
- ☐ Architektur- und Ingenieurbüros; technische, physikalische und chemische Untersuchung
- ☐ Forschung und Entwicklung
- ☐ Werbung und Marktforschung
- ☐ Sonstige freiberufliche, wissenschaftliche und technische Tätigkeiten
- ☐ Veterinärwesen

ÖNACE Abteilungen zu Abschnitt M

[G2_Q0022]

Welcher genauen Branche vom Wirtschaftszweig "Erbringung von sonstigen wirtschaftlichen Dienstleistungen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Vermietung von beweglichen Sachen
- ☐ Vermittlung und Überlassung von Arbeitskräften
- ☐ Reisebüros, Reiseveranstalter und Erbringung sonstiger Reservierungsdienstleistungen
- ☐ Wach- und Sicherheitsdienste sowie Detekteien
- ☐ Gebäudebetreuung; Garten- und Landschaftsbau
- ☐ Erbringung von wirtschaftlichen Dienstleistungen für Unternehmen und Privatpersonen (Call Centers, Messe-, Ausstellungs- und Kongressveranstalter)

ÖNACE Abteilungen zu Abschnitt N

[G2_Q0023]

Welcher genauen Branche vom Wirtschaftszweig "Wissenschaft, Erziehung und Unterricht"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Volksschulen
- ☐ Weiterführende Schulen (Haupt-, berufsbildende Schulen)
- ☐ Tertiärer und post-sekundärer, nicht tertiärer Unterricht
- ☐ Sonstiger Unterricht

ÖNACE Abteilungen zu Abschnitt P

[G2_Q0024]

Welcher genauen Branche vom Wirtschaftszweig "Gesundheits- und Sozialwesen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Gesundheitswesen
- ☐ Heime (ohne Erholungs- und Ferienheime)
- ☐ Sozialwesen (ohne Heime)

ÖNACE Abteilungen zu Abschnitt Q

[G2_Q0025]

Welcher genauen Branche vom Wirtschaftszweig "Kunst, Unterhaltung und Erholung"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Kreative, künstlerische und unterhaltende Tätigkeiten
- ☐ Bibliotheken, Archive, Museen, botanische und zoologische Gärten
- ☐ Spiel-, Wett- und Lotteriewesen
- ☐ Erbringung von Dienstleistungen des Sports, der Unterhaltung und der Erholung

ÖNACE Abteilungen zu Abschnitt R

[G2_Q0026]

Welcher genauen Branche vom Wirtschaftszweig "Erbringung von sonstigen Dienstleistungen"? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war bei Frage '12 [G2_Q0010]' (Welchem/n Wirtschaftszweig/en kann/können die wirtschaftliche/n Aktivität/en der Organisation, an der Sie arbeiten, zugeordnet werden?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Interessenvertretungen sowie kirchliche und sonstige religiöse Vereinigungen (ohne Sozialwesen und Sport)
- ☐ Reparatur von Datenverarbeitungsgeräten und Gebrauchsgütern
- ☐ Erbringung von sonstigen überwiegend persönlichen Dienstleistungen (Wäscherei, Chemische Reinigung, Thermal-, Heilbäder)

ÖNACE Abteilungen zu Abschnitt S

[G2_Q0027]

In welchem/n Funktionsbereich/en arbeiten Sie derzeit? *

Bitte wählen Sie alle zutreffenden Antworten aus:

- [ ] Administration/Organisation/Verwaltung
- [ ] Assistent/in der Geschäftsführung/des Vorstandes
- [ ] Beratung/Personalberatung/Consulting/ Bildung & Training (Unternehmensextern)
- [ ] Supply Management/Einkauf
- [ ] Bildung & Training (Unternehmensintern)
- [ ] Business Intelligence/Datenmanagement
- [ ] Customer Service/Support
- [ ] Materialwirtschaft/Logistik/Disposition
- [ ] F&E/Labor/Ingenieurwesen/Konstruktion
- [ ] Facility Management/Bauten
- [ ] Finanzen/Banking/Versicherungen
- [ ] Geschäftsführung/strategisches Management
- [ ] Gesundheitsvorsorge/Arbeitnehmerschutz
- [ ] HR/Personalwesen
- [ ] IT/Softwareentwicklung
- [ ] Lehre & Wissenschaft
- [ ] Marketing/Werbung/PR/Produktmanagement
- [ ] Prozess-/Produktions-/Qualitätsmanagement
- [ ] Rechnungswesen/Controlling
- [ ] Rechtsabteilung/Patentrecht
- [ ] Redaktion
- [ ] Unternehmertum/Entrepreneurship
- [ ] Verkauf/Vertrieb (Außen- und/oder Innendienst)
- [ ] Sonstiger Funktionsbereich

Bitte nur Ihre jetzigen Funktionsbereiche eintragen, nicht die Branche Ihrer Organisation (z.B. Sie arbeiten in der HR Abteilung und als Assistent/in des/der Geschäftsführers/in im Gesundheitswesen, dann bitte nur "HR" und "Assistent/in der Geschäftsführung" ankreuzen)

[G2_Q0028]

Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?

*

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ Ja
- ○ Nein

Kategorie 2: Die Wirtschaftsingenieur-Ausbildung in Österreich

[G3_Q0001]

Wie beurteilen Sie den Bachelorabschluss?

*

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	trifft überhaupt nicht zu	trifft eher nicht zu	trifft teilweise zu	trifft eher zu	trifft vollkommen zu
Ich betrachte den Bachelor-Abschluss als einen vollständigen Studien-Abschluss.	○	○	○	○	○
Ich sehe den Bachelor-Abschluss gleichwertig mit einem Matura-Abschluss.	○	○	○	○	○

[G3_Q0002]

Welchen Studienabschluss bevorzugen Sie bei einer Neueinstellung?

*

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
((**G2_Q0028.NAOK** == "Y"))

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	trifft überhaupt nicht zu	trifft eher nicht zu	trifft teilweise zu	trifft eher zu	trifft vollkommen zu	Einschätzung für mich nicht möglich
Ich bevorzuge bei Neueinstellungen Absolventen/innen, die einen Bachelor-Abschluss haben und einen Master-Abschluss anstreben gegenüber jenen die keinen Master-Abschluss anstreben.	○	○	○	○	○	○
Ich bevorzuge bei Neueinstellungen Absolventen/innen mit einem Master-Abschluss gegenüber Absolventen/innen mit einem Bachelor-Abschluss.	○	○	○	○	○	○

Es ist uns durchaus bewusst dass die Bevorzugung schwer allgemein einschätzbar ist. Jedoch bitten wir Sie eine allgemeine Bevorzugung anzugeben falls dies für Sie möglich ist.

[G3_Q0003]

Welches Verhältnis zwischen technischen und wirtschaftlichen Studienfächern wäre aus Ihrer Erfahrung als Personalverantwortliche/r für ein Wirtschaftsingenieurstudium optimal? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie nur eine der folgenden Antworten aus:

- ○ 90% technische – 10% wirtschaftliche Studienfächer
- ○ 80% technische – 20% wirtschaftliche Studienfächer
- ○ 70% technische – 30% wirtschaftliche Studienfächer
- ○ 60% technische – 40% wirtschaftliche Studienfächer
- ○ 50% technische – 50% wirtschaftliche Studienfächer
- ○ 40% technische – 60% wirtschaftliche Studienfächer
- ○ 30% technische – 70% wirtschaftliche Studienfächer
- ○ 20% technische – 80% wirtschaftliche Studienfächer
- ○ 10% technische – 90% wirtschaftliche Studienfächer

Unter technischen Studienfächer wird hier die Summe aus technisch-naturwissenschaftlichen Studienfächern und techniknahen Studienfächern verstanden.

Techniknahe Fächer sind z.B. Abfall-Recyclingwirtschaft, Bauverfahren, Datenbank Anwendung, E-Business, Einführung in den Maschinenbau, Einführung in die Softwareentwicklung- Wirtschaft , Elektronische Geschäftsprozesse, Industrial Engineering, Infrastrukturmanagement, Internet und neue Medien, Methoden des Engineering, Ökologie, Planungsablauf und Terminplanung, Produktionsmanagement, Qualitätsmanagement, Technisches Projektmanagement usw.

[G3_Q0004]

Bitte bewerten Sie die Wichtigkeit der folgenden wirtschaftlich-technischen Lehrfächer vor dem Hintergrund Ihrer Berufserfahrung als Personalverantwortliche/r . *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	unwichtig	eher unwichtig	neutral	eher wichtig	wichtig
Allgemeine Betriebswirtschaftslehre	○	○	○	○	○
Rechnungswesen & Controlling	○	○	○	○	○
Finanzmanagement	○	○	○	○	○
Investitionsmanagement	○	○	○	○	○
Industriebetriebslehre / Industrielles Management	○	○	○	○	○
Unternehmensführung und Organisation	○	○	○	○	○
Wirtschaftsinformatik	○	○	○	○	○
Innovations- und F&E-Management	○	○	○	○	○
Supply Management, Beschaffung & Einkauf	○	○	○	○	○
Produktions- & Fertigungsmanagement	○	○	○	○	○
Materialwirtschaft & Logistikmanagement	○	○	○	○	○
Marketing Management, Vertrieb & Verkauf	○	○	○	○	○
Personalmanagement	○	○	○	○	○
Projektmanagement	○	○	○	○	○
Wirtschaftsrecht	○	○	○	○	○

[G3_Q0005]

Welche Fremdsprachenkenntnisse werden von Ihrer Organisation für eine berufliche Karriere vorrausichtlich in den nächsten 5 bis 10 Jahren gewünscht? *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Arabisch
- ☐ Chinesisch
- ☐ Englisch
- ☐ Finnisch
- ☐ Französisch
- ☐ Indisch
- ☐ Italienisch
- ☐ Kroatisch
- ☐ Norwegisch
- ☐ Polnisch
- ☐ Portugiesisch
- ☐ Russisch
- ☐ Schwedisch
- ☐ Slowakisch
- ☐ Slowenisch
- ☐ Spanisch
- ☐ Tschechisch
- ☐ Türkisch
- ☐ Ungarisch
- ☐ Andere Sprache
- ☐ Keine Fremdsprache

[G3_Q0006]

Bitte bewegen Sie durch doppelklick oder mit Hilfe Ihres Cursors jene österreichischen Hochschulen mit deren Absolventen/innen Sie in den letzten 5 Jahren als Personalverantwortliche/r bei Bewerbungsgesprächen und anschliessender Anstellung generell sehr gute Erfahrungen gesammelt haben in die rechte Spalte.

(Die Reihenfolge ist irrelevant und es müssen nicht alle Hochschulen bewegt

werden)

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte nummerieren Sie jede Box in der Reihenfolge Ihrer Präferenz, beginnen mit 1 bis 27

- [ ] Alpen-Adria Universität Klagenfurt
- [ ] Campus 02
- [ ] FH Burgenland
- [ ] FH Campus Wien
- [ ] FH des bfi Wien
- [ ] FH Joanneum
- [ ] FH Kärnten
- [ ] FH Kufstein
- [ ] FH Oberösterreich (Linz, Wels, Steyr, Hagenberg)
- [ ] FH Salzburg
- [ ] FH St. Pölten
- [ ] FH Technikum Wien
- [ ] FH Vorarlberg
- [ ] FH Wien
- [ ] FH Wiener Neustadt
- [ ] IMC FH Krems
- [ ] Johannes Kepler Universität Linz
- [ ] Karl-Franzens-Universität Graz
- [ ] Leopold-Franzens-Universität Innsbruck
- [ ] MCI Management Center Innsbruck
- [ ] Montanuniversität Leoben
- [ ] Technische Universität Graz
- [ ] Technische Universität Wien
- [ ] Universität Salzburg
- [ ] Wirtschaftsuniversität Wien
- [ ] Andere öffentliche Universität
- [ ] Andere öffentliche Fachhochschule

Kategorie 3: Persönlichkeitsbezogene Fähigkeiten von Wirtschaftsingenieur-Absolventen/innen

[G4_Q0001]

Bitte geben Sie die Wichtigkeit von Methoden-, Fach- und Sozialkompetenz für eine/n Absolventen/in eines Wirtschaftsingenieurstudiums an. *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	unwichtig	weniger wichtig	bedingt wichtig	wichtig	sehr wichtig
Fachkompetenz	○	○	○	○	○
Methodenkompetenz	○	○	○	○	○
Sozialkompetenz	○	○	○	○	○

Methodenkompetenz:

Methodenkompetenz zeigt sich im Einsatz und im Vermitteln sowie im kompetenten Umgang mit Fachwissen (z.B. analytisches, strukturierendes und kritisches Denken).

Fachkompetenz:

Unter Fachkompetenz wird die Summe der spezifischen Fähigkeiten und Fertigkeiten wie Ausbildungsgrad, Fachwissen, Vorwissen und Praxiserfahrung verstanden.

Sozialkompetenz:

Darunter versteht man den konstruktiven Umgang mit Anderen, Selbstständigkeit und Selbstkritikfähigkeit, Toleranz und Kontaktfreudigkeit, Leistungsbereitschaft und Belastbarkeit, Aufgeschlossenheit und Lernbereitschaft.

[G4_Q0002]

Bewerten Sie bitte die Wichtigkeit der folgenden persönlichkeitsbezogenen Fähigkeiten von Wirtschaftsingenieur-Absolventen/innen für den Einsatz in Ihrer Organisation. *

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	unwichtig	eher unwichtig	neutral	eher wichtig	wichtig
Ziel- und Leistungsorientiertheit	○	○	○	○	○
Belastbarkeit	○	○	○	○	○
Durchsetzungsfähigkeit	○	○	○	○	○
Selbständiges Arbeiten	○	○	○	○	○
Empathie	○	○	○	○	○
Delegationsfähigkeit	○	○	○	○	○
Interdisziplinäres Denken	○	○	○	○	○
Kreativität	○	○	○	○	○
Mitarbeiterführung	○	○	○	○	○
Motivationsfähigkeit	○	○	○	○	○
Teamfähigkeit	○	○	○	○	○
Verantwortungs- und Entscheidungsfähigkeit	○	○	○	○	○
Flexibilität	○	○	○	○	○
Mobilität/Reisebereitschaft	○	○	○	○	○
Kommunikationsfähigkeit	○	○	○	○	○
Internationalität	○	○	○	○	○
Ökologisches/nachhaltiges Denken	○	○	○	○	○
Konfliktfähigkeit	○	○	○	○	○
Analytisches Denken	○	○	○	○	○
Stressresistenz	○	○	○	○	○
Gute Umgangsformen	○	○	○	○	○
Kritikfähigkeit	○	○	○	○	○

[G4_Q0003]

Bitte geben Sie die Wichtigkeit der folgenden studiums- und persönlichkeitsbezogenen Erfolgsfaktoren eines/er Wirtschaftsingenieur-Absolventen/in im Rahmen eines Bewerbungsverfahrens an.

*

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	unwichtig	eher unwichtig	neutral	eher wichtig	wichtig
Studienort (Hochschule)	○	○	○	○	○
Vertiefungsrichtung im Studium	○	○	○	○	○
Studiendauer	○	○	○	○	○
Zeugnisnoten	○	○	○	○	○
Themen der Abschlussarbeiten	○	○	○	○	○
Außeruniversitäres Engagement (z.B. in Vereinen)	○	○	○	○	○
Wahl der Frei- und Wahlpflichtfächer	○	○	○	○	○
Persönlichkeitsmerkmale (z.B. Soft Skills)	○	○	○	○	○
Praktische Erfahrungen (z.B. Praktika, Projekte)	○	○	○	○	○
Zusatzqualifikationen (z.B. spezielle Computerprogramme, Sprachen)	○	○	○	○	○
Auslandsaufenthalte/Erfahrungen (z.B. Erasmus, Besuch von Veranstaltungen von internationalen Studierendenvereine)	○	○	○	○	○

Kategorie 4: Karrieremöglichkeiten von Wirtschaftsingenieuren/innen

[G5_Q0001]

Welche Kommunikationskanäle nutzen Sie um mit Hochschulabsolventen/innen in Kontakt zu treten?

*

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Inserate in Printmedien
- ☐ Online-Stellenausschreibungen
- ☐ Praktikumsmöglichkeit in der Organisation
- ☐ Ausschreibung von Diplom-, Master- und Bachelorarbeiten
- ☐ Unterstützung von Dissertationen / Forschungsprojekten
- ☐ Anbot von Traineeprogrammen
- ☐ Headhunter in sozialen Netzwerken (z.B. XING, Linkedin, Facebook usw.)
- ☐ Jobmessen an Universitäten / Fachhochschulen
- ☐ Werbung Ihrer Organisation an Universitäten / Fachhochschulen in Form von Print- und Onlinemedien (z.B. Uniscreen)
- ☐ Vorstellung Ihrer Unternehmung im Rahmen eines Vortrags an Universitäten / Fachhochschulen
- ☐ Hörsaalsponsoring
- ☐ Arbeitsamt
- ☐ Newsletter von Absolventen/innen-Verbänden (z.B. WING, Alumni-Netzwerke)
- ☐ Sonstige Kontaktaufnahmearten
- ☐ Bis jetzt noch nie den Bedarf gehabt mit Hochschulabsolventen/innen in Kontakt zu treten

[G5_Q0002]

In welchen Funktionsbereichen könnten Sie sich in den nächsten 5 Jahren in Ihrer Organisation den Einsatz von Wirtschaftsingenieuren/innen vorstellen?

*

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie alle zutreffenden Antworten aus:

- ☐ Administration/Organisation/Verwaltung
- ☐ Assistent/in der Geschäftsführung/des Vorstandes
- ☐ Beratung/Personalberatung/Consulting/ Bildung & Training (Unternehmensextern)
- ☐ Supply Management/Einkauf
- ☐ Bildung & Training (Unternehmensintern)
- ☐ Business Intelligence/Datenmanagement
- ☐ Customer Service/Support
- ☐ Materialwirtschaft/Logistik/Disposition
- ☐ F&E/Labor/Ingenieurwesen/Konstruktion
- ☐ Facility Management/Bauten
- ☐ Finanzen/Banking/Versicherungen
- ☐ Geschäftsführung/strategisches Management
- ☐ Gesundheitsvorsorge/Arbeitnehmerschutz
- ☐ HR/Personalwesen
- ☐ IT/Softwareentwicklung
- ☐ Lehre & Wissenschaft
- ☐ Marketing/Werbung/PR/Produktmanagement
- ☐ Prozess-/Produktions-/Qualitätsmanagement
- ☐ Rechnungswesen/Controlling
- ☐ Rechtsabteilung/Patentrecht
- ☐ Redaktion
- ☐ Verkauf/Vertrieb (Außen- und/oder Innendienst)
- ☐ Sonstiger Funktionsbereich

[G5_Q0003]

Welches Einstiegsgehalt (brutto Jahresgehalt in Euro) bieten Sie einem/er Wirtschaftsingenieur/in (mit Master- oder Diplomabschluss) in Ihrer Organisation durchschnittlich an?

(inklusive variablem Gehaltsanteil im Durchschnitt)

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte geben Sie Ihre Antwort hier ein:

€

[G5_Q0004]

Wie hoch ist der in der Gehaltsangabe zuvor schon enthaltene variable Gehaltsanteil in Prozent?

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Jede Antwort muss zwischen 0 und 100 sein

Bitte geben Sie Ihre Antwort hier ein:

%

[G5_Q0005]

Wie schätzen Sie die Aufstiegschancen von Wirtschaftsingenieuren/innen in der Organisation, in der Sie arbeiten, ein?

Beantworten Sie diese Frage nur, wenn folgende Bedingungen erfüllt sind:
Antwort war 'Ja' bei Frage '30 [G2_Q0028]' (Werden in Ihrer Organisation in den nächsten 5 Jahren vorrausichtlich Wirtschaftsingenieur-Absolventen/innen benötigt?)

Bitte wählen Sie die zutreffende Antwort für jeden Punkt aus:

	sehr gering	gering	neutral	gut	sehr gut
Aufstiegschancen	○	○	○	○	○

Falls Sie die Ergebnisse der Studie via Email als PDF zugeschickt bekommen möchten, bitte ich Sie um eine kurze Email an sadei@sbox.tugraz.at.

Herzlichen Dank für Ihre Unterstützung!

Im Namen des Instituts für Betriebswirtschaftslehre und Betriebssoziologie der TU Graz und des österreichischen Verbands der Wirtschaftsingenieure,

Christoph Sadei

18.02.2014 – 00:00

Übermittlung Ihres ausgefüllten Fragebogens:
Vielen Dank für die Beantwortung des Fragebogens.

Appendix D: Subjects allocation to subject categories of all IEM degree programs

The subjects' allocations for every detected IEM degree program on Austrian HEIs are illustrated as Excel files on the attached CD on the penultimate page.