

**Stockholm School of Economics**  
**Marketing Major**



## **The Limitations and Strengths of Connections;**

-a study of network factors and marketing mismatch

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## ***Abstract***

*This thesis studies the Biomedicine program at Karolinska Institutet. More than 60% of Biomedicine graduates at Karolinska pursue an academic career rather than a career in the industry. This thesis aims to investigate if marketing mismatch or lack of contacts are the factors behind this phenomenon.*

*The methodology used is of a qualitative nature, based on extensive interviews conducted with former Biomedicine students and data collected from web-based questionnaires.*

*The results of the study show that a marketing mismatch between the industry and Biomedicine students exists. The mismatch is caused by a lack of sufficient information about opportunities available for students on the labour market. In addition, the young age of the program and inbound connections within the academia world raise hurdles for the network of students that make the social structure rigid.*

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## **1. Introduction**

*In this opening chapter the background of the study and a description of the problem area, research questions and the hypothesis are presented. The chapter ends with a section on delimitations.*

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Graduate Unemployment is unemployment among educated people with academic degrees. Research study has shown that a high ratio of graduate unemployment, or underemployment, is an indicator of an unproductive society (Bruwer 1998). According to the same study, Graduate Unemployment is caused by a market mismatch which is the delta between graduate students' aspirations and the opportunities available to them.

Underemployment is considered a big problem in many countries. In China, it has been raised as a major issue when evidence show that large sums have been invested in educations leading to unemployment, investments that could have been used to increase productivity on the market. China is not however the only country complaining about wasted resources (Xiaochun 1998). In both the United States and the United Kingdom concerning statistics indicate an increase in graduate unemployment (EducationGuardian, Press Association 2006).

Sweden has not been excluded from the problem of rising unemployment among graduates. The ratio of students in higher academic education to students in vocational educations has risen during the last decade because of the perceived security the higher educations provide (SNAHE-2006:26). Recent graduate students however, have had difficulties entering the labour market in terms of finding the right job or even any job at all. The president of the Swedish Confederation of Professional Associations (SACO) states in a public memorandum that the educational committees are commercialising education without preparing graduates for professional career opportunities. Regarding the skills of the recent graduates she wrote: " *The skills lacking after graduation are basically god contacts to possible employers and working experience*". (SACO 2007).

Contacts and networking have been brought to light in many essays and publications as difficulties in finding an occupation. Social contacts help finding jobs, but those jobs might not necessary be in the profession where workers are most productive. Consequently social contacts can also generate mismatch between a worker's work-related choice and his proportional productive lead (Montgomery, 1992).

According to prior research, lack of social contacts and marketing mismatch are general reasons creating underemployment outcome (Bentolila et. al. 2004). As one of the graduates of the Biomedicine program at Karolinska Institutet, a young and unknown program, I became interested in exploring the situation faced by its' recent graduates on the Swedish market. In following introductory section I describe the program and the problem area of this thesis.

### ***1.1 Background***

There are six major universities, including Karolinska Institutet, in Sweden that offers Biomedicine programs, although the names and agendas of the programs differ. Two of them are worth mentioning for the reader.

The oldest program is in Uppsala University, which started more than 30 years ago. The content of the Uppsala education has changed over time, but the name and status of the education has remained the same. Many Biotech companies started to appear in Uppsala because of this and similar existing research intense programs (Ernst&Young-2007).

Karolinska Institutet is one of the most well known, research intensive, universities in the world. Karolinska is organizationally divided into institutions, which all have a scientific research division. Depending on the size of the institution, the research division may be divided into research groups that are focused on more specific questions in the same scientific area. Regardless of this fact, Karolinska Institutet did not offer an undergraduate education in research programs except Biomedicine Analyst Program.

In the autumn of 1995, the Biomedicine program at KI welcomed its first class. The

motivations for introducing an entirely new program at KI were threefold:

- *There was a pressure from the labour market in general, and specifically from pharmaceutical companies, such as Astra Zeneca for new postgraduates.*
- *The research field at the Medical program had been rapidly down-sized which had lead to a drop in published scientific reports compared to other rival universities.*
- *It was determined to strengthen the educational resources at KI in order to compete with other well-known universities in the world.*

One year before the launch of the Biomedicine program at KI, the faculty board had some difficulties explaining the need for such a program at KI. Finally the rapid expansion of articles within the medical science across the world and the pressure from the pharmaceutical companies (here defined as The Industry) helped the educational committee at KI to decide to introduce the program.

*"Starting a new program was not common back then and there was a certain amount of conservatism, but the basic idea was well received, I think"*  
*-Dean of Medical Faculty at KI (KI-2005)*

Originally the program aimed to produce undergraduate students with a broad knowledge in the different research fields allowing undergraduate students of the Biomedicine program to contribute in the labour market as soon as possible. This was in fact the request from the Industry (Astra Zeneca). However, as in other Medical Science programs, the number of years in the academic environment is of great importance for gaining such longed-for broad knowledge (Cronholm).

*Clarification of the programs within the medical field:*

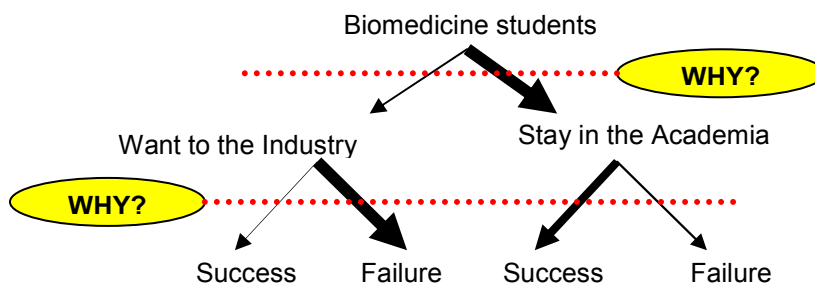
The main difference between the Biomedicine and Medicine programs lie in their different approaches towards the Medical science. The former focuses on the underlying

reasons of a disease while the latter focus on treating the symptoms of the disease. Another, in name, similar program is Biomedicine Analysis, a vocational education. This three year long program mainly concentrates on practical training rather than theoretical studies.

### ***1.2 Problem area and research question***

When students graduate from the Biomedicine program, they have the options to pursue careers in academia, which most often mean starting a PhD program, or to pursue a career in the industry.

Given the available options of choosing a career in academia or the industry, it is natural that some students want to start their careers in the industry and some want to stay in the academia. In both groups there are those that succeed in their ambitions and those that do not. The following graph demonstrates the problem faced by the Biomedicine students at KI.



According to statistics presented by Karolinska Institutet in 2005, more than 65% of the undergraduate Biomedicine students end up choosing academic research careers. Of those, 90% choose to pursue their research careers at Karolinska Institutet (of course in different areas). Only 16% of students start their careers at pharmaceutical companies, the same industry that 10 years ago was screaming for students with the knowledge of today's Biomedicine students (KI-2005). *Industry* in this case refers to pharmaceutical and biotech companies ranging from small to large in size. Even though one of the

original reasons for starting the program was to provide the industry with educated students, an increasing number of graduate students decide to stay in academia for a postgraduate (KI-2005). The remaining 12 percentages of the students are either in other industries than the pharmaceutical or studying other educational programs (KI-2005).

The tendency to stay in academia becomes even more interesting to study if one consider that the number of available job offerings and PhD studies at Karolinska Institutet has decreased since 2001 (SNAHE- 2007:56). This has led to an increase in the Biomedicine graduates' unemployment rates (SNAHE-2007:56). Students go on studying single courses, remaining out of the Swedish labour market due to underemployment (Antagningsstatistik- Appendix C) which in fact seen as one of the symptoms of graduate unemployment.

This phenomenon, that so many graduate students from the Biomedicine program are choosing to stay in academia, is the main focus in this thesis.

The research question is:

*Why are graduate students of the Biomedicine program choosing to stay in academia rather than developing a career in the industry?*

### **1.3 Purpose and hypothesis**

This study has an explanatory purpose and will mainly focus on empirical findings to highlight the phenomenon. To facilitate a focused discussion, and to provide structure for the empirical findings and analysis, two hypotheses have been established. The analysis and conclusion sections have thus been structured so that they can prove or disprove the hypotheses. This study aims however to understand whether the research question can be explained by marketing mismatch theory and/or network theory.

The following hypotheses have been chosen because prior studies have identified them as broadly applicable to explain Graduate Unemployment. In addition, these hypotheses can

be customised to the Biomedicine program students at Karolinska Institutet in order to answer the research question.

The first hypothesis is that there is a marketing mismatch between the students, KI and the labour market.

The second hypothesis is that there is an enclosed culture at Karolinska Institutet that has an impact on students' career choices.

#### ***1.4 Delimitations***

Although the problem of matching students with open job positions is a generic problem, that could be said to be applicable to most, if not all, higher education, this study is delimited to only consider the Biomedicine program at Karolinska Institutet. The Biomedicine program is quite unique in that it is a relatively new program. The implication is that the study could reach almost all the former and current students in the program. Also, the fact that the future careers of students can be divided into two main categories ensures that a very high share of the students' career choices can be captured. The study will regard only the two main choices, further academic studies and/or entering the labour market directly. The study is conducted from the students perspective and has not been able to take on neither the industry's nor the medical faculties' points of view. The reader need to take the different class years and the market capacity at the time of graduation into consideration.

Given the complexity of the research question, one would expect that a broad range of potential examination and explanation model would exist. This study is delimited to only examining marketing mismatch and network theory explanation models presented.

## **2. Methodology**

*In this part the methodology and approach to the study's questions are described and motivated in four parts. First the study's approach of the problem, the research strategy and the qualitative nature of the study is examined. In the second part, the data collection and the analyses of that data is brought to attention. In the third part the reliability and validity of the study is discussed and finally alternative methodology is presented.*

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### **2.1 Research strategy**

It is important for the reliability of the study that the researcher's approach to the problem and the research questions are well matched. (Edfelt & Fredriksson, 1995). The explanatory models normally differ between theory-based deductive and empirical-based inductive studies (Alvesson & Sköldberg, 1994).

I selected an abductive approach which is used in evaluating case studies, seeing that neither the deductive nor inductive approaches matches the problem I seek answers to. The method is a combination of deduction and induction. In similarity to induction it is highly based on the empirical observation but also shows a great connection to deduction because it does not reject earlier theories (Alvesson & Sköldberg, 1994).

The abductive approach means that an individual case is explained on the basis of a hypothesis comprehensive model that aims to clarify the studied case. In order to strengthen the interpretation of the reality the researcher oscillates between empirical theories and theoretical empiric. This leads to a deeper understanding of the studied case (Alvesson & Sköldberg, 1994).

### **2.2 Research design**

The scientific approach is based on observing patterns among students of the same background. Given the fact that this area is rather unexplored and very few theories are available, the approach is an abductive one. Two tentative hypotheses are formulated based on earlier observed facts (KI-2005).

The empirical part of the research design is divided into two parts, one of qualitative and the other of semi-quantitative<sup>1</sup> nature. The first part refers to interviews performed in order to gain an in-depth understanding of the research question. The other part is in the form of questionnaires with questions custom designed for the different class years. The underlying reason for the usage of these two approaches is to reach a big number of students and gain broadness in the study. The use of questionnaires and interview techniques to study the same phenomenon makes this a multiple methods approach (triangulation), (Steiner Kvale). This methodology is used to enhance the understanding of the problem and also to extend the reliability of the analyses.

### ***2.3 Research data collection***

The Biomedicine program, being a very young program, has few undergraduate students to start with. This fact made the sample selection easier as most of the former students were available and did participate in this study. However, a large number of interviews were not possible to perform due to the scarce time resources available for the thesis. Instead of interviewing the full underlying population, eight interviewees were chosen. In addition, questionnaires were used for the rest of the population, and were meant to reach current as well as former students of this program.

#### **2.3.1 Career survey**

Interviewees were chosen through an Internet service available for Biomedicine students at KI. This service covers all former students of the program with extensive information about their current position in the labour market. The semi structured interviews were conducted with eight former Biomedicine students working in the industry and academic research at KI. A variation of industries was selected to give a broad understanding of the opportunities in the labour market but also how the opportunities appear to undergraduate students. For the same reason, PhD students from different institutes at KI were chosen. Different class years of the interviewees were also part of the selection criteria because of its importance for visibility of time elapse and social affects on the preferred career among the students of Biomedicine.

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<sup>1</sup> Major part of the questionnaire provided space for explanations of the respondents' thoughts.

The interviewees received information about the genre of the interview questions a few days before the interview. The main reason for this was to recall their memories about their educational and their classmates but also to prepare them for the upcoming questions. In order to have a qualified interview, some guideline questions were formed to establish a main focus of the interviews that were otherwise open dialog. Conducted interviews were recorded by a tape recorder in order to increase the interaction with the interview subjects and to avoid forgetting or missing any data especially due to language barriers hence the interviews were in Swedish. The interviews lasted for one hour each.

The recorded interviews were translated into text transcripts. The recorded conversations were then compared with the conversations in the text format by two independent persons in order to increase the reliability and validity of the interviews. The text format was written word for word based on the recorded conversation in order to make sure that the analyses of the text would be as valid as possible. The interview texts were sent back to the respective subject for approval. This approach intends to decouple the objectiveness of the researcher from the study due its non-positivism approach.

### 2.3.2 Questionnaires

The first questionnaire targeted current students in their third until eight semesters. The second targeted were graduated students, alumni, excluding interviewees. Both of these questionnaires were, in difference with the one made for first year students, web based. The postal questionnaire has the disadvantage of causing miscomprehension despite the low response rate but due to the large amount of participants and high time consumption, personal distribution was impossible. Two main actions were taken to increase the response rate. The survey was uploaded from the university home site to increase the incentives of the participants to respond as a result of a higher authority of the university. A reminder mail was sent out when the rate of returns began to drop. The first questionnaire was sent to 125 current students and had a response rate of 60%. The second questionnaire was sent to 276 alumni students and had a response rate of 45%.

The questionnaires were semi structured and included both closed and open-ended questions. The main reason was that the survey's funnel approach not fully encapsulated the research if only one set of questions were asked. Open-ended responses have in a

higher rate been used in the analysis because of the freedom one feels in expressing feelings and consideration in words rather than in boxes. Questions as well as responses in the questionnaires were both in Swedish.

## ***2.4 Research data analysis***

A triangulation method was used in the analysis of the interview based data. Three different qualitative analytical methodologies, the sensitizing concept and the ad hoc concept were used in order to improve the interpretation of the data. The result of these methods will be presented later.

### ***2.4.1 Interviews***

As mentioned previously, the interviews were guided by several pre-determined questions which were coupled and presented in the appendix. The nature of the questions was open and the interviewees could give their perspective on each topic. Questions asked were also used as a template when the written interview texts were analysed. The questions targeted different objectives of the thesis and the answers were compared between the interviewees. The sensitizing method was used to find key phrases and the general view of the interviewees regarding a specific phenomenon. Through this approach some significant central themes in the data were recognised. Separating the questions into related groups made the analysis more transparent for the outside observer.

Three different methods were used to elucidate central themes. The method used to analyse themes varied depending on the method used. However, the final understanding of these themes regarding the question objectives was independent of the approach method. The analytical approach aimed to find the main themes in the summarised transcripts of the interviews to be the template for the empirical findings. In the upcoming sections the methods used are thoroughly explained and illustrated through the use of some examples. The actual analysis of the identified central themes will be discussed in the analysis section.

The sentence concentration is based on an empirical, phenomenological approach. The used method is to minimise the size of the interview content and concentrate the

paragraphs to shorter key messages. The approach simplifies and without bias interprets the answers of the interview objects to central themes relevant to the main questions of the thesis. This method present the identified central themes from the interviewer's perspective based on the thesis' hypothesis.

After going through the transcripts of the interviews, some central categories were identified with relevance to the hypothesis. These categories were then further divided into sub-categories that were of positive or negative sense. Every unit of answers were then divided between these sub-categories to codify the statements. Both the central categories and the sub-categories were then explained. The main reason for applying this method, categorisation, in this thesis was to present the results of long interviews in a simplified system.

The Ad-hoc approach is a mix of text, graphs and figures. It is the ultimate qualitative method to use in analysing interviews. In contrast to sentence concentrating and sentence categorising, the method does not make use of a standard approach but the techniques used are interchangeable. The main reason for choosing this method was to compare the structured and standard approach to a more free method. The existing contrasts were meant to further explore and compare the outcome of the analysis.

#### 2.4.2 Questionnaires

Methods used in the analysis of the questionnaire responses are based on the same analytical methods used in the interview data analysis. However, due to the convenient approach of the ad hoc method the latter has been used to higher extent.

### ***2.5 Interpretations and analysis***

After every completed interview, a transcript of the session was created. On the basis of these documents some subjects of interest were identified and used as the foundation of the empirical part of the thesis. The empirical reasoning were then analysed based on the theoretical framework presented in the upcoming section.

### 2.5.1 Reliability and validity

To evaluate and describe the thesis reliability is important not only for the quality of the presented results but also for further research. The two well used notations in the case of assessing the correctness of the results are *reliability* and *validity*. There is however, within the qualitative studies, some debates about whether other meanings should be added in these notations. Merriam (1994) refers to Lincoln & Guba (1985) who suggest that inner validity should be exchanged for value of truth, external validity exchanged for transformation and the reliability of a thesis presented as consistency or congruency. Independent on the terms used the real question is how to evaluate a qualitative research and its results' reliability. According to Merriam (1994) it is the researchers' observational technique, critical mind, presence and interpretational ability that determine whether the qualitative study is scientific. However the chosen observational technique and the thesis structural outline, according to Merriam, makes it a scientific thesis. Through use of sensitizing method and involvement of other independent parties for clarification of interview transcripts, I have applied a scientific approach to the study.

The concept of validity examines whether the researcher has assembled the data that was intentioned to be studied. This concept could also be further divided in internal and respectively external validity. Internal validity observes the correlation between the results gathered from the study with the reality itself. The external validity however observes the results of the study are applicable for usage and understanding of other related situations. Regarding this thesis's external validity there are some difficulties to generalise the results upon other situations because the very approach of the thesis has been to study one particular circumstance with well defined delimitations. In order to be able to generalise the results of this thesis some further quantitative studies are required, based on hypothesis sampled from this thesis.

Internal validity can be satisfied, according to Merriam (1994), by usage of several informational sources, different analytical methods, observing the phenomenon over time and at different points in time and finally allowing colleagues and experts to evaluate the results of the study. This thesis has been written under the influence of my perception,

and therefore the empirical part has been given a larger room. This thesis has been read by several people during the writing process and a continuous revaluation of the results has occurred to improve the internal validity's strength. Interviews and questionnaire samplings have been conducted in end of 2006 and some data is from 2008.

If one study can be repeated with the same outcome, the study says to have a high reliability. In a qualitative study however different interpretations are possible because of the multidimensional phenomenon that is being scrutinised. This includes that it is not definite that the results of two qualitative studies will relate. Therefore it is of high importance to have a reliable result or as Lincoln & Guba have expressed - high consistency. According to Merriam (1994) who refers to Goetz & LeCompte (1984) the consistency of the results can only be guaranteed when the assumptions, theories, methods and the relation of the researcher to the interview subject has been given account for. Further facilitation is to use different sources and methods and also to describe every step in the researching process (Merriam 1994). These mentioned conditions have been met through out this thesis to ensure such high reliability especially in clarifying the methodology used.

It is also of great importance to always be aware of the influence of one's own and the supervisor's perceptions on the results. There have been discussions about how the results might be influenced by the interpretation of the empirical results.

#### 2.5.2 Alternative methodology

I am aware that there are other potential approaches for resolving the research question of this thesis. An entirely inductive or deductive strategy for example might have helped conceiving a more generalised hypothesis. That would obviously require behavioural, social, and more complete labour market research. Biomedicine studies are in general a relatively young fields and the program offered at Karolinska Institutet, is in fact the youngest. An analysis based entirely on theoretical grounds in this thesis would not be able to capture the underlying reasons for the phenomenon studied. On the other hand an analysis built only on empirical findings might diminish the importance of the issue.

The approach could also have been different. If I was requested to go about a different way designing this thesis, the choice would be a simple, quantitative approach. Quantitative design contributes to the reliability of analysis and would also be feasible to conduct with limited resources.

### **3. Theory**

*This section presents a description of applicable theories. The main concentration is on the network theory of Granovetter and its relevant characteristics on connections and ties. Later a correlation between these theories and the phenomenon at hand is offered to strengthen the interpretation of the empirical findings.*

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The abductive approach of the thesis was partly chosen because few theories existed to explain the phenomenon. The studies of disabling and enclosing network have had an impact on me and therefore I have chosen to concentrate mainly on Granovetter's theories on strong and weak ties. Social Capital has also been mentioned to envisage the importance of awareness about the Biomedicine program. These theories are explained later in this section.

#### **3.1 Marketing mismatch**

A marketing mismatch generally means that the service or product offered by the producer is not recognised on the market. The value of the product/service is unknown and the usage area rather vague. Information is a key word in these fields of thoughts.

##### **3.2.1 The Labour Market with information as its nave**

The classical labour theory regards labour as any other commodity where demand and supply are the deciding parameters (Robert Solow 1990). According to this traditional view, these two parameters balance the labour market. However, as in the case of all other commodities, a perfect market where information is transparent and available for all parts exist only in theory (Granovetter 1985). Imperfect information leads to malfunctioning markets, resulting in high unemployment rates (Solow 1990).

The lack of information is normally about the existence of vacancies that an employer offers and a job searcher desires in the labour market. The individuals behind these demand and supply are unknown. How information is obtained and distributed among individuals in a market has been studied. The main focus in these studies has been on search, which refers to the extensiveness and intensiveness of the individual's efforts on finding the desired commodity. The extensiveness of the search is the first stage of

finding the individual on the demand or supply side. The intensiveness of the search is the second stage where the individuals evaluate the commodity on hand (Rees 1966).

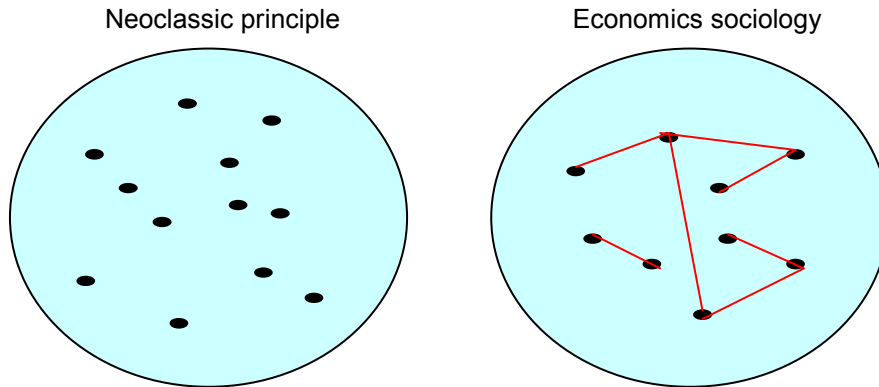
Studies have shown that the amount of search is significantly lower for more educated individuals and individuals already in the market (Granovetter 1985). The search is of more extensive nature for first job seekers while for high-level jobs an intensive nature of the search has been observed. Individuals with higher education, graduated from more prestigious universities, seem to spend less time searching for a job position. This has been showed to partly depend on the good reputation of the schools and partly due to the amount of contacts the graduates obtain during their education (Granovetter 1973).

Granovetter gained this knowledge by following and questioning many people from different background and with different connections. The questions have normally been about how, why and when the interview subject has received their current position. Also some follow-up questions regarding their former position, their career movements and the reasons behind their movements are included in the Granovetter's studies.

### ***3.2 Network theory***

#### **3.2.1 From Economic Sociology to Social Networks Theory**

Within economic sociology, socioeconomics, the correlation between individuals' economical and social behaviour is studied. Socioeconomics appeared in literature in the beginning of the 18<sup>th</sup> century, when theorist such as Marx Weber and Karl Polanyi became interested in studying and describing the correlation that exist between individuals' economical decisions and the society she/he lives in. One of the fundamental assumptions within economic sociology theory is that economical issues at hand are not entirely explained on the basis of neoclassical principals. All economical decisions are socially constructed and occur as a result of the individuals sociological references. The differences between the two perspectives are easier to observe through the following diagram.



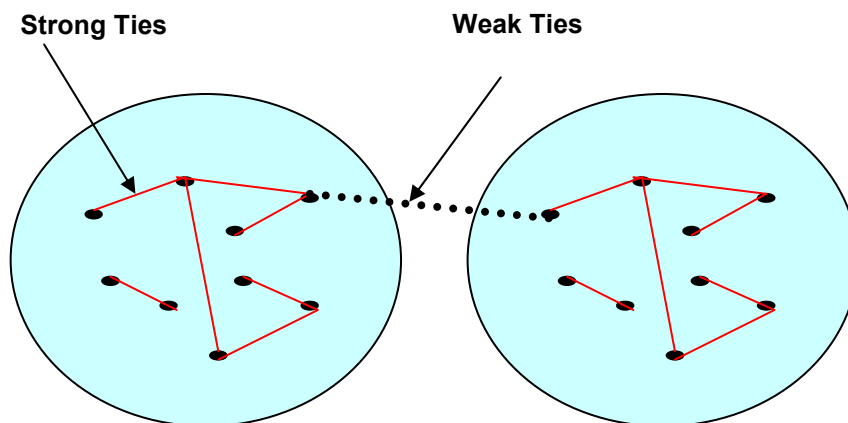
Both theories explain the economical as well as social behaviour however the perception of the theories are different. In the basic neoclassic theory the relation of the individuals within the society is scrutinised while in the socioeconomics, the relation between the individuals within the society is studied.

The notion of social networks is normally deduced to the anthropologist Johan Arundel Barnes (1954), who conducted a study in a village in northern Norway. He stated that the fishermen in his study could be seen as nodes and that they were connected to each other through relationships which he on an aggregated level gave the term *network*. However, already in the mid-thirties the psychologist Jacob Moreno (1937) developed psychometric methods to chart group structures based on individual's positive or negative assessment of other individuals. These group structures were then visualised through sociograms. Moreno used the sociograms to identify social leaders and isolated individuals in order to study what friendship is build on and how it is reflected in the relationship. This kind of early research has gradually developed into social network theory that mainly concentrates on charting group structures from an anthropology and psychology perspective, focused on centre, periphery rather than an instrument of sociology analyses (Scott 2000).

In 1973, the sociologist Mark Granovetter published an article named "*The Strength of Weak Ties*" which came to be one of the most influential and quoted contributions in modern socioeconomic theory and would become the foundation of the research field of social network theory. Granovetter's point in the article is that a certain person's actions and situation can not solely be described based on the analyses of that person but the

person should be seen as one of the actors parting in a network of players and the existing bonds between these players.

A central assumption in social network theory is that a social relationship between two individuals constitutes a channel of information exchange. An individual with extended social bonds gain access to more contacts and thereby a greater amount of information that gives the individual a higher position and more power in that network. Granovetter describes a study conducted on the habitants of a Boston suburb about how they find a position in the labour market. He found out that the knowledge of new opening positions is not normally transferred through close contacts, such as relatives or friends, but rather through temporary acquaintances, or what he call *weak ties*. These weak ties are strongly supplying the searching individual with diversified information. The flowing diagram tries to facilitate an easier understanding of this theory of Granovetter.



Another link within one close society will not lead to more information; it is simply the same information that is being told once more. This refers to the weakness of the strong ties in Granovetter's network theory. The weak ties however lead to spread of information from one society to another. This is what causes the strength of the weak ties.

A notable amount of studies have been performed to verify Granovetter's network theoretical outline of which Friedkin (1980) is the most well-known. In an empirical study he distributed questionnaires to researchers in seven different institutes at a

University in order to define the bonds between these researchers. He studied the knowledge of one researcher of another research group working in another institute than his own. A single awareness link was defined as a weak tie and a double link as a strong tie. He found that the result was consistent with Granovetter's outline of argument and that weak ties build bridges predominantly between different networks.

Ever since Granovetter published his theories they have been object of debate. The main criticism is often directed to the fact that the theories lack generality. Analyses of personal networks demands detailed empirical information that many times is difficult to gain through the simple parameters that are used to visualise a network. The necessary simplifications combined with the intrinsic complexity of the issue makes it difficult to draw general conclusions on the basis of a network analyses. Another criticism directed to the method fundamentally translates a structural analysis rather than an analysis of individual actor's relationship (Løvseth 2000). On the other hand the simplicity of the theory makes it useful in many cases.

### ***3.3 Social Capital***

Social capital is defined as any aspect of social structure that creates value and facilitates the action of individuals within the social structure (Coleman 1990). Comparing physical capital with human capital, both are in need of change if higher production is required. In the former case the changes is in material and in the later is in individuals' skills and capabilities. Social capital is created when the relation between individuals change in the way that facilitate higher production (Coleman 1990).

Another interesting theory used to conceptualise social capital is the social resources theory (Lin et al,1981). This approach concentrate on the resources embedded in the social network. According to Lin, it is not the weak ties in themselves that conveys an advantage but the fact that such ties is more likely to provide you with social resources. Persons or organisations that provide you with social resources could be highly significant for you career development (Lin et al, 1982). These theories are not mutually exclusive but can be integrated as they focus on different point of accumulating social

capital (Scott 2000). The integration of the theories explain both the different network structure that smooth the progress of accessing social resources and the nature of the social resources in the network (Scott 2000). The network structure that gives you more access to important social resources are not weak ties but from a practical point of view investing in weak ties will provide you with increased level of social resources embedded in your network. The network benefits are argued to be access to information, access to resources and career sponsorship which provides social capital (Scott 2000).

### ***3.4 Theory Links***

The mentioned theories have been chosen to study this phenomenon more thorough. Social economic theories are described because of today's society and its dynamic influences on individuals as well as groups. In this thesis, I see every Biomedicine student as one individual and every university or institute as one group. The dynamic are the links between these players. The weak and strong ties refers to the connection that every individual or group has inside or outside its own group. The connections that lead to academic position at KI will be the weakness of the strong ties and the connection that leads to a position outside KI will be the strength of the weak ties. In the next section the empirical findings will visualise the relation between these chosen theories and why they are of interest in this thesis.

#### **4. Empirical findings**

*The empirical findings will start with a short presentation of the interviewees that the thesis is based on. Later the findings will be presented categorised in line with the hypothesis questions. The last part will be the results of the questionnaires.*

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##### **4.1 Interviewee group**

<b>Name</b>	<b>Class Year</b>	<b>Current Position</b>	<b>Company/Institute</b>	<b>Interview Date</b>
Anna	2001-2005	Clinical Operations	PPD Scandinavia	14-11-2006
Fredrik	1995-1999	Research Scientist	Astra Zeneca	03-11-2006
Oskar	2000-2004	Head of Sales and Marketing	Novartis Sverige AB	31-10-2006
Astrid	1997-2001	PhD student	CCK	09-11-2006
Hanna	1995-1999	Head of Product Information	Amgen	08-11-2006
Anders	1998-2002	Research Scientist	Medivir	07-11-2006
Lotta	1998-2000	Marketing and Information	Lilly	08-11-2006
Charlotte	1997-2001	PhD student	Molecular Biology	31-10-2006
Tomas Cronholm		Professor	Karolinska Institutet	28-09-2006

Empirical findings are presented in two categories, marketing mismatch and Network. Under each category questions of relevance for the thesis are solicited.

## 4.2 Interviews

### 4.2.1 Marketing mismatch

The interviewees were asked a set of questions that combined would provide empirical insights on whether the marketing mismatch hypothesis should be accepted or rejected.

The questions and answers regarding the hypothesis of a marketing mismatch have been divided into three main categories presented in the coming section.<sup>2</sup>

#### What was the initial motivation for applying to the Biomedicine program?

The first category investigated the motivation for applying to Biomedicine Program among the students. The Biomedicine program offers 60 students per year a place in the program. More than 25% of them leave during the first year (Antagningsstatistik-Appendix C). The questions asked were open-ended and referred to the former students' motivation and hopes for the future outcome of their studies. All of the interview subjects expressed a clear initial interest in the pharmaceutical industry. However the perception of the content of the education differed between the interviews. While some were interested in medicine in general and searched for an education that would provide them with broad opportunities in that field, others applied for the Biomedicine program because it was the only alternative to the medicine program. Here are the key responses collected.

Anna, who works with clinical trials, says during the interview: *I knew that I wanted to work in the pharmaceutical business. I had no previous knowledge about the extensive laboratory practise, however. I wanted a broad education which could give me a broad range of opportunities within the business.* Fredrik also expresses the same reason for applying for the program. He says: *I was hoping that this new program would lead to research positions or anything connected to the medical research field. Anything really that helped the patients in the end of the process, sales, production etc. I wanted an education that could give me broad options in the labour market.*

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<sup>2</sup> Please visit Appendix, A:3 for the question categorise

Another former student, Anders, was recommended to apply to the program. He was mainly interested in the opportunity to use the education in combination with his previous studies. He says: *I was studying journalism in the US but did not enjoy it. My friend's brother had started the Biomedicine program a year before and recommended me to apply and that is how I ended up at Karolinska Institutet. I found the program very interesting but my first thought was to combine the two disciplines of journalism and medicine, to write scientific articles. I did however never follow up that idea. I think it was because I found medical research interesting enough.* Lotta, who actually did combine two different disciplines in her current position express her initial interest in the program as following: *I have always been interested in molecular medicine and therefore applied for transfer from the biotechnology program at Uppsala University to the Biomedicine program at Karolinska Institutet I have always thought that I would take my PhD degree but I have also been interested in writing and could imagine my self combining these two fields."*

Astrid, a PhD student says: *I was interested in medicine but did not have any plan to become a physician. I choose the program because it was in Stockholm and also because it was my main area of interest.* Another former student, working in the industry, Hanna, says: *I knew about my interest in Medicine, but I also was pretty sure that I did not want to study the Medicine program and become a physician. For me it was a blessing because the program started the same year of my secondary school graduation and I felt that the program would be perfect for me."*

In contrast to other interview subjects, Oskar expressed his initial interest in applying to the program as follows: *I had a clear vision, goal if you may, when I moved to Stockholm and that was medical research, which was mainly why I started at the Biomedicine program at Karolinska Institutet.* It is interesting to mention that Oskar is now working as sales manager for an international pharmaceutical company and never did apply for a PhD program.

*Did the outcome correspond with the initial motivation?*

The second category of questions investigated whether the interviewees' current positions in the labour market coincided with the initial motivation to study the program. Was there a discrepancy and in that case, what were the roots causes the motivations changed? This set of questions was based on the hypothesis of misinformation. The underlying reason for asking the questions was twofold. One was to gain additional knowledge about the choices that were made and the second to find out whether the choices were due to an information mismatch existing between academia and industry. Some of the responses are quoted below.

*"I was interested in research during the education but gradually I changed my mind. The lack of career development for females in the academic research area discouraged me from pursuing such ambitions."* Anna is currently working with clinical trials after trying several career opportunities. She further states: *"My thesis work at Astra Zeneca was a discouraging experience because of the down sizing. I figured that if Astra Zeneca, a big multinational company is saving on its primary research department, what would happen with the need for PhD graduates. This information discouraged me from pursuing a PhD degree."*

Astrid expressed a very different answer to this question. *"Initially, a clear goal for me was to work a couple of years after graduation, trying different possibilities and maybe at some time in the future get my PhD degree..., but of course it has not been the best labour market for Biomedicine students and at the time of graduation I felt that I had no choice. I found my thesis work department very enjoyable, it was an interesting topic and the research group was very friendly, so it became a natural choice to stay for a PhD."* She further explains her reasoning. She means that the information she gained from the industry was discouraging and led to her change of mind. *"Normally there were company presentations..., many of these companies recommended us to take a PhD degree, travel to other countries for PostDoc and then they would be very interested. That is what they told us."* This information led to her not applying to any position outside Karolinska Institutet but she states that she would have accepted an offer from the industry if the

opportunity had turned up. *“I did not apply for any other position at all..., I had most definitely considered an offer from the industry, there are many positive aspects of academic research but there are at least as many negative aspects.”*

Other respondents expressed experiences that changed their perception of their future opportunities. Oskar, who is today head of sales at one of the major pharmaceutical companies in the world describe his change of mind differently than Astrid. He says: *“I accepted a thesis work that I know would give me a PhD position after graduation. So there were some ideas of completing a PhD program but not a clear goal from my side.”* The experience from his thesis work seemed to have changed his mind. He further explains: *“My picture of the academic research changed during the education. You realise which sort of problems researchers must endure. It is not always easy to be a PhD student. I got cold feet. Even though I was interested in research I felt that I was not ready to put my soul and life into something that might not give result..., wanted to see a solution where I worked with fascinating problems but under economically acceptable circumstances.”* It seems that his motivation dramatically changed as the education passed and his experience in the academic field increased.

Anders, who works as a researcher at a biotech company says about his initial motivation: *“I tried out the academic world parallel to my studies, it was mainly a playground. It was very fun but with no structure. The academic research is unfocused in contrast to the industry, which is very much target oriented.”* He also explains what he thinks may be the perception of the labour market. He says: *“I think most students believed that more interesting positions were available if you had a PhD degree. It is a title-focused industry and the market searches for those titles. The general perception is that you need a PhD or you will end up cleaning laboratories.”* However, he refers to himself and says: *“I have no PhD degree but I am not cleaning in the laboratory either.”*

Tomas Cronholm, Professor and Program Director of the Biomedical Program, explicitly states: *“We wanted to create an academic program for future researchers. We wanted students to stay at Karolinska Institutet, be part of a research group and contribute to the*

*academic research. The process was expected to take some time but the students would be very attractive for the labour market at the time of their PostDoc.”* Other contributing powers in developing the program were pharmaceutical companies such as Pharmacia and Astra Zeneca. In 1994 these giants were in need of new minds in the medical research field and therefore pushed for starting the Biomedical Program.

*They were asking for PhD students at 1995 but they did not realise the time needed for educating young students to researchers,* reflects Tomas Cronholm.

*What was the impact of student's early exposure to the industry?*

Finally, the third category of questions refers to the exposure to the industry and/or other relevant future opportunities were presented during the education. The reason for asking this set of questions found in the appendix was to satisfy two objectives. The first objective was to find out if there had been any clear introduction of the opportunities available for graduate students. The second objective was to determine whether that information was of use. Most of the interview subjects had been exposed to the industry at some time during their education. The main exposure had occurred through career days or company presentations. However, the frequency of these meeting points between the industry and students differed depending on the class year (questionnaire). The follow-up questions covered the perceived opportunities after such meetings. In the previous section, negative aspects about these meetings were stated by some of the interview subjects. In this section the empirical findings about the reasons behind these negative aspects are presented.

Anna turned down an offer from the industry and she explains her decision as follows: *“Astra Zeneca offered me a position at the laboratory after my thesis work which I turned down. The position was more suitable for a BMA (Biomedicine Analyst- a three year program of practical nature) graduates.”* She perceived this offer as an insult to her extensive theoretical knowledge. She means that the industry does not know the difference between these, in name similar, programs. She realised, however, that the labour market is rather difficult to enter and any proposition should be considered

carefully. She further explains that in her current position she owe gratitude to her previous experience in the industry. She says: *“Companies are looking for experienced people and most preferably in the pharmaceutical business. I would not probably have a chance on getting this job if I had not performed my thesis work at Astra Zeneca.”*

Fredrik, who is one of the graduates of class of -95 (first class of Biomedicine Program) works as a scientist at Astra Zeneca expressed his perceived attitude to the excessive number of PhD students at Karolinska Institutet as follows: *“To me it is clear that Karolinska Institutet recruits its students to contribute in the academic research field. These students are less costly for the institute and many of them actually end up at Astra Zeneca with PhD degrees. In the primary research the employment has been dead. It is no longer enough with a broad knowledge base but the industrial research require in depth understanding. It is difficult to compete with higher educated with only a Masters degree.”* In addition he says: *“Astra Zeneca has not taken its responsibility towards the educational program they started..., it’s unfortunate that even they do not have enough information about the scope of the Biomedicine program.”* As a resolution to this mismatch he says: *“from a student perspective it would be helpful to have some clear career paths to choose from..., it is really about available information and I personally think it should not be difficult to share this information.”*

Astrid, one of graduates of class of -97 remembers the radical change in the perception of future opportunities in the industry: *“At the beginning of our education we seemed to be very attractive for the market of pharmaceutical as well as biotech companies. These companies would simply absorb us from the market when we graduated; very little of this became reality.”* She also mentions the lack of information about the opportunities within the companies. She says: *“It is still fuzzy which jobs to apply for, which positions would match our competencies. I still lack this information. It seems as if Medical research has disappeared from Stockholm. There are very few vacancies left. They are increasingly moving to other countries. There are other positions but I really don’t know what they might be. I would appreciate more concrete descriptions about the different possibilities. It seems that there exists perfect positions but none of them are known to us.”* She further

explains her reasoning when she searched for a thesis work: *“I believe the thesis work is the opening door to a future position. I remember that many said that if the thesis work was performed in the industry it would later minimize ones chances for a PhD position at Karolinska Institutet and that it was not preferred from a status point of view.”*

Anders, also a graduate of -97 says: *“The program lack the information needed for us to know the possibilities outside Karolinska Institutet.”* Considering the high number of PhD students at Karolinska Institutet, he reasons as follows: *“The current labour market is rather closed. If major biotechnical companies such as Biovitrum are letting personal with higher education and lots of experience go how Master program students could be able to compete with that unemployed human capital.”* About the perception of Biomedicine students at his current employee, he says: *“There is a lack of knowledge about the program among companies in the relevant industries. Among people with 20 years of experience in the business, the Biomedicine program is very much appreciated. But they have to gain more information about the program in whole, which basic knowledge the students have.”*

Lotta has a strong opinion about the perceived opportunities from both sides. She says: *“My general opinion is that the industrial employers are not knowledgeable about the content or the existence of the program.”* From the students' point of view she sees the problem as follows: *“The main point is that nobody seems to know what the education leads to. The information about future opportunities seems to start and end with academic research.”* In order to gain more market share as Biomedicine students she suggests: *“We need stronger marketing effort at the program. Karolinska Institutet is a closed world and it is natural that information goes around inside that world especially considering the willingness to keep the resources inside the circle. The program is also very young and the information has not yet penetrated the labour market..., the program should be introduced to the private sector as well.”* She further explains that her current position was offered to because the employee was informed about the program and its content: *“The Head of Research at Lilly was fully aware about the program and I strongly believe that information helped me in my career.”*

#### 4.2.2 Network

In addition to the questions targeted to the marketing mismatch hypothesis, a set of questions directed at the students network experiences were asked. Questions were aimed to explain whether there is a shortage of contacts between the industry and students, and how in that case that impacted the students' career choice.

In this empirical section the findings are presented in three main question categories asked during the interviews.

#### *Thesis work used as an entrance to future career opportunities & available vacancies after performed thesis project.*

The questions asked during the open-end interviews aimed to create an understanding of the students' network base and whether that base contributed to their choice of thesis project. Most of the interview subjects declared a planned strategy for choosing their thesis work. The thesis project is seen as a door opener for a future career. Some were interested in the industry for future employment and some were interested in academia and a future PhD position. However, there existed a large group of students in the survey with an initial interest in the industry that were unsuccessful in reaching there. Here is a summary of the answers to the questions relating these activities resulting in the chosen thesis project.

Anna was one of the students that performed her thesis work in the industry. She explained about the opportunity as follows: *"Astra Zeneca needed to save in research operations at that period of time and probably reasoned that using students would be economically more beneficial."* About how she received this information, she stated: *"I became aware of one of these offered projects through a personal contact at Karolinska Institutet."* The thesis project led to a job offer from the company. However she did not consider the position attractive enough to accept.

Fredrik was also one of the students who completed his thesis work at Astra Zeneca. He explained his application process to the industry: *"I contacted the department I was*

*interested in working with and received a positive response...however when the time came, they had unfortunately forgotten about my application so I asked for help from KI. I contacted, a well known professor at Karolinska Institutet, who contacted the head of the department at Astra Zeneca, a former student.”* He further explains his success in the application as follows: *“The thesis work at Astra Zeneca was offered to me as a combination of own ambition and usage of contacts within KI and its network with former students.”* The company offered a one-year project placement after the graduation which he accepted. After that year a position as a research scientist within the laboratory technician team was offered to him.

Anders is another example of a student performing his thesis project in the industry. He originally applied for a summer position which he later successfully used for a project placement: *“The summer of second year of my studies I sent an application to Medivir for a summer internship and when it was time for the thesis work I had contacts within the company.”* The reason for applying for a project outside the academia he reasoned: *“I was very much interested in the industry and not in the academic research. I had no contacts at the time of my summer internship; I simply sent out my CV to three or four companies and hoped for the best.”* He explains his success in the application process: *“I think I was lucky. It really comes down to if someone picks up your resume from the pile of applications or not.”* Medivir offered Anders a position after his graduation which he accepted.

Among the interview subjects there were two, Oskar and Astrid, who had completed their thesis project at Karolinska Institutet in academia. Oskar explains his line of strategic thinking as follows: *“I accepted a thesis project that I knew would give me a PhD position after graduation... I knew that the project was a great base to stand on with many threads to pull, if necessary.”* Oskar further states that he did actively search for vacancies in the industry and intensified his search towards the end of his education. He says during the interview: *“I was very active and had a clear strategy on how to overcome the problem of career... My strategy involved the Lif (-Läkemedelsindustriföreningen) companies. I systematically went through their*

*homepages every week looking for a position or an available vacancy.*” This strategy paid off. Oskar turned down a PhD position at the same Institutet of his thesis work and accepted an offer from Novartis.

#### *Usage of personal contacts for obtaining the desired position*

Astrid found an interesting project at Karolinska Institutet for her thesis project. Her approach was to contact a professor that could recommend her to a research group. Astrid reasoned that a thesis project with later prospects for a PhD position was a safe card to play. She describes her strategy as follows: *“I simply approached my professor during the course and expressed my interest in the subject and that I wanted to do my thesis work at the Institutet... I applied for the research group and planned my thesis work before going to Australia for an exchange semester.”* She, in difference to Oskar, did not send out applications to the industry. She enjoyed her research group and accepted the offered PhD position after her thesis project.

From the interviews it is clear that most of the subjects had an offering at the time their thesis project ended. It is also clear that not all positions offered were of interest to the applicants. This statement holds true for both academia and industry. It is also stated in the previous section that most of the subjects did make use of their contacts to increase their chances of receiving the project they wanted. It is of interest to follow up this line of thinking and to clarify whether these contacts have been of relevance for their current position.

Anna, regarding her current position says: *“Through the alumni network I found out about a clinical trial post which I applied successfully for...but I would probably not have received this job if it was not for my thesis project conducted at Astra Zeneca which I received thanks to Karolinska Institutet.”* She does however describe the challenging environment of the labour market for Biomedicine students in general at that time. She says: *“The ones that did not have a thesis position in the industry nor had personal contacts had at harsh time.”* She also says during the interview that she worked hard to get her current position which she is very pleased with. She emphasises the importance of

personal contacts in the current labour market: *“I had to work for this offer... An acquaintance of mine works at the same company as I do but he just graduated this year. The job he got through personal contact which is an even more efficient way of reaching the desired market.”*

Anders informs about his experience from a company perspective that: *“Normally when a vacancy is announced the position is filled internally. The position goes to someone you know rather than digging in resume piles.”* His advices to the students are: *“If your ambition is to build a career in the industry, you should gain more contacts...i.e. Attending courses that involves companies where you could gain direct contact to people in the business.”*

When it comes to applying to the industry for thesis projects and/or permanent positions, the competition is strong. In the cases of successful application processes, the applicant had been highly active in pursuing a career in the industry. Oskar informs about his successful experience at Novartis: *“At the interview I found out that the head of the department had a PhD degree from the same institute as my thesis project and that in fact we had a common acquaintance, a professor at Pharmacology. This resulted in a connection between us and he found me suitable for the position I had applied for.”* Even after a while at the company the same person recommended him to an unannounced position within the company. Also Astrid stressed the importance of contacts during the interview: *“Personal contacts are of course very helpful. Many positions are filled through contacts, the applicants are recommended by someone inside the company...however my classmates are in academia concurrently and I’m not sure how helpful they would be for me.”* Lotta agree with Astrid about the importance of contacts, she remembers: *“A job in the industry demanded personal contacts. There was no systematic way of applying for theses jobs. Many of my fellow classmates, therefore, applied for PhD vacancies instead.”* Anders concurs with this statement: *“My experience is that many wanted to go to the industry but few succeeded in doing that, for many different reasons.”*

### The source of information related to available vacancies

This thesis also investigated the significance of information and its contribution to identify vacancies in the labour market. The questions were mainly related to the interview subjects' perception of the labour market before and after receiving an offer. The follow-up questions aimed to identify the source of information in every case. Here are some of the responses regarding these issues.

Anna had the opportunity to try out different practices in the labour market before being recommended to her desired position in clinical trials. She expresses her opinion about the general conditions of the labour market: *“Short-term project based positions were easy to find but no long-term contracts existed at that time.”* Hence the different practises she tried out. She argues that you gain more from being in the market doing a short project, than being outside and not gaining any new knowledge. She recommends: *“You should not be afraid to take on small jobs or outside Stockholm. The opportunities become more frequent if you are in the labour market even though the position is not your first choice. It is better to be in the labour market, you gain experience and contacts and gradually you will reach your desired market.”*

Fredrik argues that a long-term objective when it comes to choosing a career facilitates the opportunities in the future. He remembers his time of study and how his classmates experienced the program: *“My classmates came directly from secondary school and had very short objectives. They believed that studying was enough and that position offers would come naturally after graduation. Because of the program being novel, the scope of relevant information was rather small...The Biomedicine program is not a vocational program which transfers the responsibility of finding a suitable career to the student...You have to start your network during the education. You have to start early so you can work on those things needed to reach the target. Screening through my network enabled me to reach my target.”* Oskar agrees with this line of thinking, he says: *“You have to be clear about what you want to do in the long run.”*

*The role of Karolinska Institutet in promoting and marketing*

Finally it was of interest to investigate the role of Karolinska Institutet in the decision process of students' choice of career. The reason behind the asked questions was to understand the network of the university and its access to resources and information for the students. Karolinska Institutet has a well-known brand due to its activities in the Nobel committee. All of the interview subjects expressed their knowledge about the extensive network existing in Karolinska; however some disappointments were expressed involving the access to these resources.

Oskar who has experienced from both academia and the industry states his opinion about the Karolinska network. *"KI is not terrible on the networking issue, on the contrary, they know how to present the different opportunities as future careers, however they have been modest in promoting other opportunities than the ones at KI. It has never been clear what the next step is after the graduation. It is a solid base to build on and you should build on it at KI as a student."* In addition to this Anna expressed her understanding of the resources available: *"There are possibilities at KI to build a network but it depends solely on the student. How eager she/he is to reach the industry and make use of the resources."* She refers to her current company and explains: *"In my company there are several employees with Biomedicine background which attracts more Biomedicine students. To be entirely honest my current position is thanks to former Biomedicine students, an invisible network between the Biomedicine graduates."* This phenomenon is mentioned by other interview subjects as well, Fredrik says: *"Graduate Biomedicine students are becoming more visible in the market and the links are starting to expand."*

Astrid, who is concurrently completing her PhD thesis, expresses her aspiration about the possibilities offered by Karolinska Institutet and its brand. She means that the good name of KI will contribute to extended opportunities after graduation. She says: *"I hope that the program in itself would have a sign, a quality mark...the graduate student in the market should have proven themselves commendable which will help the upcoming students in the market...I trust that by every class graduation the network becomes bigger which will lead to greater opportunities available and clearer to students."* This

reasoning seems not to be distant from the reality. Anders who is currently positioned in Medivir, a biotech company, says that: *“I am trying to promote the Biomedicine students as much as possible and I have received positive response from the company. We have now some from the progr question categorise am working here at Medivir... the problem is the young age of the program but I strongly believe that it would get better with time, as I see it there are more applicants from the program every year.”*

#### **4.3 The results from the questionnaires**

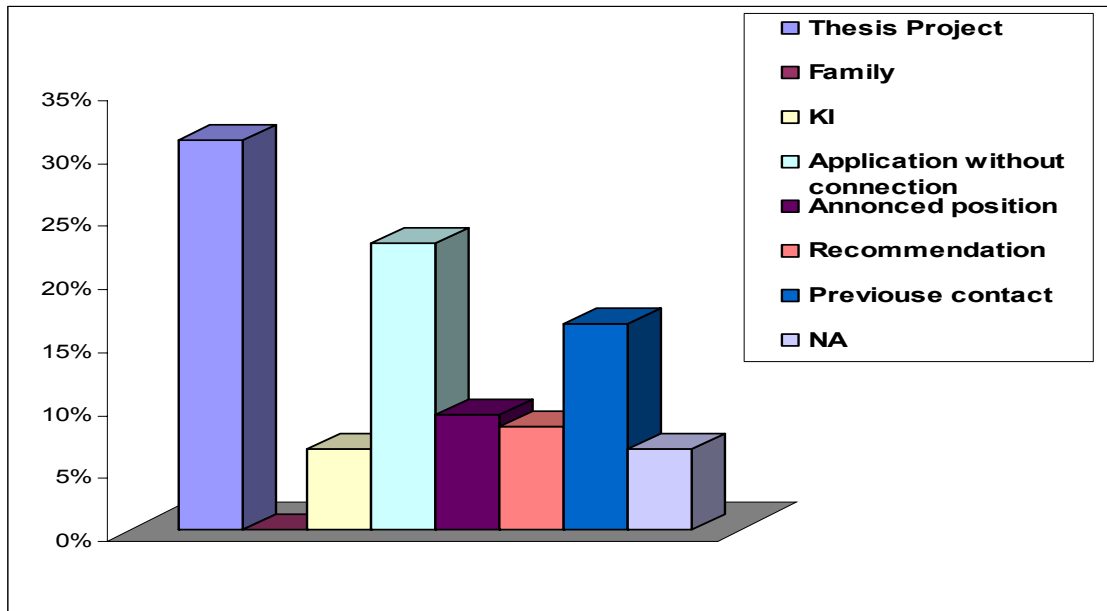
In addition to the empirical findings from the interviews, questionnaires asked questions that could contribute to prove or disprove both hypotheses.

This section with the empirical presentation is rather straight forward. The relevant questions asked on the questionnaires are presented and the data obtained made accessible through graphs and demonstrative tables. Many more tables and graphs are accessible in the appendix section. The results have been divided into two sections corresponding to the two questionnaires sent out to former and current Biomedicine students. The respective questions asked in each questionnaire are available in Appendix B:1 and B:2.

##### **4.3.1 Alumni**

In graph1 the existence of strong and weak ties are illustrated. Referring to the theories, it is important to recognise two different aspects of these two dissimilar ties. The first is to know which are strong and which weak ties are. In this case the strong ties are representative by the columns of *Family*, *Recommendation* and *KI* while the remaining categories, excluding the *not applicable (NA)*, are interpreted as the weak ties. The second recognition is to understand the strength and /or weaknesses of each tie. In this case the second understanding is found in section 4.1 and 4.2.

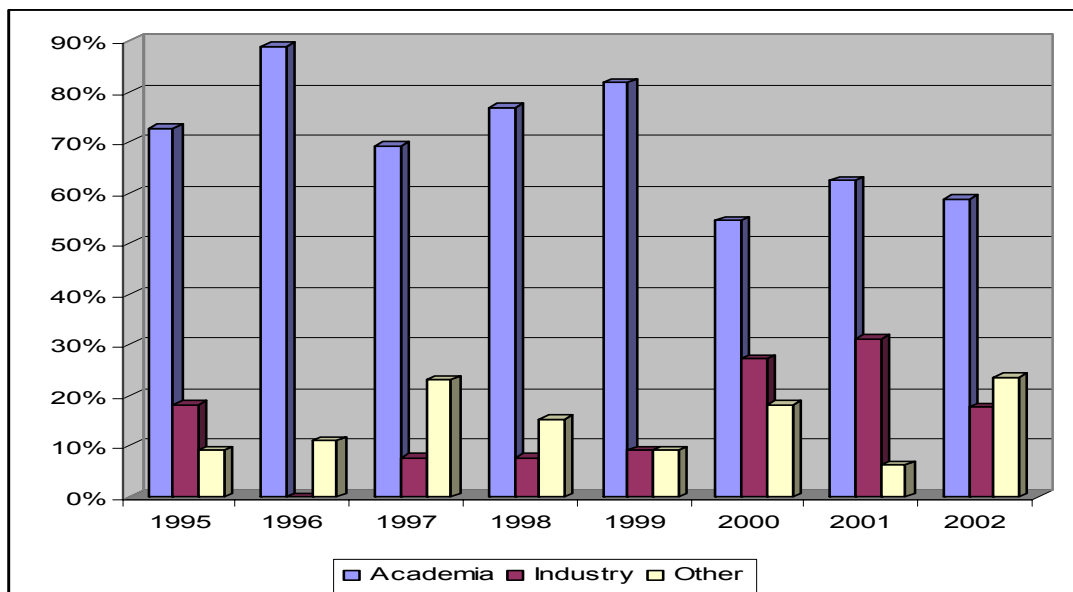
1- Which sources helped you in receiving your current position?



Graph1, The source of information to the current position

Another important question asked regarded the thesis project. The former students were asked to respond to the question of where they completed their thesis project and if the project had led to a job offering. The reason for examining this was to understand whether the thesis project was important for locating vacancies.

2-Where did you complete your thesis project?

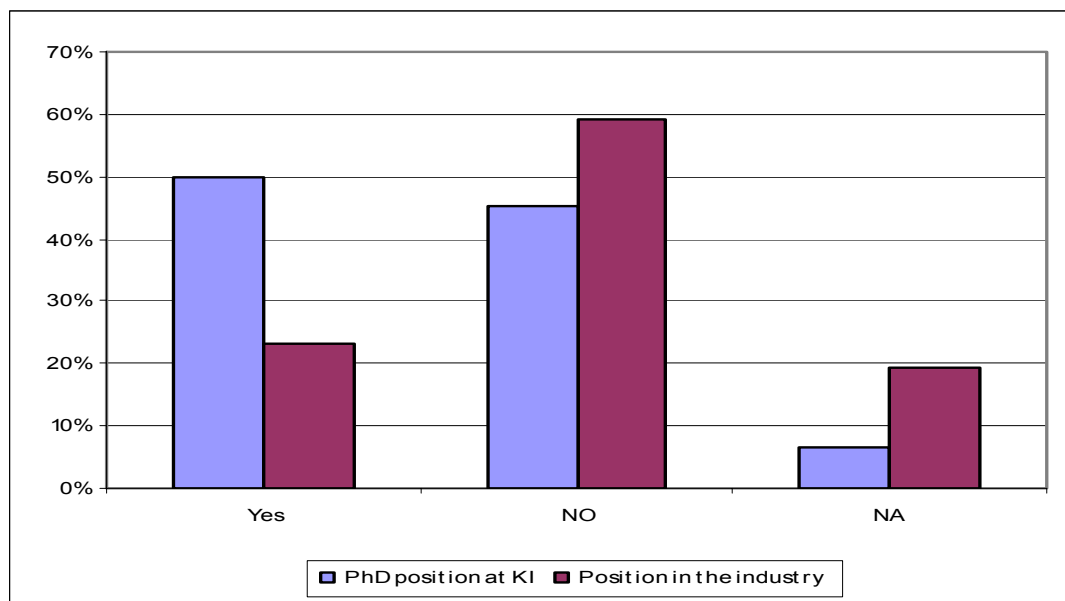


Graph2, The total number of students' thesis project

Among the respondents, a significant majority had pursued their thesis project in academia where many of the projects were at KI. In graph 2 the category, *other*, consist to a high extent of academic research at international sites and clinical research. In the category *industry*, Astra Zeneca and few other major pharmaceutical companies were mentioned and by early classes (95&96).

The follow up question was if the thesis project pursued by the responder had in fact help gaining a vacancy after completed project. The question was asked to understand if the site for completing ones thesis work had an affect on offered vacancies.

3- Did your thesis project led to a job offering?



Graph3, The impact of thesis project job offering

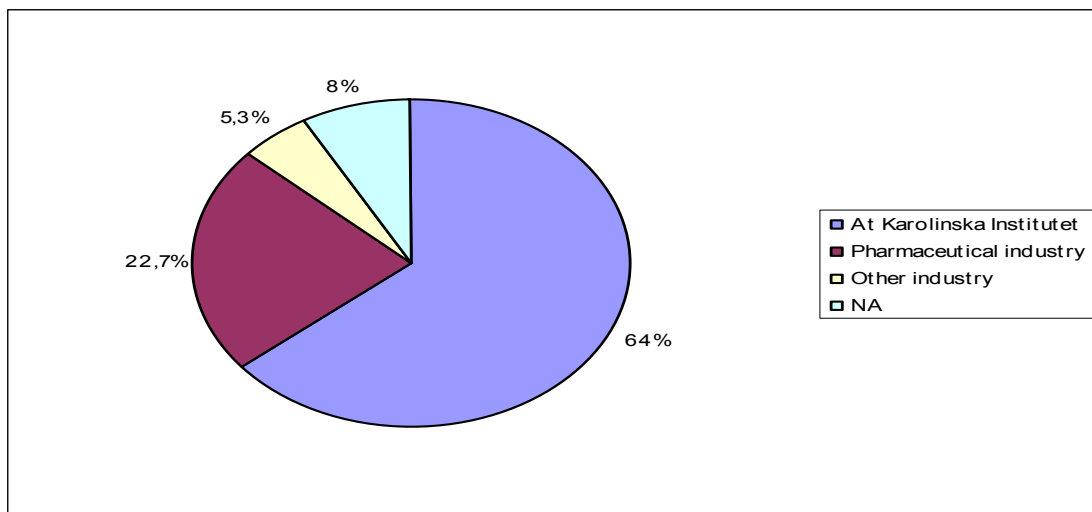
In graph3 we can observe that performing thesis project at academia could in higher degree provide the undergraduate with available vacancies. There is also a higher discrepancy comparing only the industry positions. According to this chart the possibility of receiving an offer from the academia is higher then from the industry.

#### 4.3.2 Current students

The questionnaire directed to current students started with enquiring the year of start at the program, the age and gender of the respondents. The questions were asked to gain more information about the students in general and are found in the appendix A:1 section.

The second set of questions regarded the thesis project and where the students saw themselves completing the project. Almost 67 percent had pondered about the thesis project and from that percentage 64 percent wanted to pursue a project at Karolinska Institutet and academia. Follow up, open ended question (Appendix, B:2) revealed that most of the responders had or want to apply to KI because: *“it is much easier”*, *“I have already been offered a position”*, *“it doesn’t look so positive outside, I wish I could”*. Some other responds complained about the industry’s unawareness of the Biomedicine program; *“KI have not introduced us to the industry yet”*, *“I don’t think it is possible”*. The reason for enquiring these questions was to see how students reasoned about their possibilities on completing a project outside KI. Also to distinguish any discrepancies between these responds to the follow up questions of desired position after graduation. The responds are presented in graph5 and 6 respectively.

5- Where have you considered completing your thesis project?

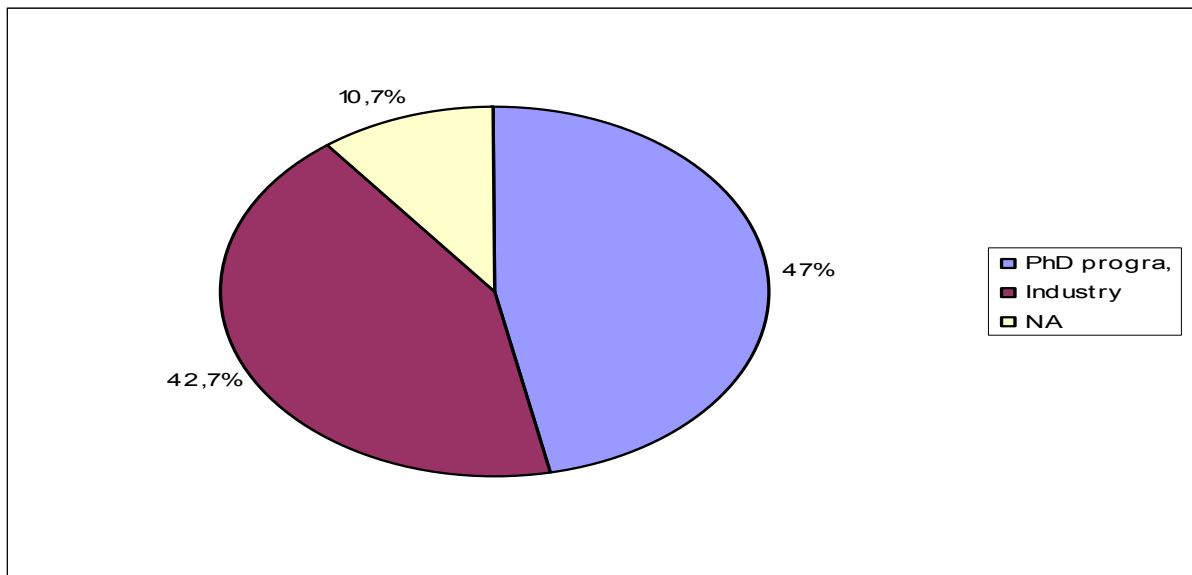


Graph5. The division between expected thesis project opportunities

Question number 6 looked upon the future opportunities anticipated by the current students. The motivation for asking this question was to investigate whether the perception of the students corresponded to the former students’ current positions. The percentage of current students’ aspiration to start their career in the industry rather than at KI is slightly less. The result is presented as a pie diagram in graph 6.

To follow up the reason behind the previous result, an open ended question asked for clarifications from the responders. Words such as “*natural choice*”, “*automatically*” and “*no other options*” were used to a high extent. Other reflections were the scarcity of future opportunities without having pursued doctoral studies as the main reason for pursuing a doctoral study at KI.

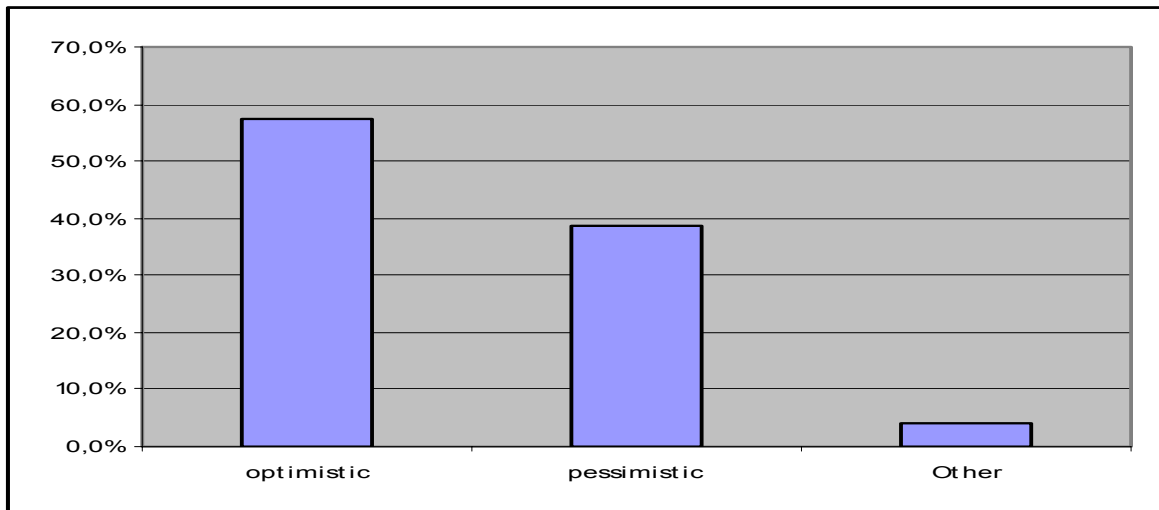
6- *Where do you see yourself after graduation?*



Graph6. The division between career developments

The last sets of enquires were on the expected job openings and the students' expectations for the future. They were simply asked to state whether their classmates were feeling optimistic or pessimistic towards the future career opportunities. The reason behind the enquiry was to appreciate the expectation of the Biomedicine students' future career development. The result is presented in graph7.

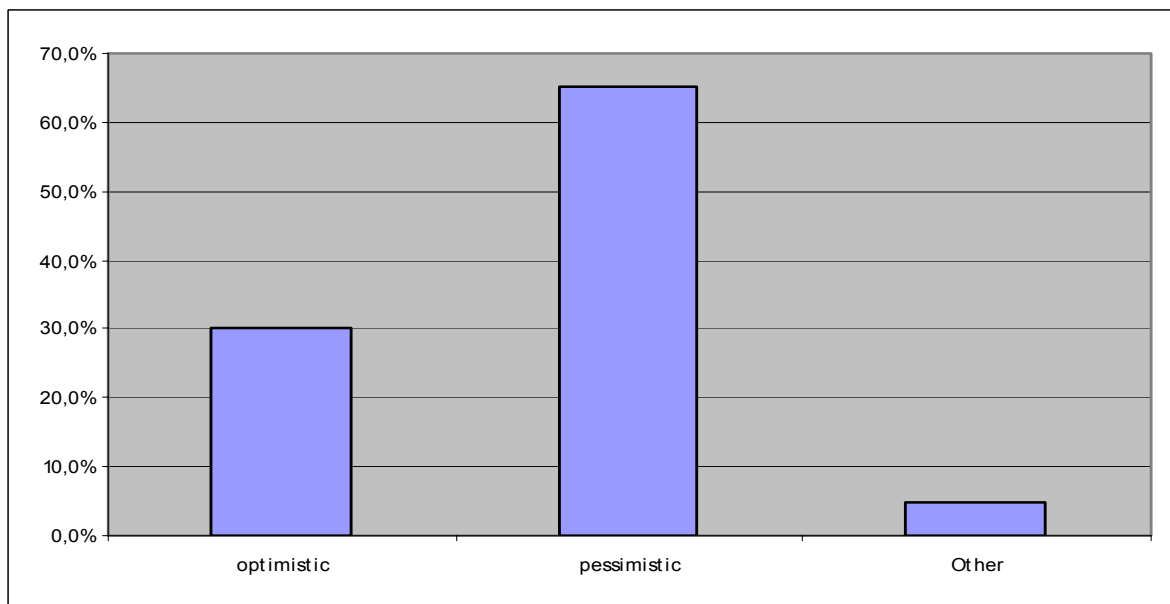
7- What are your classmates' feelings towards their future careers?



Graph7. The experienced future career development when asked of the students

The follow up questions related to these feelings were the following, “which group did the respondent belong to” and “why”. The reason for asking these questions was to examine the reliability in the first set of responses. The amount of optimistic declined significantly when considering the reasoning behind their choice of group. The result of the enquiry is presented in graph 8.

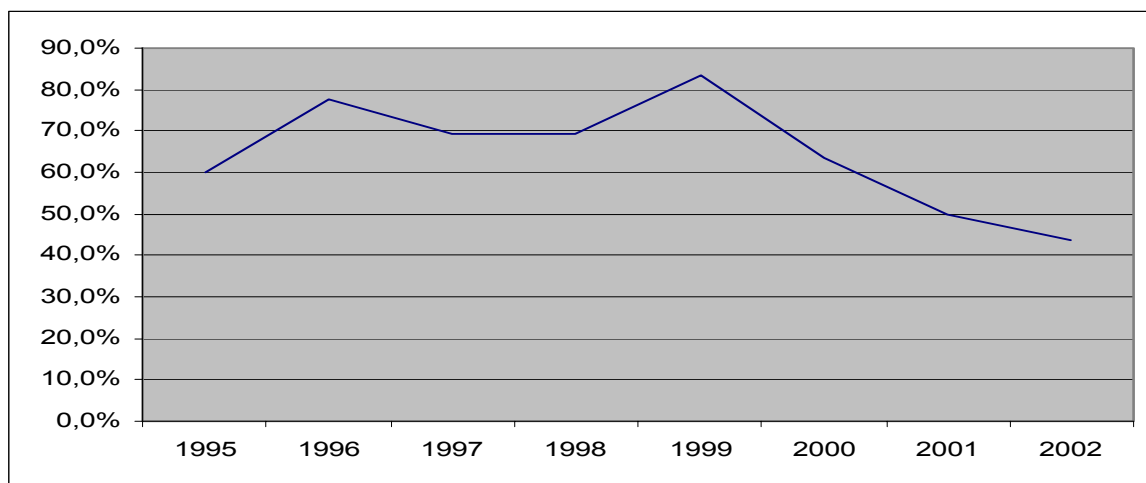
8- Which category do you belong to?



Graph8. The actual experienced future development

The next follow up question was asked to capture the reason for the respondents' previous reply in more depth. The majority of the responders expressed an unenthusiastic mood towards their own future career opportunities. One of the responders communicated; *"A doctoral position is just a further education, not a job"*. Some complained about the non existing connection with the relevant market; *"it feels as if KI and/or further studies are the only possibilities for us"*.

Another observation, interesting to present, is the fact that the amount of Biomedicine students applying for research has started to drop. Graph 9 illustrates the shift of PhD pursuance among students over time. According to the empirical findings, the majority of changes are due to a new field of interest among Biomedicine students, namely clinical trials<sup>3</sup>.



Graph9. The percentage of Biomedicine student that have or will be pursuing a PhD program in respective class year

Graph 9 shows a small change in the movement of the biomedicine students from academic research. Many of the responders mentioned clinical trials as a position of interest after graduation. The majority of these were from class of 98 and onward. The horizontal axis represents the class starts of the students meaning that the class of 2002 have only just began to considerer their career movement.

<sup>3</sup> For commercialising a newly developed substance, studies must be performed on humans. There are three phases differing in number and health of the sample size.

## **5. Analysis**

*The hypotheses of this study is to understand the underlying reasons for the large number of Biomedicine students' choosing of the academic research careers instead of career development in the industry. The analysis will therefore be based on the theoretic framework and empirical data, attempt to explain this behaviour. The main theory used is the classical labour theory of Solow, social network theory of Granovetter and Scott's social capital theory of career success. In addition to these theories classical economic theories regarding the labour market is used to shed light on the importance of information in that market. Also this section will be a partition between the two main hypotheses.*

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### **5.1 Marketing mismatch**

Through analysis of the empirical findings, three credible causes of marketing mismatch related explanations have been identified:

1. There is confusion among students on the Biomedicine program
2. The labour market has changed since the start of the program
3. The industry lack correct information on graduated students' knowledge

#### *1. There is confusion among students on the Biomedicine program*

Both the interviews and the survey showed a broad generality in the responses that indicate a spread perception of the program and its contents. On the one hand we have Anna, who applied to the program because, "*I wanted a broad education which could give me a broad range of opportunities within the market*" and on the other hand we have Oskar who applied because: "*had a clear vision...and that was Medical Research, which was mainly why I started the Biomedicine program.*" From the interviews, it seems as if there exist insecurities among students about what the program offers. This impression is reinforced when looking at the empirical data collected from the survey. Statistics gathered by Karolinska Institutes' own student department shows the deep drop of Biomedicine students in the first two years (Appendix C). Reason behind this might be the fact that students' understanding of the program is not clear at the time of application.

These reasons are based on some of the questions (Appendix B) asked during the interviews, the main question being the following: *What was your reason for applying to the Biomedicine Program?*<sup>4</sup> Looking at the presented empirical findings we see among applicants to the Biomedicine program, a clear majority having an initial and strong interest in medicine and the medical field in general without specific clarification in between the categories. The conclusion is taken based on comments such as the following: “... *I knew that I wanted to work in the pharmaceutical business...anything connected with medical research field,...always been interested in molecular medicine,...didn’t wanted to become a physician,...etc.*”<sup>5</sup> Very few of the responders actually verified their interest in biomedicine in specific. It appears that the understandings of the program at the time of application are different because the description of the program is open for interpretation and very indistinct.

My second argument supporting the confusion of the students’ initial understanding is that the incentive of the applicants at time of application to the program does not coincide with their actual goal of pursuing the program. One of the reasoning behind this argument becomes evident when comparing the amount of applicants to the program and the amount of students that leaves the program.<sup>6</sup> Many of these applicants withdraw to other similar studies; most will go to the medicine program. This could partly be explained by the young age of the applicants (A: 2, Figure1). Within the alumni group almost 80 percent were in their mid-twenties which correspond to early twenties at the time of commencing the program. These low age figures are also observed among the current students with more than 65 percent under the age of twenty-five (A1: Figure1). The Biomedicine program is defined as a broad education and that might also be a contributing reason to attracting particular applicants. Many young applicants seem to be attracted to this broad description of the program because they experience uncertainties about the future profession and that they simply are not sure about which profession they want to pursue. “...*I knew about my interest in medicine but I also was pretty sure that I did not want to become a physician, biomedicine program seemed as a perfect choice*”

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<sup>4</sup> Empirical findings section

<sup>5</sup> Empirical Findings section

<sup>6</sup> Antagningsstatistik- Biomedicine Program-Graph: All registrant/Study term

was the comment of Hanna regarding her uncertainty. She was one of the former students that applied to the program directly after completing her upper secondary school.

The third argument on confusion concerning the program is that when students start to study, preferences changed over time. Among the interviewees there was a discrepancy between the original motivation for pursuing the Biomedicine program and the actual position in the market after graduation. Reasoning behind this could be tracked back to the fact the expectations of the program due to its vague account have been perceived differently by the students. Taking in an example, both Anna and Oskar had an initial idea of pursuing academic research but changed their minds during the education. Also Anders decides after trying out academic research during the education, in another direction then academia.<sup>7</sup> The interviewees had different reasons for applying to the program and that, I argue, indicate an inconsistency of information presented by the program for the applicants leading to a set of different expectations. It is arguable that the existing information about the program had not been satisfactory for the applicants to have little inkling about their future opportunities. The empirical finding shows that the interviewees that searched for information and tried out their first motivation also changed their direction in career. For example Oskar tried out the world of academia that opened his eyes for other opportunities. *“You realise which sort of problems researchers must endure. It is not always easy to be a PhD student. I got cold feet”*. It is interesting to compare some of the respondents stated perception of the program. While Anders found the academic research *“mainly a playground...very fun but with no structure”* Tomas Cronholm explains the outcome of the program, *“We wanted to create an academic program for the future researchers...”* Astrid who pursued a PhD program, still feels uncertain about the education, *“...it is still fussy which jobs to apply for, which positions would match our competencies...”*.

There are hence differences in perception of the program causing the initial vision or goals for applying to the program not to coincide with neither of the interviewee's current position. This further show that the inadequate information available about the program

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<sup>7</sup> Empirical Finding section

presents an incorrect picture of its contents, leading to a misunderstanding between the requirements and outcome of the study, referring to Lotta, “...*the information about future opportunities seems to start and end up with academic research*”. Any information about Biomedicine program is also lacking from the Swedish National Agency for Higher education website (SNAHE-2006). The existing information refers only to Biomedicine Analyst Program<sup>8</sup> which adds to the confusion since it is a very different program with very different future opportunities.

## *2. The labour market has changed since the start of the program*

The incentive to start up the Biomedicine program from the university and the industry point of view has gradually changed because of a shift in the relevant labour market for the Biomedicine graduates. These changes are mainly due to the pharmaceutical industries' allocation resources for primary research (Ernst&Young-2007). According to data collected the trend seems to differ depending on the class year of the students (A1:1, Figure 1). Astrid started her education year 1997 and she remembers that in the second year of her education the demand for Biomedicine students started to decrease, “*In the beginning we were very attractive and in the end we were to have PhD and PostDocs in order to be attractive...that is why I applied for positions at KI*”. The graph A1:1 in the appendix section shows a gradual decrease in positions occupied in the industry and an increase in positions in academia (SNAHE-2007:56). The time of the class years starting and their current position seems to coincide with what Astrid's comments. The bright future of the upcoming researchers transferred to academic research publications at Karolinska Institutet.

The big pharmaceutical companies have been appearing more and more in the academic world searching for projects to invest in. The fact that none of the big companies have had a big blockbuster approved by the FDA for many years is an indication of the changes in the business. The new comers, Biotech companies which are normally spin offs from universities, are taking a big market share in the research and development area. The giants are now investing in licensing or mergers and acquisitions instead of

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<sup>8</sup> BMA, is a three year education also offered at Karolinska Institutet. (Appendix)

primary research and development (Ernst&Young-2007).

These are the changes that have occurred since the start up of the Biomedicine program in year 1995 onward. From the pharmaceutical perspective Fredrik paints the following picture: *“In the primary research field the employment has been dead. It is no longer enough with broad knowledge base...Difficult to compete with higher educated with a master’s degree.”* This picture is coherent with the one painted by the biotech companies. According to Anders, *“The current labour market is rather closed. If major biotechnical companies such as Biovitrum are letting personal with higher education and lots of experience leave how undergraduate students can be able to compete with that unemployed human capital”*. This could in fact be an explanation for why Astra Zeneca has not employed more students from the Biomedicine program.

Amount of accepted applicants for pursuing a PhD degree has been in declination during the last years (Graph9). The reason behind this movement might be twofold:

- Fewer vacancies are available for Biomedicine graduate students to pursue a PhD program because of financial scarcity at universities (SNAHE-2007:56).
- Graduate students have become aware about other possible labour markets to enter, taking the increased positions in the clinical trial areas as an example (Graph9)

*“The labour market will still be difficult to enter even after PhD,<sup>9</sup> ..I have heard that too much specialisation might be in your disadvantage in some areas of study<sup>10</sup>...”*. These thoughts might have led to more extensive search after relevant markets to enter. For example, there are a couple of former Biomedicine students with a PhD degree who are working at consultancy firms, far from the academic world.<sup>11</sup> Another relevant explanation for the decreased PhD students in the recent years may be not the increased

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<sup>9</sup> Stefan: about the opportunities available on the market.

<sup>10</sup> Linda: about her perception of the market after her PhD studies.

<sup>11</sup> Both are working as Junior Analysts at consultancy firms, McKinsey & Co and Boston Consulting Group.

number of Biomedicine students in general but more specifically the increased number of former students now working in the industry. “*Graduate Biomedicine students are becoming more visible...*” is the comment of Fredrik. It seems that the shift in the market for primary research have opened new possibilities on the market for the Biomedicine graduate. The interest for new areas such as clinical trials has attracted more and more graduate students<sup>12</sup> and the numbers are expected to be even higher in the near future (Ernst&Young-2007)

If labour is considered as a commodity on the market with existing supply and demand (Solow 1990), the value of the labour should then be equal to the wage or the status of that commodity (Solow, 1990).

*“Labour is only another name for a human activity which goes with life itself, which in turn is not produced for sale but for entirely different reasons, nor can that activity be detached from the rest of life, be stored or mobilized (Polanyi 1957). “*

It goes without saying that the average person in modern society is dependent on receiving a wage and also that person’s status and personality are also profoundly influenced by what that person does for a living (Polanyi 1957). It is obvious that the type of profession a person pursues is an important factor to consider. If a graduate from a Biomedicine program is a product, the students are the suppliers of that product and the labour market the demand. The wage of the labour should be seen as the value of that product. In this case it seems that the product is undervalued because there is no clear market to target to.

The empirical findings among current students showed a very small difference between the incentives for pursuing a career in the academia or the industry (graph5). Many of the soon graduating students are troubled about the opportunities in the labour market, and a clear uncertainty was expressed about the future possibilities (graph8). The fear of not

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<sup>12</sup> Anna works with clinical trials and has colleagues from Biomedicine program.

finding employment after graduation has in several cases led to students not even applying to the industry but rather to accept the opportunity that is offered by the different institutes at Karolinska, “...I spoke to classmates that also had difficulties finding a vacancy in the industry....that was the general perception of my classmates...”.<sup>13</sup>

Conclusively the labour demand for Biomedicine students with an original design for primary research has decreased significantly due to a reallocation of resources in the pharmaceutical companies. Nevertheless, initial demand for Biomedicine graduate might be shifting from one market to another. Other positions in the labour market have increased their capacity to absorb Biomedicine students, with opportunities in the clinical trials as one example.

*“A great program however considering the conjuncture of the industry the amount of students educated might be more than the market is asking for.”*  
*-Anders*

### *3. The industry lack correct information on graduated students' knowledge*

The third marketing mismatch appears to have been caused by a lack of knowledge about the Biomedicine students in the labour market. Referring again to the Swedish National Agency for Higher Education, the only existing information is about Biomedicine analyst program (SNAHE-2006). It seems that many companies have difficulties separating the two, only in name, similar programs. Anna was offered a position at Astra Zeneca that was more suited for Biomedicine analyst.<sup>14</sup> Another contributing reason to the shortage of information about the Biomedicine program on the market might be due to the few former students actually working in the industry (A1:1, Figure 3).

There are comments from former students that are today working in the industry which give reasons to believe that there exists information scarcity about the Biomedicine

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<sup>13</sup> Linda: about the opportunity perception of her classmates. .

<sup>14</sup> Anna: regarding her thesis project at AZ with a job offering as an outcome.

program among companies. All of the interviewees with a current career in the industry had to in detail explain the contents of the program for their employers at the time of employment. According to Fredrik at Astra Zeneca, *“Astra Zeneca has not taken its responsibility towards the educational program they started...its unfortunate that Astra Zeneca does not have enough information about the scope of the program”*. Anders at Medivir, *“there is a shortage of knowledge about the program among companies within relevant industries”*. Lotta at Lilly, *“the industrial employers are not knowledgeable about the content or the existence of the program. The head of research at Lilly was fully aware about the program and I strongly believe that information helped me in my career”*.<sup>15</sup>

Almost every interviewee working currently in the industry had to describe the entire education for their employer before starting their career. Seemingly the knowledge base of the relevant industry for Biomedicine graduates is very poor which causes the existing marketing mismatch.

## **5.2 Network**

Two arguments for accepting the second hypothesis have been found in the empirical findings:

1. The thesis project as the link to reach outside KI has not been fully explored by the students.
2. The contact links in social structure has been enclosed at KI.

*1. The thesis project as the link to reach outside KI has not been fully explored by the students*

Access to information increases when you change your social structure (Scott 2001). With change of social structure the network expands and more resources become available. One identified way for graduate students to gain access to social resources is to perform their thesis project outside KI. Referring to the empirical findings, many of the

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<sup>15</sup> Interviewees' responses to whether their company had any information about the Biomedicine program.

early class starts on the program that performed their thesis work at the industry, experienced more opportunities after performed project. Even though the thesis work did not immediately offer a position in the industry, it revealed openings for the students later in their careers. The amount of students considering working in the industry after graduation is as high as 42 percent (graph7). However the percentage of students considering completing their thesis project in the academia is significantly higher (graph8). Many of the students see the thesis project as an opening for further employment, Oskar *“I accepted a thesis project that I know would give me PhD position after graduation”*.<sup>16</sup>

On the other hand there is a higher chance of receiving a job offering after completing the thesis project in the academia then the industry (graph6). This fact turns the decision process to a risky act. Thesis project outside academia creates a valuable source to outside information but is a risky decision because there is a higher chance of getting a PhD position at KI than an offering for a job from the industry. Another reason that students choose to perform their thesis in academia is because of the locking effect.<sup>17</sup>

*“...if the thesis work was performed in the industry it would later minimize the chances for a PhD position at KI... not considered a positive thing to write your thesis outside KI.”* -Astrid

What I find interesting is that, despite the increasing unemployment rate among PhD graduates on the market, the Biomedicine students still argue for improved job offerings after a PhD. The information received from KI is one of the promoting reasons to further research educations. It should however be acknowledged that due to decrease of PhD vacancies, Karolinska Institutet has amplified its contacts with the industry.<sup>18</sup> According to previous studies graduate unemployment normally leads to further studies (Xiaochun 1998) which is also observed among graduate Biomedicine students at KI. Students that have conducted their thesis at KI are now running the risk of not receiving a PhD vacancy

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<sup>16</sup> Oskar: about his reasons for completing a thesis project at KI.

<sup>17</sup> When a product/service comes from only one source

<sup>18</sup> Cooperation with other universities and the business world

due to financial scarcity forcing them to stay a student.

## *2. The contact links in the social structure has been enclosed at KI.*

As mentioned in the previous section KI is full of strong links and ties (Granovetter 1974). These links are all the institutes that students have the privilege to study at and all the professors and lecturers they meet during the education. All of these links have provided the students at KI many opportunities to make use of such as PhD programs and the summer research school.<sup>19</sup> Many of the responses collected from the questionnaire emphasises the importance of these strong links to get information about available vacancies within research groups, which are classified as strong ties but considered weak because of its locking effect. The same links are required to get information about job openings outside the circle of KI (Granovetter 1974) which I argue are missing. Former Biomedicine students seem to have become aware of available jobs through three different ways (Graph1). Thesis projects as the most representative source, previous contacts and application without any usage of strong ties as the second and third significant selection (Graph1). Excluding the previous contacts, these weak ties, however strong in element, have had a significant role in providing information that stretches outside the circle of KI supplying the student with more resources which explains the ties' strength (Granovetter 1974).

The quality of the ties discussed above is also important and refers to the valuable and relevant information received from the links (Scott 2001). From the conducted interviews one can read that some of the contacts established with the industry during the education may have influenced the students negatively. Astrid *"companies recommended us to take a PhD degree, travel to other countries for PostDoc and then they would be interested"*. Anna *"I found company presentations depressing...employment freeze and primary research were moving abroad...no clear opportunities... discouraging experience because of the down sizes"*.<sup>20</sup> These are enough discouraging reason for not even applying to positions in the industry.

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<sup>19</sup> Johan: about the possibilities for gaining a position in a research group during summers.

<sup>20</sup> About their encounters with the industry.

Decisively the early off beam exposures to the industry by attending career days or company presentations have discouraged some of the former students from pursuing a career path in the industry. The effect has varied depending on class year. During the employment freeze period in the industry, the contacts have been negative and a higher percentage of the students are in the academic career paths today. There is insufficient access to information and resources from the business connection, a weak tie perspective (Table1).

Scarcity of Biomedicine students on the market might be seen as another reason to a decrease in established contacts with the industry. The information available about the Biomedicine students is therefore very little leading to a decrease of weak ties linking the KI-circle with the industry-circle, especially among former and current students (Graph2). On the other hand the program has had now some time to grow and today there are many more Biomedicine students on the market then five years ago. The former students' capability and ability seems to have had some impact on the market (Graph 9).

Then again, KI has also been promoting opportunities inside its own circle which has led to few established links outside academia. Anna:” *There are possibilities at KI to build a network but it depends solely on the student and how eager she/he is to reach the industry and make use of the resources.*”, Oskar: “*they have been modest in promoting other opportunities then KI vacancies*” Jan: ” *KI recruits its own students to contribute in the academic research field*”.<sup>21</sup>

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<sup>21</sup> Responses regarding KI's role too promote Biomedicine students to the market.

## **6. Conclusions**

This thesis has an explanatory purpose with a main focus on discovering answers through empirical findings. The aim of the study has been to understand whether marketing mismatch theory and/or network theory could explain the research question of *why Biomedicine students are choosing a career path in academia rather than a career in the industry*. To synthesize the findings in this chapter before diving into it, there seem to be good arguments to accept both hypotheses outlined in chapter 1.3

The first hypothesis, that there is a marketing mismatch between the students, KI and the labour market is supported by the observations that:

1. There is confusion on the students' part as to what the program really offer in terms of an education and career paths.
2. The change in the industry as a whole have has effected the students' choices after completed studies.
3. The lack of proper information and knowledge in the industry on Biomedicine students' expertise upon graduation.

Though lack of a clear description of the Biomedicine Program has caused confusion between the students and the program offered by KI. The confusion seems to arise from a misunderstanding among the Biomedicine students concerning the scope of the program. Lack of career guidance and different set of expectations of the applying students has further increased the uncertainty about the outcome of the program. Students' young age at the time of applying to the program has added to this confusion. Therefore, a marketing mismatch could be said to be supported.

The pharmaceutical industry has gone through many changes since the start of the program. Astra Zeneca, that was one of the underlying reasons for the program to launch, has faced many setbacks since then which have caused career movements among established scientists. These changes are mainly due to the pharmaceutical industries' allocation resources for primary research (Ernst&Young-2007). Reduced Industry

opportunities among PhD graduates have led to an increased pressure on academic positions. Available PhD positions in general have therefore decreased, even though KI still absorbs many of the research students (SNAHE-2007:26). The reduced market demand for graduated students in the primary research has in turn led to an additional marketing mismatch between the students and the industry. There is however other absorbing markets such as clinical trials that are shifting the demand for Biomedicine graduates (Graph 9).

Finally, a third marketing mismatch is between the industry and the program caused by a lack of information in the industry about the graduated students' knowledge and capabilities. Information about the scope of the program and the knowledge base of its students has been kept within the academic world<sup>22</sup> due to the low number of students exploring the outside academic opportunities. The lack of awareness of the Biomedicine program and its meaning for the industry has caused a discrepancy in knowledge about the program between the industry and Biomedicine students.

The second hypothesis is that there is an enclosed culture at Karolinska Institutet that has an impact on students' career choices. According to the empirical findings, there are two strong arguments for accepting the second hypothesis

1. Students have lacked possibilities to develop weak ties (contacts with the industry) due to the unexploited opportunities as students mostly perform their thesis project within KI.
2. The strong ties (contacts with institutions at KI) established at KI have not led to industry opportunities.

It has been observed that students have lacked opportunities to develop weak ties with contacts in the industry. These weak ties are highly important for the students' career mobility outside the academic world. Within the closed world of academia, Biomedicine students are under strong influences from their ties and connections. These strong ties

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<sup>22</sup> See section 5.1.3

(relations developed with institutions at KI) are in this case a weakness since the information needed for career movement is absent. Through contacts within KI, students' awareness of a job position is scarce and one new contact at KI would not necessary increase student's chance to a position compared to a contact from outside academia.

There is however a higher chance of receiving a job offering after completing the thesis project in the academia than the industry (graph6). Recent graduates' fear of not finding a job outside academia leads them to only apply for thesis projects at KI. Many of the information and contacts needed to find a position after graduation is ironically enough found through weak ties established when performing thesis project. This is the opportunity the Biomedicine students are missing out off.

The second argument for accepting the hypothesis is students' lack of information about opportunities outside the academic circle. This is of course an outcome of relying only on strong ties, in this case KI and not reaching out for conducting their thesis project. The enclosed environment has simplified a job search within academia and complicated job searching outside academia.

Early encounters with the industry, for some students, have also been a negative experience because of industries' lack of awareness about students' knowledge level and also their financial scarcity, at the time, for recruitment.

The novelty of the program and few graduates out in the industry has caused the pool of weak ties to be small in size. The information flow is however more recognisable today, comparing with the first class graduates of 1999 when there were no Biomedicine graduates outside the academia (Graph9). The elapse of time has increased the information flow about the program into the industrial section leading to a somewhat increase of graduates within the industry (Graph9). The strength of weak ties is now developing due to the success of some of the Biomedicine students on the market.

Karolinska Institutet has traditionally promoted opportunities within its institutions, building and concentrating on strong ties. Writing thesis projects outside academia has been feared by students wishing to have a PhD vacancy after graduation<sup>23</sup>. Reason behind this fear has been based on believes that academia have a more strict sight on non-academic work. The last two years however, Karolinska Institutet in general and especially the Biomedicine program has amplified its marketing towards the industry.<sup>24</sup> The initiative comes from current students with the assistant of former Biomedicine students.

## **7. Discussion**

The choice of university and area of education has a great impact on the first job offering (SNAHE-2007:56). According to the same report, students in higher education have increased rapidly and does not show any sign of slowing down. Undergraduate students from high status universities have simply much higher success rate in finding the job they had in mind (SNAHE-2006:26). At the same time many headlines demonstrate the difficulties newly graduates have with unemployment. With this pace, we are running the risk of losing the value of higher education. Setting a set of qualifying and well-known criteria for educations are some of many approach to ensure the value of higher education. One approach is to cooperate with other universities and institutions; another is to involve the industry early in the educational programs. Schools and Universities that allow its students an early contact with the labour market are usually known as more successful brands (SNAHE-2006:26).

There are two elements of importance identified in this thesis that should be recognised and localised in order to be successful in career development in general. The two elements are: access to information and network (Scott 2001). Possession of these elements leads to a broader network and resources. Studies conducted (Scott 2001) on career motilities amplify these elements as a source of encountering closed networks which provide one with more information about available opportunities on the market.

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<sup>23</sup> Referring to Astrid

<sup>24</sup> Labour Market Days at KI (two occasions a year).

Looking at other educations in entirely different academic areas, students are still faced by same issues as Biomedicine students. Future opportunities are not always obvious nor are ones network immense enough to enhance ones chance of getting the dream position. Network and access to information are two elements that set hurdles for finding a position for recent graduate students. In the case of Biomedicine students and KI, it is a new program with very few inhabitants, leading to less information flow and causing marketing mismatch in the labour market. This social structure is however changing because of more students applying and graduating from the program.

To conclude, it seems that there is a need for a higher marketing effort towards the industry. Introducing career development support or dividing the education in two year general studies and two year of major studies might help students to decide on their future career. Karolinska Institutet is a closed world and it is natural that information goes around inside that world especially considering the willingness to keep the resources inside the loop.<sup>25</sup> Providing support for the students to gain professional experience during their education, through internships or secondments should be a significant part of the program. Considering the novelty of Biomedicine program the information has not yet infiltrated the labour market. There are many ways to improve the information flow to and from the Institutet e.g. introducing and marketing open-market days where students get the opportunity to interact with different industries or the leading role of a professional mentor as part of education.

On a more general level, applicable for the graduate unemployment issue, is to invite the government to see and comprehend the problem faced by graduates. E.g. providing services only directed to these specific groups with specific needs are some of the suggested approaches to fight against losing higher education value and quality as other countries, such as China, are now facing.

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<sup>25</sup> Referring to Tomas Cronholm.

Finally, I believe, developing the career path is also about the combination between education, knowledge base and personality. The education creates a profile on the labour market but the person having that knowledge base must grasp the opportunities on the market. The Biomedicine program is very broad and offers great opportunities which make the career movement manageable if there is a strong ambition to successes<sup>26</sup>. My thesis raises the issue of graduate unemployment and shows that there are problems to take on.

### ***7.1 Critique***

Like many other qualitative studies, it is important that the final result of this thesis is criticised of being coloured by the author's advance knowledge on the subject, her personal opinions and lack of a complete objectiveness. In addition it must be mentioned that since this thesis has been worked on during a relatively long period of time, changes has occurred both in the market and the Biomedicine program that might have an impact of the final result. Some of the changes occurred since 2006 have been incorporated into the analysis.

Critique could also be directed to the sampling of the interviewees. The majority of the interviewees were from the industry which could be argued to have caused an uneven result.

### ***7.2 Further research***

On the basis of the results and the limited scope in this thesis, some further research areas would be interesting to investigate.

In more general term the following questions would be of interest:

- Effect of market trends on graduate unemployment? This could be interesting to look at across Europe or in comparison between developed and developing countries.

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<sup>26</sup> Referring to Oskar at Novartis

- Importance of personality and social ability on career movements?
- Is there any incompatibility rendering between an education's academic value with its factual need in the industry?

In more Biomedicine specific studies I would propose the following questions of interest:

- What is the perception of pharmaceutical companies towards Biomedicine undergraduates now compared with ten years ago?
- Where does the Pharmaceutical industry see the need for Biomedicine graduates (now and in the future)?
- Does the degree of parents education influences the choices of future careers?

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Hanna (1995;1999) Head of Product Information at Amgen (08-11-2006)

Lotta (1998;2000) Marketing and Information at Lilly (08-11-2006)

Oskar (2000;2004) Head of Sales and Marketing, Novartis Sverige AB (31-10-2006)

Charlotte (1997;2001) PhD- student at Institutet of Molecular Biology (31-10-2006)

Tomas Cronholm Professor at Karolinska Institute (28-09-2006)

## **9. Appendix**

### **A: Questionnaires**

A1: Questionnaire directed to former Biomedicine students.

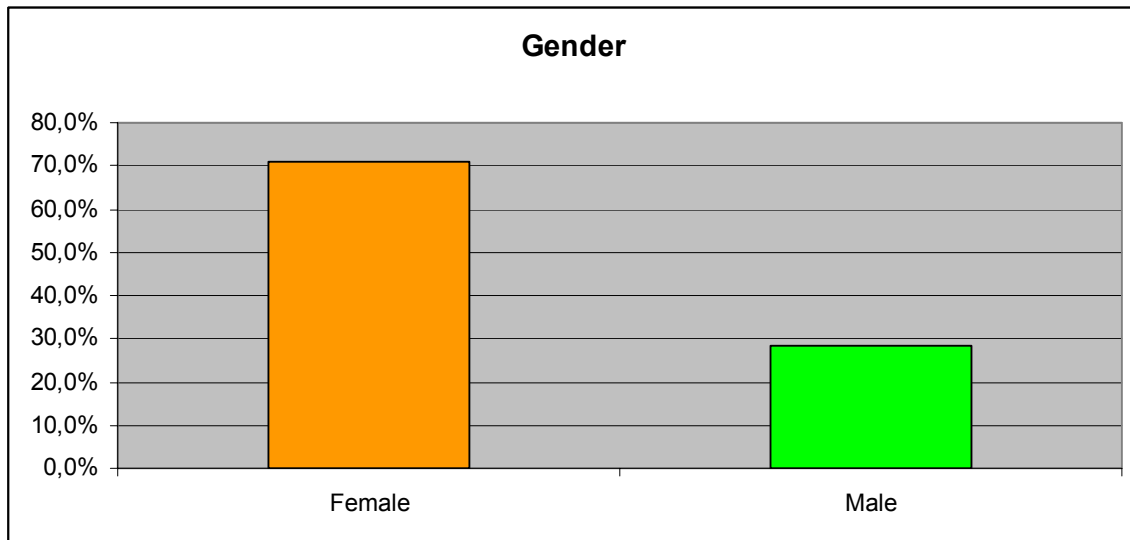


Figure1

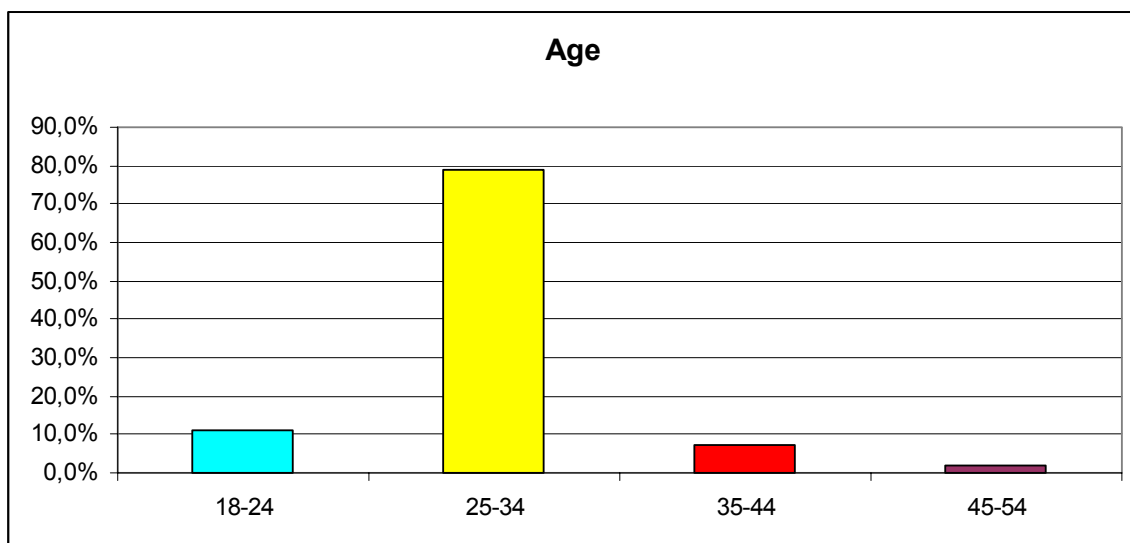


Figure 2

To further understand the mobility of information in the market and localise the source of information, the following question was asked.

A1:1 *What is your current position?*

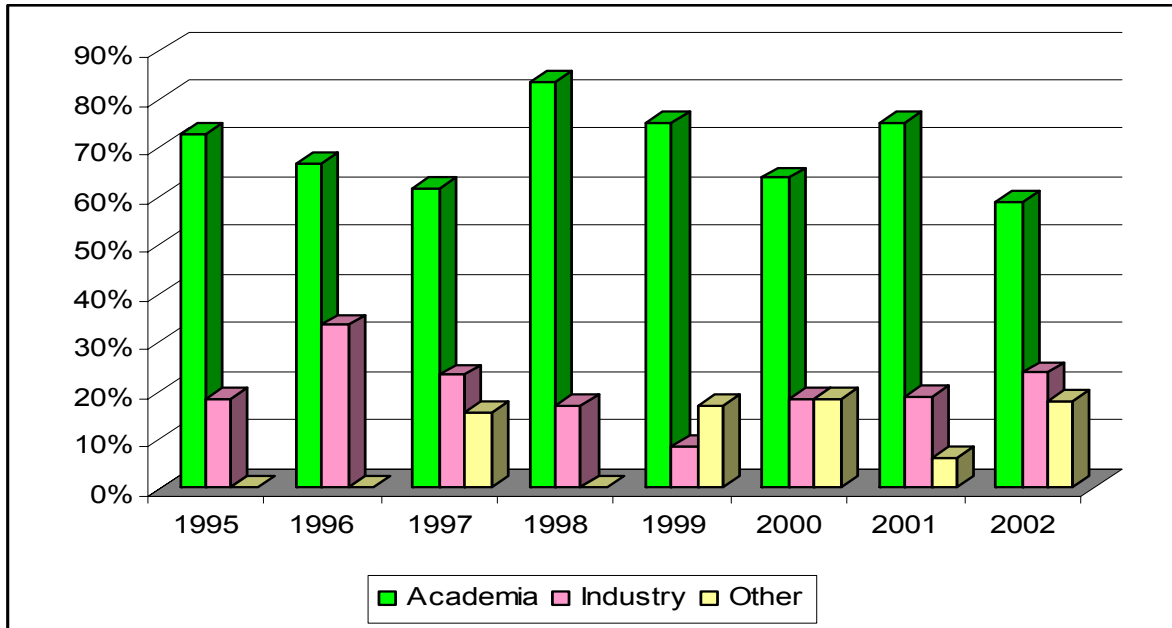


Figure 3. The current positions among former Biomedicine students

The next question regarded the former students' plans for a PhD program. The questions were:

*-Do you have a PhD degree? Presented in figure4*

*-Are you planning for a PhD degree? Presented in figure5*

The reason behind investigating these issues was to understand the behaviour of the students. We needed to appreciate if the former students were only buying time or were they in fact interested in a degree.

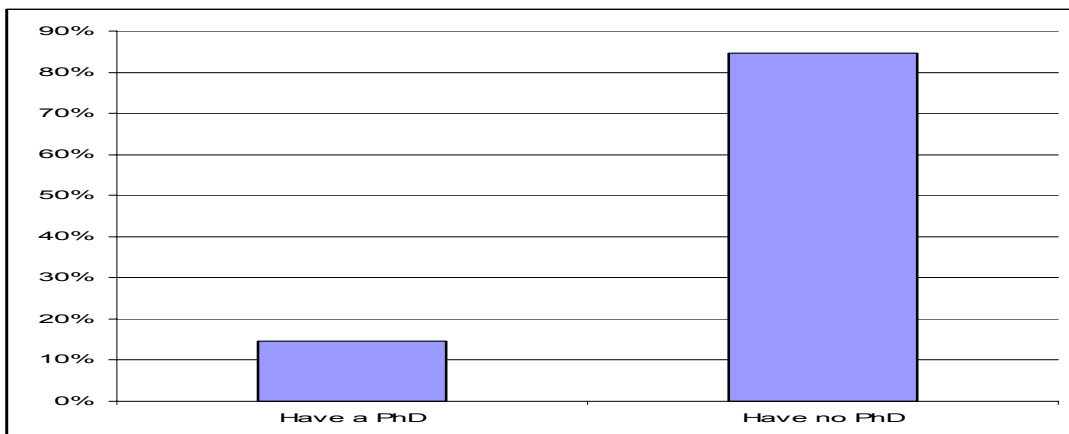


Figure 4, The amount of PhD degrees since start of the program

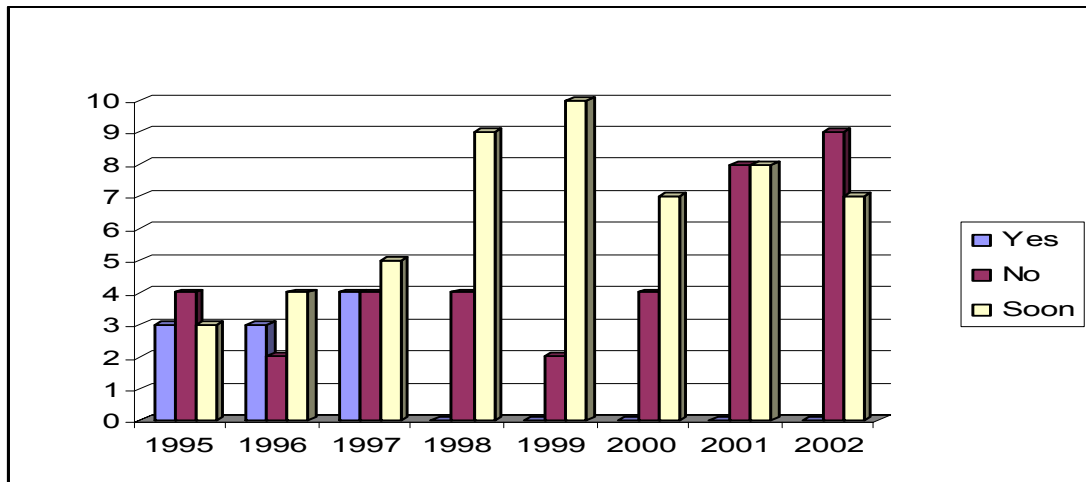


Figure 5. The actual sum that will have a PhD degree.

A:1:2 Hur har utbildningen inom biomedicinprogrammet påverkat dig?

*In what ways has the Biomedicine program have influenced you?*

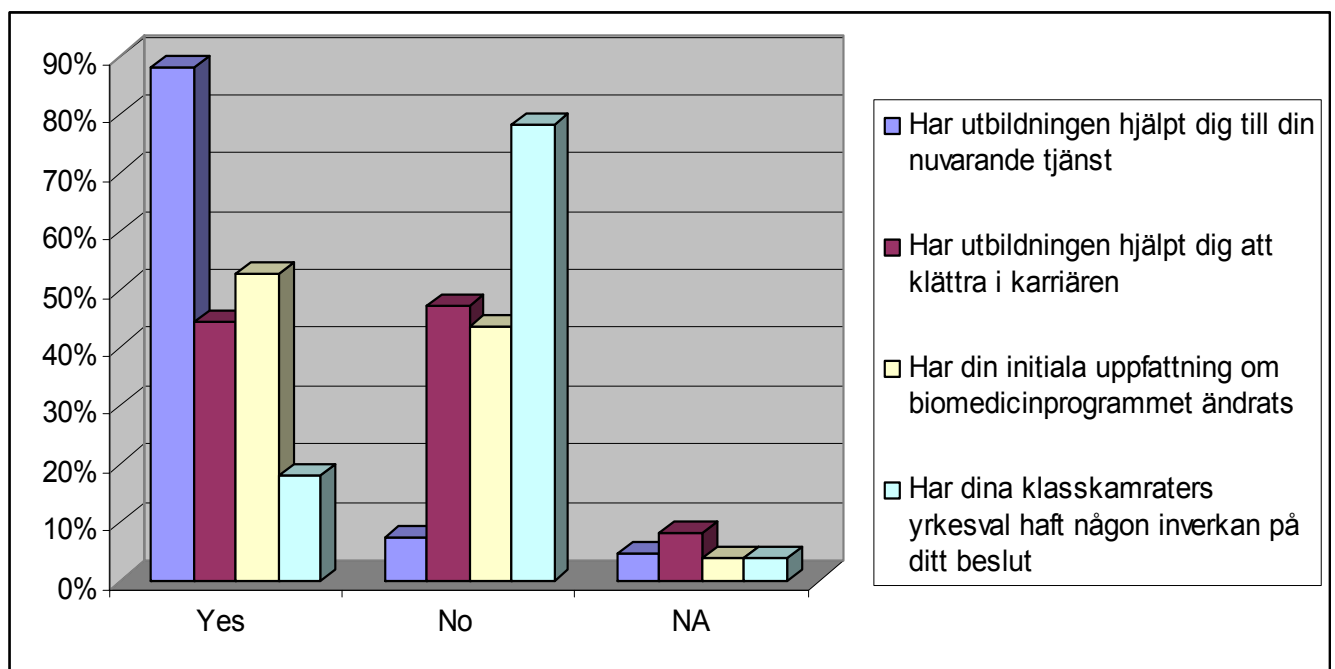


Figure3

A2: Questionnaire directed to current Biomedicine students

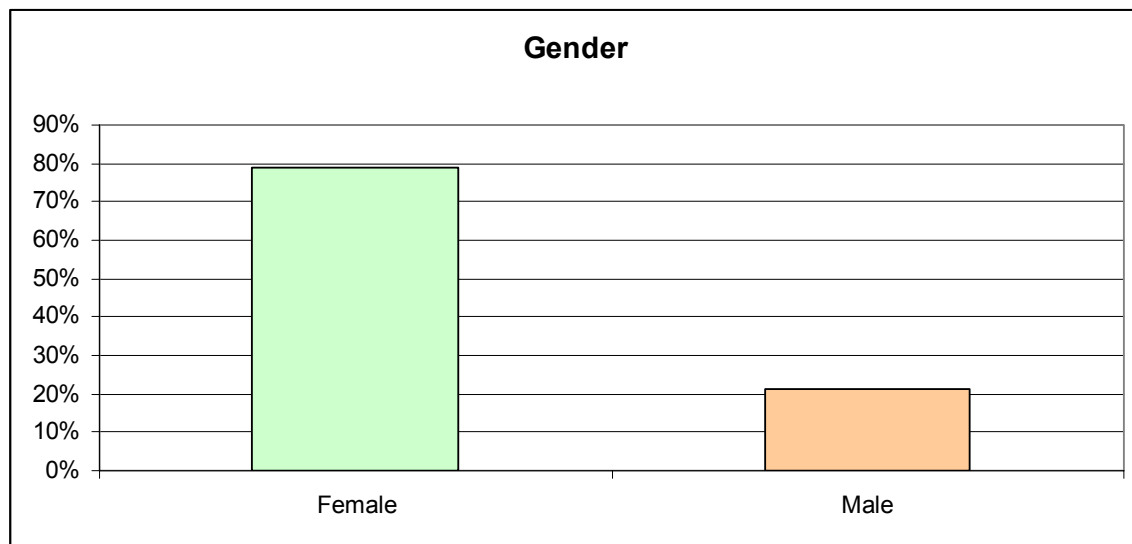


Figure1

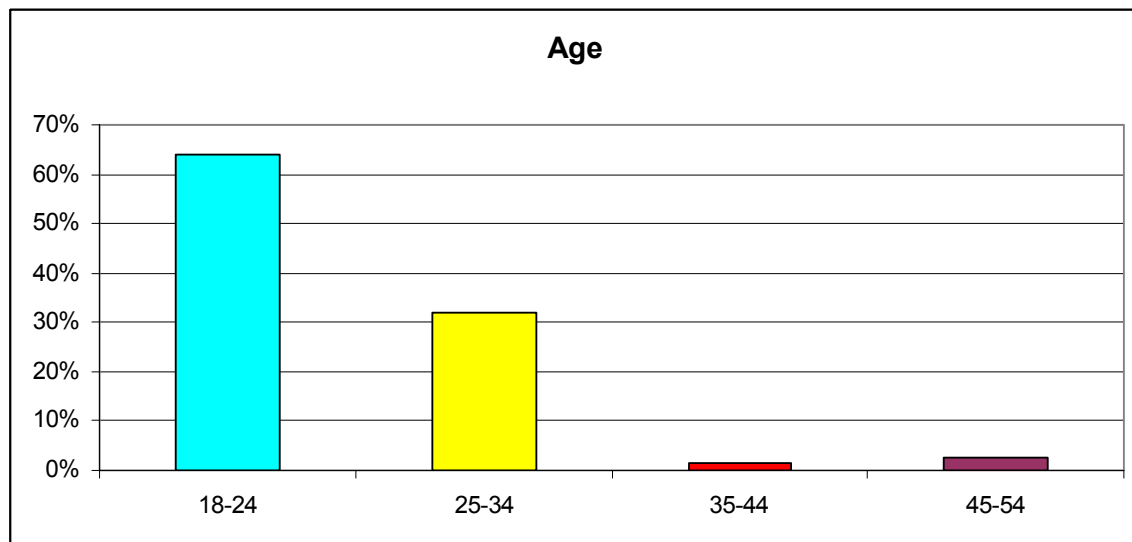


Figure 2

The first set of questions related to the program in general requiring responds to a series of assertions. The reason for asking these questions was to gain information about the students' understanding of the contents of the program. The result is presented in table 2.

4- What is your opinion about the Biomedicine Program?

	<b>Do Not Agree</b>					<b>Fully Agree</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<i>Scope of the Program</i>	0%	0%	4%	16%	56%	24%
<i>Possibility to Practice</i>	22,7%	18,7%	20%	30,7%	8%	0%
<i>Business contacts available</i>	29,3%	34,7%	22,7%	9,3%	2,7%	1,3%
<i>Career mobility</i>	4%	21,3%	17,3%	34,7%	14,7%	8%
<i>Research opportunities at KI</i>	0%	1,3%	4%	10,7%	37,3%	46,7%

Figure 1

More than 60% of the students believed the program did not provide them with business contacts while over 80% believed that the program provided them with many research opportunities.

B: Interview questions

The semi conducted interviews were guided through questions categorised and presented in this section.

- What are the general perceptions of the education before and after the start of the education?

*What was the initial motivation for applying to the Biomedicine program?*

*Did the outcome correspond with the initial motivation?*

- What are the opportunities after graduation?

- What are the impact of the early exposure to the industry and the future choice of career?

- How were industry contacts established during the education?

- What is the impact of the contacts on the students' chosen career path?

*Thesis work used as an entrance to the future careers opportunities?*

*Available vacancies after performed thesis work?*

- What are the students' acknowledged future possibilities?

*What are the roles of Karolinska Institutet in networking and marketing its students?*

*Where the sources of information for obtaining the desired position are are*

*found?*

*Has the usage of personal contacts, an impact on obtaining the desired position?*

### B.1 Questions enquired from Alumni

- Vilket år började du på biomedicinprogrammet?
- Är du kvinna eller man? Kvinna/Man
- Hur gammal är du? 18-24, 25-34, 35-44, 45-54
- Vad har du för tjänst för tillfället?
- Hur hamnade du där?
  - Genom examensarbetet
  - Genom familjen
  - Genom KI
  - Genom ansökan
  - Utannonserad tjänst
  - Genom rekommendation till tjänsten
  - Genom tidigare kontakt med företaget/institutet
- Trivs du med din nuvarande tjänst? Ja/Nej
- Varför trivs du/trivs du inte med din nuvarande tjänst?
- Vad är din uppfattning om biomedicinprogrammet nu efter det att du slutfört din utbildning? 1= stämmer inte alls, 6=stämmer helt
- Teoretiskt relevant för min nuvarande tjänst
- Praktiskt relevant för min nuvarande tjänst
- Det räckte med 4-års utbildning
- Det kommer att bli bättre med en 5-årig utbildning
- Bör kombineras med annan utbildning
- Det fanns många företagsbesök under utbildningen
- Närvarade på många kontaktkvällar med företag
- Utbildningen är starkt forskningsinriktad
- Hade du velat ändra vissa kurser under utbildningen? Ja/Nej
- Om du har svarat ja på frågan att du velat ändra kurser under utbildningen? Specificera vilka kurser.
- Om du har svarat ja på frågan att du velat ändra kurser under utbildningen? Specificera varför.
- Hur har utbildningen inom biomedicinprogrammet påverkat dig? Ja/Nej
- Har utbildningen hjälpt dig till din nuvarande tjänst
- Har utbildningen hjälpt dig att klättra i karriären
- Har din initiala uppfattning om biomedicinprogrammet ändrats
- Har dina klasskamraters yrkesval haft någon inverkan på ditt beslut

- Baserat på vad du vet idag, hade du valt biomedicinprogrammet eller hade du valt något annat? Ja/Annat
- Om du hade svarat att du valt något annat. Vad hade du då valt?
- Var gjorde du ditt examensarbete?
- Vad var orsaken till att du gjorde ditt examensarbete på den platsen?
- Hjälpte ditt examensarbete dig att få arbete/doktorandplats? Ja/Nej
- Arbete
- Doktorandplats
- Hur stor del av din årskull tror du har disputerat?
- Har du disputerat? Ja/Nej
- Varför har du/varför har du inte disputerat?

## B.2 Questions enquired from Current students.

- Vilket år började du på biomedicinprogrammet?
- Är du kvinna eller man? Kvinna/Man
- Hur gammal är du? 18-24, 25-34, 35-44, 45-54
- Vad är din allmänna uppfattning om programmet? 1= mycket dålig, 6= mycket bra
- Omfattning
- Mängd praktik
- Näringslivskontakter
- Antal karriärmöjligheter
- Forskningsmöjligheter
- Vad har du för framtidsvisioner?
  - Doktorera på KI, Doktorera på annat svenskt universitet
  - Doktorera utomlands, Forskningstjänst inom
  - Läkemedelsföretag, Läkemedelskonsult, Klinisk prövning, Annat
- Om du har svarat annat på frågan om framtidsvisioner. Specificera
- Har du funderat på examensarbete än? Ja/Nej
- Om du har funderat på examensarbete. Vad vill du i så fall göra?
- Var är det troligast att du gör ditt examensarbete?
  - Institution på KI, Läkemedelsindustrin, Annan industri
- Om du svarat annan industri på frågan var du troligtvis gör ditt examensarbete. Specificera
- Varför tror du att du kommer att göra ditt examensarbete på den plats du angivit i föregående fråga/or? Svara kortfattat
- Vad är troligast att du gör efter utbildningen?
  - Doktorerar direkt efter examensarbetet,
  - Börjar arbeta direkt efter examensarbetet
- Varför tror du att du kommer att göra det efter utbildningen? Svara kortfattat
- Hur är den allmänna stämningen i din årskull?

- De flesta är optimistiska inför framtiden
- De flesta är pessimistiska inför framtiden
- Vilken grupp tillhör du?
  - Gruppen som är optimistiska inför framtiden
  - Gruppen som är pessimistiska inför framtiden
- Varför hör du till den grupp som du angivit i föregående fråga? Svara kortfattat
- Arbetar du vid sidan av studierna? Ja/Nej
- Med vad arbetar du vid sidan av studierna? Förklara Kortfattat

### C: Antagningsstatistik – Biomedicinprogrammet

#### Statistik från tidigare år:

2005								
Kvotgrupp	Antal	Män	Kvinnor	Antagnings-poäng Urval 2/VHS	Antagningspoäng reserv	Sist antagnes reserv nr	Medelålder	Ålder min/max
BG	50	12	38	17,86	17,71	7		
BF	1	1	0	4	*	*		
HP	14	8	6	1,2	1,2	8		
HA	12	7	5	1,4	1,2	8		
Totalt	77	28	49					
%		36	64					

2004								
Kvotgrupp	Antal	Män	Kvinnor	Antagnings-poäng Urval 2/VHS	Antagningspoäng reserv	Sist antagnes reserv nr	Medelålder	Ålder min/max
BG	53			17,87	17,37			
BF	1			4	4			
HP	13			1,4	1,2			
HA	13			1,6	1,2			
Totalt	80							
%		28	72					

2003								
Kvotgrupp	Antal	Män	Kvinnor	Antagnings-poäng Urval 2/VHS	Antagningspoäng reserv	Sist antagnes reserv nr	Medelålder	Ålder min/max
BP	46			17,74	17,32			
BL	8			4,45	4,1			
HP	13			1,5				
HA	13			1,5				
Totalt	80							
%		20	80					

2002								
Kvotgrupp	Antal	Män	Kvinnor	Antagnins-poäng Urval 2/VHS	Antagningspoäng reserv	Sist antagnes reserv nr	Medelålder	Ålder min/max
BP	40			17,44	17,13			
BL	13			4,24	4,2			
BF	1							
HP	13							
HA	13			1,4				
Totalt	80			1,5				
%		27	73					

2001								
Kvotgrupp	Antal	Män	Kvinnor	Antagnins-poäng Urval 2/VHS	Antagningspoäng reserv	Sist antagnes reserv nr	Medelålder	Ålder min/max
BP	43			16,97	16,95			
BL	10			4,33	4,3			
BF	1							
HP	13			1,4				
HA	13			1,6				
Totalt	80							
%		21	79					

BG Slutbetyg från gymnasieskolans program, poängskala 10,00-20,00

BF Avgångsbetyg från folkhögskola, betygsskala 1-4

BL Avgångsbetyg från den gamla gymnasieskolans linjer inkl mellanårsprogrammen, betygsskala 1-5

BP Slutbetyg från den nya gymnasieskolan, inkl mellanårsprogram.

HP Högskoleprov: 0,1-2,00

HA Högskoleprov (0,1-2,00) och ev arbetslivserfarenhet i minst 5 år (0,5 poäng) på minst halvtid, max poäng 2,5

\* Hela kvotgruppen kontaktad

### Statistik – Sökande i första hand per plats

	2005	2004	2003	2002	2001
<b>Biomedicinprogrammet – KI</b>	2,3	2,0	1,7	2,2	2,0
<b>Biomedicinprogrammet – Riket</b>	1,9	1,8	1,6	2,1	2,0

### Reservantagning – H05

Efter att de antagna studenterna bokat tid till förregistreringen fanns det 12 reservplatser, 15 reserver kontaktades för att tillsätta dessa platser.

7st reserver antogs i BG-gruppen, den sist antagnes meritvärde är BG 17,71

5st reserver antogs i HP/HA-gruppen, den sist antagnes meritvärde är HP 1,20 resp HA 1,20

### Statistik från VHS för 2005 – Urval 1

Utbildningsalternativ	Universitet/Högskola	Antal platser	Antal sökande i första hand	Totalt antal sökande även obehöriga	Antal sökande i första hand, per plats
Biomedicinprogrammet	Karolinska Institutet	50	126	792	2,5
Biomedicinsk Kemi	Högskolan i Kalmar	22	13	99	0,6
Biomedicin	Lunds Universitet	40	94	614	2,4
Biomedicinarprogrammet	Uppsala Universitet	45	78	735	1,7
Biomedicinarprogrammet	Umeå Universitet	36	58	374	1,6
Medicinsk Biologi	Linköpings Universitet	30	70	475	2,3

### All students registered/Study term

	Termin 1	Termin 2	Termin 3	Termin 4	Termin 5	Termin 6	Termin 7	Termin 8
V06		67		47		42		44
H05	75		53		42		53	
V05		55		46		62		38
H04	75		51		62		45	
V04		58		58		44		22
H03	72		59		41		28	
V03		63		48		40		33
H02	75		49		37		21	
V02		58		41		34		28
H01	68		42		36		27	
V01		53		32		32		30
H00	67		33		29		28	
V00		48		34		38		34
H99	64		37		42		26	
V99		47		47		34		16
H98	47		51		36		17	
V98		57		35		23		
H97	62		34		24			
V97		37		28				
H96	51		30					
V96		32						
H95	40							