
benchmarking entrepreneurship education programs

1: Managing the Improvement of
Entrepreneurship Education Programs
A comparison of universities in the life
sciences in Europe, USA and Canada

2: A comparison of green higher education
institutes in the Netherlands and Belgium

Wageningen University
Department of Social Sciences
Management Studies

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For quality of life

Benchmarking entrepreneurship education programs

Part one: A comparison of universities in the life sciences in Europe, USA and Canada

Part two: A comparison of green higher education institutes in the Netherlands and Belgium

Msc Minor Thesis Management, Economics and Consumer Studies
Research Master Variant: Economics of Consumers and Households

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Preface

Dear reader,

In front of you lays the result of benchmarking entrepreneurship education at universities and schools for higher professional education in Europe, USA and Canada. This benchmark study enabled me to learn new research methods, get understanding about new academic disciplines and improve my research skills. However, this process went with ups and downs. But, with great help of my supervisor Dr. V. Blok, I managed to realize this minor thesis that is laying in front of you. Dr. V. Blok gave me the opportunity to get involved in entrepreneurship research. Furthermore, I am very thankful for his great feedback, the time and energy he put in supervising me and his motivating words at times when it was necessary. I also want to thank Dr. Ir. T. Lans and professor S.W.F. Omta for sharing their professional opinions about the study, their inputs in finalizing this benchmark study and their collaboration in the chapter submitted for publication. Finally, I want to thank Floris Simons with his help during the benchmark research especially in the beginning of the project with interviewing.

This minor thesis consists of two parts. The first part is the chapter submission in the Handbook of Research in Entrepreneurship education (vol. 4) by: Dr. V. Blok, R. Lubberink, Dr. T. Lans and Prof. Dr. S.W.F. Omta. In this part entrepreneurship education at universities in Europe, USA and Canada are benchmarked to provide recommendations how to start or improve entrepreneurship education. The second part consists of benchmarking entrepreneurship education at Schools for Higher Professional Education which are part of the Dutch Agro- Food Network of Entrepreneurship (DAFNE). The benchmarking of the Schools for Higher Professional Education is commissioned by DAFNE (nowadays StartLife).

I hope that you will enjoy reading the rest of the Minor Thesis. You already managed to reach this point, for that I want to thank you.

Rob Lubberink

Part 1: Managing the Improvement of Entrepreneurship Education Programs

A comparison of universities in the life sciences in Europe, USA and Canada

Chapter Submission:

Handbook of Research in Entrepreneurship education. Volume 4

Entrepreneurial University Handbook

Prof. A. Fayolle & prof. D.T. Redford (ed.).

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Chapter submission

embargo

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Part two: A comparison of green higher education institutes in the Netherlands and Belgium

Benchmarking entrepreneurship education at higher education institutes part of the Dutch Agro-Food Network of Entrepreneurship

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Samenvatting

Tegenwoordig wordt ondernemerschap gezien als een van de belangrijke factoren van economische groei. De Europese Unie en de Nederlandse overheid willen daarom ondernemerschap ook stimuleren. Studies tonen aan dat ondernemerschapsonderwijs één van de middelen is om uiteindelijk ondernemerschap te stimuleren. Dit heeft ertoe geleid dat er een breed scala aan ondernemerschapsprogramma's is ontstaan.

In Nederland zijn in navolging daarvan verschillende *Centres of Entrepreneurship* opgericht. Eén van deze centra is Dutch Agro-food Network of Entrepreneurship (DAFNE). Dit centrum voor ondernemerschap is opgericht in samenwerking met verschillende instellingen in het groene onderwijs die ondernemerschap wilden opnemen in het curriculum: Wageningen Universiteit, Van Hall Larenstein Wageningen, Van Hall Larenstein Leeuwarden, Christelijk Agrarisch Hogeschool Dronten en de HAS Den Bosch. In opdracht van DAFNE is onderzocht hoe het ondernemerschapsonderwijs van de deelnemende instellingen is opgezet en hoe het onderwijs wordt uitgevoerd. Op basis hiervan kunnen aanbevelingen worden gedaan voor de verdere verbetering van de onderwijsprogramma's van de individuele onderwijsinstellingen.

Er zijn drie doelstellingen geformuleerd van het benchmarkonderzoek:

- De analyse van de huidige stand van zaken op het gebied van ondernemerschapsonderwijs aan de deelnemende instellingen (zowel kwalitatief als kwantitatief).
- De identificatie van 'best practices' die als voorbeeld en inspiratie kunnen dienen voor de verdere ontwikkeling van het ondernemerschapsonderwijs
- Een individueel advies aan de betrokken onderwijsinstellingen hoe zij het ondernemerschapsonderwijs verder kunnen verbeteren.

Bij de zes deelnemende onderwijsinstellingen zijn enquêtes afgenomen, zijn face-to-face interviews afgenomen en heeft een secundaire data-analyse plaatsgevonden. De resultaten van het onderzoek zijn ten slotte gevalideerd door de deelnemende instellingen.

De *best practices* zijn bepaald op basis van de volgende performance indicatoren, die uit de literatuur zijn afgeleid: *entrepreneurial mind-set through education* (studenten die een ondernemende geest ontwikkelen door deelname aan educatieve activiteiten in het

curriculum), *knowledge transfer* (kennisoverdracht van de universiteit naar de omgeving) en *entrepreneurial mind-set through practical experience* (studenten die een ondernemende geest ontwikkelen door deelname aan ondernemerschaps-activiteiten buiten het curriculum). Vervolgens is er gekeken naar de factoren die de hogere performance van de *best practice* instellingen kunnen verklaren. Op basis van literatuuronderzoek konden de volgende *framework conditions* worden geïdentificeerd: de missie en strategie van de instelling, de aard en hoeveelheid beschikbare resources, de ondersteunende infrastructuur die de instelling te bieden heeft, het onderwijsprogramma zelf, de publieke uitstraling van het ondernemerschapsonderwijs en de aandacht voor de ontwikkeling en verbetering van het programma.

Huidige stand van zaken op het gebied van ondernemerschapsonderwijs

De resultaten van dit benchmarkonderzoek tonen aan dat er drie typen programma's voor ondernemerschapseducatie onderscheiden kunnen worden op basis van de performance indicatoren. Programma's die goed scoren op één van de drie performance indicatoren, programma's die constant scoren op alle drie de indicatoren, zonder echt uit te munten op één van de indicatoren, en ten slotte programma's die op geen van de performance indicatoren goed scoren.

Er zijn drie onderwijsinstellingen die onder het eerste type ondernemerschapseducatie programma's vallen. Van deze drie onderwijsinstellingen heeft er één de hoge performance te danken aan het toepassen van *knowledge transfer* op grote schaal. De tweede onderwijsinstelling scoort goed op het creëren van een *entrepreneurial mind-set through education* en een derde onderwijsinstelling scoort goed op het creëren van een *entrepreneurial mind-set through practical experience*. Deze drie instellingen zijn complementair aan elkaar en fungeren daarom gezamenlijk als inspiratiebron voor verbetering van de ondernemerschapseducatie-programma's.

Strategie

De resultaten van het benchmark onderzoek laten zien dat de inbedding van het ondernemerschapsonderwijs in de missie en strategie van de instelling belangrijk is. De best practices laten allemaal een hoge score zien op deze *framework condition*. Daarmee lijkt

inbedding in de strategie van eminent belang te zijn voor de hoge performance van deze onderwijsinstellingen op het gebied van ondernemerschapsonderwijs.

Er zijn drie indicatoren voor de *framework condition* strategie, namelijk de mate waarin ondernemerschap in de missie en de strategische plannen van de onderwijsinstelling is opgenomen, de mate waarin ondernemerschap is opgenomen in het operationeel beleid van de departementen of faculteiten en de betrokkenheid van het senior management bij het ondernemerschapsonderwijs. De resultaten van de benchmark laten duidelijk zien dat de *best practice* onderwijsinstellingen ondernemerschap en ondernemerschapseducatie centraal stellen in de missie en de strategische plannen van de onderwijsinstelling, in tegenstelling tot lager scorende instellingen. Hetzelfde geldt voor de strategische verantwoordelijkheid voor de ontwikkeling van het ondernemerschapsonderwijs. In tegenstelling tot de lager scorende instellingen beleggen de best practice onderwijsinstellingen de strategische verantwoordelijkheid voor het ondernemerschapsonderwijs bij het hoger management van de onderwijsinstelling. De *framework condition* strategie lijkt daarmee een sterke invloed te hebben op de performance van instellingen.

Resources

In tegenstelling tot het rapport voor de Europese Commissie (2008) zijn geen grote verschillen gevonden tussen onderwijsinstellingen met betrekking tot de *framework condition* resources. Over het algemeen zijn de onderwijsinstellingen tevreden over de financiering voor het huidige onderwijsprogramma en met de financiering van nieuwe initiatieven. De beschikbaarheid van resources wordt niet als primaire belemmering ervaren.

Kenmerkend voor de *best practice* onderwijsinstellingen is dat zij in tegenstelling tot de andere deelnemende onderwijsinstellingen proberen om zelf inkomsten te genereren. De hoeveelheid middelen die zelf wordt gegenereerd door onderwijsinstellingen is overigens klein in vergelijking met de financiële middelen die door de overheid en/of de eigen onderwijsinstelling beschikbaar worden gesteld.

Ondersteunende infrastructuur

Kwalitatief goede onderwijsprogramma's op het gebied van ondernemerschap onderscheiden zich doordat ze een goede ondersteunende infrastructuur bieden. Te denken valt daarbij aan incubator faciliteiten en een *center of entrepreneurship*, maar bijvoorbeeld ook aan wetenschappelijk onderzoek en een multidisciplinaire aanpak. Over het algemeen scoren de *best practice* onderwijsinstellingen goed op de *framework condition* ondersteunende infrastructuur. Een aantal zaken vallen op:

Drie van de vijf HBO instellingen hebben een lector op het terrein van ondernemerschap. Verder wordt geen van de faciliteiten (ondernemerschap lectorschap/department, incubator faciliteiten, technology transfer office en ontmoetingsplek voor studenten) standaard aangeboden door (vrijwel) iedere onderwijsinstelling. Elke onderwijsinstelling biedt wel één of meer van de bovengenoemde faciliteiten aan. Dit kan gedeeltelijk te maken hebben met het feit dat onderzoek (nog) niet tot de kerntaak van HBO instellingen behoort. Onderzoek op het terrein van ondernemerschap kan ook bevorderlijk zijn voor de HBO instellingen, bijvoorbeeld toegepast wetenschappelijk onderzoek dat past bij de taak en opdracht van deze onderwijsinstellingen.

Bij de *best practices* lijkt meer sprake te zijn van een multidisciplinariteit; zowel docenten als studenten vertegenwoordigen verschillende disciplines. Tevens lijkt meer samengewerkt te worden tussen verschillende departementen bij de ontwikkeling van het ondernemerschapsonderwijs.

Educatie

De *framework condition* onderwijs omvat zowel de *scope* van het onderwijs ofwel het aantal en de aard van de cursussen, alsook de methode van onderwijs. De *best practices* onderscheiden zich sterk op deze *framework condition*. Zij onderscheiden zich door het aanbieden van experimentele vormen van onderwijs en doordat ze studenten confronteren met echte ondernemerschapsproblemen. Ten aanzien van het aantal gastcolleges, tevens een indicator van kwalitatief ondernemerschapsonderwijs, ligt de *performance* nog niet echt hoog. Alternatieven, zoals coaching van studenten door ondernemers en bedrijfsbezoeken worden wel aangeboden.

Een opvallend resultaat is dat de onderwijsinstellingen, die op basis van de performance indicatoren, lager presteren niet minder verschillende vormen van ondernemerschapsonderwijs – individuele cursussen, minoren of volledige bachelor programma's – aanbieden. Eerder lijkt het erop dat de vraag naar ondernemerschapsonderwijs achterblijft bij het aanbod van deze instellingen.

Tevens valt op dat onderwijsinstellingen die hoog scoren op educatie – en dat zijn meestentijds ook de best practices – relatief minder tevreden zijn over de hoogte van het budget voor het huidige programma en voor nieuwe initiatieven. Een mogelijke verklaring hiervoor is dat deze instellingen werkvormen hanteren die uiterst geschikt zijn voor het ondernemerschapsonderwijs (bijvoorbeeld groepswork, excursies of business plan competities) maar tevens hogere kosten met zich meebrengen. Door de relatief hogere kosten in vergelijking met de programma's die meer traditionele werkvormen hanteren, worden deze instellingen mogelijk vaker geconfronteerd met beperkingen van het budget.

Outreach

De publieke uitstraling van het ondernemerschapsonderwijs omvat de externe contacten, de betrokkenheid van ondernemerschap vanuit de onderwijsinstelling in de samenleving en het alumni netwerk van de onderwijs instelling. Uit het onderzoek komt duidelijk naar voren dat de beter presterende educatieprogramma's een goed ontwikkeld en groot netwerk hebben opgebouwd. Dit netwerk kan onder andere bestaan uit overheidsinstellingen, venture kapitalisten en alumni. Tevens ontplooiën de betere onderwijsinstellingen initiatieven om ondernemerschap in de omgeving van de instelling te promoten .

De verschillen tussen de instellingen zijn echter niet heel groot. Eén van de instellingen onderscheidt zich duidelijk door de uitdrukkelijke focus op de gouden driehoek waarbij er uitwisseling van kennis, geld en expertise plaatsvindt tussen het bedrijfsleven, overheid en de onderwijsinstelling. Deze gouden driehoek staat centraal in het beleid van deze onderwijsinstelling, en heeft een positief effect op kennisoverdracht vanuit de onderwijsinstelling. Voor de andere onderwijsinstellingen liggen hier nog verschillende mogelijkheden voor verdere ontwikkeling.

Het betrekken van alumni in het ondernemerschapsonderwijs staat nog in de kinderschoenen bij de meeste deelnemende instellingen. Ook hier liggen mogelijkheden voor verbetering.

Ontwikkeling

De aandacht voor ontwikkeling en verbetering van het programma lijkt verband te houden met performance van de deelnemende onderwijsprogramma's. Alle instellingen besteden aandacht aan vraag gestuurd onderwijs, maar laten grote verschillen zien op de andere indicatoren, nl. de mate van evaluatie van doelstellingen en de strategie en de mate waarin geïnvesteerd wordt in human resources.

Een belangrijke conclusie is dat human resources vrijwel geen aandacht krijgt binnen de onderwijsinstellingen. Weinig tot geen docenten worden specifiek getraind voor ondernemerschapseducatie. Daarnaast zijn er weinig middelen beschikbaar om het doceren in ondernemerschap verder te bevorderen en stimuleren.

Aanbevelingen voor verbetering van ondernemerschapseducatie programma's

High-level managers betrekken als ambassadeurs van ondernemerschapseducatie

De meeste onderwijsinstellingen hebben een groot netwerk opgebouwd van stakeholders die bij het ondernemerschapsonderwijs betrokken kunnen worden. Door het senior management meer te betrekken als ambassadeur van het ondernemerschapsonderwijs, kunnen de onderwijsprogramma's toegang krijgen tot deze stakeholders. Tevens kunnen deze managers bijdragen aan een meer centrale positie van het ondernemerschapsonderwijs binnen de instelling.

Genereren van eigen inkomsten

De onderwijsinstellingen kunnen zich meer toeleggen op de activiteiten die inkomsten genereren voor het ondernemerschapseducatie programma. Dit maakt het programma minder afhankelijk van overheidsfinanciering en financiering door de instelling. Daarnaast zorgt het ervoor dat ondernemerschap eerder een vast onderdeel van de instelling wordt wanneer deze zelf inkomen genereert.

Gastcolleges

Het percentage gastcolleges ligt bij sommige onderwijsinstellingen vrij laag. Wanneer dit wordt verhoogd dan zal het ondernemerschapsonderwijs hiervan profiteren. Onderwijs blijft dan up-to-date en in contact met de daadwerkelijke wereld van ondernemers. Daarnaast is er direct contact tussen student en ondernemer, wat de authenticiteit van het onderwijs bevordert. Studenten worden geconfronteerd met echte problemen uit de praktijk. Ook kan een onderwijsinstelling ervoor kiezen om deze authenticiteit op een andere manier in het curriculum te verwerken, bijvoorbeeld door bedrijfsbezoeken en door studenten te laten coachen door ondernemers.

Strategie

In de missie en het strategisch plan van de onderwijsinstelling kan ondernemerschap meer centraal gesteld worden. Dit bevordert de uitstraling als ondernemende onderwijsinstelling wat interesse wekt bij potentiële stakeholders vanuit de overheid en het bedrijfsleven.

Daarnaast moeten de strategie ondersteund worden met een ondernemerschapsbeleidsplan. Dit document richt zich specifiek op de het communiceren van de uitvoering van activiteiten die onderdeel zijn van de ondernemende onderwijsinstelling en het ondernemerschapsonderwijs.

Investerings in human resources

De belangrijkste aanbeveling voor de benchmarkdeelnemers is dat de investeringen in human resources verhoogd moet worden. Op dit moment is er geen of weinig aandacht voor training van docenten specifiek voor ondernemerschapsonderwijs, terwijl dit wel belangrijk is. Docenten moeten trainingen krijgen om de specifieke didactiek en pedagogische vaardigheden die nodig zijn in ondernemerschapsonderwijs te verkrijgen en toe te passen. Daarnaast zijn er weinig tot geen incentives om te doceren in ondernemerschapsonderwijs. Bovendien zijn er ook geen tot weinig vormen van beloningen voor ondernemerschapsonderwijsdocenten met goede prestaties.

Investeren in human resources is belangrijk omdat het docenten in de mogelijkheid stelt om goede ondernemerschapsonderwijs te verzorgen. Resultaten geven aan dat er financiering mogelijk is voor training van docenten. Wanneer dit niet het geval is, is het mogelijk om

mensen uit de ondernemerspraktijk in te huren voor vakken die al volledig ontwikkeld zijn en waar de inhoud al van bekend is. Dit is minder kostbaar in vergelijking met het trainen van nieuwe docenten.

Executive summary

Nowadays, entrepreneurship is seen as one of the vital factors in stimulating economic growth. Therefore, the European Union and the Dutch government want to encourage entrepreneurship. Studies indicate that entrepreneurship education is one of the ways to stimulate entrepreneurship. This has led to the development of a whole range of entrepreneurship education programs.

Following this trend, various *Centres of Entrepreneurship* have been established in the Netherlands as well. One of these centres is the Dutch Agro-food Network of Entrepreneurship (DAFNE). This centre of entrepreneurship was set up in collaboration with several institutions in providing green education that wanted to include entrepreneurship in the curriculum: Wageningen University, Van Hall Larenstein Wageningen, Van Hall Larenstein Leeuwarden, Christelijk Agrarisch Hogeschool Dronten and the HAS Den Bosch. Commissioned by DAFNE, a study was made of how entrepreneurship education at the participating institutions is organised and how the teaching is put into practice. On the basis of this data, recommendations can be given for further improvement of entrepreneurship education at the individual education institutes.

Three objectives were formulated on the basis of the benchmark research:

- To analyse the current condition of entrepreneurship education at the participating institutions (both qualitatively and quantitatively).
- To identify 'best practices' that can serve as sources of inspiration for the further improvement of entrepreneurship education.
- To give individual advice to the participating education institutes on how they can improve entrepreneurship education at their institute.

At the six participating education institutes questionnaires were distributed, face-to-face interviews were conducted and a secondary data analysis took place. The results of this research were validated by the participating institutions.

The best practices were determined on the basis of the following performance indicators, which are obtained from the literature: *entrepreneurial mind-set acquired through education* (students developing an entrepreneurial mind-set by attending education activities in the

curriculum), *knowledge transfer* (knowledge transfer from the university to society) and *entrepreneurial mind-set acquired through practical experience* (students developing an entrepreneurial mind-set through practical activities outside of the curriculum). Subsequently, we looked at the factors that explain the performance of the best practice education institutes. On the basis of a study of the relevant literature the following framework conditions were identified: the mission and strategy of the education institute, the type and quantity of resources, the supporting infrastructure offered by the institution, the education program itself, the outreach of the entrepreneurship education, and the institution's own focus on the development and improvement of the entrepreneurship education.

Current situation of entrepreneurship education

The findings in this benchmark study indicate that there are three types of entrepreneurship education programs that can be distinguished on the basis of the performance indicators. There are entrepreneurship education programs that score well on just one of the three performance indicators, programs that show constant scores on all three indicators without excelling on any of them, and finally programs that do not score well on any of the performance indicators.

There are three education institutes that belong to the first type of entrepreneurship education programs. One of these education institutes has a high performance due to large scale knowledge transfer. Another education institute performs well on developing an entrepreneurial mind-set through education and the third education institute performs well on developing an entrepreneurial mind-set through practical experience. These three institutions are complementary to each other and are therefore used together as sources of inspiration for improvement of the other entrepreneurship education programs.

Strategy

The results in this benchmark study show the importance of embedding entrepreneurship education in the mission statement and strategy of the institution. Every best practice institute shows a high score on this framework condition. Therefore, the embeddedness of

entrepreneurship (education) in the strategy seems to be of crucial importance for the high performance of these education institutes in entrepreneurship education.

There are three indicators of the framework condition *strategy*: the extent to which entrepreneurship is included in the mission statement and strategic plan of the education institute, the degree to which entrepreneurship is included in the operational policy of the departments or faculties, and the involvement of the senior management in the entrepreneurship education program. The findings of this benchmark clearly show that the best practice education institutes focus on entrepreneurship and entrepreneurship education in the mission statements and strategic plans of the education institute, contrary to the lower scoring education institutes. The same holds for the strategic responsibility for the development of entrepreneurship education. Contrary to the lower performing higher education institutes, the best practices situate the primary strategic responsibility at the higher management of the institution. The findings indicate a strong influence of the framework condition strategy on the final performance.

Resources

Contrary to the report for the European Commission (NIRAS et al., 2008), there are no major differences identified between the education institutes with regard to the framework condition *resources*. In general, the higher education institutes are satisfied with the financing of the current entrepreneurship education program and financing of new initiatives. The availability of resources is not perceived as a primary barrier for entrepreneurship education.

What is characteristic for best practice education institutes is their engagement in self-generating income activities; this is in contrast with the other participating education institutes. However, the size of that self-generated income by the education institutes is small in comparison with the financial funds that are made available by the government and/or the education institute itself.

Institutional infrastructure

High quality entrepreneurship education programs are distinctive in having a sound supportive infrastructure, for example incubator facilities and a centre of entrepreneurship,

but also scientific research in entrepreneurship and a multidisciplinary approach in entrepreneurship education. In general, the best practice education institutes score well on the framework condition institutional infrastructure. Some aspects attract attention:

Three out of the five schools of higher professional education (in Dutch: HBO) have a lectureship in the field of entrepreneurship. None of the facilities seems to be essential for all education institutes as no facilities are routinely offered by any of them. However, every education institute does offer one or more of the above-mentioned facilities. This situation can be partly due to the fact that scientific research is not (yet) part of the core tasks of schools of higher professional education. Research in entrepreneurship can indeed benefit these schools, for example applied scientific research fits in well with the tasks of these education institutes.

Multidisciplinary approaches in the entrepreneurship education program seem to be more strongly present at the best practice education institutes; both the teachers and the students represent a variety of disciplines. Furthermore, it seems that there is more collaboration between the departments in the development of entrepreneurship education.

Education

The framework condition *education* covers both the scope of entrepreneurship education (i.e. the number and size of the courses) and the set-up of entrepreneurship education. The best practice education institutes distinguish themselves regarding this framework condition. They differ from the other education institutes regarding their experimental didactic methods and they confront students with real-life entrepreneurship problems. With regard to guest lectures, assumed to be crucial to high quality entrepreneurship education, the scores are not that high. However, alternatives are offered, such as entrepreneurs coaching students and students making business visits.

A striking result is the fact that the lower performing education institutes are not offering fewer different types of entrepreneurship education (e.g. individual courses, minors or full degrees in entrepreneurship). Rather, it looks as if the demand lags behind the supply at these education institutes.

Furthermore, the findings in this benchmark indicate that the education institutes that score well on education, most of the time the best practice institutes, are less satisfied with the size of the budget for the current entrepreneurship education program and new entrepreneurship education related initiatives. An explanation can be that these education institutes apply methods that are suitable for entrepreneurship education (e.g. business plan competitions, group work, business visits) but also involve higher costs. Because of the relatively higher costs in comparison with programs that contain more traditional methods, these education institutes might more often come up against the limitations of their budget.

Outreach

The outreach of entrepreneurship education involves the external stakeholders, the involvement of entrepreneurship education in society, and the alumni network of the education institute. Findings indicate that better performing entrepreneurship education programs have created a well-developed and wide network of stakeholders. Furthermore, they develop initiatives to promote entrepreneurship in the environment around the education institute.

However, the differences between the education institutes are not very considerable. One of the education institutes distinguishes itself from the others by its focus on collaboration between the government, private companies and the education institutes, the so-called triple helix. There is a continuous flow of money, knowledge and expertise between them. This triple helix is at the core of the policy of this education institute, and is beneficial to the knowledge transfer from this education institute. There are opportunities for the other education institutes to perform better in this respect.

The involvement of alumni in entrepreneurship education is still in its infancy at most of the participating education institutes. Also in this respect improvements are needed.

Development

The focus on development and improvement of entrepreneurship education seems to be related to the performance of the participating education institutes. All the institutions pay attention to demand-driven education, but show great differences on the other indicators (i.e. the extent to which they evaluate goals and strategy and invest in human resources).

An important conclusion to be drawn is that investing in human resources receives (almost) no attention at all from the education institutes. Hardly any lecturer is specifically trained to teach entrepreneurship. What is more, there are little or no means available to encourage or stimulate teaching entrepreneurship.

Recommendations for improving entrepreneurship education programs

Involve high-level managers as champions for entrepreneurship education

Most education institutes have created a large network of stakeholders that can be involved in entrepreneurship education. By making the senior management more involved as ambassadors of entrepreneurship education, the entrepreneurship education programs can get access to these stakeholders. Furthermore, these managers can contribute to a more embedded central position of entrepreneurship education within the education institute.

Engage in self-generating income activities

The education institutes can become more focused on activities that generate income for entrepreneurship education. This results in a program that is less dependent on governmental funds and funds from the institution. Besides, it is more likely that entrepreneurship will become a fixed entity within the institution when it generates its own income.

Guest lectures

The percentage of guest lectures at some institutions is low. It will be beneficial to the entrepreneurship education to increase this percentage. Education will stay up-to-date and in contact with the entrepreneur in the real world. Furthermore, there is a direct connection between the student and the entrepreneur, which is beneficial to the authenticity of the entrepreneurship education. Students are confronted with real-life entrepreneurship problems. However, the education institute can also choose to stimulate authenticity in the curriculum in a different way, for example by organising business visits and inviting entrepreneurs to coach students.

Strategy

Entrepreneurship should get a more central place in the mission and strategic plan of the education institute. This stimulates the entrepreneurial character of the education institute, which in turn creates interest from the potential stakeholders in the government and business world.

Furthermore, this strategy should be supported with an entrepreneurship policy plan. This document focuses specifically on informing about the execution of activities that are part of the entrepreneurial education institute and entrepreneurship education.

Invest in human resources

The most important recommendation for the participating education institutes is to increase investments in human resources. At present, little or no attention is given to training lecturers in teaching entrepreneurship education even though this is very important. Entrepreneurship education needs didactic methods and pedagogic skills which are different from traditional teaching. The teachers should be taught how to apply these methods.

Furthermore, there are little or no incentives to teach in entrepreneurship education. In addition to this, there are also few or no means to express recognition for achievements by entrepreneurship teachers.

Investing in human resources is important because it enables teachers to provide quality entrepreneurship education. The findings indicate that there are resources available to train lecturers. However, one can also choose to hire practitioners for the courses that are already fully developed and where the practitioner does not have to add content anymore. This is less costly compared to training teachers.

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1. Introduction

Entrepreneurship Education

Nowadays there is a widespread recognition that entrepreneurship stimulates economic growth (Gorman et al. 1997). There is a positive correlation between entrepreneurship and economic growth, innovation and employability creation. Therefore, the challenge for European countries is to promote entrepreneurship in order to achieve future economic growth.

Besides economic and demographic factors (Arenius & Minniti, 2005), social capital (Davidsson, 2005; Henley, 2007) and personal skills are assumed to be necessary for being a successful entrepreneur (Arenius & Minniti, 2005). Skills like alertness to opportunities, low fear of failure and confidence about one's own skills can lead to entrepreneurial activity and entrepreneurship (Arenius & Minniti, 2005), but are not inborn. These skills can be developed through entrepreneurship education (Lee et al., 2005; Fayolle & Klandt, 2006; Birenbaum et al., 2006).

Entrepreneurship education is nowadays seen as an effective means to foster entrepreneurship, as is recognized by European policymakers (European Commission, 2006; Fayolle & Klandt, 2006). Entrepreneurship education programs are therefore being promoted and implemented in education curricula all over Europe (European Commission, 2006) and the United States (Kuratko, 2005). These education programs not only focus on education for self-employment or business skills. Intrapreneurs need similar skills as entrepreneurs and therefore can benefit from the same education program (Manion, 2001). The policy commitment to enhance entrepreneurship education has led to an increasing diversity of entrepreneurship education programs in European HEIs.

The Dutch Agri-Food Network of Entrepreneurship (DAFNE) is a partnership between Dutch schools for higher professional education and Wageningen University, which stimulates entrepreneurship and entrepreneurialism amongst students, lecturers and researchers. Supported by the Dutch government, the DAFNE-partners developed entrepreneurship education programs and related activities from 2008 to 2011. After the integration of the

entrepreneurship education programs in the education curricula of the different partners, DAFNE commissioned this benchmark study to evaluate the quality of these programs. The purpose of this benchmark study is to identify the strengths and weaknesses of entrepreneurship education programs of different HEIs in the Netherlands and Belgium in order to give suggestions for improvement.

Benchmarking is a tool for evaluation which has a competitive origin (Kyrö, 2003); competitive scrutiny can ward off complacency and act as a stimulant for better operating programs (Vesper & Gartner, 1997). However, the purpose of this benchmark study is explicitly to learn from other practices in entrepreneurship education instead of enforcing competition. The DAFNE-partners want to learn from the best performing entrepreneurship education program in order to be able to improve their program.

The following questions then arise: what can be seen as the best performing entrepreneurship program, and what can be assumed to be the indicators of performance? In this benchmark study, three performance indicators are used, which are taken from an eminent report drawn up for the European Commission (NIRAS et al., 2008), called *The Survey of Entrepreneurship in Higher Education in Europe*:

- The number of students with an entrepreneurial mind-set acquired through education
- The scale of knowledge transfer to society
- The number of students with an entrepreneurial mind-set acquired through practice

What the best performing entrepreneurship programs are will be determined on the basis of these three performance indicators.

However, knowing the performance of an entrepreneurship education program is insufficient to improve the performance of that program. To improve an education program, it is necessary to know what specific input leads to the best performance; the quality of the lecturers for instance, or the practical orientation of the education program? The assumption is that there are various aspects, so-called *framework conditions*, of the entrepreneurship education program that lead to higher performance; an education program with a low score

on the framework conditions will also score low on overall performance. HEIs can learn from the best practices by understanding what activities they are engaged in regarding the different framework conditions. This is where the benchmarking turns into benchlearning. By identifying the strengths and weaknesses of the different education programs, this method lays the basis for improving these programs (Watson, 1993); by comparing HEIs with best practices, the room for improvement compared to other entrepreneurship education programs can be identified, as well as ways in which the improvement of the program can be realized. In this way, this report helps to improve the entrepreneurship education programs at HEIs in the Netherlands and Belgium.

Structure of the report

In section 2, the benchmark method and the methodology of this study is explained. In section 3, the overall framework conditions and performance indicators used in this study are presented. Section 4 gives the operationalization of framework conditions and performance indicators. In section 5 the results of entrepreneurship education programs are presented and analysed. In section 6 the conclusions and recommendations are given.

2. Methods

The principle of the benchmarking method used in this study is to identify best practices by linking performance indicators to the input that leads to high performance, the so-called framework conditions. This benchmark study applies the definition of benchmarking made by Jackson and Lund (2000), which is also used in the benchmarking research of Australian universities by Garlick and Pryor (2004). The definition of benchmarking used in this report is the following:

Benchmarking is, first and foremost, a learning process structured so as to enable those engaging in the process to compare their services/activities/products in order to identify their comparative strengths and weaknesses as a basis for self-improvement and/or self-regulation. (Jackson & Lund, 2000; 6 in Garlick & Pryor, 2004)

There are several methods of benchmarking (Carpinetti & de Melo, 2002; Andersen & Pettersen, 1996; Kyrö, 2003; Mc Adam et al., 2008; Freytag & Hollensen, 2001). Some benchmark methods focus on the final product or output, others on inputs or the throughput, i.e. the processes between input and output. It is hard to classify this benchmark study in one particular benchmark category, because all three focus points are involved in entrepreneurship education programs. However, entrepreneurship education programs do have a final product, namely the outputs of entrepreneurship education. This final product is the result of inputs and processes. These outputs are the previously mentioned performance indicators.

There is still no consensus about what can be considered desired outputs of entrepreneurship education (Pittaway & Cope, 2007). However, in this report, the performance indicators used in the eminent report by NIRAS et al. (2008) commissioned by the European Commission are used. These outputs are (NIRAS et al, 2008):

- The number of students with an entrepreneurial mind-set acquired through education
- The scale of knowledge transfer to society
- The number of students with an entrepreneurial mind-set acquired through practice

Measurements for the performance indicator entrepreneurial students are for instance the number of students following entrepreneurship courses. Measurements for the performance

indicator knowledge transfer are the third flow of funding, the number of patents and of peer-reviewed studies (see section 3 and 4 for further details).

The framework conditions which can be seen as the input and throughput of the entrepreneurship education programs are also taken from the report by NIRAS et al. (2008) for the European Commission and Hoffmann et al. (2004). The input which is necessary for developing and maintaining a well-functioning entrepreneurship program are: strategy, resources and institutional infrastructure. The throughput contains the following framework conditions: education, outreach and development. When these inputs and processes are functioning well, the outputs (i.e. performance) are expected to be good as well. So, there are six framework conditions which affect the performance of an entrepreneurship education program. The relationships between framework conditions and performance are presented in Chapter 3 and the operationalization of the framework conditions and performance indicators is presented in Chapter 4. The conceptual model is presented in the Appendix.

2.1 Benchmark participants

The benchmark study requested higher education institutes (HEI) in the Netherlands and Belgium to participate. These higher education institutes are similar in their focus on agri-food and/or other technical background. Furthermore, all of the participating education institutes have an internal or external centre of entrepreneurship. This ensures that differences between higher education institutes are due to the various ways the programs give substance to the framework conditions and not due to differences in the nature of the higher education institutes.

The main characteristics of the participating HEI's in this benchmark study are explained below:

- *22ND (the Netherlands)*

Interview: 1 June 2011, face-to-face. Validation of the results was received on 6 December 2011 by e-mail.

General information: In 2003 the two HEIs Van Hall and Larenstein merged into the School for Higher Professional Education 24LE and 22ND (VHL). VHL is situated at

three different locations - Wageningen, Velp and Leeuwarden – which each have different roots and specialisations. In 2004, VHL joined the 21PI. Nowadays VHL has about 4,000 students. The focus of 24LE and 22ND is on nature and environment, health of humans and animals, and sustainable entrepreneurship. The 24LE and 22ND institutes took part in the DAFNE project, moreover they are involved in: a centre for start-ups, incubator activities and other entrepreneurial initiatives. At the 22ND entrepreneurship acquired a greater role around 2005, when entrepreneurship became a compulsory part of all the bachelor programs.

- *24LE (the Netherlands).*

Interview: 27 June 2011, face-to-face

General information: see *22ND*.

- *21CW (the Netherlands).*

Interview: 14 June 2011, face-to-face. Validation of the results was received on 7 December 2011 by e-mail.

General information: 21CW is situated in the south of the Netherlands. The applied university educates students in the sectors: animal and environment, food and business, and horticulture and rural development. In 2011, the education institute had about 1,800 students. The 21CW developed their entrepreneurship education with the help of DAFNE, and it also developed TopKlas Ondernemerschap and Technology Transfer: HAS Kennisbalie. The 21CW does not participate in the follow-up program of DAFNE called 'Start-Life' but it has developed an own similar project from its own resources.

- *01MY (the Netherlands)*

Interview: 31 June 2011, face-to-face. Validation of the results was received on 12 December 2011 by e-mail followed by a phone interview on 22 December 2011.

General information: 01MY is home to 1,500 students. The education institute focuses on the agricultural sector and more specifically cattle breeding, plant-breeding and agricultural small and medium-sized businesses. Entrepreneurship education at 01MY originated around 2002 and nowadays all study programs at the 01MY contain courses in entrepreneurship. Since then the 01MY also presents itself as an entrepreneurial HEI.

- *25BG (Belgium).*

Interview: 12 June 2011 by phone. Validation of the results was received on 1 December 2011 by e-mail.

General information: The 25BG was founded in 1959 and is currently home to 17,000 students. Entrepreneurship education started to develop in 2007 when it became more and more integrated into the regular curriculum. The Centre of Entrepreneurship of the 25BG started in 2008 and currently employs five full-time employees. The demand for technology-oriented expertise has shown the indispensability of entrepreneurship to students from different disciplines.

- *21PI (the Netherlands).*

Interview: 21 and 30 June 2011, face-to-face. General information: In 1876 an agricultural college was founded. In 1998 collaboration between the 21PI and several research institutes was realized. In 2011, the 21PI had about 6,500 students in both natural and social sciences. Five different science groups operate in the three core domains: food and food production, living environment, and health, lifestyle and livelihood. The university is ranked 151-200th in the Shanghai Academic Ranking World Universities. Entrepreneurship education started in 2007 with the help of the DAFNE project and was primarily focused on entrepreneurship in the agricultural field. The department of Management Studies facilitates the entrepreneurship education.

2.2 Protocol

The DAFNE-partners received a letter to inform the heads of the entrepreneurship education programs about the benchmark study. If the partners were willing to contribute to the study, interview appointments were scheduled with the head of the entrepreneurship education program and, if possible, a (senior) lecturer involved in entrepreneurship education. Subsequently, a content analysis of the strategic plan, mission statement and financial plan of the participating HEIs was executed, as well as an analysis of the course manuals of courses related to entrepreneurship.

The questionnaire was sent to the participants approximately one week before the interview so they could prepare the questions. The heads of the entrepreneurship program received all questions which had to be answered. The lecturers received only the questions which related

to the execution of the education program. In this report these questions are presented in italics. However, at the time of surveying and interviewing, the teachers and heads of the centres of entrepreneurship were present as well. The teachers were therefore able to answer more than just the questions given here in italics, as they were confronted with the full survey as well. One week after receiving the questionnaire, the actual interviews were conducted.

The interviews were conducted face to face or, if the universities were located abroad, by phone. The duration of the interviews ranged from 38 minutes to as long as 3.5 hours. The interviews were semi-structured, i.e. there were closed questions asked during the interview and subsequently probing questions when necessary. This method of follow-up questions was used when answers were vague or ambiguous, or explanations of specific answers were needed. Also when more specific or in-depth information was needed, this interview technique was used. Probing questions yielded information about the entrepreneurship program which was relevant enough to be included in this report. It was helpful for the interpretation of the quantitative results and therefore contributed to the validity of this study.

In a few cases, the respondents were not able to answer all the questions immediately. In that case, a date was set before which the missing answers must be provided. The interviews were recorded so as to be able to make written transcripts. This made it possible to provide quotes selected from the respondents' answers.

When major inconsistencies were identified between the interviewed representatives of an HEI and/or between the interviews and content analysis of the written information, the head of the entrepreneurship education program was asked to validate the given information of the HEI. When minor inconsistencies were identified – e.g. a difference of 1 on a 5 point scale - the answer of the representative who was assumed to be the expert was adopted. In case of inconsistencies regarding courses and didactic methods, the answers of the representative involved in education was adopted. In case of inconsistencies regarding resources or the institutional infrastructure, for instance, the answer of the head of the centre of entrepreneurship was adopted.

Moreover, the benchmark participants received the results of the draft version of the report in order to verify the data presented. Results which were not correctly presented in the draft report were reviewed and adjusted when appropriate.

2.3 Validity and reliability

In this section, the actual sample is evaluated in relation to reliability and variability.

Response rate

Of the 6 schools for higher professional education that were invited, all 6 institutions responded to the invitation: a response rate of 100%, which is satisfying. Also, the 6 institutions fully completed the questionnaire and all persons were interviewed face to face except one, who was interviewed by phone. No respondents answered too few questions to be usefully included in this study.

Potential biases

All the institutions had an equal opportunity to answer the questionnaire, since all received invitations and several reminders.

The HEIs that took part in this benchmark study are all schools for higher professional education. This can bias the scores regarding the performance indicator knowledge transfer and affect the scores on the framework indicator research. However, one of the benchmark participants is the 21PI. Because 21PI is part of DAFNE, it is part of the benchmark study. However, universities differ from schools for higher professional education in many ways. Therefore, the results can be biased regarding the performance and scores on framework conditions. The differences between 21PI and the other HEI's involved in this benchmark study can therefore be partly explained by the nature of the HEIs. This should be kept in mind when interpreting the results of this benchmark study.

The questionnaire was presented in English. This implies that there are 0 out of 13 benchmark participants that completed the questionnaire in their native language. The benchmark of schools for higher professional education and university consists solely of

Dutch speaking HEIs. Therefore we assume that there is no bias due to language that affects the benchmark of schools for higher professional education.

The benchmark method is a method in which the identification of the best practice is important. With the questionnaire and the interviews, the performance of the entrepreneurship education program and the specific inputs which lead to the performance – the framework conditions – are measured. However, there might be a tendency of benchmark participants to give answers which might overestimate their performance, in order to become the best practice. To prevent this tendency, respondents were asked to elaborate on their answers during the interviews. Furthermore, inconsistencies between respondents of one HEI and/or between the interviews and the content analyses of the written information were double checked.

Another tendency which can be found with questionnaires is the central tendency error. This means that respondents are not willing to give extreme answers. At a five point scale they will give scores between 2 and 4. However, in this study, the education institutes were asked to motivate their answers by addressing probing questions. By asking why a specific score was given, the answer of the respondent could be validated by the interviewer. Because the respondent had to give reasons for his or her answer, he or she gave extreme answers if there was a sufficient reason for it.

At every school for higher professional education and the 21PI, there were interviews conducted with the head of the centre of entrepreneurship and a senior lecturer involved in the entrepreneurship education program. However, there is one exception where there was only one respondent: the 25BG. This was due to the fact that the respondent of this HEI is involved in the management of the centre of entrepreneurship as well as in the entrepreneurship education program as a lecturer.

Besides, some respondents of HEIs gathered information from people in their institution who are in charge of the field covered by the question, and were therefore better able to answer the questions. With these measures taken, this benchmark study can claim a high validity and reliability for its results.

3. Framework

This section gives an overview of the six framework conditions and how these framework conditions affect the performance of entrepreneurship education programs. The operationalization of the framework conditions and performance outputs is done in detail in chapter 4. One can find the schematic overview of the concepts, operationalization and how it is measured in figure I in the appendix.

Vesper and Gartner (1997) developed a first framework of conditions important for entrepreneurship education. The *education* program itself, the *development* of the program and the *outreach* are important framework conditions for entrepreneurship education according to Vesper and Gartner. These framework conditions are further developed in the benchmark reports for the European Commission (NIRAS et al., 2008) and the benchmark of Hoffman et al. (2004) in Entrepreneurship and Higher Education (Potter, 2008) published by the OECD. Next to the framework conditions that Vesper and Gartner distinguished – Education, Development and Outreach – these reports added the following framework conditions: the embeddedness of entrepreneurship education in the *strategy* of the HEI, the *resources* available for the entrepreneurship education program and the facilities or *institutional infrastructure* which supports entrepreneurship education.

In this benchmark study, the model of framework conditions and performance indicators is developed by combining the reports for the European Commission and the OECD. Because these reports differ with regard to the indices for the different framework conditions, an extensive literature study is conducted in order to identify the indicators for the different framework conditions. This benchmark study includes all six framework conditions contained in the eminent reports for the European Commission and the OECD. It is assumed, therefore, that the model which is used in this research covers all relevant dimensions of entrepreneurship education programs of HEIs.

3.1 Performance

This report uses three indicators of performance which are also used in the report for the European Commission (NIRAS et al., 2008). They used three performance indicators:

entrepreneurial students through learning, knowledge transfer and entrepreneurial students through practice. The reason why they chose these indicators is that fostering the right mind-set, creating entrepreneurial skills and encouraging entrepreneurship and knowledge transfer positively influences economic growth, business growth etcetera (NIRAS et al., 2008).

This implies that, ideally, one would collect data from students to analyse the entrepreneurial mind-set and conduct economic analyses to investigate the knowledge transfer. However, one can assume that entrepreneurship courses and extracurricular activities will have a positive influence on the entrepreneurial mind-set of students involved in these courses and activities (NIRAS et al., 2008). Furthermore, one can assume that knowledge transfer activities of HEIs like technology transfer offices or advisory centres will increase the performance of the surrounding business environment, which ultimately boosts the economy (NIRAS et al., 2008). This information can be obtained from the higher education institutes, and makes measurements of effective entrepreneurship education programs possible.

Entrepreneurial students through learning

The first performance indicator is measured by the share of students enrolled in entrepreneurship courses. This is measured school-wide which implies a calculation of the share of entrepreneurship students in relation to the total number of enrolments at the education institute. This is multiplied by the average number of ECTS for a course in entrepreneurship education in order to estimate the total number of hours of attended entrepreneurship education. We have chosen to perform school-wide measurements because students from all disciplines can benefit from courses in entrepreneurship (such as intrapreneurs, artists, etcetera). Moreover, the more students get acquainted with entrepreneurship education, the more they will be triggered to perform entrepreneurial behaviour in the future (NIRAS et al., 2008), which in turn is beneficial to the economy (Gorman et al. 1997).

Knowledge transfer

The second performance indicator is measured by the number of patents/IPR, third flow of funds and peer-reviewed studies. These indicators measure the spreading of knowledge to the environment. However, it should be kept in mind that in comparison to schools for higher professional education, universities are likely to score higher on this performance indicator. Knowledge transfer is one of the main tasks of any university, but particularly schools for higher professional education give a higher priority to practice based education. However, according to NIRAS et al. (2008), the indicator knowledge transfer is essential for all HEIs. It measures to what extent entrepreneurship education is being disseminated in society, to what extent HEIs and their staff themselves perform entrepreneurial behaviour and to what extent lecturers at HEIs keep their teaching methods up to date. Therefore, this performance indicator is included in this benchmark study as well.

Entrepreneurial students through practice

The third performance indicator is measured by the number of executive education attendants and the number of students participating in extra-curricular activities. This gives an indication of the development of an entrepreneurial mind-set through practical entrepreneurial activities.

3.2 Framework Conditions

This section covers the six framework conditions which should be well managed in order to achieve a good entrepreneurship education program.

3.2.1 Strategy

Entrepreneurship education programs involve a lot of actors and stakeholders. This circumstance is likely to contribute to the success of a program. Because entrepreneurship education is not a 'one man band', the cooperation and coordination of multiple actors within the institution and its surrounding environment is essential for establishing an effective entrepreneurship education program. According to NIRAS et al. (2008) and Hoffmann et al. (2004), embedding entrepreneurship education in the strategy of an HEI helps to promote the cooperation of the different actors within and outside the institution. According to Vesper and Gartner (1997), strategy and more specifically strategy and

operational planning can act as a road map for successful entrepreneurship education programs.

NIRAS et al. (2008) and Hoffmann et al. (2004) therefore use *strategy* as a framework condition. This condition concerns *how and if institutions embed entrepreneurship in their overall strategy* (NIRAS et al., 2008, p. 45). It is the one framework condition which explains the difference between front-runner institutions and the ones that lag behind. Moreover they state that *“the strategic dimension must be considered of crucial importance if higher education institutes want to fulfil the ambition to become entrepreneurial”* (NIRAS et al., 2008: 91). In this benchmark study, the framework condition *strategy* is selected because it can explain to a large extent the actual performance of an entrepreneurship education program (Vesper and Gartner, 1997).

3.2.2 Resources

In order to develop and establish an entrepreneurship education program, dedicated funds are needed (NIRAS et al., 2008; Vesper & Gartner, 1997). The number, sources and availability of resources over time influence the development and establishment of the education program in direct and indirect ways. Without available resources, research in entrepreneurship, the training of teachers in entrepreneurship etc. is impossible (Vesper & Gartner, 1997). In this benchmark study, the framework condition *resources* is selected because it can explain the actual performance of an entrepreneurship education program.

3.2.3 Institutional infrastructures

Like all education programs, the entrepreneurial education program should be supported by an environment and facilities which are conducive to learning. Examples are the availability of a centre of entrepreneurship or incubator facilities for students and postgraduates. Technology transfer offices stimulate knowledge valorisation and knowledge transfer (Etzkowitz, 2003). These institutional infrastructures are especially important in entrepreneurship education. Not only because the stimulation of entrepreneurship places a greater demand on such (expensive) facilities compared with other education programs, but also because the didactic methods which are used in entrepreneurship education require smaller groups of students (Garavan & O’Cinneide, 1994). In this benchmark study the framework condition *institutional infrastructures* is selected because the availability of

supportive entrepreneurship infrastructures can explain the performance of an entrepreneurship education program (NIRAS et al., 2008).

3.2.4 Education

Education is a framework condition which directly influences the competences of students. Students gain knowledge about entrepreneurship in a direct way through education (Souitaris et al. 1997). Moreover, by means of education, one can influence attitudes (Lepoutre et al. 2010) and intentions and ultimately the entrepreneurial behaviour of students (Souitaris et al. 2007). According to Vesper and Gartner (1997), entrepreneurship courses are the number one indicator for excellent entrepreneurship education programs. Not just the quantity of entrepreneurship courses is an important indicator for the performance of an entrepreneurship education program, but also its logic, coherence and the efficacy of educational experience should be measured when comparing entrepreneurship education programs (Gartner & Vesper, 2007). In this benchmark study, the framework condition *education* is selected because it can explain the actual performance of an entrepreneurship education program.

3.2.5 Outreach

Acquiring entrepreneurial competences not only concerns doing theoretical exercises. Offering opportunities for gaining practical experience is essential for an effective entrepreneurship education program (NIRAS et al., 2008). The framework condition *outreach* involves links with external stakeholders. These links positively affect the performance indicators entrepreneurial students through practice (NIRAS et al., 2008) and knowledge transfer (Etzkowitz, 2003). Furthermore, these links with external stakeholders can help students to become successful entrepreneurs while they are studying (Rasmussen & Sørheim, 2006). In this benchmark study, the framework condition *outreach* is selected because it can explain the actual performance of an entrepreneurship education program.

3.2.6 Development

The sixth framework condition, *development*, is beneficial to the performance of an entrepreneurship education program for the obvious reason that aiming for development leads to improvement. By regular evaluation of the education program and investments in human resources by training etc., the entrepreneurship education program will be further developed and improved (NIRAS et al., 2008; Vesper & Gartner, 1997). It is expected that

high-levels of development will lead to higher performance of the entrepreneurship education program. In this benchmark study, the framework condition *development* is selected because it can explain the actual performance of an entrepreneurship education program.

4. From framework condition to indicators and operationalization

This chapter covers the operationalization of the framework conditions. First it is explained which indicators are subject to the framework condition and why. Subsequently it is explained what the content of each indicator is. Finally, all indicators are operationalized. At the end of each operationalization of the framework condition, the questions from the questionnaire which measure the indicators are presented. In the appendix, Table XXI, an overview of framework conditions, variables and measurements is given. Also, an overview of the hypotheses of this benchmark study, which are based on a study of the relevant literature, is presented in the appendix (Appendix Table XXIII)

4.1 Strategy

Strategy is the framework condition which indirectly contributes to the entrepreneurship education program (Poole & Robertson, 2003) (cf. §3.2.1). The framework condition strategy concerns the question whether entrepreneurship is integrated in the overall strategy of the institution and if so to what extent. Strategy consists of three indicators: goals, policies and embeddedness. The graphical representation of the framework condition strategy is presented in figure 1.

Figure 1 Strategy indices



4.1.1 Goals

This indicator concerns the centrality of entrepreneurship in the mission statement and in the strategic plans of the HEI. The importance of entrepreneurship for a HEI and the attention given to entrepreneurship is often reflected by the level of integration of entrepreneurship in the mission statements of the institution (Hoffmann et al, 2004; NIRAS et al., 2008). The leading entrepreneurship education institutes often embed entrepreneurship within their mission statement (NIRAS et al., 2008).

In strategic plans, the strategic goals of the HEI with regard to entrepreneurship education are presented. The embeddedness of entrepreneurship in the strategy of the HEI can stimulate the development and assessment of the entrepreneurship education program. Furthermore, the integration of entrepreneurship in the mission statement and the strategic plans gives an indication of the importance of knowledge transfer for the HEI (NIRAS et al., 2008).

Operationalization of the indicator goals

A content analysis of the mission of all participating HEIs is executed to measure the indicator goals. These documents were analysed with regard to the topics entrepreneurship in general and entrepreneurship and entrepreneurial skills of students in particular, but also the transfer and commercialization of knowledge and so on. The scores are given on a five-point scale reaching from no embeddedness of the goals in the mission and/or strategy at all, to high-levels of embeddedness. Because there are major differences in embeddedness of entrepreneurship in the mission between the HEIs, it is possible to discriminate between institutions with the help of these scores.

With regard to the strategic plans, the corporate strategic plan was analysed with regard to the questions whether the HEI wants to create entrepreneurial students and/or entrepreneurial staff, whether the institution itself strives to act and behave entrepreneurially, whether the HEI stimulates entrepreneurship in its environment by helping start-ups or creating start-ups, and whether commercialization or valorisation of knowledge is given priority by the HEI.

4.1.2 Policies

Compared with the indicator goals, the indicator *policies* is more practical. Where missions and strategies are set at an overall level of the university, policies flow from these goals to the departments and chair groups of the traditional decentralised universities (Sporn, 2001). Often, the success of the implementation of entrepreneurship education programs is determined by factors related to the policy level (NIRAS et al., 2008).

The goals at university level regarding entrepreneurship should not only affect policies of the business or management departments of the HEI, but all departments or chair groups of the HEI should include supportive policies for entrepreneurship in their policy plans (NIRAS et al., 2008; Potter, 2008). The university goals with regard to entrepreneurship can be embedded in (operational) action plans of different departments and chair groups of the HEI (NIRAS et al., 2008). Besides having entrepreneurship policy plans for the different departments, it is also important that the policy plans are clear and guiding for undertaking entrepreneurship education.

Besides having policy plans to develop entrepreneurship within the institution, a HEI can also foster entrepreneurship by attracting employees which have experience in the business world. These employees have experience gained in the field and therefore know what should be offered by the entrepreneurship education program to prepare students for their future career. Next to supportive policies at department or chair group level, existing policies to attract employees with entrepreneurial experience is helpful in developing the entrepreneurship education program of the HEI.

Operationalization of the indicator policy

To measure the presence of entrepreneurship policies within different departments, we asked what percentage of the departments has their own policies/action plans. We also asked whether the institution as a whole has a clearly written action plan specifically developed for entrepreneurship education. Besides policy plans for entrepreneurship education and extra-curricular activities, it is also asked whether there are policies to attract/recruit employees which are active in business.

4.1.3 Embeddedness

In this study, embeddedness means the extent to which policies and strategies for entrepreneurship are embedded in the hierarchy of the HEI. Support from higher positions in the institution affects the embeddedness of entrepreneurship at the lower positions of the HEI (NIRAS et al., 2008). By communicating the vision of the institution, senior managers can motivate employees and let them identify themselves with the overall strategy of the HEI (Sporn, 2001). This identification with the strategy is important, because these employees have to execute the strategy formulated by the management.

Sotirakou (2004) notes the importance of governance in creating a context in which entrepreneurship education can prosper. University governance and leadership do not directly contribute to entrepreneurship but they do create the context for successful entrepreneurship education (Sotirakou, 2004). Not only the input of staff members in the education program is important, but also the choices made by the program director and the support from senior management affect the success of program implementation (Mortimer, 1995).

Important for embedding entrepreneurship is also the support from people in the field (Mortimer, 1995). Various studies show the importance of so called 'champions for entrepreneurship' for embedding entrepreneurship in educational institutes and its education programs (Standish-Kuon & Price, 2002; Gibb & Hannon, 2006; Wilson, 2008). Champions of entrepreneurship can convince the management that entrepreneurship education is important, which in turn is beneficial to the embeddedness of entrepreneurship education through the institution. The HEIs can make use of the knowledge and experience of these practitioners in the development of their education program. Moreover, with the help of practitioners, the HEI can build a highly profiled network of entrepreneurs (Hoffman et al., 2004).

Operationalization of the indicator embeddedness

To assess whether entrepreneurship education is supported by the senior management of the HEI, it is asked at which level of the organization the primary strategic responsibility for the entrepreneurship education program is placed. Furthermore, it is asked how many senior managers act as champions of entrepreneurship education and directly or indirectly contribute to the development of the program.

On the next page an overview of the questions per indicator of the framework condition strategy.

Table I Questionnaire questions Strategy

Entrepreneurship goals:

1. What is the level of embeddedness of entrepreneurship in the mission statement?
2. What is the level of embeddedness of entrepreneurship in the strategic plan?

Entrepreneurship policies

1. What percentage of the different departments at your institution has their own entrepreneurship policies/action plan?
2. Please indicate the level of agreement with the statement: our university has clearly written institutional policies/action plans for undertaking entrepreneurship education.
3. Please indicate the level of agreement with the statement: Our institution has a policy to attract/recruit employees which are active in business.

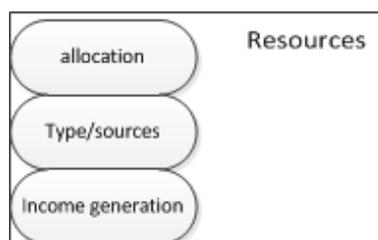
Embeddedness of entrepreneurship

1. Where is the placement of the primary strategic responsibility for entrepreneurship education program at your institution?
 2. How many high-level managers act as champions of entrepreneurship education and contribute to the development of the educational program?
-

4.2 Resources

The framework condition *strategy* is essential for a successful entrepreneurship education program. But having sufficient resources is as crucial as strategy, in order to develop and maintain the entrepreneurship education program successfully. In this report, the framework condition, resources, focuses on financial resources and not human or other resources. This is because financial resources are especially important in the start-up phase of the entrepreneurship education program (McMullan & Long, 1987). The research by NIRAS et al. (2008) covers most of the indicators related to resources and is used in this research as well. The framework condition resources consist of three indicators: allocation of resources, types of sources and the institution's own generated income are indicators of the framework condition resources.

Figure 2 Resources indices



4.2.1 Allocation

Good budget allocation should ensure that there is a sufficient amount of money available for investments in the entrepreneurship education program, where it is needed. If a HEI wants to develop and maintain an entrepreneurship education program, it is important to have sufficient funding (Wilson, 2008 in Potter, 2008; NIRAS et al., 2008). Entrepreneurship education programs which have a bigger budget can invest in better facilities, offer more activities, train employees, etcetera. Therefore the assumption is that the better the support in terms of funding, the better the performance of the program will be.

However, there should also be (financial) support in a broader sense. Besides the necessary resources for maintaining the program, there should also be budget available for initiating new activities; new courses on entrepreneurship, but also staff or student start-ups or spin-outs are entrepreneurial activities in need of investment. With dedicated resources available,

the entrepreneurial intentions of students, developed through the education program, can be turned into entrepreneurial action.

Operationalization

The indicator *allocation* is measured by one question and one statement. Participants are asked to give an indication of the level of institutional support for the entrepreneurship education program in terms of funding. This is measured on a five point semantic differential scale ranging from very insufficient to very sufficient. In the questionnaire, a statement is made that aims to measure whether new entrepreneurship education initiatives are stimulated with funding. This statement is measured on a five point semantic differential scale, ranging from totally disagree to totally agree.

4.2.2 Type of sources

The type of sources is important because it gives an indication of the long term certainty of the entrepreneurship education program. Government funding for the development of the entrepreneurship education program is important, for instance, but it often stops before the program can have a significant impact (Wilson, 2008). Diversifying the sources of income is therefore important to developing an entrepreneurship education program that is sustainable over time (Wilson, 2008 in Potter, 2008). Moreover, HEIs which are mainly dependent on state funding are less able to adapt to rapidly changing environments (Sporn, 2001). Diversifying the types of sources therefore decreases the vulnerability of HEIs (Clark, 1998; Williams, 1995).

Besides having diversified sources of income, it is also beneficial to the sustainability of the program to have long term income dedicated for the program (Wilson, 2008; Potter 2008). Resources allocated to the entrepreneurship programs which are long term, from within the institution as well as outside, can therefore contribute to the development of a sustainable entrepreneurship program.

Operationalization of type of sources

The types of sources are measured by three questions. First, the respondents had to indicate what sources of income are relevant for the entrepreneurship education program. Various

options were offered: own activities, institution budget, governmental funds, benefactors and others. Subsequently, respondents had to indicate what percentage of the budget is provided by each individual type of source. Finally, they had to estimate how long the indicated sources of income would remain available for the entrepreneurship education program.

4.2.3 Self-generating activities

The third indicator measures the ability of HEIs to generate income of their own or attract external funding. Self-generating activities like consultancy, admission fees for workshops etc. are often based on the entrepreneurship expertise of the HEI. It would be valued as positive if certain activities of the entrepreneurship education program were to generate income, which can be allocated to the further development of the entrepreneurship education program (NIRAS et al., 2008). The centres of entrepreneurship play an important role in generating income (Menzies, 1998). According to NIRAS et al. (2008), the more an HEI is able to generate income of its own, the more entrepreneurship becomes a permanent element of the education institute. Furthermore, self-generating activities reduce dependence on external funding.

Operationalization of self-generating activities

The ability of HEIs to generate income of their own is measured by the following question: what income generating activities related to entrepreneurship does your institution have? Various options were offered: fees for seminars/workshops, advisory services, donations from people, publication revenues and other ways. The assumption is that the more different kinds of income an HEI is able to generate, the more sustainable the entrepreneurship education program is.

Table II Questionnaire questions Resources

Allocation

1. *How was the support of the entrepreneurship education program with funding in the previous academic year?*
2. *Was there enough budget available which stimulated new entrepreneurship education related initiatives, in the previous academic year?*

Type of sources

1. What are the sources of the budget for entrepreneurship?
2. How long are the previously indicated sources with certainty available for the entrepreneurship budget?

Self-generated income

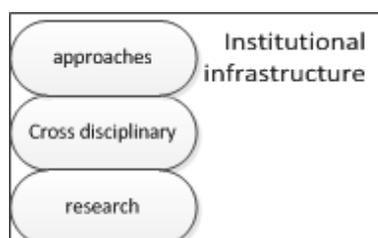
1. What activities which generate income does your institution have?
-

4.3 Institutional infrastructure:

The framework conditions strategy and resources are important because they both affect the other framework conditions. If a HEI has a good strategy and dedicated resources to develop and maintain an entrepreneurship education program, this strategy has to be translated into good institutional infrastructures, education, outreach and development of the program. The framework condition institutional infrastructure is covered in this section.

The framework condition *institutional infrastructure* is adapted from studies by Hoffman et al. (2004) and NIRAS et al. (2008). Pittaway and Cope (2007) state that institutional infrastructure is one of the factors which determine the success of implementing entrepreneurship education. Institutional infrastructure indirectly and directly affects entrepreneurship education (Poole & Robertson, 2003). There are three indicators which measure this framework condition: the availability of physical structures (approaches), the presence of entrepreneurship research and the level of cross-disciplinary structures. Entrepreneurship research is part of this framework condition because it concerns primarily entrepreneurship as an academic research field explored by professionals, instead of activities designed to influence the entrepreneurial mind-set of students. Research in the field of entrepreneurship and executed by students (e.g. PhD, or the degrees Master of Science and Bachelor of Science), which does have a direct influence on their entrepreneurial mind-set, is included in the framework condition education.

Figure 3 Institutional Infrastructure indices



4.3.1 Approaches

The first indicator involves the kind of facilities which are offered. This indicator is also used in the report for the European Commission (NIRAS et al., 2008). However, their report lacks the question whether there is a meeting place for entrepreneurship students. Having a meeting place leads to the exchange and discussion of ideas and therefore positively

influences the performance of the entrepreneurship education program (Hoffmann et al., 2004). The facilities which are covered by the indicator approaches are: entrepreneurship chair group, entrepreneurship centre, incubator facilities, technology transfer offices and a meeting place for entrepreneurship students.

Entrepreneurship is not widely acknowledged as an academic discipline by researchers (Finkle & Deeds, 2001). Having an entrepreneurship academic department/chair group implies that entrepreneurship as a discipline is accepted. Therefore the assumption is that having an entrepreneurship chair group positively affects performance of the entrepreneurship education program.

The presence of a centre of entrepreneurship is important because it affects entrepreneurship education in several ways (Menzies, 1998). Many entrepreneurship centres not only stimulate entrepreneurship within the institution but also work on outreach to nurture entrepreneurship in a broader community. This in turn positively affects the knowledge transfer of an education institute (Menzies, 1998). Entrepreneurship centres are set up mainly for five reasons: to enhance entrepreneurial knowledge development and research, to foster an entrepreneurial culture for students, to further the interaction between faculty and community, to play a role as liaison for academic, private and government initiatives, to provide a focal point for enhancing the reputation of the faculty or university, and to build and foster outreach (Menzies, 1998).

Incubator facilities, which are one of the physical structures, support entrepreneurship education programs because they enable start-up firms to rent space on easy terms (Klofsten, 2000). Moreover, incubators enable students to start a company while studying (Rasmussen & Sørheim, 2006). These facilities are important, because entrepreneurship education programs should support the starting up of small firms besides educating students (Klofsten, 2000).

Technology transfer offices also support entrepreneurship education programs, especially the productivity of technology transfer (Siegel & Phan, 2004). University technology transfer involves: licensing agreements, research joint-ventures, university-based start-ups etcetera.

Technology transfer offices are important factors (besides capable university scientists, university administrators and entrepreneurs) that can improve the efficiency of the commercial activities of a university. It can lead to increased financial gains. Technology transfer is one of the resources needed by entrepreneurship education (Souitaris et al., 2007), therefore it should be included in high performing entrepreneurship education programs.

The last facility which measures the indicator facilities is the presence of a meeting room for entrepreneurship students. According to Hoffmann et al. (2004), this facility is important for stimulating the discussion and exchange of ideas. The assumption is that meeting rooms will stimulate the entrepreneurial mind-set of students and therefore positively affect the performance of entrepreneurship education programs.

Operationalization of the indicator approaches

Respondents were asked to indicate whether they have an entrepreneurship chair group or not. Because all benchmark participants needed to have a centre of entrepreneurship to be included, we asked whether this centre is internal or external to the institution. The other three questions which could be answered with yes or no are the following: Does your institution provide incubator facilities? Does your institution have a technology transfer office? Does your institution have a physical place where entrepreneurship students can meet (e.g. reading room, café etcetera) to exchange ideas and knowledge?

4.3.2 Research

Besides having physical facilities to support entrepreneurship education, it is also important to have support from professors and other researchers of the HEI. They can embed entrepreneurship in the HEI through their research (NIRAS et al., 2008). Even though entrepreneurship is not (yet) acknowledged as an academic discipline by researchers (Finkle & Deeds, 2001), it is important to conduct research in order to improve teachers' and students' knowledge on entrepreneurship (Wilson, 2008). According to Wilson (2008), HEIs should employ more professors for entrepreneurship education in order to sustain entrepreneurship at the HEI in general and to invest more time in course development and entrepreneurship research in particular. Research into entrepreneurship still receives little

attention. It also enhances entrepreneurship at the faculty and fosters the reputation and outreach of the HEI.

Operationalization of research

The indicator *research* is measured by the questions: how many peer-reviewed studies on entrepreneurship were published in the previous academic year? The second question is: how many entrepreneurship chairs/professorships (in measurement of full time employees) did the institution have in the previous academic year?

4.3.3 Cross-disciplinary structures

One of the most important elements in entrepreneurship education is the availability of cross-disciplinary structures of entrepreneurship within the institution (Potter, 2008). Entrepreneurship education should not be limited to the fields of management or business studies, but should be developed by a variety of scientific fields (Sociology, economy, management etc.). As Martinez et al. (2010, p.11) says: “*Entrepreneurship education is inherently multidisciplinary in nature*”. The advantage of multidisciplinary structures is that the more disciplines are involved in the development and support of the entrepreneurship education program, the more it becomes embedded in different chair groups of the institution. Furthermore, students learn to think beyond their traditional academic discipline and to appreciate potential contributions of other disciplines (Wiese & Sherman, 2011). The process of minimising institutional barriers to realise cross-fertilisation provides creative and innovative learning. Cross-functional learning can result from interdisciplinary teams working on projects in entrepreneurship education (Hynes, 1996; Potter, 2008), and can instil entrepreneurial thinking in all disciplines (Wilson, 2008).

In order to measure cross-disciplinary structures, it is interesting to know how many teachers from different disciplines facilitate courses together. Besides this it is important to know whether the students are multidisciplinary as well (Potter, 2008). Having a mix of students with different backgrounds shows the importance of entrepreneurship in different fields. Besides these two sub-indices – multi-disciplinarity of teachers and students - knowledge has to be gained regarding whether entrepreneurship courses are being developed through the cooperation of different chair groups.

Operationalization of cross-disciplinary structures

To measure the level of cross-disciplinary structures three questions are asked. Question one is: on average, how many scientific disciplines are represented by the lecturers that facilitate entrepreneurship courses (e.g. sociology, economy, management, etc.)? The second question is: on average, how many different study programs are represented by students in the entrepreneurship courses? The last question concerns the number of courses in which entrepreneurship is part of the content and which were developed through the cooperation of multiple chair groups in the previous year.

Table III Questionnaire questions Institutional Infrastructure

Approaches

1. Does your institution have an entrepreneurship chair group?
2. Is the Centre of entrepreneurship external or is it embedded in the university?
3. Does your institution provide incubator facilities?
4. *Does your institution have a technology transfer office?*
5. *Does your institution have a physical place where entrepreneurship students can meet (e.g. reading room, café etcetera) to exchange ideas and knowledge?*

Research

1. *How many peer-reviewed studies on entrepreneurship were published in the previous academic year?*
2. How many entrepreneurship chairs/professorships (in FTE) did the institution have in the previous academic year?

Cross-disciplinary structures

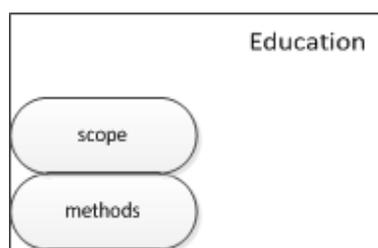
1. On average, how many scientific disciplines are represented by the lecturers that facilitate entrepreneurship courses (e.g. sociology, economy, management, etc.)?
2. On average, how many different study programs are represented by students in the entrepreneurship courses?
3. How many courses in which entrepreneurship is part of the content were developed by cooperation of multiple chair groups in the previous year?

4.4 Education

The framework condition *education* concerns all educational activities of the entrepreneurship education program. It is the centre of the entrepreneurship education program because it is affected by the other framework conditions and it has a large effect on the performance of the entrepreneurship education program. The framework condition education is developed on the basis of the report of the European Commission (NIRAS et al., 2008) and the benchmark research of Hoffman et al. (2004).

The larger the number of courses and degrees offered in entrepreneurship education, the more students can be educated to develop an entrepreneurial mind-set. This is called the education scope. But besides the content of the courses and its accessibility to students, the didactic methods are important for students to acquire an entrepreneurial mind-set (Lans & Gulikers, 2010). This is called the education set-up. Traditional teaching methods are not applicable to entrepreneurship education (Potter, 2008). Therefore, an effective entrepreneurship education program provides a diversity of courses and degrees combined with high quality teaching methods. The framework condition education is therefore measured by the two indicators: scope and set-up.

Figure 4 Education indices



4.4.1 Education scope

The indicator education scope covers the supply of courses and the availability of degrees in entrepreneurship. The content of this indicator is obtained from the study by Hoffmann et al. (2004). Contrary to the Hoffman report however, research is not part of the framework condition education, but part of the framework condition institutional infrastructure (cf. §4.3). Only research done by students (e.g. PhD, or the degrees Master of Science and Bachelor of Science) is included in education scope. The presence of a PhD program in entrepreneurship is beneficial because it provides pure entrepreneurship to the faculty or

chair group (Kuratko, 2005). It increases research in entrepreneurship and stimulates the development of entrepreneurship education at the HEI. Moreover, it stimulates more quality articles and makes research in entrepreneurship more accepted as an academic discipline.

The number of courses offered by a HEI is also an important indicator of the demand for entrepreneurship education. If there are many courses offered, and if these courses have many ECTS/semester credits and large enrolments, then a lot of students will potentially develop an entrepreneurial mind-set. These three aspects enable calculation of the so-called entrepreneurial student volume: the average number of attendants per course X the number of courses X the average number of credits per course. By comparing this number with the total student enrolment, the relative importance of entrepreneurship education for the HEI can be measured.

Another aspect of entrepreneurship education to consider is the availability of executive education and/or management training. Executive entrepreneurship education stimulates knowledge transfer and is especially important for entrepreneurs who are facing a rapidly changing business climate. Every phase an entrepreneur goes through has different challenges and therefore requires different skills (Hoffmann et al., 2004). Executive education can be a means to develop these skills.

Operationalization of education scope

The indicator education scope is measured by five questions. The first question measures the forms of entrepreneurship education offered by the institution: individual courses, B.Sc. minor, Full Bachelor degree, M.Sc. minor, M.Sc. major, Full Master degree and PhD.

The second question is divided into three parts which together measure the student volume.

1) What was the average number of attendants per entrepreneurship course in the previous academic year? 2) What is the average number of ECTS/ semester credits for entrepreneurship courses? 3) How many entrepreneurship courses were given in the previous academic year? The total number of students at the HEI is obtained from the annual report of the HEI.

The third question measures the number of executive education attendants by asking how many people attend the executive education/management training offered, if available.

4.4.2 Education set-up

The set-up of this indicator is inspired by NIRAS et al. (2008) and Hoffmann et al. (2004). It focuses on the content of the courses, the applied type of pedagogy and whether the applied type of pedagogy enhances the development of an entrepreneurial mind-set. According to a systematic literature review done by Pittaway and Cope (2007), most researchers agree that the type of pedagogy is of utmost importance in entrepreneurship education.

The type of pedagogy in entrepreneurship education varies between learning *about* entrepreneurship and learning *for* entrepreneurship (Gibb, 2002; Honig 2004; Menzies, 1998; Kirby, 2004). Most authors agree that 'learning by doing' - which is called experiential learning - is more effective than traditional learning for entrepreneurship (NIRAS et al., 2008; Walter & Dohse, 2009, Dana, 1987). The presence of experimental teaching (Hoffman et al., 2004) promotes innovative behaviour, students' self-assessment and the development of an entrepreneurial spirit (Blenker et al., 2006). Creative and reflexive processes are further encouraged by teaching methods where students are confronted with themselves through reflection methods (NIRAS et al., 2008). To conclude, entrepreneurship education is more successful if it employs an experiential hands-on approach (Aronsson & Birch, 2004; Izquierdo, 2008; Lepoutre et al., 2010; Solomon et al., 2002).

Another aspect of experiential learning is the participation of students in daily practices of entrepreneurship. Pittaway and Cope (2007) state that entrepreneurship education can have an impact on awareness and perceptions of students when it includes 'real-life' learning and experiential learning. Intensive experiential learning increases self-perceived feasibility, intentions, desirability and propensity to start a venture. It also enhances creativity and positive attitudes towards entrepreneurship (Lepoutre et al., 2010).

Contacts between students and entrepreneurs contribute directly as well as indirectly to the success of entrepreneurship education (Brindley & Ritchie, 2000). An example of a direct relation is when entrepreneurs act as guest lecturers in the education program. Attending

guest lectures is one of the ways in which students can be confronted with real-life entrepreneurship problems.

Experiential learning is also enhanced by internships or similar placements (Kirby, 1998; Westhead et al., 2000) and projects with small firms (Hollingsworth et al., 1974; Sonfield, 1981; Holoviak and Ackelsberg, 1983; Chan and Anderson, 1994; Brindley and Ritchie, 2000). It can raise student awareness of entrepreneurship (Ridder & van der Sijde, 2003) and enables experiential learning (Carson, 1985; Chan and Anderson, 1994; Wani et al., 2004). On the other hand, students are useful resources for local firms (Hollingsworth et al., 1974; Sonfield, 1981; Long & Ohtani, 1988).

Operationalization of education set-up

The first question measures whether the entrepreneurship education at the institution is experimental. This is done by asking the respondents to indicate on a semantic differential line what the approach to teaching methods in entrepreneurship courses is. The semantic differential line ranges from only theoretical/traditional to experimental, which means that the focus is only on learning and reflexive processes.

To measure the presence of guest lecturers, respondents are asked what percentage of all lectures in entrepreneurship courses are given by guest speakers.

The extent of students' contacts with companies and the degree in which students are familiar with entrepreneurial problems are measured by two more questions: what was the number of ECTS/semester credits for internships or similar practical experiences which are part of the entrepreneurship education program? And how often were entrepreneurship students in contact with a private company in the previous academic year?

Table IV Questionnaire questions Institutional Education

Education scope

1. Please indicate which form(s) of education regarding entrepreneurship is/are offered by your institution?
- 2.1 What is the average number of attendants per entrepreneurship course in the previous academic year?
- 2.2 What is the average number of ECTS/ semester credits for entrepreneurship courses?
- 2.3 How many entrepreneurship courses were given in the previous academic year?
3. How many people attend the executive education/management training?

Education set-up

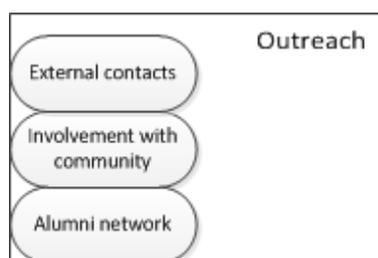
1. Please indicate whether the approach of teaching methods in entrepreneurship courses is theoretical/traditional or experimental (where the focus is on learning and reflexive processes, which involves action-based learning)?
 2. To what extent is the personality of students developed by exposing them to real-life entrepreneurship problems. (Development not only of theoretical skills but also personal and practical entrepreneurship skills).
 3. On average, what percentage of all lectures in entrepreneurship courses is given by guest speakers?
 4. What is the number of ECTS/semester credits for internships or similar practical experiences which are part of the entrepreneurship education programs?
 5. On average, how many times were entrepreneurship students in contact with a private company in the previous academic year
-

4.5 Outreach

Entrepreneurial universities foster interaction and networking with stakeholders in the community (Formica, 2002). *“The involvement of the institutions in the wider environment”* is called outreach (NIRAS et al., 2008, p. 45). Outreach activities are important because they offer students the opportunity to gain practical experience with entrepreneurship and, ultimately, to develop an entrepreneurial mind-set. Outreach activities are especially important for university students, because otherwise they might become more isolated from the business world (NIRAS et al., 2008).

The framework condition *outreach* is measured by three indicators: The links between a HEI and various external stakeholders is an indicator of the number and variety of opportunities for practical experience offered to students. Alumni can be seen as important stakeholders beneficial to current students in general and the entrepreneurship education program in particular. In this research, the availability of an established alumni network is a measure for the framework condition outreach. Finally, community engagement by helping the society and providing knowledge is an indicator of the knowledge transfer of the HEI.

Figure 5 Outreach indices



4.5.1 External contacts

An entrepreneurship education program has different linkages with stakeholders, also called external contacts. Hynes and Richardson (2007) state the importance of the stakeholder network in the following way: *“The added value of the linkages lies in the ability to provide technical support, business supports and skills development for both the student and the owner/manager”* (Hynes & Richardson, 2007; 736). According to Matlay (2011), there are three types of stakeholders which are subsequently called the primary, secondary and tertiary stakeholders. The primary stakeholders are students and staff which are directly

involved in entrepreneurship education (Matlay, 2011). Local entrepreneurs and future employers are secondary stakeholders and often influence entrepreneurship in a similar way as alumni do. They are involved in entrepreneurship education activities and try to support the education of future high quality entrepreneurs which are in turn beneficial to the economy (Matlay, 2011). Tertiary stakeholders are representatives of government, industry etcetera. Government agents affect entrepreneurship education through policy and regulations (Matlay, 2011). This means they have influence on entrepreneurship education by education accreditation rules, but also by informing students about policies and regulations regarding entrepreneurship.

External stakeholders are beneficial to students to acquire an entrepreneurial mind-set in various ways (NIRAS et al., 2008; Pittaway & Cope, 2007). Rasmussen and Sørheim (2006) give the following reasons for having links with experienced business people and entrepreneurs: The voluntary support of entrepreneurs increases the quality of the entrepreneurship education program without using financial resources allocated to the education. The knowledge of business people and entrepreneurs keeps the education up to date and relevant. Entrepreneurs can act as role models and have a network which might also be of use to students. Making use of role models can enhance people's ability to recognize, assess and shape opportunities (Fiet, 2001 in Martinez et al., 2010). So all in all, providing network events can create contacts for students and is assumed to be a necessary resource for proper entrepreneurship education (Souitaris et al., 2007).

Operationalization of links with external stakeholders

The links with external stakeholders is measured by the question: What links does your institution have with external stakeholders of your entrepreneurship education program and do they contribute to the entrepreneurship education program? The respondents could either simply indicate the contacts, or also whether they contribute to the program. Contribution was split into financial or other means of contributing to the program.

The HEIs received points for every contact they have with each stakeholder and they received two points if these stakeholders also contribute to the program. Subsequently the

total number of points was calculated. These total numbers of points were translated into a five point parametric scale with 1= the lowest total points and 5= the highest total points.

The respondents were required to indicate whether the HEIs students never (score =1), now and then (score= 2), regularly (score= 3), often (score= 4) or continuously (score= 5) participated in entrepreneurship events outside the institution.

4.5.2 Community engagement

Community engagement and knowledge transfer to society is vital because it aligns the entrepreneurship education program with the dynamics of the environment around the institution. Therefore connecting the entrepreneurship education with the community can be beneficial. This connection points in two directions: facilities are provided to the environment and students are provided with contacts enabling them to enter that environment (NIRAS et al., 2008).

Rasmussen and Sørheim (2006) have pointed out that the offering of mentoring and/or vocational guidance is a necessity for students starting a new business while studying. This not only applies to new ventures but also to firms in later stages of development. Mentor schemes, i.e. entrepreneurship professionals helping entrepreneurship students with their (future) start-ups, stimulate entrepreneurship and new ventures by students (Hoffmann et al., 2004; Rasmussen and Sørheim, 2006) and therefore included in this research.

Etzkowitz (2003) indicates the importance of community engagement to the commercialization of research and technology by education institutes. University and industry based innovation should influence, stimulate and fertilize each other (Etzkowitz, 2003). The commercialization of research is covered in this study by the share of third flow of funding (e.g. through contract research) and the number of patents. Patents give for-profit firms a signal that the institution is serious in furthering commercialization and recognizes the needs of firms because the institution invested time, effort and resources in obtaining the patent. Therefore firms can become more interested in obtaining the technology created by the university (Bell & McNamara, 1991 in Powers & McDougall, 2004). Research by Shane (2001) shows that universities with greater domestic and international patent class coverage

and patent citations were highly predictive for the development of technology via formation of start-ups.

However, it is not only the institution which is an essential actor in community engagement. The role of students in the network is important as well because interaction between students and the community can lead to the transfer of knowledge and ultimately contribute to society (NIRAS et al., 2008).

Operationalization of the indicator community engagement

To measure the indicator *community engagement* HEIs were asked to give an estimation of the number of people other than students making use of vocational guidance and/or mentor schemes affiliated to the entrepreneurial activities. This question is an open question and thus not measured on a five point scale.

The commercialization of research is measured by the share of the third flow of funding (e.g. contract research) in the total budget of the HEI. The respondents were also asked to give an estimate of the average number of patents. The first question is validated by calculating the third flow of funding with data from the annual financial plan of the institute.

The patents are validated by assessing data of patents from the database of the World Intellectual Property Organization. This is a specialized agency of the United Nations which promotes the protection of intellectual property.

Subsequently the institution's contribution to the wider community is evaluated. The wider community involves entrepreneurs, local schools, people outside of the education institute, and companies. The wider community can be national or international. These aspects are measured by five questions. Respondents had to answer with either yes or no whether the institution: 1. has an advice centre for entrepreneurs. 2. Supports entrepreneurial activities in schools. 3. Hosts entrepreneurial events open to people other than students or academic staff. 4. Provides training (e.g. boot camp) for entrepreneurs and companies. 5. Supports entrepreneurship not only on a local scale but also on an international scale.

4.5.3 Alumni

Alumni are important for an entrepreneurship education program because they have practical experience of the field (NIRAS et al., 2008; Hoffman et al. 2004). Alumni are often part of the business world and can therefore provide good links between the entrepreneurship program and the wider community. Furthermore, alumni can be useful in more ways than other stakeholders. Monitoring alumni can help to evaluate the impact of the education program and, on the basis of these evaluations, to improve the program. Alumni can also play an important role in the development of entrepreneurial activities of the institution (NIRAS et al., 2008; Standish-Kuon & Price, 2002), for instance as guest lecturers, as assessors in business plans competitions and by providing placements for students (Matlay, 2011). Because the presence of an alumni network is beneficial to the program (Standish-Kuon & Price, 2002), it is the third indicator of the framework condition outreach.

Operationalization of the indicator alumni.

The education institute had to indicate whether they keep track of the alumni and if so, why? The following options were given: keeping contact, keeping track of growth and number of ventures started by graduates, doing research with alumni as respondents, and other reasons. The second question is: how many alumni are involved in the entrepreneurship education program?

The reasons why the HEI keeps track of alumni are five in total. Therefore the scores can range from 0 to 5.

The question how many alumni are involved in the program is an open question. The answers were translated into a five point parametric scale where 1= the lowest number of alumni involved in the program and 5= the highest number of alumni involved in the program.

Table V Questionnaire questions Outreach

Links with external stakeholders

1. What links does your institution have with the following external stakeholders of your entrepreneurship education program and do they contribute to the entrepreneurship education program?
2. *How many entrepreneurship students at our institution participate in Entrepreneurship events/projects or business plan competitions outside our institution?*

Community engagement

1. Please give an estimation of the number of people other than students making use of vocational guidance and/or mentor schemes affiliated to the entrepreneurial activities?
2. What is the percentage share of the third flow of funding (e.g. contract research) of the total budget of the university?
3. Please give an estimation of the average number of patents.
4. Please indicate whether:
 - 4.1 The institution has an advice centre for entrepreneurs
 - 4.2 The institution supports entrepreneurial activities in schools
 - 4.3 The institution hosts entrepreneurial events open to people other than students or academic staff
 - 4.4 The institution provides training (e.g. boot camp) for entrepreneurs and companies
 - 4.5 The institution supports entrepreneurship not only on a local scale but also on an international scale

Alumni

1. The university keeps track of alumni for what reasons?
 2. *How many alumni are involved in the entrepreneurship education program?*
-

4.6 Development

The proverbial truth that stagnation means decline also holds for entrepreneurship education programs (Pittaway & Cope, 2007). Entrepreneurship education should adapt to the ever changing needs and wants of the users of the education program and the stakeholders involved in the program. By continuously trying to improve the program, it can satisfy the actors which are involved (NIRAS et al., 2008).

This framework condition refers to the effort to effectuate continuous improvement of entrepreneurship at the HEI. The framework condition *development* is measured by three indicators which are subsequently: user-driven improvement, evaluation of goals, and investment in human resources. These indicators were obtained from NIRAS et al. (2008) and Hoffmann et al. (2004).

Figure 6 Development indices



4.6.1 User-driven improvement

The indicator *user-driven improvement* measures to what extent HEIs take the wishes of students, alumni and other stakeholders regarding the entrepreneurship education program into account. Students are the main focus of the entrepreneurship education program and are therefore seen as the primary stakeholders of the program (Matlay, 2011). Users are able to evaluate the performance of the program and this information can be helpful to improve the education program. Whitely (1995) also indicates the importance of self-evaluation to improve the education program in the long run. This involves the teachers' evaluation of their own courses and the pedagogic methods applied and how they can improve it.

Operationalization of the indicator user-driven improvement

This indicator is measured by asking respondents what indicators are used to evaluate the entrepreneurship courses. The respondents were able to choose from the following methods: self-evaluation by the lecturer, peer reviews, evaluation by students, executive staff and/or other.

4.6.2 Evaluation of goals

There are also other stakeholders involved in the evaluation and development of the education program. The board wants to evaluate whether the goals of the entrepreneurship education program are reached, and also the satisfaction of employees and other stakeholders with regard to the education program is important for evaluation and development. The evaluations by these different stakeholders can influence the improvement of the program directly or indirectly (Rossi et al., 2004).

Operationalization of the indicator evaluation of goals

The respondents had to indicate how often (formal and informal) the education institute evaluated the following aspects of the entrepreneurship education program: the effect of entrepreneurship education on students' careers, and examination whether stakeholders' needs are met.

4.6.3 Investment in human resources

One crucial area of development is the development of the human resources involved in entrepreneurship education. There are several reasons why it is important to invest in the teachers of the entrepreneurship education program.

Because of the growth of entrepreneurship education programs all over Europe, investments are necessary to increase the number of professors in entrepreneurship (Wilson, 2008). Entrepreneurship education is different from regular education and therefore requires lecturers and guest speakers who have the skills to be entrepreneurship teachers. Investment in human resources is needed, because the Introduction of experiential approaches in training for teachers can take as much effort as developing a curriculum (WEF, 2009). Sorgman and Parkison (2008) state that teachers starting out in entrepreneurship education

are often unprepared for the shift towards the more experiential learning which is needed (cf. §4.4.2).

Investments in human resources are also needed to create ambitious and enthusiastic entrepreneurial lecturers and other employees of entrepreneurship education. Having sufficient resources to encourage lecturers is important for improving or sustaining these previously mentioned characteristics of employees. The lecturers should be trained and encouraged to attend training (Wilson, 2008). This indicator is called the *human resources development and management*.

Operationalization of the indicator investment in human resources

In the first question, respondents are asked to indicate through what means the HEI encourages lecturers to take initiative related to entrepreneurship education. The following options were offered: less teaching, higher salary, grants/fellowships, awards, and/or other.

To measure how the institute expressed recognition for achievements of academic staff, the following question was asked: does our institution provide recognition for the achievements of academic staff members which are active in entrepreneurship education? The following answers were allowed: awards, professorial status, monetary awards, fellowships, other or none. More options were possible.

Besides asking what is offered and possible, it is also interesting to know what effect this has. Therefore, the question is asked what percentage of teachers of entrepreneurship courses engage in education training/coaching aimed at improving their entrepreneurship education skills? This is an open question which resulted in a ratio variable.

Table VI Questionnaire questions Development

User-driven improvement

1. Please indicate the methods used by your institution to evaluate the entrepreneurship courses

Evaluation

1. How frequently is the effect of the entrepreneurship education on the student's career being monitored?
2. How frequently does examination of the needs of stakeholders (employers, business angels, technology brokers and others) take place?
3. How frequently does the institution make use of a procedure for following up on its entrepreneurship goals and strategies?

Human resources development and management

1. The institution encourages lecturers by means of which incentives to take entrepreneurship education related initiatives?
 2. How does your institution provide recognition for the achievements of academic staff members which are active in entrepreneurship education?
 3. What percentage of teachers of entrepreneurship courses engage in education training/coaching aimed at improving their entrepreneurship education skills?
-

5. Results

In this section the performance of the higher education institutes is presented. The results of the HEIs on the three performance indicators are all individually presented. Subsequently the scores on the framework conditions are covered. Before presenting the results it is important to discuss the reading instructions about how to interpret the results so as to prevent misunderstandings.

5.1 Reading instructions

The purpose of this study has already been explained earlier in the introduction. However, it is necessary to explain this again because it affects the reading instructions and the interpretation of the results. To prevent misinterpretation of the results it has to be clear that the purpose of this study is not to determine the best entrepreneurship education program. Instead, the purpose is: *to learn from the best practice education institutes that can serve as the main role models and provide inspiration for improvement*. Therefore determining these best practices is a necessity to achieve improvement. The assumption is that the HEIs will be inspired by the initiatives carried out by the best practices in this benchmark study.

There are performance indicators developed by NIRAS et al. (2008), which are used in this report as well, to determine which higher education institutes can be considered as best practices among the participating institutes. Subsequently these best practices are used as role models. Therefore, the performance indicators can be seen as an index measurement to distinguish among programs in order to find points for improvement and factors of success.

The second important aspect is that the data is gathered from multiple sources. The sources used for analysis are the following: strategic plans, mission statements, surveys, annual financial plans and interviews. The use of multiple sources of information results in triangulation of research methods which supports the validity and reliability of this report. However, some questions in the survey and during the interview may be subject to biased answers. This report minimizes this tendency as much as possible by:

- having two interview respondents in order to verify answers
- using objective documents

- verifying data by contacting respondents when results seemed inconsistent

This benchmark study makes use of quantitative data and qualitative data. In order to compare entrepreneurship education programs, some qualitative data have to be quantified and are therefore translated into a five point scale measurement. Most of the qualitative data is presented by using quotes and figures. In order to calculate the final scores on the framework conditions, the qualitative data is translated into a five point scale. This should be kept in mind when interpreting the results.

5.2 Performance rankings

This paragraph covers the performance of the applied universities on the performance indicators. Therefore the focus here will subsequently be on the indicator entrepreneurial students through study, followed by knowledge transfer, and finally the indicator entrepreneurial students through practical experience. Definitions, explanations and operationalization of these indicators have been presented in the previous chapters.

The '*best practices*' are determined on the basis of these three performance indicators. Subsequently the best practices are used as role models for the lower performing higher education institutes. After presenting and elaborating on the performance of the entrepreneurship education programs, the framework conditions are presented. The relationships between the framework conditions and the performance are included in the analysis. The line of reasoning is that the higher the performance, the higher the mean score of all framework conditions. These framework conditions can be used as explanations or causes of the performance of the higher education institutes.

The third indicator, entrepreneurial students through education, is measured by the student volume of entrepreneurship education. The student volume is a measure of the total volume of entrepreneurship education followed by all students¹. Therefore multiplying the number of students per course by the number of courses gives an indication of the demand for entrepreneurship education. However, it is likely that larger universities have more entrepreneurship students in absolute numbers. Therefore dividing the number of students by the size of the university makes the numbers comparable. Besides the number of students it is important to know the size in ECTS of the courses. This varied considerably among the higher education institutes. Therefore multiplying the relative share of students attending entrepreneurship courses by the size of the courses gives a good insight in the total volume of attended entrepreneurship education.

Performance

The figure below shows the performance of the higher education institutes. This score is the average taken from the three indicators of the performance. The scores on the three

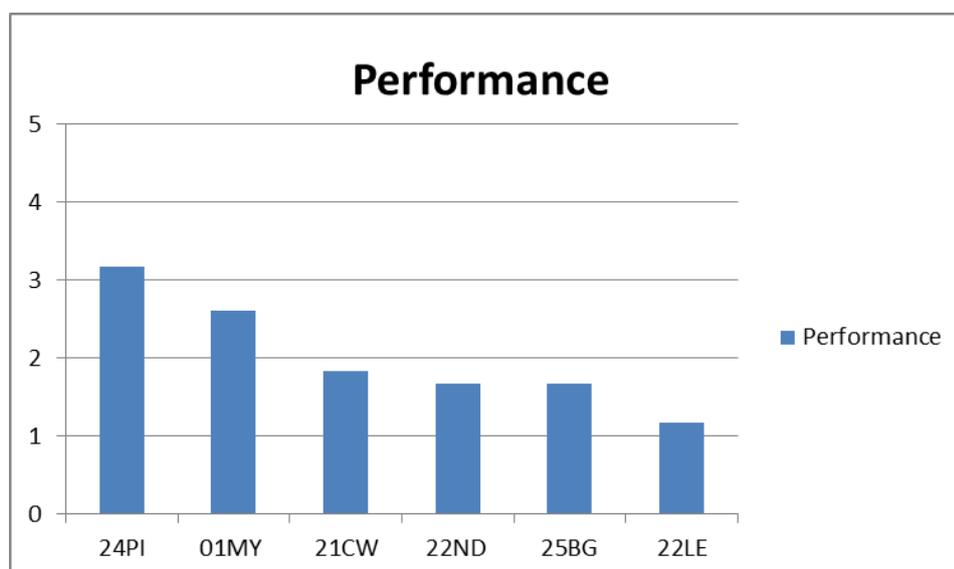
¹ The number of students attending entrepreneurship education is not the same as the number of individual students because some students attend 2 or more courses.

indicators are translated into scores on five point scales except the questions which were already measured on a five point scale. This enables a comparison of higher education institutes on these three performances. When a HEI has a score of 5 it means it is the best scoring higher education institute regarding that specific aspect, whereas the lowest scoring university receives a score of 1.

The 21PI is the best performing higher education institute followed by the schools for higher professional education. This is because one of the indicators of performance is knowledge transfer, which is measured by third flow of funding, number of peer-reviewed studies on entrepreneurship and number of patents over the last three years (WIPO database). These aspects have a much higher priority for a university compared with a school for higher professional education. Therefore it is not surprising that the 21PI turns out to be the best performing higher education institute.

This is the reason why the focus will be on 01MY and 21CW as well as higher education institutes which are used as best practices and therefore role models of entrepreneurship education programs. The indicators will be covered individually in the following three sections.

Figure 7 Overall scores Performance



5.2.1 Entrepreneurial students through education

The higher education institutes that have the most students in absolute numbers are 01MY, 21CW and the 25BG. However, when you look at the size of the entrepreneurship education

program compared to the total number of students at the HEI, 01MY and 21CW outperform the others. Both higher education institutes educate three times as many students as the number three education institute and even sixteen times as many as the education institute with the smallest share of entrepreneurship students. The relative number of students of the 25BG (which is home to 17,000 students) is not that high.

Assuming that every student can benefit from entrepreneurial skills, having as many students as possible enrolled in entrepreneurship courses is a good indicator of an effective entrepreneurship education program. Therefore, in relative numbers the 25BG does not show a good performance in developing entrepreneurial students.

When correcting for the size of the courses the 01MY is by far the best performing higher education institute, followed by 22ND and the 21CW. 22ND does not score well on the share of students are given 20 and 30 ECTS for the courses which is equivalent to half the number of hours of one study year.

Table VII Studentvolume

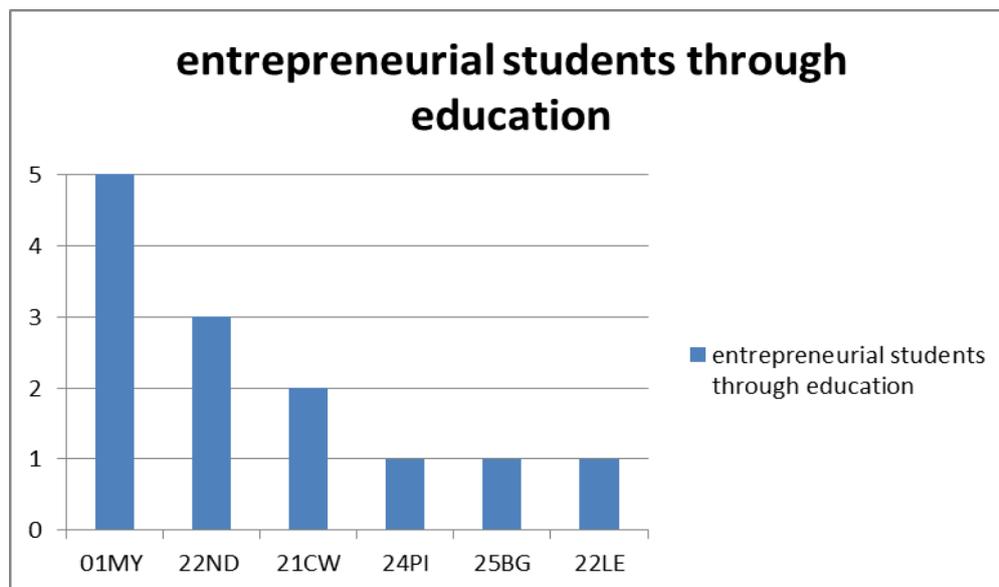
	(1) Absolute # of entrepreneurship students ²	(2) Size of education institute	(3) Relative share of students = (1)/(2)	Average ECTS per course	Student volume = (3) * ECTS per course
<i>01MY</i>	480	1400	0,3429	15	5.142857
<i>22ND</i>	200	1915	0,1044	25	2.610966
<i>21CW</i>	560	1700	0,3294	5	1.647059
<i>24LE</i>	160	2057	0,0778	7	0.544482
<i>21PI</i>	150	7298	0,0206	6	0.123321
<i>25BG</i>	400	17000	0,0235	5	0.117647

The score on student volume of the higher education institutes is translated into a score on a five point scale. 01MY provides entrepreneurship education to the largest share of students of all higher education institutes. The reason for this is that almost all students are reached because no fewer than 24 courses were offered in the previous academic year. These courses

² Average number of students per course times the number of courses offered

are equivalent to fifteen ECTS, which is one quarter of the total credits in an academic year. The large number of courses on offer which have many ECTS results in the largest share of entrepreneurial students through education. The 22ND has a high score because they offer modules of twenty and thirty ECTS in entrepreneurship. There are on average 100 students that attend these two modules. Therefore the high number of ECTS explains the high student volume. Figure 8 represents the scores obtained from translating the student volume into a discrete five point scale.

Figure 8 scores entrepreneurial students through education



5.2.2 Knowledge transfer

The indicator knowledge transfer is measured by the number of peer-reviewed studies, patents and the percentage of third flow of funding.

The number of patents applied for by the 21PI in the last three years is 41. The only school for higher professional education which applied for a patent in the last three years is the 25BG that applied for one patent. All other higher education institutes have none. Even though not all the patents in the world are part of the WIPO database, it does give a good representation of the extent to which the numbers of published patents of the universities differ from each other. Translating these absolute numbers into a discrete five point scale gives the 21PI the highest score and the other higher education institute the lowest.

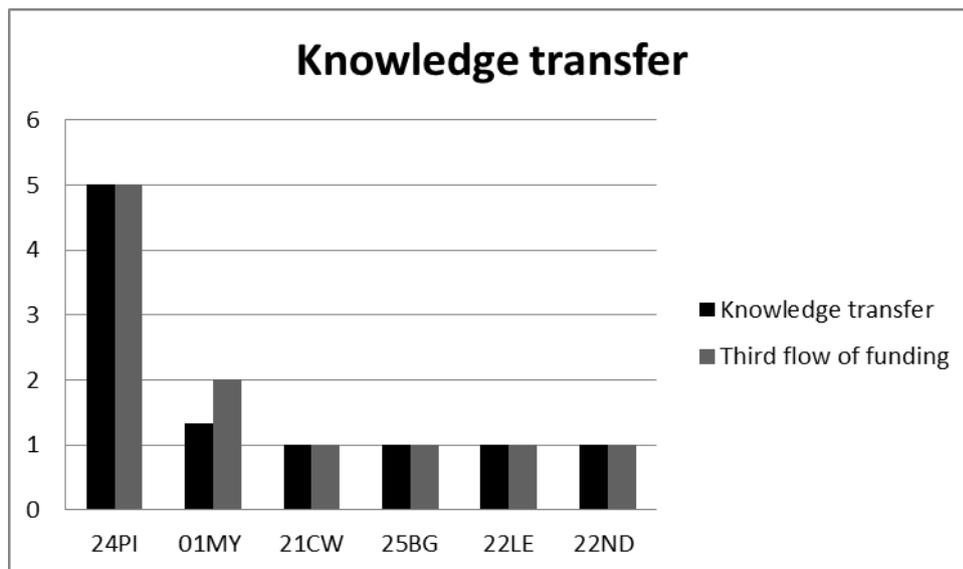
The number of peer-reviewed studies on entrepreneurship in the previous academic year is assessed by using the ISI database (through Webofscience).³ The 21PI is the only higher education institute that published peer-reviewed studies on entrepreneurship in the previous academic year. Seven articles were published in the ISI journals. The other higher education institutes did not publish any peer-reviewed study in these ISI journals. However, this is the result of differences in purpose and task between the two types of higher education institute. The 21PI is an academic university which focuses on research and is home to employees who need to publish a certain number of publications a year. The focus of the other higher education institutes is more on educating instead of research and the employees do not have certain requirements concerning published articles to meet. Therefore there is a big difference in scores on peer-reviewed studies.

The third flow of funding gives more information for comparison on knowledge transfer. The percentage of third flow of funding is calculated from the annual financial plans of the higher education institutes. The ranking based on percentage of third flow of funding shows that the 21PI scores the highest with 32% of the income obtained from third parties⁴. This number represents solely 21PI and does not include any input from the VHL institutions. The higher education institutes are close to each other with third flow of funds shares ranging between 19% and 20.6%. Therefore the total score on the indicator embeddedness is presented in the following figure.

³ The search terms were the following: *entrepr**, *new venture**, *new-venture**, *start-up**, *start-up**, *business** AND *develop**.

⁴ This percentage does not include the 24LE and 22ND higher education institutes. These are part of the overarching 21PI and Research Centre. The 21PI solely consists of the 21PI.

Figure 9 scores Knowledge Transfer



The first column on the left shows the overall score on the indicator knowledge transfer followed by third flow of funding. Patents and peer-reviewed studies are not included in the figure because they do not discriminate between schools for higher professional education and moreover do not form part of the tasks of a school for higher professional education, so inclusion of two more aspects will result in an indistinct figure.

5.2.3 Entrepreneurial students through practice

The third and last indicator that measures the performance of the higher education institutes involves students developing an entrepreneurial mind-set through practical experience.

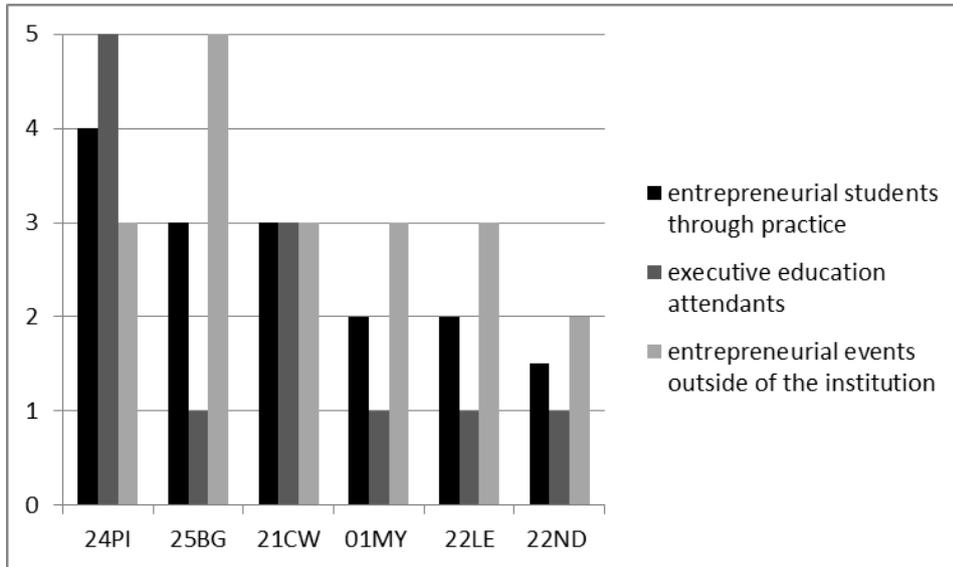
At the 25BG there are continuously students participating in entrepreneurship events outside of the education institute, such as business plan competitions. This might be the result of close connections with organizations such as those of young enterprises. In their strategic plan they also state that close collaboration with entrepreneurial organisations is a focus point. The other higher education institutes indicate that there are students participating in entrepreneurship events outside of their education institute on a regular basis, except 22ND which indicates that there are occasionally students undertaking these events.

The number of executive education attendants is the highest for the 21PI with 150 attendants. It is followed by the 21CW which is home to seventy executive education

attendants and 24LE which is home to twenty attendants. The other higher education institutes do not offer executive education.

This leads to the following ranking of scores on entrepreneurial students through practice:

Figure 10 Scores entrepreneurial students through practice



5.3 Strategy

This section will cover the results of the applied universities on the indicators which measure the framework condition strategy. Therefore this report focuses first on the indicator goals, followed by policies and finishing with the indicator embeddedness. Besides results which are presented with graphs and diagrams, this report also includes explanations for results given by schools for higher professional education. These explanations are presented by quotes from the interviews. At the end of the results of this section, the average overall scores by the education institutes on the framework condition is presented with a chart.

5.3.1 Goals

Mission statements

This indicator is measured by conducting a content analysis of *mission statements* and a content analysis of *strategic plans*. Other documents were not used for the content analysis.

The content analysis executed on the mission statements shows that there are major differences in the presence of entrepreneurship in mission statements between the higher education institutes. The 21PI and the applied universities 24LE and 22ND do not have any contents in their mission statement that can be associated with entrepreneurship or entrepreneurial behaviour. The 21PI focuses on breakthrough sciences and stimulating cooperation between specialised research institutes. The VHL education institutes follow their corporate social responsibility and prepare their students for a diverse international world. An example of an applied university that did integrate entrepreneurship in the mission statement is 21CW. The quotes in the mission statement showing the integration of entrepreneurship of this applied university are the following:

“We want to be an accessible knowledge centre of international significance for companies. We do it with and for the entrepreneurs at the moment and later.” [...] “No education without knowledge transfer, no knowledge transfer without education.” [...] “The school for higher professional education 21CW wants, from a market oriented and entrepreneurial approach, to be the leading education and expertise centre in South-Netherlands in the field of: nutrition, agri- and horticulture, space and green, nature and environment, and agribusiness” (Mission statement 21CW in Strak Plan, 2008:4 translated from Dutch).

In short, 21CW states that they want to work with and for current and future entrepreneurs. Furthermore, they state that knowledge transfer and education cannot be sustained without each other. They want to become the best centre of education and expertise by being market

oriented and entrepreneurial, which is different from the other schools for higher professional education. The 25BG wants to stimulate a critical, creative and open society through valorisation of their research (among other things). The education should be authentic, which should attract more entrepreneurial students. This is visible in the following quote (translated from Dutch) from their mission statement:

“In an authentic learning environment, modelled to reality, the dynamics and the challenges from the professional field, students obtain the necessary competencies and develop their talents. They are the managers of their own learning course”[...] “The obtained competencies and developed talents make the students more entrepreneurial and easily employable in the field of action”

The 01MY communicates its Christian identity and combines it with entrepreneurship in the following way:

“Life economists are aware of their stewardship. For them, social entrepreneurship is to be put first. They find sustainability a principle to actively pursue. Life economists are able to enjoy possessions, but at the same time realize that it is not the only thing life is about. They behave according to that. They put socially responsible entrepreneurship first and therefore hold the opinion that making profit is only justifiable if you can share profit as well.”

Strategic plans

The presence of entrepreneurship in strategic plans did not vary much between the schools for higher professional education. All these universities scored 3 or 4 at a five-point non-parametric scale. At all higher education institutes several aspects of entrepreneurship are identified in the strategic plans. The strategic plans showed that there can be a focus on:

- Entrepreneurship or entrepreneurial behaviour of staff
- Entrepreneurship or entrepreneurial behaviour of students
- The university as an entrepreneurial entity itself
- Knowledge valorisation and commercialization
- Development of entrepreneurship in the environment/network around the university

The 21CW and 25BG have the highest scores on the presence of entrepreneurship in their strategic plans. Examples of the centrality of entrepreneurship in strategic plans are presented in the following quotations.

The 21CW focuses on the importance of their knowledge transfer.

“The education and market activities of HAS KennisTransfer are constantly developed in close coherence. This balance seems of crucial importance. Financially, education and market activities are executed strictly separate, but the substantive development is meticulously tailored. Therefore we keep investing in HAS KennisTransfer as the link to the market, and by sustaining and extending our network of relationships.”

Besides knowledge transfer they also focus on education and the involvement of businesses.

“Education and development: by applying obtained knowledge and personal skills in an active work situation, students contribute to innovations in their field and business development.” [...] “inside out/ outside in: with and for companies.” [...] “Companies are more involved in the educational process.”

This should improve the interplay of education and market activities. Moreover, they want to expand the education of their special entrepreneurship program *Topklas(se) Ondernemen*. This is a special graduation variant which combines a Bachelor degree of applied sciences with starting your own company. This graduation variant is available to all studies at 21CW.

The 25BG aims at developing entrepreneurship in general society and tries to play a role in stimulating entrepreneurship by collaborating with other organisations. This involves examining what facilities are needed and how to provide these facilities. This becomes clear from a quote in the strategic plan of the 25BG:

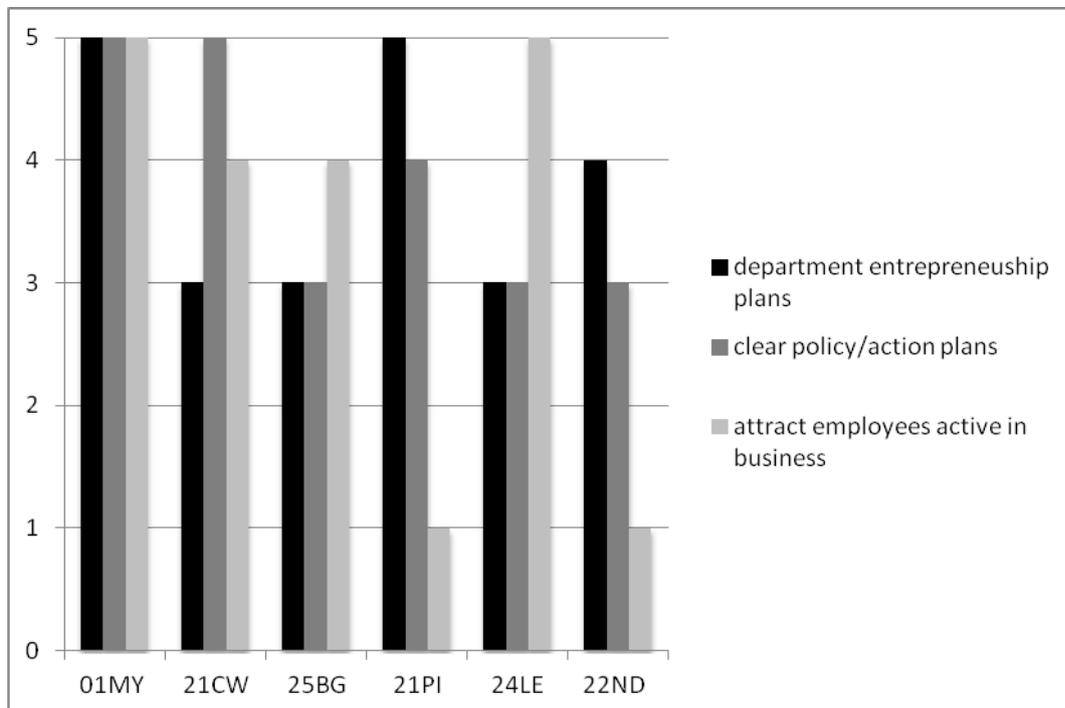
“Also entrepreneurship is a theme for which in multiple departments, extra efforts are delivered. This expresses itself, among other things, in the continuous interest of setting-up Small Business Projects (SBP’s) in cooperation with the [organisation for Young start-ups, RL]. The integration of such projects in the curriculum is a concretization of applying competency-based methods and strengthens the entrepreneurial capability of students.”[...] “Also by reconceiving the Centre for Entrepreneurship as an entity throughout the whole institution, 25BG created an institutional wide framework that functions as a laboratory for entrepreneurship. In that sense, the Centre for Entrepreneurship encourages the spirit of entrepreneurship.”

5.3.2 Policies

There are three aspects used which measure policies regarding entrepreneurship within the higher education institute. These three aspects are: the number of departments with their own entrepreneurship policy plans, the question whether the university has clear policy/action plans regarding entrepreneurship and whether the institute tries to attract potential employees active in business. The following diagram (Fig. 12) presents the scores of

every applied university separately. The higher education institutes are ranked from the highest score on the indicator policy to the lowest score on the indicator policy.

Figure 11 Scores indicator policies



Departments that have their own entrepreneurship plans

At the 21PI, the departments have their own entrepreneurship plans as a result of the decision by the board to decentralize the entrepreneurship policies. This implies that every department has its own plan of approach regarding entrepreneurship activities. The entrepreneurship plans for entrepreneurship activities (not education) are the responsibility of the director of all individual science departments.

The score of 21CW on departments with entrepreneurship action plans needs some clarification. Some departments are not very much involved in entrepreneurship even though they have their plans. Every department individually does not have an official paper with action plans. This implies that there are no clear departmental entrepreneurship plans for individual departments. However, at an overall level and unofficially, the boards of the departments have a policy to implement entrepreneurship in the departments.

Clearly written entrepreneurship education plans

The 21CW has an overarching entrepreneurship education plan to stimulate entrepreneurship among students from all disciplines. However, in some fields entrepreneurship does not come naturally to students (e.g. in food and technology sciences). For these departments, information and coaching are provided to enhance entrepreneurship for the benefit of the students. However this is still taking place at a modest level. Other studies (e.g. business management & agribusiness, and horticulture & agriculture) really have entrepreneurship at the centre of their actions.

The 21PI is similar to the 21CW, but the entrepreneurship education plans cover only the social sciences department.

Attracting employees from business

Regarding attracting employees from the business world the response of the 21CW was the following:

“We try to attract people which have experience in business. However, there are limitations towards keeping the combination of their own business and being involved in education. (translated from Dutch 21CW)”

The applied university of 24LE also scores well on attracting employees. This is due to a clear goal which is formulated in the following quote:

“The goal is really to attract those people [people with experience in the business world: RL] in reality it is very hard. We have a large amount of employees but when looking at new replacement they [the ones in charge of hiring employees: RL] focus on attracting people with business experience.”

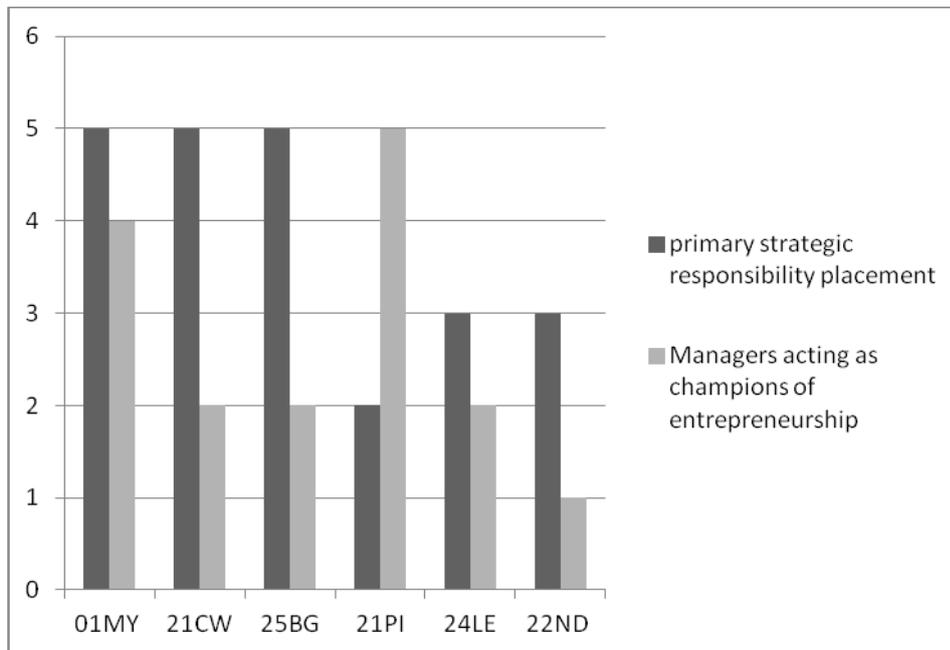
This is in contrast to the 22ND where there is no policy to attract employees active in business. The 21PI, which makes use of tenure track, focuses on research competencies and lecturers should have proven themselves in research. Tenure track is a career path for academic staff that, if followed successfully, will lead to a professorship. For this reason the focus in general is on the scientific qualities of the employees. Therefore the 21PI scores low on attracting employees active in business.

“Tenure track does not take into account one’s entrepreneurship competences.”

5.3.3 Embeddedness

This indicator is measured by the questions where the primary strategic responsibility of the HEI is situated and how many high-level managers are entrepreneurship champions. In the following diagram, the scores of the higher education institutes are presented.

Figure 12 scores indicator embeddedness



The 21PI is the best scoring university on the indicator embeddedness. This is due to the number of high-level managers who act as champions of entrepreneurship.

“There are between 7 and 10 high-level managers consisting of: director education research, directors of science groups, professors, executive directors, educational officer among others, management team.”

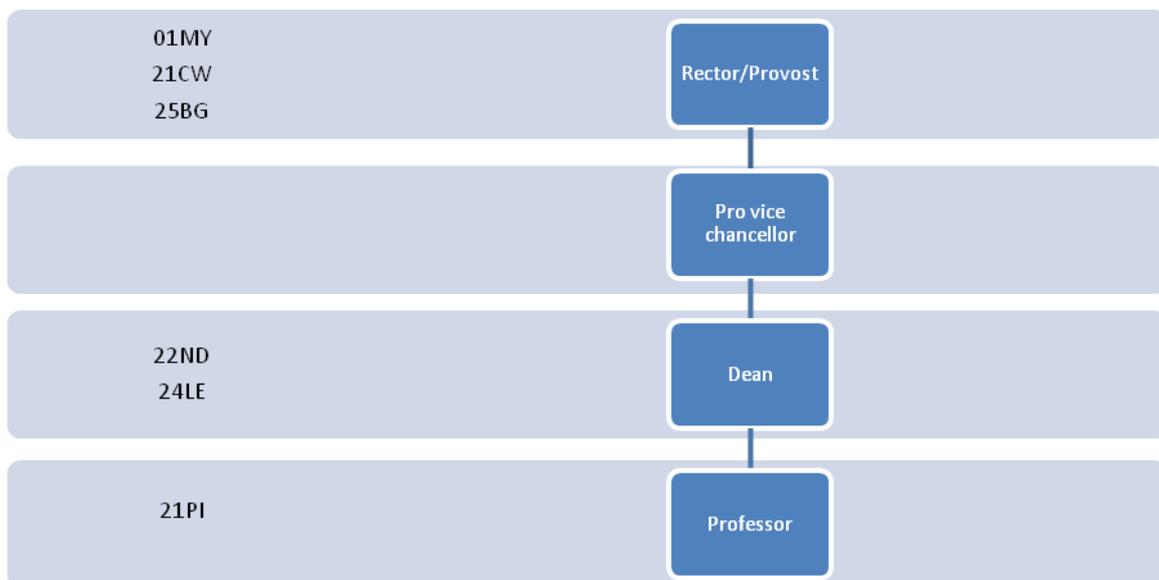
The reason for a lower score on the primary strategic responsibility for entrepreneurship education is that it is carried by the professor who is primarily strategically responsible, while at other HEIs higher ranking managers are primarily responsible.

The 01MY also scores well, as there are several high-level managers acting as champions for entrepreneurship. The major coordinator of the entrepreneurship education program acts as a champion for entrepreneurship. One professor of applied sciences is employed, who is highly involved in entrepreneurship and responsible for embedding entrepreneurship in all the departments. Furthermore, there is a project team of the ‘Groene Kennis Coöperatie’

dedicated to entrepreneurship that try to make entrepreneurship more embedded in the HEI. Also the Chamber of Commerce helps developing entrepreneurship at the 01MY.

The best practice schools for higher professional education have in common that the primary strategic responsibility for the entrepreneurship education program is situated at the higher management of the education institute, the rector or provost of the institute. The schools for higher professional education which have a less adequately performing entrepreneurship education program have departmental deans who hold the primary strategic responsibility. The education institute 21PI scores low regarding the primary strategic responsibility, which is there situated at the level of the professor. However, they counteract this by having many high-level managers acting as champions of entrepreneurship.

Figure 13 level of primary strategic responsibility for entrepreneurship education



The applied universities score lower on the number of high-level managers compared with the only university in this framework condition. The Dean (the director of the location of 22ND) has the primary strategic responsibility over the entrepreneurship education of the 22ND.

Figure 14 overall scores Strategy



5.4 Resources

This section will cover the results of the applied universities on the indicators that measure the framework condition resources. First we discuss the indicator allocation. This is followed by type of sources and we will finish with the indicator self-generated income. Besides results which are shown in graphs and diagrams, explanations of results given by universities will be reported as well. These explanations are presented as quotes from the interviews. At the end of the results of this section, the average overall scores by the education institutes on the framework condition are presented in a chart.

5.4.1 Allocation

The indicator allocation is measured by the questions whether the budget, allocated by the HEI, for the current entrepreneurship education program is sufficient and whether the budget for new entrepreneurship program initiatives is at a satisfactory level. There are only minor differences in scores regarding the sufficiency of the budget for the current entrepreneurship education program and new entrepreneurship education related initiatives.

Overall the 21PI scores best on the indicator allocation. It scores high on both questions. Although the entrepreneurship education program is not funded by the institution but by DAFNE, the budget for the current entrepreneurship education program is very sufficient. Also, at the HEI 21PI they absolutely agree that the budget available stimulates new entrepreneurship education initiatives and that it will be allocated to the program if needed. New initiatives for entrepreneurship education are stimulated with a budget as becomes clear from the following quote:

“If you have a good idea, the money will be available.”

There are also examples of HEIs with a relatively lower score on both questions, 24LE for instance. The score for funding by 24LE is relatively low.

“Every time we have to make choices regarding what we can and cannot do.” [...] “It is the budget and whether you have enough people to execute. “The last years we tried to allocate more money towards entrepreneurship.”

All the higher education institutes indicated that the size of the budget for the current entrepreneurship education program was sufficient. This holds as well for the size of the budget for new entrepreneurship education related initiatives.

5.4.2 Type of sources

The portfolio of income sources for the entrepreneurship program is one of the indicators that are part of the framework condition resources. The shares of the different sources are represented. It is also important to have resources available over a longer time. The diversity of income sources that form the budget of the higher education institutes are shown in the following graph.

Table VIII Sources of income

	own activities	institution budget	government funds	benefactors	other
21PI		22%	74%	14%	
25BG	5%	10%	85%		
21CW	10%	90%			
22ND		50%	50%		
24LE	5%	80%	10%		5%
01MY		90%	10%		

24LE, in contrast to the other higher education institutes, has four types of income sources. The other institutes have two or three types of income sources. However, their own activities and other sources of income represent five per cent of all income. So when looking at the added value in reality, 24LE is comparable to the other HEIs.

The chamber of commerce is an example of a source which they indicated as 'other' sources of income. There are also one time grants from the local government for entrepreneurship initiatives. Even though there is a diversity of sources of income, still eighty per cent of the budget comes from the institution budget that is allocated to the entrepreneurship education program.

In contrast to other schools for higher professional education, 21PI and 25BG use governmental funds as the biggest source of income. For the 21PI this is due to the fact that

the DAFNE program is funded by governmental agencies and most of the money for the entrepreneurship education program is allocated from DAFNE. One explanation can be that 21PI was lagging behind with the introduction of entrepreneurship education, whereas at other HEIs it was already operationalized. The financial support from DAFNE was a catch-up effort.

There are different examples of what the sources of income can be. For example, the higher education institute 25BG has consultancy and services which generate money:

“Entrepreneurs which have an assignment for a student, who is supported by us, pay an amount of money for it.”

Money from benefactors is not common at schools for higher professional education. One possible reason is given by the 25BG:

“You have to admit them in the policy.” [...] “there were negotiations but it has too much influence on policy and it deviates too much from the current mission of the 25BG which is providing education”.

When looking at the type of sources, the conclusion can be drawn that higher education institutes have two or three different sources of income. When taking the time of availability of the biggest sources of income into account, differences can be identified. The HEI 25BG scores high in contrast to 21CW which scores relatively low. We can conclude, on the basis of how long the largest sources of income are available to the program, that 25BG, 21PI and 22ND have good portfolios of types of income sources.

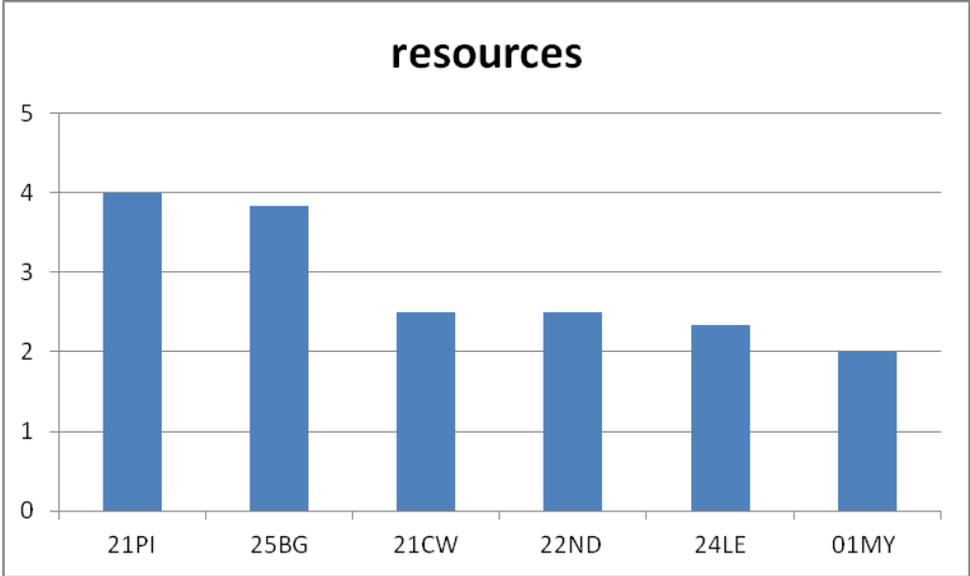
5.4.3 Self-generated income

The schools for higher professional education and 21PI did not engage overmuch in self-generating income activities. Therefore there is no graph presented in this section covering the kind of self-generated income sources. The HEIs 25BG, 21PI and 21CW are engaged in advisory services which generated income for the entrepreneurship program. The 25BG and 21PI generated income from fees for seminars and workshops which are used for the entrepreneurship education programs. The 21CW is not engaged in fees for seminars and workshop but is involved in advisory services.

As was mentioned before in this section, the scale of this income source is limited and therefore cannot be compared to the impact of the previous indicator. The 01MY chooses not to engage in self-generating income activities because it does not want to have

commercial interests involved in research done by students. There are similar activities, but these are on a non-commercial base and therefore do not contribute to self-generating income activities.

Figure 15 Overall scores Resources



5.5 Institutional infrastructure

This section will cover the results of the applied universities on the indicators which measure the framework condition institutional infrastructure. Therefore this report focuses first on the indicator approach, followed by research and finishing with the indicator level of cross-disciplines. Besides results which are shown in graphs and diagrams, this report also includes explanations for results given by the higher education institutes. These explanations are presented by quotes from the interviews. At the end of the results of this section, the average overall scores by the education institutes on the framework condition are presented in a chart.

5.5.1 Approach

The indicator *approach* encompasses the facilities offered by the higher education institute. It appears that there are major differences in the facilities offered by the different higher education institutes. The HEI 24LE offers the most facilities of all benchmark participants. The facility which it does not offer is a technology transfer office. Besides a lectureship in entrepreneurship they offer incubator facilities and a meeting place for students. Moreover, they have a lectureship in entrepreneurship.

Table IX facilities

	Chair group/ lectureship in entrepreneurship	Incubator facilities	Technology Transfer Office	Meeting place for students
01MY	✓		✓	
21CW			✓	
25BG	✓	✓		
24LE	✓	✓		✓
22ND			✓	
21PI		✓		

From the table above, it appears that there are three higher education institutes with an entrepreneurship chair group or lectureship. The best practices 01MY and the 25BG are among these three. The other education institute is 24LE which offers a wide variety of facilities as well. The HEI 25BG also offers incubator facilities like 24LE and 21PI.

At the time of the surveys and interviews the 01MY did not offer incubator facilities. In the past they used to have incubator facilities for start-ups called '*agrarisch bedrijven centrum*'. However, the costs were too high which ultimately led to the absence of start-ups. However, in 2012 a new building was opened accessible to students and their business ideas⁵. The lectureships and students cluster together in this building. This should stimulate the communication between the lecturers, the students, and between lecturers and students. Cross-fertilization of ideas will be stimulated through this new building.

The 21PI has incubator facilities. However, the other facilities which are open to students, staff, etcetera, are outsourced to DAFNE and therefore are not offered by the institution in a strict sense. DAFNE, nowadays StartLife, offers incubator facilities and a meeting place for students. Also there is a technology transfer office. The 01MY and 21CW both have a technology transfer office. The technology transfer office of 21CW is well known and is responsible for liaison activities. The 22ND and 24LE are the only higher education institutes offering a meeting place for students to exchange their entrepreneurial ideas and moreover cross-fertilization of entrepreneurial intentions is supported.

5.5.2 Research

The second indicator of the framework condition institutional infrastructure does yield big differences. However, this is a result of including the 21PI in the benchmark study together with schools for higher professional education. Therefore this indicator is covered in less detail. There were no peer-reviewed studies on entrepreneurship published by schools for higher professional education in the previous year. The 21PI published 7 peer-reviewed studies on entrepreneurship. This is the result of the difference in focus between schools for higher professional education and a general university. Therefore the peer-reviewed studies do not give relevant information that leads to points for improvement.

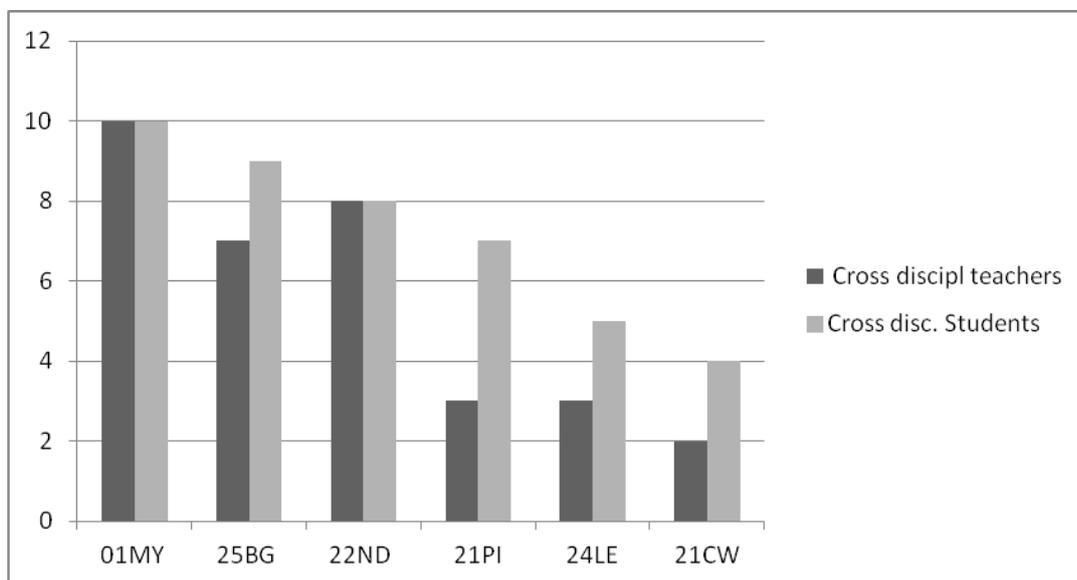
⁵ The incubator facilities are available in 2012 and therefore this is not included in the score on the indicator approach.

Since 2004 the 21CW is home to a lector⁶ in creative entrepreneurship (0,2 FTE) who is directly involved in the special entrepreneurship education *Topklas Ondernemen*. Besides 21CW, 01MY too has a lector in entrepreneurship. The lectureship at 01MY started in 2010 as a collaboration between 01MY and the LEI 21PI. One of its tasks is to manage the policy research program *entrepreneurship and innovation* of the ministry of Agriculture, Nature and Food quality. The 21PI has 0.2 FTE in chairs/professorships. This is one professor that also focuses on other academic disciplines besides entrepreneurship and therefore this score is 0.2 chairs in innovative entrepreneurship. This chair was cancelled by the 21PI in 2011.

5.5.3 Level of cross-disciplines

This indicator yielded many differences between the higher education institutes. This indicator is measured by the level of cross-disciplinary teachers, students and subsequently new courses developed by cooperation of multiple chair groups. The following figure (fig. 16) shows the number of disciplines represented by teachers and students.

Figure 16 number of disciplines represented by teachers and students



From figure 17 it appears that there are three higher education institutes that have a lot of different disciplines which are represented by teachers in entrepreneurship. The 01MY focuses on cross-fertilization of ideas, which is reflected in the number of different disciplines

⁶ At schools for higher professional education this person is called a *lector* who is elsewhere known as a professor in applied sciences.

represented by teachers and students. The focus on cross-fertilization of ideas by 01MY is also reflected by building a new centre for students and teachers in entrepreneurship, which was already mentioned in paragraph 1.4.1. The 21CW, which has a high performance, does not score high on this indicator, which is also expressed in their low overall score on institutional infrastructures. The data of the higher education institutes indicate a trend suggesting that higher education institutes with high scores on cross-disciplinary teachers also score well on cross-disciplinary students. An exception is 21PI where on average 7 different disciplines are represented by students who attend entrepreneurship courses. This does not hold true for the teachers. Cross-fertilization in entrepreneurship by different disciplines is therefore differently realized between higher education institutes, via students or teachers or both. This also becomes clear from the following quotes

“We have eight different studies and we try to reach all eight by offering them a course of free choice. But we are structurally embedded in five studies where it is a compulsory course in the curriculum. The other three studies can become acquainted with entrepreneurship if they take the course as a free choice. So eight [studies] are reached only with the course in entrepreneurship” (25 BG).

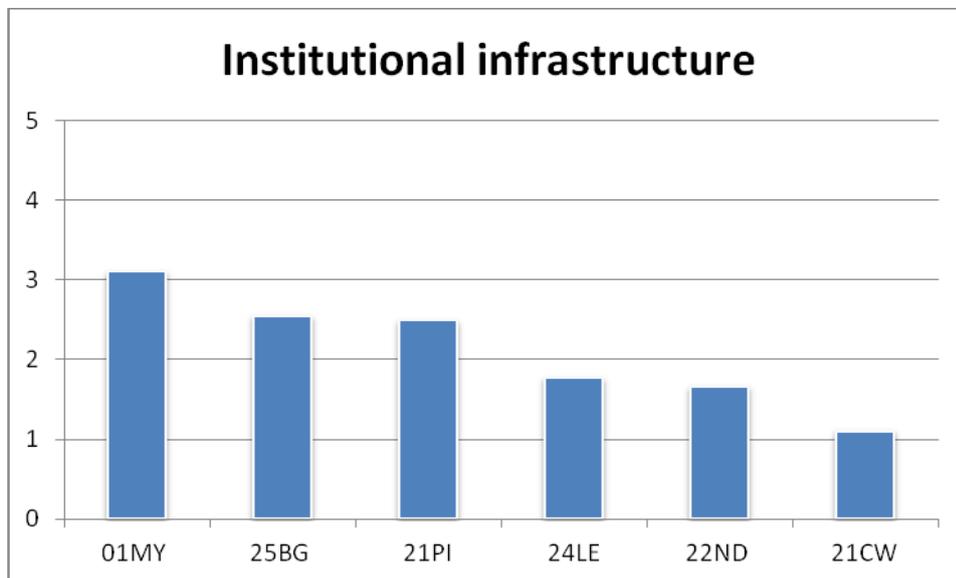
A possible explanation for the high score of the 01MY for cross-disciplinary students and teachers is that entrepreneurship is a central concept in the whole university. All teachers of all programs carry a responsibility for entrepreneurship.

The third question that measures the level of cross-disciplines is the development of courses by cooperation of multiple chair groups. However, the numbers involved are influenced by the longevity of the entrepreneurship education program. New entrepreneurship education programs most probably need to develop new courses, whereas older entrepreneurship education programs already have developed entrepreneurship courses a longer time ago. The 21PI scored better than the other higher education institutes by developing six courses through cooperation of multiple chair groups. They further developed around six courses and few new courses. There was a lot of collaboration between chair groups in developing the courses. Examples of collaborations are those with law (IP and Technology transfer), marketing, and education and competences studies (Basics of entrepreneurship). Furthermore, there is a multidisciplinary course which also focuses on entrepreneurship called Academic Consultancy Training.

The high score for the 21PI is a result of a new set-up in entrepreneurship education that needed many courses to be further developed and one or two new courses. This further development is done in cooperation with other chair groups like *law* and *education and competences studies*.

However, the institutes scoring well on the previous two questions measuring the indicator also score well on the development of new courses, except for the 21CW which developed two new courses by cooperation of multiple chair groups but did not score well on cross-disciplines of teachers and students.

Figure 17 Overall score on Institutional infrastructure



5.6 Education

This section will cover the results of the schools for higher professional education on the indicators which measure the framework condition education. We focus first on the indicator education scope and subsequently the indicator education set-up. Besides results which are shown in graphs and diagrams, we also included explanations of results given by higher education institutes. These explanations are presented with quotes from the interviews. At the end of the results of this section, the average overall scores by the education institutes on the framework condition is presented in a chart.

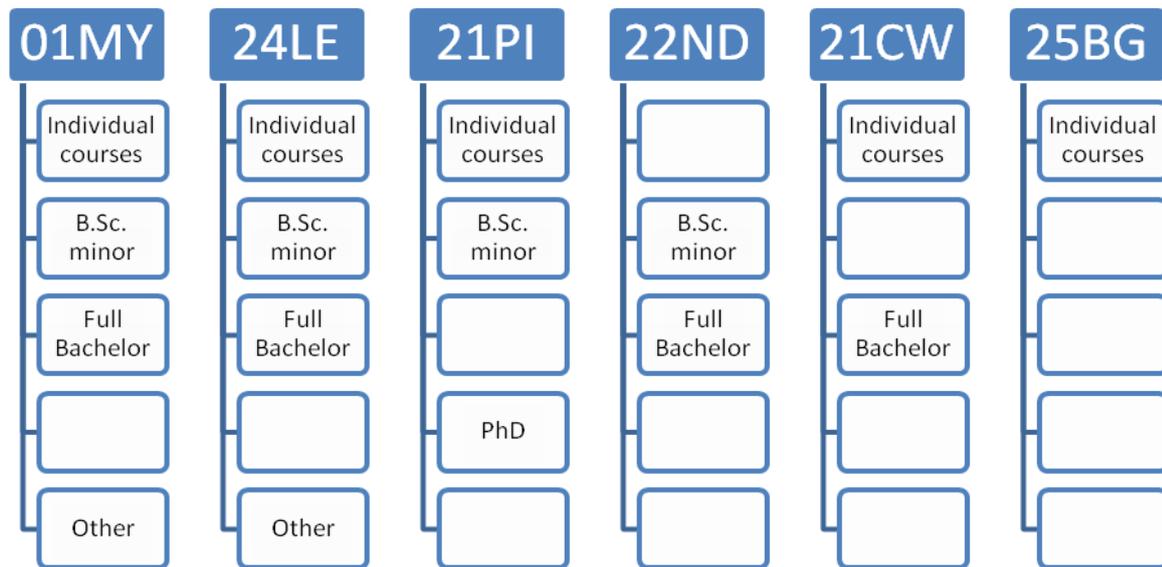
5.6.1 Education Scope

The O1MY outperforms all other higher education institutes on the basis of the supply and demand of entrepreneurship education. They offer many different types of entrepreneurship education and the relative demand for these is much higher than in the case of the other higher education institutes. This can be explained by the fact that they make entrepreneurship part of all study programs and create the opportunity to follow the entrepreneurship program simultaneously with the normal bachelor program. The supply and demand of entrepreneurship courses are covered separately in the following two sections: *types of education offered* and *student volume*.

Types of education offered

The indicator education scope is measured by two aspects. The first aspect is the different types of education offered by the education institute.

Figure 18 types of education



The 25BG does not offer any other type of education besides individual courses. However, they are working on the development of a degree in entrepreneurship but this is not realized yet. There are no minors offered. This seems to be characteristic of the overall score on the framework condition education. The Dutch schools for higher professional education all offer a bachelor degree in entrepreneurship and individual courses, with the exception of 22ND that does not offer individual courses but instead a bachelor minor.

The HEIs 24LE and the 01MY offer a so-called associate degree in entrepreneurship. This is a full time or part time (depending on the student's previous education and work experience) education program for a specific job profile. One must have three years of prior experience in an entrepreneurial environment. In this education program there is also a coaching program aimed at further developing an entrepreneurial attitude.

The 01MY also offers a major in agricultural entrepreneurship. The major is the core of the applied sciences degree and forms the largest subject in that degree. Moreover they offer two minors and a master in entrepreneurship which was not yet approved at the time of gathering these research data. However, it has now been approved. The minor international business leadership is offered as a one year minor with 60 ECTS. Moreover, 01MY has two modular certificates as part of the bachelor studies: Agricultural Entrepreneurship and Business Administration and in the minor entrepreneurship. This certificate, which is

subdivided into two modular certificates, is called *certificaat ondernemerschap*. The 01MY is the only school for higher professional education in this benchmark study that is associated with this certificate.

Because of the nature of the 21PI it is logical that it is the only higher education institute examined in this benchmark study that offers PhDs in entrepreneurship. However, it is possible to have PhD students at schools for higher professional education as well. But such cases were not found in this benchmark study. Therefore, appointing PhDs in entrepreneurship can be a unique way to increase the research in entrepreneurship at schools for higher professional education. An overview of the types of education offered by each higher education institute has been presented above.

Student Volume

Besides what the education institute offers it is also important to know what the demand for entrepreneurship education is. The higher education institutes which have the most students in absolute numbers are 01MY, 21CW and the 25BG. However, when correcting for size 01MY and 21CW outperform the others. Both higher education institutes educate six times as many students as the number three education institute and even sixteen times as many as the education institute with the smallest share of entrepreneurship students. The relative number of students of the 25BG is not very high.

Besides the number of students it is also important to know the size in ECTS of the courses. This varied considerably among the higher education institutes. When correcting for the size of the courses the 01MY is by far the best performing higher education institute, followed by 22ND and the 21CW. 22ND does not score well on share of students but the courses earn students 30 ECTS, which is equivalent to half the number of hours of one study year.

Table X student volume indicator education scope

	(1) Absolute # of entrepreneurship students ⁷	(2) Size of education institute	(3) Relative share of students = (1)/(2)	Student volume = (3) * ECTS per course
<i>01MY</i>	480	1400	0,3429	5.142857
<i>22ND</i>	200	1915	0,1044	2.610966
<i>21CW</i>	560	1700	0,3294	1.647059
<i>24LE</i>	160	2057	0,0778	0.544482
<i>21PI</i>	150	7298	0,0206	0.123321
<i>25BG</i>	400	17000	0,0235	0.117647

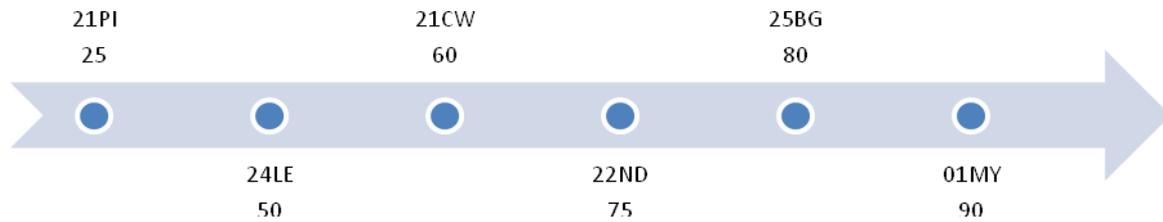
5.6.2 Education Set-Up

The first question that measures the indicator *education set-up* is the number of executive education attendants. The 21PI scores high on this indicator with 150 attendants. This achievement is due to its business school. 21CW also scores well, especially compared with the schools for higher professional education with 70 attendants. 24LE is the only other school for higher professional education with a modest number of 20 attendants.

For analysing the education set-up, the question what didactic methods are used for entrepreneurship education is taken into account as well. The first question measures the level of experimental teaching on a semantic differential line. The numbers should be interpreted as the position on a semantic differential line, with 0 meaning traditional education methods, 50 denoting teaching methods somewhere in between traditional and experimental, and 100 meaning the use of experimental methods. The relative position of the higher education institutes in comparison to each other from traditional to experimental is presented on the next page.

⁷ Average number of students per course times the number of courses offered

Figure 19 level of experimental versus traditional didactic methods



The low score of the 21PI can be attributed to the fact that the methods of university education are limited by the rules of accreditation which have a more theoretical focus for university education. Moreover, it can also be due to a difference in ways of thinking. The respondent might determine the score based on the fact that they make it as experimental as possible within the limits set by the rules and therefore indicate a high score. However, others might be focused on the fact that the score is limited by the rules and are convinced that because of the experimental aspect it cannot be high and therefore they indicate a lower score. The teachers that facilitate courses at the university can also have different backgrounds. So this result has to be interpreted with caution. However, there is a clear distinction between schools for higher professional education that early on adopted a focus on competence oriented education, which is more directed to future job profiles, and the 21PI which has only recently begun to take this type of education into account.

Another question measuring the indicator education set-up is whether students are often confronted with real-life entrepreneurship problems. All respondents answered in the affirmative. Therefore the quantitative results do not yield much information. However, the examples given by higher education institutes of how they confront students with real-life entrepreneurship education are interesting in themselves and are therefore presented below.

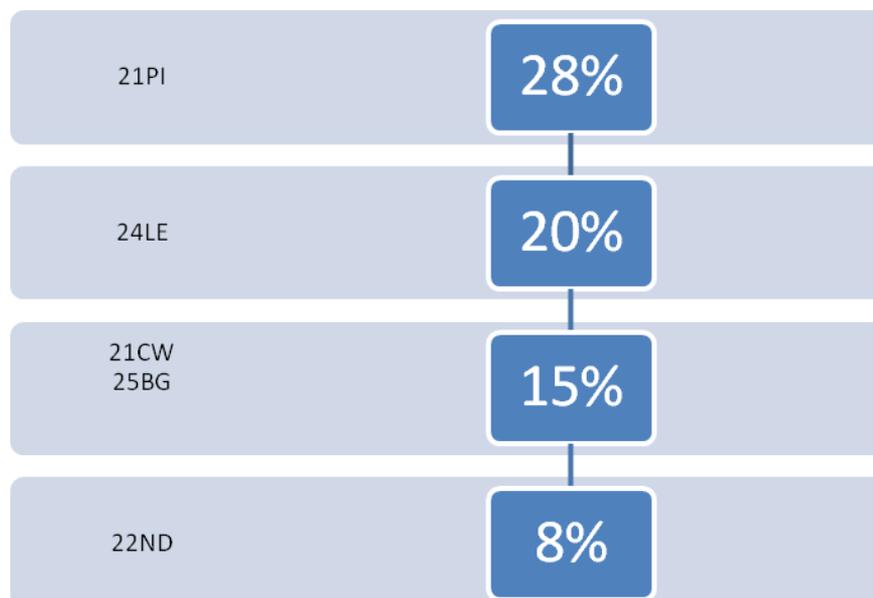
“Only the people from the field can sufficiently transfer [entrepreneurship intentions and skills.] to students and in a way that it also shapes the personality [entrepreneurship attitude, intentions, actions etcetera] of the student. By offering a normal course by a lecturer that just runs through his lecture we notice that there is little change in the mind-set and development of the student. But when you include practical experience by someone from the field [...] if then you do an assessment we notice that a student’ opinion is changed or their attitudes and intentions changed.” (25BG)

Furthermore, questions were asked concerning the percentage of lectures that are given by guest speakers, how much ECTS in practical experiences students attend and how often they are in contact with private companies.

The percentages of guest lectures ranged from 8% (22ND) to 28% (21PI). What is interesting is that the best practice institutions make relatively little use of guest lectures. This might be due to the fact that guest lectures show similarities in didactic methods compared with traditional teaching methods.

The HEI 01MY is not presented in the figure below. The percentage of guest lectures per course varied too much, which made it impossible for the respondent to indicate a reliable average percentage. For the minor entrepreneurship the percentage reaches 60%, but there are also courses in which it is much less. Besides guest lectures the 01MY also makes use of external coaches and financial mentors for entrepreneurship students.

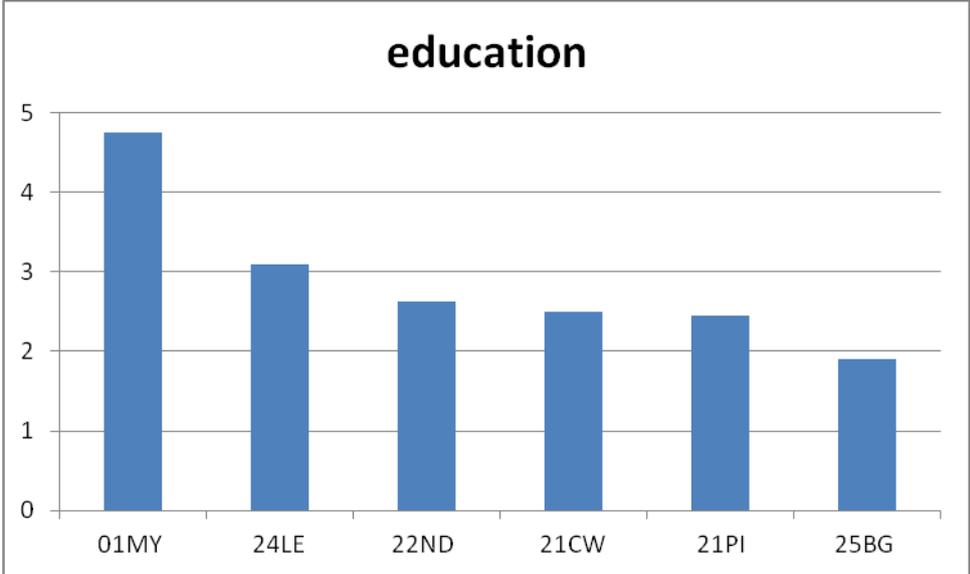
Figure 20 percentage guest lectures



The number of ECTS in practical experiences like internships varied between 6 ECTS and 60 ECTS. The 21PI is the lowest with 6 ECTS which is a course in academic consultancy for entrepreneurship. The 24LE has the highest number with 60 ECTS.

“All the practice they do for entrepreneurship”[...] “that starts with orientating internships, that also starts with entrepreneurs.” [...] “During graduation [they do] a project internship in the last year so that is 60 [ECTS].” [...] “Anyway, the students who are involved in entrepreneurship education 60.”(24LE).

Figure 21 Overall scores Education



5.7 Outreach

This section covers the results of the applied universities on the indicators which measure the framework condition *outreach*. Therefore we focus first on the indicator links with stakeholders, followed by community and finally the indicator alumni. Besides results which are shown in graphs and diagrams, this report also includes explanations of results given by universities. These explanations are presented by quotes from the interviews. At the end of the results of this section, the average overall scores by the education institutes on the framework condition are presented using a chart.

5.7.1 Links with external stakeholders

There are many differences between higher education institutes with regard to the contacts with external stakeholders. In the following figure, the links with stakeholders and their contributions are presented. Contributing to the entrepreneurship education program can take the form of financial contributions, guest lectures, helping with the set-up of the program, etcetera.

Table XI Links with external stakeholders

	government	foundations	Entrepreneurs	science parks	private companies	investors	Other
21PI	++	++	++	++	++	++	++
25BG	++		++		++		
24LE	++	++	++	+	++		
21CW	+		++		++	++	
22 ND	+	+	++	+	++	+	
01MY	++		++	++	++	++	

++ means that the stakeholder is contributing; + implies that there are only contacts with stakeholder

The 21PI clearly stands out on this indicator.⁸ This is due to the fact that many stakeholders contribute to the entrepreneurship education program and that venture capital is available. The only aspect of this indicator in which 21PI has a mediocre score is the frequency of

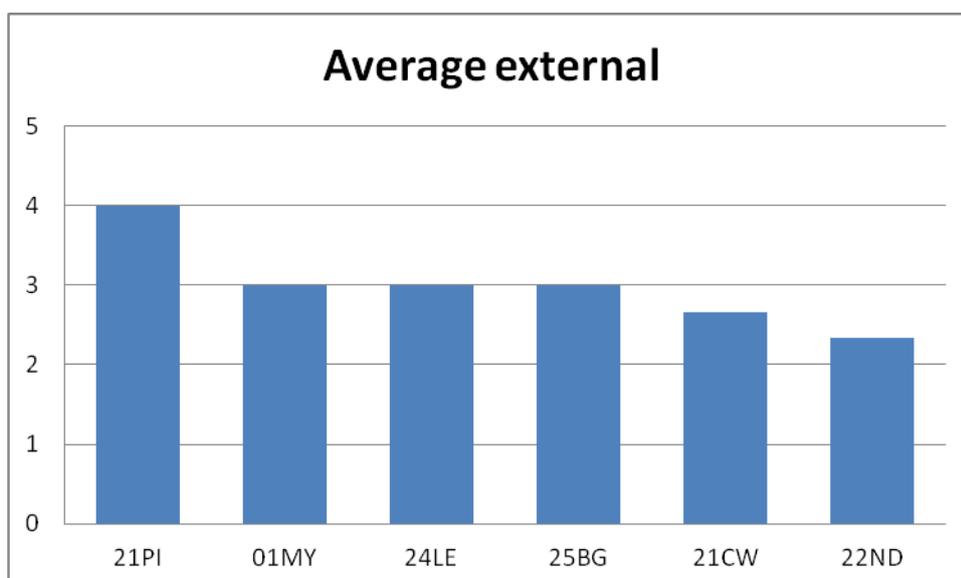
⁸ The respondent indicated the stakeholders of the current entrepreneurship program called Start-Life. All other framework conditions are covering the previous entrepreneurship program DAFNE.

students' participation in entrepreneurship events outside of the institution. The 01MY scores the lowest on stakeholders and venture capital and has a mediocre score on entrepreneurship events.

"Government is of course also the patentcenter NL who deliver a contribution with respect to the contents of the entrepreneurship education program. Foundations, for example the foundation FoodValley who often act [as guest lecturers]. Sciencepark who coaches [with starting up a company] a lot, also students. I think that this is all [support for the entrepreneurship education program] a combination of money, knowledge and expertise.." (21PI)

Another good example is 01MY which is taking part in the Groene Kennis Coöperatie (GKC). This innovation platform is home to a team dedicated to entrepreneurship where 01MY takes a leading role. The collaboration in the GKC yielded projects for 01MY that benefit their entrepreneurship education program. Besides the GKC there is the Agricultural Economics Institute (LEI) which offers tools (e.g. strategic management) that help students think about the strategy of their business. But also the lecturers are involved in the outreach of 01MY. They have developed huge networks in entrepreneurship with weaker ties with science parks and strong ties with investors. There is the investor 'Ontwikkelingsmaatschappij Flevoland' that invests in start-ups of students that have potential.

Figure 22 scorers on indicator average external stakeholders



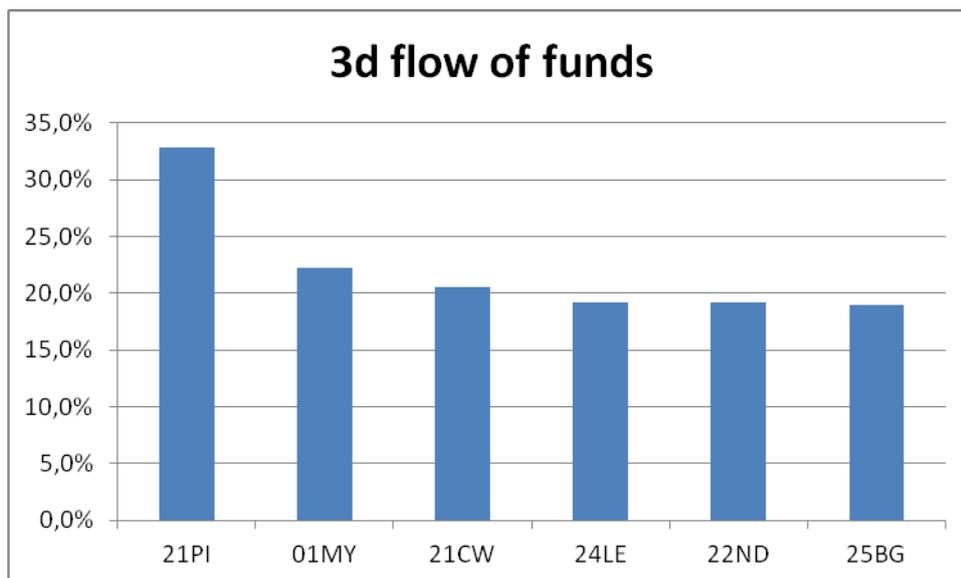
5.7.2 Community

The involvement of the education institute with the community is measured by the knowledge transfer and other ways of contact with society. Knowledge transfer is measured

by third flow of funding and patents. The scores on patents are not comparable because there are major differences that can be attributed to the differences in nature of universities and other HEIs. Schools for higher professional education did not apply for patents whereas 21PI has 41 patents according to the World Intellectual Property Organization (WIPO).

Also the third flow of funding is much higher for the 21PI. The scores ranged from 19% of the 25BG to 32.8% of the 21PI. The schools for higher professional education are close to each other with scores ranging between 19% and 20.6%. What has to be mentioned is that the schools for higher professional education in this benchmark sample have shares third flow of funding that are almost three times higher than the average in the Netherlands (based on statistics of CBS in 2006). At the academic university the focus is more on research and fundamental knowledge, capacity and facilities that support fundamental research. This ultimately leads to third parties investing their money in contract research done by the university (CBS, 2006).

Figure 23 percentage third flow of funds



Besides knowledge transfer in the form of patents and third flow of funding, one can also transfer knowledge by having an advice centre for entrepreneurs, visiting schools, open entrepreneurial events, training for entrepreneurs like boot camps whether on a local or even international level. The following figure shows all activities that the higher education institutes offer or are engaged in.

Table XII involvement in the community

	Advice centre	Entrepreneurship in schools	Open entrepreneurial events	Training for entrepreneurs	international scale
21PI	✓	✓	✓	✓	✓
25BG	✓	✓	✓	✓	✓
21CW	✓	✓	✓	✓	
22ND		✓	✓	✓	✓
01MY	✓		✓	✓	✓
24LE			✓		

The HEIs 21PI and 25BG offer all aspects which stimulate entrepreneurship in society. The higher education institute 21CW does not stimulate entrepreneurship on an international scale but does offer the other facilities and activities.

The 22ND is highly involved in entrepreneurship on an international scale. Their international business orientation becomes salient in their so-called internationalisation concept where the focus is on international internships, international projects, internationally oriented entrepreneurship education and international entrepreneurship in general. This international focus is a unique selling point of 22ND.

5.7.3 Alumni

The 01MY has an alumni organisation. The major coordinator has a wide network with alumni that can be used to engage alumni in the entrepreneurship education program. They mainly act as guest speakers. Moreover, these alumni often make use of the technology transfer office at the 01MY. The alumni are familiar with the 01MY, the business environment and are aware of the presence of the Kennisbalie. The first aim of an alumni organization (having an organized network of alumni contacts) is realized. However, it is time for the

following steps to be taken, like using alumni as sources for data mining or other research and keeping track of their careers.

Table XIII alumni organisation

	keeping contacts with alumni	tracking alumni careers	alumni as research sample	Other reasons
21PI	✓	✓	✓	✓
01MY	✓			✓
21CW	✓	✓		✓
24LE	✓		✓	
22ND	✓			
25BG				

The HEI 21PI has 27 alumni involved in its entrepreneurship program, which is a much higher number compared with the schools for higher professional education. It does not keep track of alumni themselves but has outsourced this to an independent association that manages the organization of alumni. It does keep track of alumni and sometimes asks whether alumni have started new ventures. This becomes clear from their website:

“An increasing number of [...] members are entrepreneurs or are interested in starting up for themselves. The educational courses at 21PI are paying more attention to entrepreneurship as a career choice in its own right. [The alumni organization: RL] is accumulating statistical information about this group and is supporting (potential) entrepreneurs with various networking opportunities. [The alumni organization: RL] is a partner in a variety of initiatives in this field”

KLV is also involved in data mining with alumni as respondents and they engage in international fund raising which is one of the other reasons why they organise the alumni. Alumni often wish their higher education institute well, and are more prepared to support

their former education institute. When these alumni are organised they can be appealed to for raising funds. At higher education institutes in the United States this is an essential way to finance education.

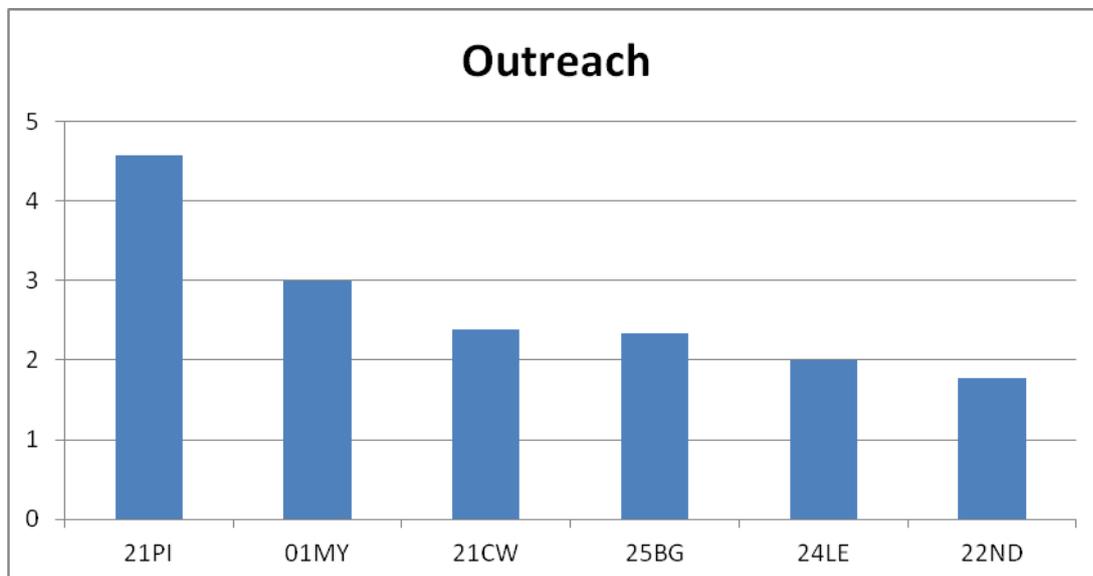
Another example is 21CW. They set up their alumni policy in the following way:

“We keep contact, we want to know that they [alumni] are doing, we keep track of them and want to know whether they are involved in entrepreneurship. It is also a relation for us that can become meaningful for us in the future. For final projects we often end up with alumni. Via their current company and profession we ask the alumni for guest lectures.”

The HEIs 21CW, 24LE and 22ND all have five alumni who are involved in the entrepreneurship education program. The 25BG has two alumni involved.

The 25BG hired an employee dedicated to alumni management and since 2011 the 25BG has a well-managed alumni network. Therefore the lower score on alumni by the 25BG will be higher in future measurements by other benchmark studies.

Figure 24 Overall scores Outreach

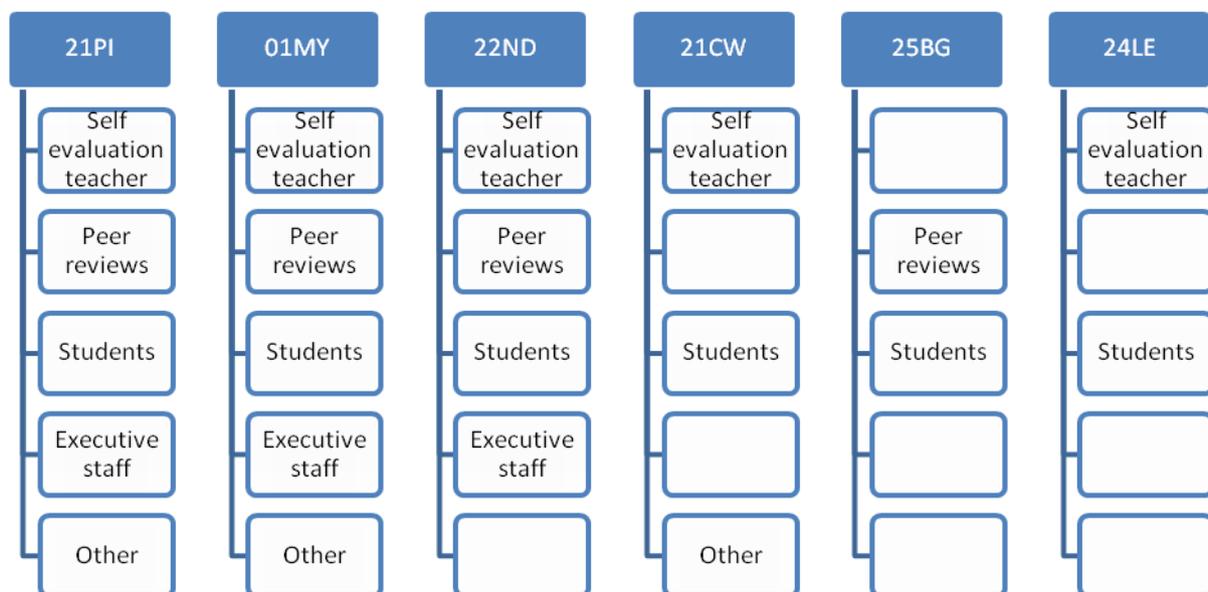


5.8 Development

This section will cover the results of the applied universities on the indicators which measure the framework condition *development*. Therefore we focus first on the indicator user-driven improvement, followed by the evaluation of goals and finally the indicator human resources investment. Besides results which are shown in graphs and diagrams, we also include explanations for results given by universities. These explanations are presented by quotes from the interviews. At the end of the results of this section, the average overall scores by the education institutes on the framework condition are presented in a chart.

5.8.1 User-driven improvement

Figure 25 User-driven evaluation methods



All institutes make use of student evaluations. Besides this type of evaluation 24LE makes use of the teachers' own evaluation. The HEI 25BG makes use of peer reviews (colleagues evaluating). The higher education institutes 01MY and 22ND are high scoring institutes besides the 21PI. Self-evaluation of teachers, peer reviews and student evaluations are the most used types of program evaluation. Some higher education institutes also include other types of evaluation that can lead to program improvement or executive staff evaluations. The latter is also the type of evaluation that distinguishes the best scoring higher education institutes from the others.

5.8.2 Evaluation of goals

Table XIV Evaluation methods

evaluation	Students' careers		Stakeholder needs		Goals and strategy	
	Formal	Informal	Formal	Informal	Formal	informal
01MY	✓	✓	✓	✓	✓	✓
21CW	✓	✓	✓	✓	✓	
25BG	✓	✓	✓	✓	✓	
21PI	✓	✓	✓	✓	✓	
24LE		✓		✓		✓
22ND			✓	✓	✓	

The table represents whether HEIs evaluate the three aspects and whether they do that formally, informally or both. It does not represent the level of intensity and frequency of evaluations. The indicator evaluation of goals is measured by whether students' careers, stakeholder needs and goal/strategy achievement are monitored. The evaluations can be done in formal (e.g. with systematic evaluation procedures) or informal (e.g. meetings with stakeholders to discuss the program) ways.

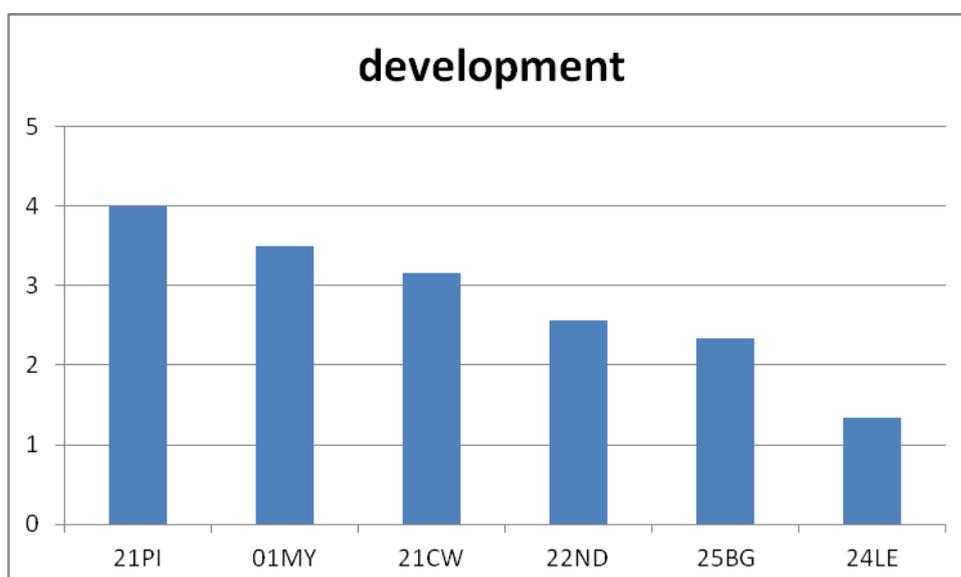
One can conclude from the table that the best practices show an excellent evaluation of stakeholders. All best practices, 01MY, 21CW, and 21PI, have a formal evaluation of students' careers, stakeholder satisfaction and whether goals are met. The 21CW also has informal student career evaluation whereby entrepreneurial alumni are invited into a café for entrepreneurs two times per year. The other HEIs do not have any formal evaluation of students' careers.

5.8.3 Investment in human resources

This indicator is measured by asking what incentives are present for encouraging lecturers to teach in entrepreneurship education and what recognitions for achievements are given. There are two higher education institutes, 21PI and the 21CW, which have an acceptable score on stimulating entrepreneurship education lecturers. However, between these two institutes there is a major difference in approach. The HEI 21PI has many incentives to *encourage* lecturers to teach entrepreneurship which focuses on external motivation. However, 21CW focuses more on the *recognition* for achievements, which is positive reinforcement. The other higher education institutes offer little or no such incentives to stimulate entrepreneurship education among lecturers.

The respondents were unable to give the percentage of teachers trained for entrepreneurship education. However, the higher education institutes which were able to provide an answer indicated that either none of the teachers (24LE and 25BG) or ten per cent of the teachers (21PI) had trained for entrepreneurship education. At 25BG the teachers do not get training in entrepreneurial teaching. However, the education is organised via the entrepreneurship centre and it is the job of the entrepreneurship centre to support the teachers in order to facilitate the courses. Therefore the education facilitated by the CoE of 25BG does have trained entrepreneurship education, but the existing teaching personnel of the 25BG are not retrained. 22ND indicated that 50% of the teachers in entrepreneurship education participated in training for entrepreneurship education.

Figure 26 Overall scores Development



6. Conclusions and recommendations

In this section we discuss the relationship between performance and framework conditions on the basis of the findings in this benchmark study. This will be followed by recommendations about how to improve framework conditions. The best practices in this benchmark study are used as examples of how to give substance to the indicators that need improvement. The recommendations are presented for each HEI individually because each may have different reasons for its (good or bad) performance. The HEIs will be treated in the order from the best practices to the lower performing programs.

6.1 Overall conclusions

In this section the overall conclusions are presented. First the conclusions regarding the best practices are drawn. Subsequently the conclusions regarding the framework conditions are presented.

Performance

When looking at the results of the performance by the HEIs, the conclusion can be drawn that three types of HEI can be distinguished. The first type of HEI has excellent scores on one indicator (e.g. 01MY and 24PI), another type of HEI has fairly constantly good scores (e.g. 21CW) and there are HEIs that are not among the best performing institutes on any performance indicator (e.g. 24LE and 22ND).

The 01MY is the best higher education institute on the indicator entrepreneurial students through education. This means that 01MY is the best practice School for higher professional education on the absolute overall score on performance. The 21PI also has its high ranking due to knowledge transfer and entrepreneurial students through practice. The high score on the performance indicator knowledge transfer can mainly be attributed to the difference in nature between universities and schools for higher professional education.

The 21CW scores fairly acceptably on all the indicators. It has the best score on knowledge transfer of all schools for higher professional education, which is due to the high percentage of third flow of funds. The share of students with an entrepreneurial mind-set through education is the second best of all higher education institutes. Moreover it shows an excellent score on entrepreneurial students through practice. Because of its constant scores the 21CW will be used as a best practice together with 01MY.

The 25BG does not score high on the share of students with an entrepreneurial mind-set through education. However, this might be due to the fact that it is the largest school for higher professional education in the sample. In absolute numbers it is one of the bigger entrepreneurship education programs that are part of this benchmark study. Moreover, when looking at the framework condition *development*, it is the best scoring school for higher professional education. Therefore the way in which 25BG gives substance to the framework conditions which constitute its strength, leads to 25BG being used by us as a role model for the improvement of some points as well.

The HEIs 24LE and 22ND do not perform well on any of the performance indicators. But 22ND is among the better performing HEIs regarding entrepreneurial students through education. However, due to the extremely high score of the 01MY this performance is biased and seems negligible. These HEIs have more points that need improvement compared with the other HEIs.

Strategy

The ranking of best practice entrepreneurship education programs by higher education institutes is also reflected in the scores on the indicators of strategy. The data of our benchmark study endorse the findings in the report of the European Commission (NIRAS et al., 2008), which is that the framework condition strategy is crucial to a successful entrepreneurship education program.

The framework condition strategy yielded the biggest differences between the front runner institutions and the ones lagging behind. Therefore, the scores on the framework condition strategy are characteristic of their overall performance of the entrepreneurship education program.

There are three indicators that comprise the framework condition strategy. The findings indicate that the HEIs can focus on different indicators in order to establish a high performing entrepreneurship education program. There are two indicators which seem to cause the difference between front runner institutions and lower performing higher education institutes. These indicators are goals and embeddedness. The best practice institutes have integrated goals with regard to entrepreneurship education in their mission statements and

their strategic plans. The lower performing higher education institutes do not include entrepreneurship in the mission statements at all.

Moreover, there are differences in the way entrepreneurship is embedded in the higher education institutes. The best practice schools for higher professional education have high management levels primarily responsible for embedding the entrepreneurship education program. The HEI 21PI uses a different approach and embeds entrepreneurship in the institution by attracting high-level managers acting as champions for entrepreneurship in the institution.

The lower performing HEIs neither embed the entrepreneurship program in their institution by placing primary strategic responsibility at the highest management level nor attract important managers acting as champions for entrepreneurship. This is also not compensated for by making entrepreneurship central in their mission statement and strategic plan.

Resources

The framework condition resources does not yield major differences between schools for higher professional education. However, the best practice entrepreneurship education programs do score well on the indicators of resources as well.

When looking at the total scores on the framework condition resources, one cannot say that these scores are characteristic of the performance of the entrepreneurship education program. NIRAS et al. (2008) state that having insufficient resources is the biggest obstacle in entrepreneurship education programs. However, our findings show that this is not the case with the sample in this study. This might be due to the fact that the policy is already implemented and the financial support provided as well.

The findings regarding the importance of entrepreneurship related income activities in this report endorse the earlier findings by NIRAS et al. (2008). The best practice higher education institutes, except the 01MY, engage in money generating activities related to entrepreneurship whereas the ones lagging behind do not engage in these activities. Even though the share of total income represented by these activities is low, all the best practice higher education institutes are engaged in these activities.

Institutional infrastructure

Contrary to the findings in the report for the European Commission (NIRAS et al., 2008), the framework condition institutional infrastructures does not show large differences between higher education institutes in overall scores. It appears that best practice entrepreneurship education programs have good scores on the framework condition institutional infrastructure with the exception of 21CW. Even though there are no large differences on overall scores, there are differences identified in scores on the indicators individually.

What is most interesting is that the 21CW scores low on this framework condition but it does not affect the final performance that much. This low score might be compensated for by other strengths of their entrepreneurship education program. The HEIs 01MY, 25BG and 22ND show that embedding entrepreneurship in the strategy and having resources can positively affect the institutional infrastructure. They show that entrepreneurship education is not solely intended for business studies and management students, but they offer their entrepreneurship education to many different disciplines.

The HEIs lagging behind do not score well on the overall score on this framework. However, they both show excellent scores on different indicators of institutional infrastructures. 24LE offers many facilities whereas 22ND has a high-level of cross-discipline structures. The 25BG and 01MY also have a high-level of cross-disciplinary structures. Therefore it seems that an effective entrepreneurship education program needs a high-level of cross-disciplinary structures combined with sufficient facilities to support the program. Especially 25BG has a good foundation for entrepreneurship education with a chair group dedicated to entrepreneurship, a multidisciplinary approach and sufficient resources.

Education

The best practice higher education institutes show excellent scores regarding the level of experimental teaching and students confronted with real-life entrepreneurship problems. A striking result is that the best practices do not use many guest lectures, even though they state that they confront students with real-life entrepreneurship problems. This implies that they use other ways to confront students with real-life entrepreneurship problems besides guest lectures, and these other ways appear to be successful. Frequently mentioned teaching methods were: case studies, business plan competitions and traditional lectures.

What is in contrast with the previous results is that entrepreneurship is embedded in the strategy of the 25BG and there are sufficient resources supporting the entrepreneurship education program, but the primary process of education is not outstanding. The fact that they only offer individual courses in entrepreneurship likely affects the number of ECTS dedicated to entrepreneurial experience by practice, like an internship or similar activities.

The number of different types of education offered by the education institutes is not characteristic at all of their final performance. The lower performing higher education institutes do not offer less types of education than the best practices. This can indicate points for improvement for the low performance universities, because they do offer the education, but the demand is lagging behind.

There seems to be a negative relationship between the scores on resources and the scores on education. The best scoring practices on the framework condition education score lower on the framework condition resources. Some HEIs seem to focus on teaching entrepreneurship to a high quantity of students, which might result in less budget being available for other new entrepreneurship education initiatives and a rather tight budget for the current program because of the enrolments. Moreover, good teaching methods cost more money and this might exceed current budgets.

Outreach

Where NIRAS et al. did not find clear relationships between high scores on outreach and the performance of the entrepreneurship education program, this study shows that the best practices are highly involved in outreach.

The three best practice schools for higher professional education have higher scores on the framework condition outreach than the two lower performing schools for higher professional education. However, the difference is negligible. Most of the benchmark participants are well aware of the importance of outreach. But where findings by NIRAS et al. (2008) indicate the alumni as a natural starting point for outreach, in our study this does not hold. In most cases the network of stakeholders is fairly well managed but the alumni are not fully used for entrepreneurship education. When looking at the different indicators of the framework condition interesting results can be identified. The higher education institute 24LE for example shows excellent management regarding their relations with external stakeholders.

However, there are differences between HEIs that have contacts with external stakeholders and HEIs that are in addition able to develop these contacts into contributing external stakeholders.

The results on the framework condition outreach indicate a difference in the importance of outreach between the university and the schools for higher professional education. The university focuses on the 'golden triangle' formed by the government, private companies and the university itself. At the schools for higher professional education, this is given a lower priority. This can be the reason why 21PI has a higher percentage of third flow of funding compared to the schools for higher professional education.

In this benchmark study the most frequently mentioned ways to disseminate entrepreneurship to society is by setting up an advice centre or visit schools to promote entrepreneurship and entrepreneurship education. Almost all HEIs in this benchmark have open entrepreneurial events for people other than students.

The higher education institute 21PI distinguishes itself from the schools for higher professional education by having a higher share of third flow of money, different types of external stakeholders who contribute to the program and a greater involvement of alumni in the program. Moreover it is the only Dutch higher education institute in this study that is involved in vocational guidance.

Development

The performance of entrepreneurship education programs is also reflected in the scores on the indicators of development. The higher education institutes that have a high performing entrepreneurship education program are also the institutes that score well on the framework condition development. Where the indicator user-driven improvement does not give major differences between higher education institutes, the evaluation of goals and investment in human resources do.

The higher education institutes that have good scores on the indicator development score especially well on the share of students with an entrepreneurial mind-set through education. Therefore it is assumed and confirmed that proper evaluation procedures and investment in human resources benefits the performance of the entrepreneurship programs.

However, findings show that investment in human resources is not a top priority of the higher education institutes examined in this benchmark study. The same findings are also reported in the publication by NIRAS et al. (2008). There are few or no teachers being trained to teach the new pedagogy which is assumed to be different from traditional teaching methods and therefore necessary for entrepreneurship education.

As NIRAS et al. (2008) indicated, the evaluation of goals and strategies is lagging behind the performance of some higher education institutes. The findings indicate that this is also the case with the evaluation of students' careers and meeting stakeholder needs. Continuous evaluation of goals and strategies is essential for improving entrepreneurship education. Like the findings in the report by NIRAS et al. (2008) for the European Commission, there is an overall tendency to focus on individual and user-driven improvement rather than an evaluation of goals and strategies.

6.2 Overall recommendations

In this section recommendations are given regarding the overall performance of the higher education institutes taking part in this benchmark study. This means that the following recommendations apply to all the higher education institutes (to some more than others) unless stated otherwise. In the next section all higher education institutes will be treated individually by presenting their strengths and weaknesses and giving individual recommendations.

High-level managers acting as champions of entrepreneurship education

The number of high-level managers acting as champions of entrepreneurship at schools for higher professional education is lower than the number of high-level managers at university. However, the HEI 01MY is an exception. This implies that there is room for improvement at the other schools for higher professional education. The HEIs 21PI and 01MY have created large networks of which some high-level managers assume their roles as champions of entrepreneurship. There are also schools for higher professional education that have created a large network around their institutions. It is likely that there are high-level managers willing to take up their role as champions of entrepreneurship. These high-level managers can act as champions of entrepreneurship, and subsequently try to draw attention from the university

board with the aim of making entrepreneurship more central to the institution (NIRAS et al., 2008).

Self-generating income activities

In the report by NIRAS et al. (2008), it is stated that the best practices are involved in self-generated income activities. However, even though these do not constitute a large share of their income, the higher education institutes may be advised to become more involved in these activities. It would be a positive development if certain activities of the entrepreneurship education program were to generate income which could be allocated to the further development of the entrepreneurship education program (NIRAS et al., 2008). The centres of entrepreneurship play an important role in generating income (Menzies, 1998). According to NIRAS et al. (2008), the more a HEI is able to generate income of its own, the more entrepreneurship will become a permanent element of the education institute. Furthermore, self-generating activities reduce dependence on external funding.

Guest lectures

The percentage of guest lectures given in a course, with the exception of the 24LE (20%), is around half or smaller than the percentage of guest lectures at the 21PI (28%). This percentage can be increased. Guest lectures provide many benefits to the entrepreneurship education program. They are relatively inexpensive and they keep teaching up-to-date. Contacts between students and entrepreneurs contribute directly as well as indirectly to the success of entrepreneurship education (Brindley & Ritchie, 2000). Direct relations can be realized when entrepreneurs act as guest lecturers in the education program. Listening to guest lecturers is one of the ways in which students can become acquainted with real-life entrepreneurship problems. However, there can be a good reason for a lower percentage of guest speakers. One can confront students with real-life entrepreneurial problems in a different ways (e.g. by letting students interview entrepreneurs). This can be even more intensive and has more practice components than a guest lecture.

Involvement of the external environment

In general, the schools for higher professional education should try to involve the different actors in their environment in the program. Some schools for higher professional education

do not have any significant contacts with potential stakeholders, whereas others have contacts but stakeholders do not contribute to the entrepreneurship education program.

First of all, developing the entrepreneurial mind-set of students through practice needs opportunities to gain those experiences. Alumni and other stakeholders can play a vital role in offering these opportunities. One can choose to outsource the alumni organization to an external association. This organization can do data mining using alumni, can track their careers and create a professional network. This can increase the number of alumni involved in entrepreneurship education. The outsourcing of an alumni organization appears to be a successful way to manage the network as well.

Improving the involvement of alumni has more benefits than just more opportunities for entrepreneurial experience through practice. Alumni are beneficial to the entrepreneurship education set-up because they confront students with real-life entrepreneurial problems and keep the program up-to-date with reality. Also, using alumni enables an institution to increase the scope of the teaching because lectures can be given by guest speakers which can be alumni and other stakeholders, while the costs of extra lectures can still be kept low. The contacts of students with private companies can also be stimulated when keeping alumni and stakeholders closer in touch and inviting them to contribute to the entrepreneurship education program. Moreover, alumni can help students whose entrepreneurial intentions are triggered.

Share of the third flow of money

The percentage of third flow of money available to the schools for higher professional education may be increased if they are compared with the academic university that is part of this benchmark study. The 21PI outscores the other institutes who have around 20% third flow of money. This might imply that the schools for higher professional education should focus much more on companies in their environment. However, it should be clear that the schools for higher professional education in this benchmark sample have percentages of third flow of funding that are almost three times higher than the average in the Netherlands (based on statistics of CBS in 2006). At the academic university the focus is more on research and it is home to fundamental knowledge, capacities and facilities that support fundamental

research. This ultimately leads to third parties investing their money in contract research done by the university (CBS, 2006).

Investment in human resources

All the higher education institutes are recommended to encourage interest in entrepreneurship education by teachers and to give recognition for achievements by the entrepreneurship education teachers. Moreover, the percentage of teachers who are trained for entrepreneurship education is far too low (except the 22ND). Investment in human resources benefits the entrepreneurship education program because teachers can provide the necessary teaching methods. When looking at the overall satisfaction regarding funding for the old program and for new initiatives it seems that there are resources available that can be used for investment in human resources. However, another way to facilitate entrepreneurship education can be to appoint practitioners for the already fully developed entrepreneurship education courses. This is less costly compared to training teachers and is therefore an interesting option for entrepreneurship education programs facing cutbacks.

6.3 Individual recommendations for higher education institutes

In the following section each higher education institute is covered individually. First we will present the strengths and weaknesses of the higher education institute. Then we will elaborate on the strengths of the HEI. Finally we will consider those points which in our view need improvement.

6.3.1 01MY

Table XV Strengths and Weaknesses 01MY

Strengths	Weaknesses
<ul style="list-style-type: none"> • Primary strategic responsibility is located at the highest management level of the institution 	<ul style="list-style-type: none"> • Investment in human resources receives little attention
<ul style="list-style-type: none"> • Clear entrepreneurship policies, entrepreneurship education policies and policies to attract people from the business world. 	<ul style="list-style-type: none"> • No special attention given to the involvement of entrepreneurship in the community
<ul style="list-style-type: none"> • Presence of a lector and an entrepreneurship department 	<ul style="list-style-type: none"> • There is alumni management but the potential is not fully used yet for the entrepreneurship education program
<ul style="list-style-type: none"> • Large offer of, and large student audience for, different types of entrepreneurship education 	
<ul style="list-style-type: none"> • Many different studies and different teachers involved in entrepreneurship education 	
<ul style="list-style-type: none"> • Well organised evaluation of program and environment 	

The 01MY is one of the best performing schools for higher professional education. They perform particularly well on entrepreneurial students through education. First of all, entrepreneurship is embedded in their strategy. Secondly, they have laid the foundation for their success by having clear entrepreneurship education policies and a policy to attract people from the business world. Thirdly, the primary strategic responsibility is situated at the highest management level of the HEI.

Besides the strategy, there is also a good institutional infrastructure for entrepreneurship education at the O1MY. The institution offers a lot of facilities that support entrepreneurship education and it has lectureships in entrepreneurship. Moreover, the O1MY has many students from various disciplines enrolled for entrepreneurship courses. This demand is met by a large supply of different courses and activities. There are a lot of courses offered that have the size of 15 ECTS, which means that many hours are needed to pass the course. This is the equivalent of a quarter of an academic year of education, which means that there is a large offer of entrepreneurship education in the program.

Findings indicate that their well-managed strategy and institutional infrastructure positively affect the framework condition education. Their education scope and their education set-up are outstanding. They offer individual courses, bachelor minor and a full Bachelor of Science degree in entrepreneurship. Their applied pedagogic methods are focused on self-reflection and are perfectly action-based.

Development

This framework condition refers to the effort to effectuate continuous improvement of entrepreneurship at the HEI. The framework condition development is measured by three indicators: user-driven improvement, evaluation of goals, and investment in human resources.

The higher education institute O1MY shows good management of evaluations and user-driven improvement. However, there is a lack of investment in human resources. If O1MY wants to have lecturers that are trained to teach the didactics needed for entrepreneurship, they should first of all use more means and different ways of encouraging teachers to become engaged in entrepreneurship education. The same holds for recognition for the achievements by teachers engaged in entrepreneurship. Finally measures should be taken to ensure that teachers receive training for facilitating entrepreneurship education.

Outreach

The framework condition outreach is measured by three indicators: the links between an HEI and various external stakeholders; the availability of an established alumni network; and community engagement by contributing to society and providing knowledge, which is an indicator of the knowledge transfer of the HEI.

First of all, foundations and science parks should become more involved and contribute to the entrepreneurship education program financially or by helping with the content of the entrepreneurship education program.

Secondly, the O1MY can become much more involved in society by creating an advice centre for people who have entrepreneurial intentions. These people should also be assisted by entrepreneurial alumni or other practitioners that can act as mentors. Furthermore, the spreading of entrepreneurship abilities in schools is good for the community and shows the institution's involvement in society. If the number of alumni increases, and that of the stakeholders as well, entrepreneurship education will benefit. However, the first steps to achieve this have already been made and in 2012 a new building will be opened that should promote the cross-fertilization of ideas and entrepreneurial intentions.

Institutional infrastructure

The framework condition institutional infrastructure is a broad framework condition in the sense that it has three different sub-indices. It involves the facilities that support entrepreneurship education, research regarding entrepreneurship and the level of cross-disciplinary structures.

The higher education institute O1MY has no peer-reviewed studies in ISI journals. Even though the focus of schools for higher professional education is more on education than research, if it really wants to take entrepreneurship education seriously, it should publish more peer-reviewed studies, which should be possible because they have a professor of applied sciences involved in entrepreneurship whose job it is to also pay attention to entrepreneurship research.

6.3.2 21CW

Table XVI Strengths and Weaknesses 21CW

Strengths	weaknesses
<ul style="list-style-type: none"> • Central place of entrepreneurship in the mission and strategic plan supported by situating primary strategic responsibility at highest management level 	<ul style="list-style-type: none"> • Few facilities offered compared with other 'best practice' higher education institutes
<ul style="list-style-type: none"> • The primary strategic responsibility lies with the provost 	<ul style="list-style-type: none"> • Relatively few stakeholders involved in the entrepreneurship program
<ul style="list-style-type: none"> • Structural evaluation of: students' careers, stakeholders' needs and goals/strategies 	<ul style="list-style-type: none"> • Relatively low scores on education set-up
<ul style="list-style-type: none"> • Recognition for teachers' achievements in entrepreneurship education 	<ul style="list-style-type: none"> • Relatively low number of students and teachers from different disciplines attending/facilitating entrepreneurship education
<ul style="list-style-type: none"> • Relatively large-scale executive education 	

The school for higher professional education 21CW is one of the best practices schools for higher professional education. Furthermore, 21CW is performing fairly well on knowledge transfer and entrepreneurial students through education. The 21CW scores fairly well on entrepreneurial students through practice. This higher education institute has constant scores on the performance indicators and on most of the framework conditions.

The higher education institute 21CW has a central place for entrepreneurship in their mission statement and in their strategic plan. In combination with support by the provost, who carries the primary strategic responsibility for the entrepreneurship education program, there is a solid foundation for a best practice entrepreneurship education program.

Another strength is the management of evaluating goals and strategies of the entrepreneurship education program and students' careers and whether stakeholders' needs are met. This benefits the performance of the entrepreneurship education program in the

long run. Furthermore, there are investments in teachers in entrepreneurship education by rewarding them for their achievements in entrepreneurship education.

What is special about the HEI 21CW, and what distinguishes it from the other schools for higher professional education, is their large-scale executive education. However, there is always room for improvement of some framework conditions on which 21CW has a relatively lower score.

institutional infrastructure

The framework condition institutional infrastructure is a broad framework condition in the sense that it has three different sub-indices. These sub-indices are: the availability of physical structures (approaches), the presence of entrepreneurship research and the level of cross-disciplinary structures.

The HEI 21CW should make more students from different disciplines involved in entrepreneurship education. It seems that there is enough budget to realize this. Cooperation of multiple chair groups can play an essential role in this process.

Compared to other best practices, the 21CW does not offer many facilities. One opportunity for improvement could be to establish a lectureship in entrepreneurship as the other best practices, 01MY and 25BG, have done. Useful networks will develop around the lectureships and this can be beneficial to the entrepreneurship education program. As at 01MY, incubator facilities can be combined with the lectureships to make it possible for students to do more with their entrepreneurial intentions and turn intentions into action.

The number of disciplines involved in entrepreneurship education program can be improved. This can be achieved by involving more different chair groups in the development of entrepreneurship education. Cross-functional learning can instil entrepreneurial thinking in all disciplines (Wilson, 2008). This stimulates the spread of entrepreneurship through the whole institution instead of only those departments associated with business administration or agribusiness.

Outreach

The framework condition outreach is measured by three indicators: the links between an HEI and various external stakeholders; the availability of an established alumni network; and

community engagement by contributing to society and providing knowledge, which is an indicator of the knowledge transfer of the HEI.

Although 21CW scores quite well on percentage of guest lectures, there is still room for improvement. Having closer contacts with external stakeholders can play a role in this process, and they also contribute to the program (e.g. by providing guest lecturers). Confronting students with guest lecturers is one of the ways students can be confronted with real-life entrepreneurship. Another opportunity to confront students with real-life entrepreneurial problems is for example allowing students to interview actual entrepreneurs. This can be even more intensive and can have more practice components than a guest lecture.

Resources

The framework conditions resources consist of three indicators. Allocation of resources, types of sources and the self-generating income activities by the institution are indicators of the framework condition resources.

Financial resources (among others) are important for the entrepreneurship education program because good entrepreneurship education programs have teaching methods that are expensive. The diversity of income sources and the duration for which these sources are available to the program are important for creating a sustainable program over time. Because the available budget is not structurally available to the entrepreneurship program over time, this is an issue that 21CW should pay attention to.

6.3.3 22ND

Table XVII Strengths and Weaknesses 22ND

Strengths	Weaknesses
<ul style="list-style-type: none"> • Relatively large share of students with entrepreneurial mind-set through education. 	<ul style="list-style-type: none"> • Little attention paid to entrepreneurship and knowledge valorisation in mission statement and strategic plan
<ul style="list-style-type: none"> • Action based teaching methods with a focus on practical entrepreneurial experiences 	<ul style="list-style-type: none"> • Low number of alumni involved in the entrepreneurship education program
<ul style="list-style-type: none"> • Many types of entrepreneurship education program evaluators 	<ul style="list-style-type: none"> • Low number of high-level managers acting as champions of entrepreneurship education
<ul style="list-style-type: none"> • Large percentage of teachers trained for entrepreneurship education 	<ul style="list-style-type: none"> • Small percentage of guest lectures.
<ul style="list-style-type: none"> • Many different disciplines represented by teachers and students 	<ul style="list-style-type: none"> • No explicit policy to attract people from business world

The school for higher professional education 22ND is the higher education institute which is not among the best practices. This is mainly due to its relatively low score on the indicator entrepreneurial students through practice; in comparison with other HEIs in absolute numbers a small share of students receive entrepreneurship education. However, on some framework conditions and their indicators 22ND yet shows excellent scores.

For instance, 22ND is the only higher education institute that trains its teachers for entrepreneurship education. Investment in human resources benefits the entrepreneurship education program because teachers are stimulated and trained to teach in entrepreneurship education and can provide the necessary teaching methods. Also, many different types of self-evaluation are used and there is a clear focus on practical entrepreneurial experiences like internships. This is beneficial to the entrepreneurship education program especially in the long run. With regard to this framework condition, 22ND can inspire other HEIs to improve their programs.

Strategy

“the strategic dimension must be considered of crucial importance if higher education institutes want to fulfil the ambition to become entrepreneurial” (NIRAS et al., 2008: 91). The framework condition strategy consists of the three indicators goals, policies and embeddedness.

The HEI 22ND has a large percentage of departments that have their own entrepreneurship policy plans. However, if this HEI considers entrepreneurship really important they should improve some aspects regarding the framework condition strategy. They could consider embedding entrepreneurship (education) in their mission statement and their strategic plan.

Another possibility is having more high-level managers acting as champions of entrepreneurship. Champions of entrepreneurship can convince the management that entrepreneurship education is important, which in turn is beneficial to the embeddedness of entrepreneurship education throughout the institution. The HEIs can make use of the knowledge and experience of these practitioners in the development of their education program. Moreover, with the help of practitioners, the HEI can build a highly profiled network of entrepreneurs (Hoffman et al., 2004).

Outreach

The framework condition outreach is measured by three indicators: the links between an HEI and various external stakeholders; the availability of an established alumni network; and community engagement by contributing to society and providing knowledge, which is an indicator of the knowledge transfer of the HEI.

In order to increase the performance indicator entrepreneurial mind-set of students through practice, students must be given opportunities to gain practical experience. Alumni and other stakeholders can play a vital role in offering these opportunities. When looking at the score of 22ND on the indicators stakeholders and alumni, we can conclude that there is room for improvement. There are already contacts with all different types of stakeholders, but they do not contribute to the program yet. 22ND does not keep track of the careers of their alumni and do not involve them as other HEIs do. 22ND can decide to outsource the alumni organization to an external association. This organization can do data mining using alumni, can track their careers and create a professional network. This can increase the number of

alumni involved in entrepreneurship education. Alumni are beneficial to the entrepreneurship education set-up because they confront students with real-life entrepreneurial problems and can provide guest speakers. Also, using alumni can increase the contacts of students with private companies, and can moreover increase the funds obtained from alumni.

Resources

The framework conditions resources consist of three indicators. Allocation of resources, types of sources and the institution's own generated income are indicators of the framework condition resources.

If 22ND chooses to give entrepreneurship education a more prominent place in the institution, it should increase the resources allocated to the program as well. These resources should be used to increase the number of facilities offered by the HEI for the entrepreneurship program. Moreover the resources should be allocated to encourage and/or show recognition for entrepreneurship education teachers.

6.3.4 25BG

Table XVIII Strengths and Weaknesses 25BG

Strengths	Weaknesses
<ul style="list-style-type: none"> • Primary strategic responsibility for the entrepreneurship education program is carried by the provost 	<ul style="list-style-type: none"> • Only individual courses in entrepreneurship offered
<ul style="list-style-type: none"> • Many facilities offered and disciplines represented by teachers and students 	<ul style="list-style-type: none"> • Few contacts with external stakeholders
<ul style="list-style-type: none"> • High involvement in the community 	<ul style="list-style-type: none"> • The involvement of alumni in the entrepreneurship education program is quite low; also alumni are not kept track of
<ul style="list-style-type: none"> • Very sufficient and well-organised portfolio of sources of income 	<ul style="list-style-type: none"> • Relatively low investment in human resources
<ul style="list-style-type: none"> • Involved in self-generating income activities 	
<ul style="list-style-type: none"> • Large program in vocational guidance 	

25BG shows that entrepreneurship is central in their mission statement and the strategic plan of the HEI. Moreover, the primary strategic responsibility is situated at the highest management level of the institution. 25BG is one of the few higher education institutes with high scores on both framework conditions strategy and resources.

Some specific activities of 25BG can be used as an inspiration to other HEIs, for example the large-scale vocational guidance. With vocational guidance students are trained for a specific career, like starting one’s own business. Furthermore, 25BG is also highly involved in the distribution of entrepreneurship in society. This is also reflected by the relatively high number of self-generated income activities.

Education

The framework condition education concerns all educational activities of the

entrepreneurship education program. The framework condition education is measured by the two indicators: scope and set-up.

The indicator education set-up is well managed by the HEI 25BG. However, regarding education scope there can be room for improvement. In absolute numbers there are many students attending entrepreneurship education, but in relation to the total number of students, their number is quite low. This can be due to the fact that there are only entrepreneurship courses offered and no other forms of entrepreneurship education. And even though there are only courses offered, the number of courses offered is rather low. Therefore the first recommendation is to offer different types of entrepreneurship education. The HEI 25BG should focus on increasing the scale of entrepreneurship education, to get more students involved in entrepreneurship education, also students from departments which are not directly associated with entrepreneurship should become involved in entrepreneurship education.

Outreach

The framework condition outreach is measured by three indicators: the links between an HEI and various external stakeholders; the availability of an established alumni network; and community engagement by contributing to society and providing knowledge, which is an indicator of the knowledge transfer of the HEI.

The 25BG is highly involved in the community but it is not very successful in getting stakeholders involved in their program. These stakeholders can greatly benefit the program if they can be persuaded to contribute. The 25BG can use the 21PI as an example for stakeholders contributing to the program. The 21PI has stakeholders involved in their program as guest lecturers, to finance parts of the program or coach students or staff. The 25BG should involve more stakeholders in the entrepreneurship education program because both sides can benefit from each other.

Furthermore, the 25BG should involve more alumni and let them contribute to the entrepreneurship education program. This can be achieved by having alumni as guest lecturers or by keeping track of them and trying to involve their companies as stakeholders in the program. Having a well-managed alumni organization can help a higher education

institute with this. Higher education institutes participating in this benchmark report with organized alumni management show good performances.

Development

This framework condition refers to the effort to effectuate a continuous improvement of entrepreneurship at the HEI. The framework condition development is measured by three indicators: user-driven improvement, evaluation of goals, and investment in human resources.

The HEI 25BG should increase the means for encouraging lecturers to teach in entrepreneurship education and for showing greater recognition for their achievements. This can be done by offering time for training, having an awards system, and so on. A greater number of lecturers willing to teach entrepreneurship education also makes it possible to offer more courses in entrepreneurship. Investment in human resources benefits the entrepreneurship education program because teachers can provide the necessary teaching methods. However, another way to facilitate entrepreneurship education can be to appoint practitioners as teachers in the already fully developed entrepreneurship education courses.

6.3.5 24LE

Table XIX Strengths and Weaknesses 24LE

Strengths	Weaknesses
<ul style="list-style-type: none"> • Many types of entrepreneurship education offered 	<ul style="list-style-type: none"> • Relatively low involvement of the entrepreneurship education program in the community
<ul style="list-style-type: none"> • Many contacts with (contributing) external stakeholders 	<ul style="list-style-type: none"> • There are no formal evaluations of students' careers, stakeholders' needs and goals
<ul style="list-style-type: none"> • Policies are present to attract lecturers from the business world 	<ul style="list-style-type: none"> • Absence of peer reviews evaluating the entrepreneurship education
<ul style="list-style-type: none"> • High number of ECTS dedicated to practical entrepreneurship education 	<ul style="list-style-type: none"> • There is no special policy to invest in human resources for entrepreneurship education

24LE is a school for higher professional education which is not among the best practices in this benchmark study. The HEI 24LE does not have a high score on any of the performance indicators: knowledge transfer, entrepreneurial students through education and entrepreneurial students through practice. 24LE has mediocre scores on the framework conditions and is lagging behind the other HEIs. Therefore 24LE can learn considerably from the activities carried out by the best practice institutes in this study.

When we look at the scores of 24LE on the framework conditions, it appears that some activities of their entrepreneurship education program are excellent. First of all, they offer a wide variety of study programs focusing on entrepreneurship. Second, their teaching methods focus to a large extent on practical experience. But there is also room for improvement. For instance it is a pity that the share of students that gain entrepreneurial experience through education is rather low for a higher education institute with an outstanding variety of programs for students who want to become more entrepreneurial.

Outreach

The framework condition outreach is measured by three indicators: the links between an HEI

and various external stakeholders; the availability of an established alumni network; and community engagement by contributing to society and providing knowledge, which is an indicator of the knowledge transfer of the HEI.

The HEI 24LE has many links with external stakeholders who also contribute to the entrepreneurship education program. However, their involvement in the community regarding the distribution of entrepreneurship is relatively low. The HEI 24LE does promote and inform about entrepreneurship in schools. However, there are more activities that can help this HEI become more involved in the community and increase its knowledge transfer. First of all it can help entrepreneurs in its own environment by offering advisory services in an advice centre. This can stimulate the exchange of knowledge, expertise and ideas between entrepreneurs and the HEI which is beneficial to both actors. The same benefits can be obtained from having entrepreneurial events open to other people than students. The offering of advisory services can be supported with training courses for entrepreneurs. All together these measures can improve ties with entrepreneurs in the community that in turn can bring authentic entrepreneurship to the HEI for guest lectures or coaching of students.

Development

This framework condition refers to the effort to effectuate continuous improvement of entrepreneurship at the HEI. The framework condition development is measured by three indicators: user-driven improvement, evaluation of goals, and investment in human resources.

The HEI 24LE makes use of self-evaluation by teachers. Also students evaluate the entrepreneurship education. However, there are still opportunities to further improve this framework condition. Improvement of the entrepreneurship education starts with improving the framework condition strategy as mentioned before. When an HEI has clear goals and strategies, it is also easier to evaluate whether these goals and strategies are being reached. Besides these goals and strategies, it is important to evaluate the effect of entrepreneurship education on students' careers and whether the needs of the stakeholders of the program are met.

Feedback on entrepreneurship education courses can be received from other teachers. This can lead to improvement of the courses with the help of advice from other teachers. An

example of a feedback mechanism used by the HEI 21PI is peer review by teachers from other institutions in the form of an exchange of course manuals, allowing the other teachers to give advice for improvement based on an examination of these manuals. Cross-fertilization by exchanging ideas and expertise can lead to improvement of courses and therefore the entrepreneurship education program as a whole.

The HEI 24LE can improve formal evaluation of goals and strategies by organizing meetings every three months. In every meeting a different team (e.g. lecturers, program coordinators etcetera) should present their goals and the strategy to reach them. Also they should reflect on whether these goals are being attained or not and the reasons why or why not. After the presentation, the other teams should give feedback and so help the first team by giving advice on how to improve the strategy or formulate goals. This method of evaluation is used at another HEI where it has met with wide approval.

Strategy.

“The strategic dimension must be considered of crucial importance if higher education institutes want to fulfil the ambition to become entrepreneurial” (NIRAS et al., 2008: 91). The framework condition strategy consists of the three indicators: goals, policies and embeddedness.

One of the strengths of 24LE with regard to the framework condition strategy is their clear policies to attract employees from the business world. However, there is also room for improvement. The HEI 24LE scores relatively low on this framework condition, especially with regard to written documents for entrepreneurship (education). If 24LE wants to take entrepreneurship education seriously, then the first thing to improve is the communication of entrepreneurship in order to embed entrepreneurship through the education institute. This can be realized by giving entrepreneurship and commercialization and valorisation of knowledge a more central place in the mission statement and the strategic plan. Subsequently one should develop clear entrepreneurship education policy/action plans. When setting goals and strategies specifically for entrepreneurship education and communicating them, people can become more motivated. Besides communication through written documents, 24LE should try to increase the number of high-level managers acting as champions of entrepreneurship education in the institute.

institutional infrastructure

The framework condition institutional infrastructure is a broad framework condition in the sense that it has three different sub-indices. It involves the facilities that support entrepreneurship education, research regarding entrepreneurship and the level of cross-disciplinary structures.

The HEI 24LE has many different facilities that support entrepreneurship education. However, there are some aspects of institutional infrastructure that should be improved if 24LE really intends to take their entrepreneurship education seriously. There are few students attending entrepreneurship education from different disciplines. If more students from different disciplines become acquainted with entrepreneurship education, the demand for entrepreneurship education is likely to increase. Moreover, when different disciplines are involved in entrepreneurship education, cross-fertilization of knowledge and ideas between students is stimulated. These students in turn can make other students interested. Cooperation of multiple chair groups can play a role in stimulating entrepreneurship among their students and/or try to incorporate more entrepreneurial aspects in their education, which can attract students to the entrepreneurship courses.

6.3.6 21PI

Table XX Strengths and Weaknesses 21PI

Strengths	Weaknesses
<ul style="list-style-type: none"> • Many links with different stakeholders 	<ul style="list-style-type: none"> • Relatively low embeddedness of entrepreneurship in the overall university
<ul style="list-style-type: none"> • Good management of alumni 	<ul style="list-style-type: none"> • Practical entrepreneurial experience does not have a priority when hiring new employees
<ul style="list-style-type: none"> • Clearly written entrepreneurship education plans 	<ul style="list-style-type: none"> • Few student contacts with private companies
<ul style="list-style-type: none"> • All faculties have their own entrepreneurship plans 	<ul style="list-style-type: none"> • Relatively limited investment in human resources
<ul style="list-style-type: none"> • High entrepreneurial involvement in its environment 	
<ul style="list-style-type: none"> • Good evaluation methods 	
<ul style="list-style-type: none"> • Relatively many high-level managers acting as champions of entrepreneurship 	
<ul style="list-style-type: none"> • Relatively many peer-reviewed studies for a university with no chair group and 0.2 FTE professors 	
<ul style="list-style-type: none"> • Relatively much vocational guidance 	
<ul style="list-style-type: none"> • Many resources available for the current program and new initiatives 	

The HEI 21PI is among the best practice institutes of this benchmark study. This is mainly due to it being the type of institute that focuses on knowledge transfer through commercialization and valorisation. Therefore this HEI serves as a role model for other HEIs when it comes to knowledge transfer. The activities carried out by this institute regarding research and outreach are used as an inspiration to other HEIs to stimulate their knowledge transfer.

However, when looking at the share of students that develop an entrepreneurial mind-set through education some improvements seem to be desirable. However, 21PI can learn from

activities carried out by 01MY and 21CW to improve the development of an entrepreneurial mind-set through education and practical experiences.

Strategy

“the strategic dimension must be considered of crucial importance if higher education institutes want to fulfil the ambition to become entrepreneurial” (NIRAS et al., 2008: 91). The framework condition strategy consists of the three indicators goals, policies and embeddedness.

It seems that there are two ways to embed entrepreneurship through the HEI. Instead of communicating entrepreneurial intentions through the mission statement and strategic plan, the HEI 21PI embeds entrepreneurship in the institution by engaging in the following activities. First of all, it uses high-level managers acting as champions of entrepreneurship to embed entrepreneurship in the institution. Secondly, the faculties are autonomous in their entrepreneurship practices because every faculty has its own entrepreneurship plans. Thirdly, there are clearly written entrepreneurship education plans at the faculty of social sciences. However, there are also some points that need improvement.

If entrepreneurship education is really important for 21PI it should improve some aspects of strategy. First of all, entrepreneurship should get a more central place in the mission statement or strategic plan of the university. Secondly, primary strategic responsibility is at professorial level, which is lower in the hierarchy of HEIs. Support from higher positions in the institution could positively affect the embeddedness of entrepreneurship at the lower positions of the HEI (NIRAS et al., 2008). Therefore if one wants to make entrepreneurship embedded through the university, the primary strategic responsibility and the overall university strategy plans are issues that need improvement.

Institutional infrastructure

Besides the indicator approach, which focuses on facilities, there are the two other indicators: research and level of cross-disciplines. The HEI 21PI published many peer-reviewed studies, especially when considering that there is no full-time professor dedicated to entrepreneurship. Therefore this HEI serves as a best practice when it comes to research and knowledge transfer.

The third indicator is the cross-disciplinary structures involved in entrepreneurship education. The cooperation between chair groups is excellently managed at the 21PI which manifests itself in the number of courses created by collaboration of multiple chair groups. However, findings indicate that the number of different departments with students that attend entrepreneurship education at 21PI is relatively low. If entrepreneurship education is really important university wide, then entrepreneurship should be more embedded in courses not directly linked to entrepreneurship. This can increase the interest of students who are not already acquainted with entrepreneurship. Subsequently, these students may well be persuaded to attend courses of which entrepreneurship is the main subject. Ultimately this can lead to an increase in the number of disciplines reached by entrepreneurship education.

Education

The framework condition education concerns all educational activities of the entrepreneurship education program. The framework condition education is measured by two indicators: scope and set-up.

Like almost every other HEI the 21PI offers the three most common types of education. Individual courses can be attended, a B.Sc. minor is offered and a PhD in entrepreneurship. There are education institutes in the sample that manage to reach a larger share of students than 21PI. This might imply that there is room for the 21PI as well to reach more students. The students that become interested in entrepreneurship in their bachelor stage are faced with the absence of entrepreneurship education aimed at master students. Therefore offering more entrepreneurship education to students in their masters can be beneficial and will favourably distinguish 21PI from other HEIs.

The 21PI is an average scoring university regarding the level of experimental and real-life entrepreneurial learning. However, the number of contacts with private companies by students is relatively low and needs improvement. This will benefit the entrepreneurial mind-set of students through practice. There are many contacts with stakeholders and alumni. Therefore it is likely that there are opportunities for students to get in contact with companies.

Development

This framework condition refers to the effort to effectuate continuous improvement of entrepreneurship at the HEI. The framework condition development is measured by three indicators: user-driven improvement, evaluation of goals, and investment in human resources.

The HEI 21PI has one of the highest scores on the indicators user-driven improvement and evaluation of goals. Moreover, teachers are in many ways encouraged to engage in entrepreneurship education.

However, teachers are not specifically trained for entrepreneurship education. Investment in human resources benefits the entrepreneurship education program because teachers are stimulated and trained to teach in entrepreneurship education and can provide the necessary teaching methods. Another way is to appoint practitioners to teach the already fully developed entrepreneurship education courses. Especially in times of cutbacks this can be a good alternative to training teachers, which is more costly.

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Appendix A1 – Constructs, operationalization and measurements

Table XXI Operationalization of constructs

Constructs	Operationalization of constructs	Measurement
Strategy	<p>Goals</p> <ul style="list-style-type: none"> • Embeddedness of mission statement • Embeddedness of strategic plan <p>Policies</p> <ul style="list-style-type: none"> • Departments with own policies • Clear institutional policy/action plans • Policy to attract employees from business <p>Embeddedness</p> <ul style="list-style-type: none"> • Placement of primary strategic responsibility • Number of high-level managers 	<ul style="list-style-type: none"> ➤ 5 points scale by doing content analysis for both questions ➤ In percentage of all departments ➤ Semantic differential (SD) scale from totally agree to totally disagree for both questions ➤ 7 point ladder with principal/ rector/ provost highest and none lowest measured as ratio variable
Resources	<p>Allocation</p> <ul style="list-style-type: none"> • Support with funding • Available budget for new entrepreneurship initiatives • Share of budget for entrepreneurship activities <p>Type/sources</p> <ul style="list-style-type: none"> • What sources of budget and what share • How long are the sources available <p>Self-generated income</p> <ul style="list-style-type: none"> • What income generating activities 	<ul style="list-style-type: none"> ➤ SD from very insufficient to very sufficient ➤ SD from totally disagree to totally agree ➤ calculated from annual financial plan in percentages ➤ Options indicated percentages in ratio in years ➤ six options offered
Institutional infrastructure	<p>Approaches</p> <ul style="list-style-type: none"> • Presence of a chair group • External or internal centre of entrepreneurship • Availability of incubator facilities • Presence of Technology Transfer Office • Meeting room for entrepreneurship students <p>Research</p> <ul style="list-style-type: none"> • Number of peer-reviewed studies on entrepreneurship • Number of entrepreneurship chairs/professorships <p>Level of cross-disciplines</p> <ul style="list-style-type: none"> • Teachers from multiple disciplines • Students from multiple disciplines • Courses developed by cooperation of multiple chair groups 	<ul style="list-style-type: none"> ➤ Yes/no ➤ Internal/external ➤ Yes/no ➤ Yes/no ➤ Yes/no ➤ Ratio ➤ Number in Full Time Employees ➤ Average number of disciplines per course ➤ Average number of disciplines per course ➤ number of courses
Education	<p>Scope</p> <ul style="list-style-type: none"> • What type of education forms are offered • Average number of attendants for entrepreneurship courses • Average number of ECTS • Number of entrepreneurship courses • Attendants of executive education/ 	<ul style="list-style-type: none"> ➤ 7 options offered ➤ continue variable ➤ continuous variable ➤ continuous variable ➤ continuous variable

	<ul style="list-style-type: none"> management training Share of compulsory in-curricular entrepreneurship courses in Bachelor Share of compulsory in-curricular entrepreneurship courses in Master <p>Set-up</p> <ul style="list-style-type: none"> Teaching method Authenticity Guest speakers ECTS for internship or similar experience part of entrepreneurship education Contacts with private company 	<ul style="list-style-type: none"> ➤ Percentage ➤ Percentage ➤ SD from traditional to experimental + content analysis course manuals ➤ 5points scale totally disagree to totally agree + content analysis course manuals ➤ percentage of courses ➤ number of ECTS ➤ number of times in contact
Outreach	<p>External stakeholders</p> <ul style="list-style-type: none"> What links and how do they contribute Students participating in external entrepreneurship events <p>Community engagement</p> <ul style="list-style-type: none"> Attendants of vocational guidance/mentor schemes Third flow of funding Patents Availability of advice centre Support of entrepreneurship in schools Entrepreneurial events open for everyone Training for entrepreneurs and companies Support entrepreneurship international <p>Alumni</p> <ul style="list-style-type: none"> Reasons for keeping track of alumni Number of alumni involved in entrepreneurship program 	<ul style="list-style-type: none"> ➤ options offered ➤ number of students ➤ number of attendants ➤ percentage of income ➤ number of patents over last 3 years ➤ yes/no ➤ yes/no ➤ yes/no ➤ yes/no ➤ yes/no ➤ options offered ➤ amount of alumni
Development	<p>User-driven improvement</p> <ul style="list-style-type: none"> Methods used to evaluate entrepreneurship courses <p>Evaluation</p> <ul style="list-style-type: none"> Evaluation of effect entrepreneurship education on students' career Examination of needs of stakeholders Procedure for following up on institution's goals and policies <p>Human resources</p> <ul style="list-style-type: none"> Encouragement of teachers with entrepreneurship education initiatives Recognition for staff involved in entrepreneurship education Teachers engaged in training for improving their entrepreneurship education skills 	<ul style="list-style-type: none"> ➤ methods offered ➤ how often informal and formal in years ➤ how often informal and formal in years ➤ how often informal and formal in years ➤ Options offered ➤ Options offered ➤ Percentage of teachers engaged in training
Performance	<p>entrepreneurial students through learning</p> <ul style="list-style-type: none"> share of students attending entrepreneurship education <p>knowledge transfer</p> <ul style="list-style-type: none"> patents 	<ul style="list-style-type: none"> ➤ (average number of students per course multiplied by number of courses) divided by total number of students at education institute multiplied by average ECTS for course ➤ number of patents ➤ percentage third flow of funds

	<ul style="list-style-type: none">• third flow of funds• peer-reviewed ISI articles <p>entrepreneurial students through practice</p> <ul style="list-style-type: none">• executive education attendants• number of students involved in entrepreneurial activities outside institution	<ul style="list-style-type: none">➤ number of peer-reviewed articles➤ number of executive education attendants➤ Number of students involved in entrepreneurial activities outside of education institute
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Appendix A2 – Measurement

Performance

Entrepreneurial students through education

The share of entrepreneurial students through education is measured in the following way:

1. The total number of entrepreneurship education attendants = the average number of students enrolled for one entrepreneurship course multiplied by the number of entrepreneurship courses.
2. The share of the entrepreneurship education attendants = total number of entrepreneurship education attendants divided by the total number of students at the HEI.
3. Finally this is multiplied by the average number of ECTS for an entrepreneurship course to get the total number of hours in entrepreneurship education compensated by the size of the HEI.
4. The final score on this indicator is calculated by translating the result after step three into a five-point parametric scale where 1= the lowest number by a HEI in step three and 5= the highest number by a HEI.

Knowledge transfer

- The percentage of third flow of funding is calculated from the annual financial plan.
- The number of peer-reviewed studies in ISI journals is calculated from Web of Science.
- The number of patents is determined by accessing the World International Patenting Organisation database

The scores on each aspect are translated into a five-point parametric scale where 1= the lowest number by a HEI in step three and 5= the highest number by a HEI. The average score is taken from the three aspects measuring the indicator knowledge transfer.

Entrepreneurial students through practical experience

The number of entrepreneurship students at each institution which participate in entrepreneurship events/projects or business plan competitions outside our institution was gathered by answers from respondents. The scores on each aspect are translated into a five-point parametric scale where 1= the lowest number by a HEI in step three and 5= the highest number by a HEI.

The number of people attending the executive education/management training was gathered by answers from respondents. The scores on each aspect are translated into a five-point parametric scale where 1= the lowest number by a HEI in step three and 5= the highest number by a HEI.

Strategy

- 1= absence of entrepreneurship or commercialization and valorisation
- 2= implicit communication of entrepreneurship and/or commercialization and valorisation of knowledge
- 3= explicit presence of importance of entrepreneurship in the mission
- 4= explicit communication of entrepreneurship and more detailed communication of valorisation of research, and services
- 5= explicit communication of entrepreneurial actions of the university as a whole, in the field of education, through a market oriented education and expertise.

The more topics are represented in the strategic plan, the higher the score on this indicator.

The average score is taken from the questions regarding the HEI mission and strategic plan. This average score represents the score on the indicator *Goals*. This is one of the three indicators that measure the framework condition *strategy*. The final score on the framework condition strategy is the average score on the three indicators.

Operationalization of the indicator policy

- The scores on the percentage of departments with their own entrepreneurship policy plans are the following: 1= 0% - 20%, 2= 21% - 40%, 3= 41% - 60%, 4= 61% - 80% and 5= 81% - 100%.
- The level of agreement with the statement: Our institution has clearly written entrepreneurship education policy plans is scored by a five point semantic differential scale reaching from 1= totally disagree to 5 = totally agree

- The level of agreement with the statement: Our institution has a policy to attract/recruit employees which are active in business is scored by a five point semantic differential scale reaching from 1= totally disagree to 5 = totally agree

The average score is taken from the three questions measuring the indicator policies. This is one of the three indicators that measure the framework condition strategy. The average score of the indicator policies has an equal weight as the two other indicators: Goals and Embeddedness.

Operationalization of the indicator embeddedness

- The question: Where is the placement of the primary strategic responsibility for entrepreneurship education program at your institution, is scored with: 1= lecture, 2= professor, 3= Dean, 4= Pro-vice chancellor, 5= Principal, Rector, Provost.
- The answers to the question: How many high-level managers act as champions of entrepreneurship education and contribute to the development of the educational program, is translated into a five-point parametric scale where 1= the lowest given answer and 5= the highest given answer.

The average score is taken from the two questions measuring the indicator *Embeddedness*. This is one of the three indicators that measure the framework condition *strategy*. The average score of the indicator embeddedness has equal weight as the two other indicators: *Goals and Embeddedness*.

Resources

Operationalization of the indicator allocation

The level of agreement with the following two statements:

- Our institution has clearly written entrepreneurship education policy plans
- Our institution has a policy to attract/recruit employees which are active in business are scored by a five point semantic differential scale reaching from 1= totally disagree to 5 = totally agree.

The average score is taken from the two questions measuring the indicator *allocation*. This is one of the three indicators that measure the framework condition *Resources*. The final score on the framework condition *resources* is the average score on the three indicators: *allocation, type of sources and self-generating income activities*.

Operationalization of type of sources

- The score on the indicator type of sources is measured by the number of sources which can be five in total. Therefore the number of sources can reach from 1 to 5.
- The share of the income source times the length of availability to the program gives a number that indicates the income security. This number is translated into a five-point parametric scale with 1= the lowest number indicating income security and 5= the highest number indicating income security.

The average score is taken from the two questions measuring the indicator *type of sources*. This is one of the three indicators that measure the framework condition *resources*. The final score on the framework condition *resources* is the average score on the three indicators: *allocation, type of sources and self-generating income activities*.

Operationalization of self-generating activities

- What activities which generate income does your institution have? The score on this indicator is the following: 1= none, 2= 1 type of self-generating income activities, 3= 2 types, and so on

There is one question measuring the indicator *self-generating income activities*. This is one of the three indicators that measure the framework condition *Resources*. The final score on the framework condition *resources* is the average score on the three indicators: *allocation, type of sources and self-generating income activities*.

Institutional infrastructure

Operationalization of the indicator approaches

- There are five questions asked regarding the indicator approaches. The questions that are answered positively yielded 1 point. Therefore the total score when all facilities were offered resulted in a score of 5.

The score is taken from the five questions measuring the indicator *approaches*. This is one of the three indicators that measure the framework condition *institutional infrastructures*. The final score on the framework condition *institutional infrastructures* is the average score on the three indicators: *approaches, research and cross-disciplinary structures*.

Operationalization of research

- There is a five-point parametric scale ranging from the lowest number of peer-reviewed studies with a score of 1 to the highest number of peer-reviewed studies that received a score of five.
- The same procedure is used for the number of FTE in professorships/chairs.

The average score is taken from the two questions measuring the indicator *Research*. This is one of the three indicators that measure the framework condition *institutional infrastructures*. The final score on the framework condition *institutional infrastructures* is the average score on the three indicators: *approaches, research and cross-disciplinary structures*.

Operationalization of cross-disciplinary structures

- The three questions measuring the indicator cross-disciplinary structures were open questions that yielded absolute numbers. The scores were translated into five-point parametric scales where for each question separately the lowest given answer was scored with 1 and the highest given answer yielded a score of 5. This was done for all three questions measuring the indicator cross-disciplinary structures.

The average score is taken from the three questions measuring the indicator *cross-disciplinary structures*. This is one of the three indicators that measure the framework condition *institutional infrastructures*. The final score on the framework condition

institutional infrastructures is the average score on the three indicators: *approaches, research and cross-disciplinary structures*.

Education

Operationalization of education scope

- The first question measures the number of different types of entrepreneurship education. The score on this indicator represents the number of different types of education. Therefore a score 1 implies one type of entrepreneurship education, 2 implies two types of entrepreneurship education (e.g. entrepreneurship courses and PhD), and so on.
- The student volume is measured by three questions that are mentioned above. The answers are used to calculate the student volume. The scores on student volume are translated into a five-point parametric scale where 1= the lowest student volume number and 5= the highest student volume number.

The average score is taken from the three questions measuring the indicator *Education Scope*. This is one of the three indicators that measure the framework condition *Education*. The final score on the framework condition *Education* is the average score on the two indicators: *Education Scope and Education Set-up*.

Operationalization of education set-up

The answers were translated into a five-point parametric scale where 1= the lowest percentage of experiential learning and 5= the highest percentage of experiential learning.

Furthermore, a statement is presented to the effect that that the personality of students is developed by confronting them with real-life entrepreneurship problems. This question was measured on a five-point scale where 1= totally disagree and 5 = totally agree.

To measure the presence of guest lecturers, respondents were asked what percentage of all lectures in entrepreneurship course is given by guest speakers. The answers were translated into a five-point parametric scale where 1= the lowest percentage of guest lectures and 5= the highest percentage of guest lectures.

For both open questions the answers were translated into a five-point parametric scale where for the first question: 1= the lowest number of ECTS/semester credits and 5= the largest number of ECTS/semester credits. For the second question: 1= the lowest number of contacts with private companies and 5= the highest number of contacts with private companies.

The average score is taken from the five questions measuring the indicator *Education Set-up*. This is one of the three indicators that measure the framework condition *Education*. The final score on the framework condition *Education* is the average score on the three indicators: *Education Scope and Education Set-up*.

Outreach

Operationalization of links with external stakeholders

The links with external stakeholders is measured by the question: What links does your institution have with external stakeholders of your entrepreneurship education program and do they contribute to the entrepreneurship education program? The respondents were able to indicate just contacts, or whether they actually contribute. Contribution was split into financial or other means of contributing to the program.

The HEIs received points for every contact they have with each stakeholder and they received two points if these stakeholders also contribute to the program. Subsequently the total number of points was calculated. These total numbers of points were translated into a five-point parametric scale with 1= the lowest total points and 5= the highest total points.

The respondents needed to indicate whether there are: never (score =1), now and then (score= 2), regularly (score= 3), often (score= 4) or continuously (score= 5), students at the HEI that participate in entrepreneurship events outside the institution.

The average score is taken from the two questions measuring the indicator *External Contacts*. This is one of the three indicators that measure the framework condition *Outreach*. The final score on the framework condition *Outreach* is the average score on the three indicators: *External Contacts, Community Engagement and Alumni*.

Operationalization of the indicator community engagement

The answers were translated into a five-point parametric scale where 1= the lowest number of executive education attendants and 5= the largest number of executive education attendants.

The percentages of third flow of funding were translated into a five-point parametric scale where 1= the lowest percentage of third flow of funding and 5= the highest percentage of third flow of funding.

The number of patents was translated into a five-point parametric scale where 1= the lowest number of patents and 5= the highest number of patents.

For each of these five aspects, the HEI receives a point. Therefore the scores on these questions can range between 0 and 5.

The average score is taken from the four questions measuring the indicator *Community Engagement*. This is one of the three indicators that measure the framework condition *Outreach*. The final score on the framework condition *Outreach* is the average score on the three indicators: *External Contacts*, *Community Engagement* and *Alumni*.

Operationalization of the indicator alumni.

The reasons why HEIs keep track of alumni are five in total. Therefore the scores can reach from 0 to 5.

The question how many alumni are involved in the program is an open question. The answers were translated into a five-point parametric scale where 1= the lowest number of alumni involved in the program and 5= the highest number of alumni involved in the program.

The average score is taken from the two questions measuring the indicator *Alumni*. This is one of the three indicators that measure the framework condition *Outreach*. The final score on the framework condition *Outreach* is the average score on the three indicators: *External Contacts*, *Community Engagement* and *Alumni*.

Development

Operationalization of the indicator user-driven improvement

Every option used by the HEI yields 1 point. This implies that if all options are used the HEI receives a score of 5.

The score on the indicator *User-driven improvement* concerns(?) the number of different user-driven improvement methods used by the HEI. This is one of the three indicators that measure the framework condition *Development*. The final score on the framework condition *Development* is the average score on the three indicators: *User-driven improvement*, *Evaluation of goals and Investment in human resources*.

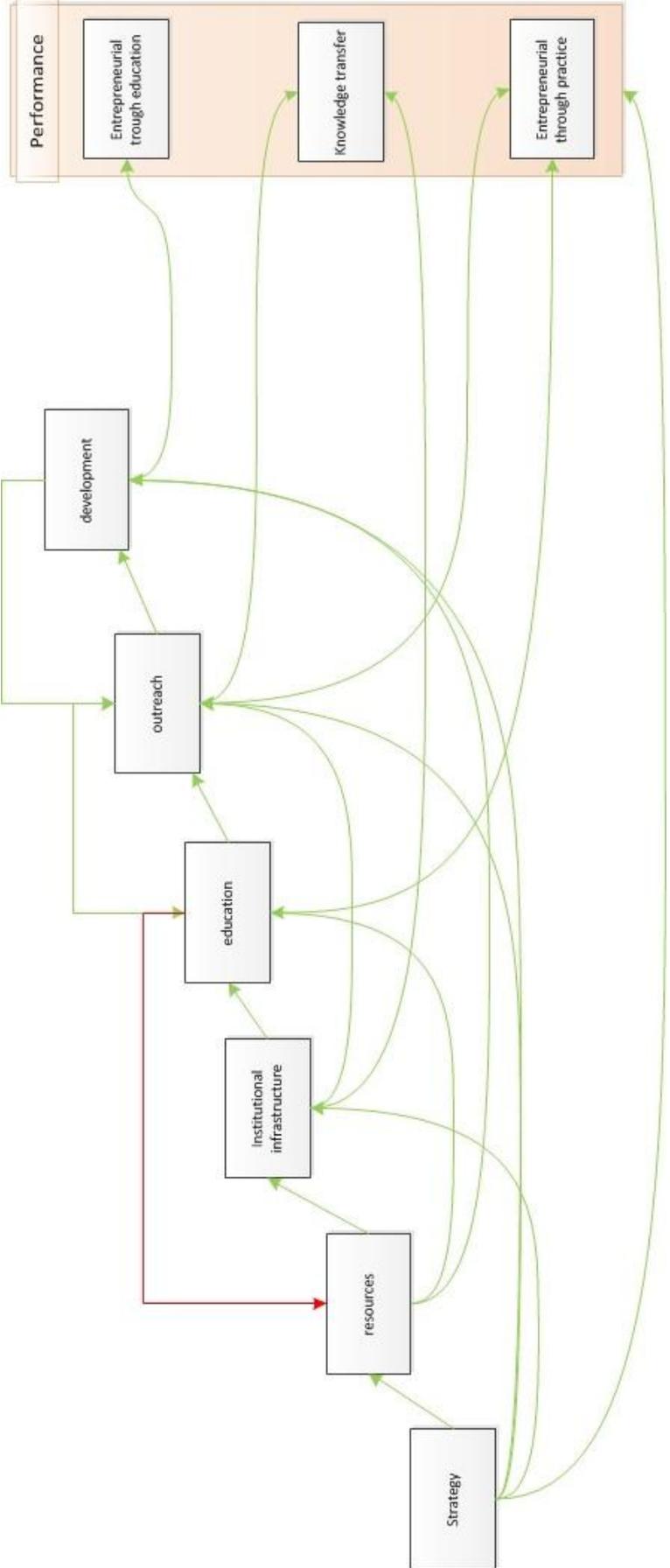
Operationalization of the indicator investment in human resources

- Every option indicated by the HEI yields 1 point. This implies that the scores can reach from 0 to 5.
- If the HEI indicated none it received a score of 0 and if it indicated all options it received a score of 5.
- The ratios were translated into a five-point parametric scale where 1= the lowest ratio and 5= the highest ratio.

The average score is taken from the three questions measuring the indicator *User-driven improvement*. This is one of the three indicators that measure the framework condition *Development*. The final score on the framework condition *Development* is the average score on the three indicators: *User-driven improvement*, *Evaluation of goals and Investment in human resources*.

Appendix B1 – Conceptual model

Table XXII Conceptual model



Appendix B2 – Hypotheses

This table presents the scientific foundation for the relationships in the conceptual model. There are recurring references as some of the aspect influence multiple dimensions

Table XXIII Hypotheses behind the model

Strategy --> institutional infrastructure
Strategy is essential for establishing well-functioning cooperation of multiple actors (Vesper & Gartner, 1997).
Strategy --> education
According to Hoffmann et al., (2004), a higher number of entrepreneurship courses and degrees among other things indicate a greater commitment from the university.
Strategy --> Outreach
Studies (Standish-Kuon & Price, 2002; Gibb & Hannon, 2006; Wilson, 2008) show the importance of champions for entrepreneurship for embedding entrepreneurship in an educational institute or part of a curriculum, utilise their knowledge and insights for the development of the program, and create high-profiled networks (Hoffman et al., 2004).
Strategy --> development
Making measurable goals in which entrepreneurship is embedded can stimulate development and assessment of the entrepreneurship education activities (NIRAS et al., 2008).
Strategy --> final performance
This benchmark explains the difference between front-runner institutions and the ones that lag behind. Moreover NIRAS et al. states that “the strategic dimension must be considered of crucial importance if higher education institutes want to fulfil the ambition to become entrepreneurial” (NIRAS et al., 2008: 91). They state that strategy and more specifically strategy and operational planning can act as a road map for successful entrepreneurship education programs (Vesper & Gartner, 1997). University governance and leadership do not directly contribute to entrepreneurship but they do create the context for successful entrepreneurship education (Sotiraku, 2004). The choice made by the director, support by the university senior management and input by the program’s staff positively affect the success of a program’s implementation. The university senior management can support the entrepreneurship program initiatives through the management (Mortimer, 1995).
Strategy --> knowledge transfer
Integrating entrepreneurship in the mission statement of the university indicates the

importance of the knowledge transfer to society through an entrepreneurial mind-set of the: different departments, chair groups or other entities in the institution (NIRAS et al., 2008).

Resources --> institutional infrastructure

Activities necessary for creating a distinctive entrepreneurship program need dedicated funding (NIRAS et al., 2008; Vesper & Gartner, 1997). The number, sources and time of availability of resources influence other aspects such as doing entrepreneurship research, training entrepreneurship teachers and so on (Vesper & Gartner, 1997). These in turn positively influence the performance.

Resources --> development

The number of sources and time of availability of resources influence aspects like training entrepreneurship teachers (Vesper & Gartner, 1997). Having sufficient resources to encourage lecturers is important for improving or sustaining necessary skills of employees. The lecturers should be trained and encouraged to attend training for entrepreneurship education (Wilson, 2008).

Resources --> final performance

Activities necessary for creating a distinctive entrepreneurship program need dedicated funding (NIRAS et al., 2008; Vesper & Gartner, 1997). The number, sources and time of availability of resources influence other aspects such as doing entrepreneurship research, training entrepreneurship teachers and so on (Vesper & Gartner, 1997). These in turn positively influence the performance.

Institutional infrastructure --> resources

The role of the centre of entrepreneurship is very important in generating income (Menzies, 1998).

Institutional infrastructure --> institutional infrastructure

Often, having entrepreneurship activities which generate income themselves leads to entrepreneurship becoming a permanent element of the education institute (NIRAS et al., 2008). The non-occupation of chairs and professorships makes it hard to sustain entrepreneurship efforts in the long term but also prevents institutions from investing time in entrepreneurship research (Wilson, 2008).

Institutional infrastructure --> education

Resources are necessary to start a new course on entrepreneurship (NIRAS et al., 2008). An entrepreneurship education program should have developed an environment of facilities that is conducive to learning for students. This means that the facilities must be available and accessible to students (Hynes, 1996). It is important to conduct research in order to improve teachers' and students' knowledge on entrepreneurship (Wilson, 2008). The non-occupation of chairs and professorships makes it hard to sustain entrepreneurship efforts in the long term but also prevents institutions from investing time in course development (Wilson, 2008). The process of minimising institutional barriers to realise cross-fertilisation provides creative and innovative learning. This can instil entrepreneurial thinking in all disciplines (Wilson, 2008).

Institutional infrastructure --> outreach

Centres of entrepreneurship also enhance entrepreneurship at the faculty and foster reputation and outreach (Menzies, 1998).

Institutional infrastructure --> final performance

Activities necessary for creating a distinctive entrepreneurship program need dedicated funding (NIRAS et al., 2008; Vesper & Gartner, 1997). Cooperation of multiple actors within the institution and its environment is therefore essential for establishing an effective entrepreneurship education program (Vesper & Gartner, 1997).

Institutional infrastructure --> knowledge transfer

Infrastructure available for knowledge valorisation, like a technology transfer office, stimulates knowledge transfer (Etzkowitz, 2003). Technology transfer offices are one of the factors which determine the productivity of technology transfer (Siegel & Phan, 2004). Technology transfer is a resource which is needed by entrepreneurship education (Souitaris et al., 2007).

Institutional infrastructure --> entrepreneurial students through practice

Centres of Entrepreneurship make it possible for students to start a company while studying (Rasmussen & Sørheim, 2006).

Education --> institutional infrastructure

The importance of educational infrastructures also becomes clear from the fact that entrepreneurial-directed approaches make greater demands on physical facilities. For example because of the need for smaller class sizes compared to traditional education (Garavan & O'Conneide, 1994).

Education --> outreach
Internships or similar placements (Kirby, 1998; Westhead et al., 2000) and student consulting projects with small firms (Hollingsworth et al., 1974; Sonfield, 1981; Holoviak and Ackelsberg, 1983; Chan and Anderson, 1994; Brindley and Ritchie, 2000) benefit entrepreneurship education in different ways. Both parties engage in problems and enable experiential learning (Carson, 1985; Chan and Anderson, 1994; Wani et al., 2004). Student awareness of entrepreneurship can be raised (Ridder & van der Sleijde, 2003). Students can become resources for local firms (Hollingsworth et al., 1974; Sonfield, 1981; Long & Ohtani, 1988).
Education --> final performance
Education is a benchmark which directly influences the competences of students. Students gain knowledge about entrepreneurship in a direct way through education (Souitaris et al. 1997). Moreover, by means of education one can influence attitudes (Lepoutre et al. 2010) and intentions and ultimately the entrepreneurial behaviour of students (Souitaris et al. 2007). But besides the content of the courses and their accessibility to students, the didactic methods are important in developing an entrepreneurial mind-set in students (Lans & Gulikers, 2010). The presence of experimental teaching (Hoffman et al., 2004) promotes innovative behaviour, self-assessment and an entrepreneurial spirit (Blenker et al., 2006).
Education --> entrepreneurial students through practice
Moreover, by means of education one can influence attitudes (Lepoutre et al. 2010) and intentions and ultimately the entrepreneurial behaviour of students (Souitaris et al. 2007). Pittaway and Cope (2007) state that entrepreneurship education can have an impact on awareness and perceptions of students when it includes 'real-life' learning and experiential learning. Intensive experiential learning increases self-perceived feasibility, intentions, desirability and propensity to act in starting a venture. It also enhances creativity and positive attitudes towards entrepreneurship (Lepoutre et al., 2010).
Outreach --> resources
The voluntary support gained from having links with experienced business people and entrepreneurs increases the quality of the entrepreneurship education program without using financial resources allocated to the education (Rasmussen & Sørheim, 2006).
Outreach --> education
Internships or similar placements (Kirby, 1998; Westhead et al., 2000) and student consulting projects with small firms (Hollingsworth et al., 1974; Sonfield, 1981; Holoviak and Ackelsberg, 1983; Chan and Anderson, 1994; Brindley and Ritchie, 2000) benefit

entrepreneurship education in different ways:

- Both parties engage in problems and enable experiential learning (Carson, 1985; Chan and Anderson, 1994; Wani et al., 2004).
- Student awareness of entrepreneurship can be raised (Ridder & van der Sleijde, 2003).
- Students can become resources for local firms (Hollingsworth et al., 1974; Sonfield, 1981; Long & Ohtani, 1988).

Rasmussen and Sørheim (2006) give the following reasons why HEIs should have links with experienced business people and entrepreneurs.

- The knowledge of business people and entrepreneurs keeps the education up to date and relevant.
- The alumni can play a vital role in the entrepreneurship activities of the institution (NIRAS et al., 2008; Standish-Kuon & Price, 2002).
- Their essential role is often realized by being guest speakers, evaluating business plans in competitions and providing placements for students (Matlay, 2011).

Outreach --> outreach

Transferring knowledge to society and engaging in society are very important activities because they keep the entrepreneurship education program up to date with the dynamic environment around the institution. Therefore connecting the entrepreneurship education with the community can be beneficial. This works from both sides, by providing facilities to the environment but also providing links to students who enter that environment (NIRAS et al., 2008). Alumni are often part of the business world and can therefore provide good links between the entrepreneurship program and the wider community.

Outreach --> final performance

The relations between students and entrepreneurs directly as well as indirectly contribute to the success of entrepreneurship education (Brindley & Ritchie, 2000). Both parties engage in problems and enable experiential learning (Carson, 1985; Chan and Anderson, 1994; Wani et al., 2004). Student awareness of entrepreneurship can be raised (Ridder & van der Sleijde, 2003). Entrepreneurship education programs involve a lot of actors and stakeholders which should make the program well-functioning (Vesper & Gartner, 1997). Rasmussen and Sørheim (2006) give the following reasons why HEIs should have links with experienced business people and entrepreneurs. They have a network which might also be of use to the education participants and they can act as role models for the students. Making use of role models can enhance people's ability to recognize, assess and shape opportunities (Fiet, 2001 in Martinez et al., 2010). So all in all, providing network events can create contacts for students and is assumed to be a necessary resource for proper entrepreneurship education

(Souitaris et al., 2007). The presence of an alumni network is very beneficial to the program (Standish-Kuon & Price, 2002) especially if it is well organized (Hoffmann et al., 2004).