European Commission

Effects and impact of entrepreneurship programmes in higher education

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Enterprise and Industry

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Full title: "Effects and impact of entrepreneurship programmes in higher education".

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Abstract:

An assessment of the impact of entrepreneurship education at the level of educational institutions can determine the degree to which it has accomplished its objectives and it justifies the resources committed to it.

This research focuses on the impact of entrepreneurship education programmes provided by higher education institutions on four dimensions:

- Impact on the entrepreneurship key competence;
- Impact on the intentions towards entrepreneurship;
- Impact on the individual's employability;
- Impact on society and the economy.

This study is based on a survey among alumni of higher education institutions in Europe who have attended entrepreneurship education and a control group of alumni that have not participated in this type of education.

The results presented in this study show clearly that entrepreneurship education makes a difference. Those who went through entrepreneurial programmes and activities display more entrepreneurial attitudes and intentions, get a job earlier after finishing their studies, can innovate more even as employees in a firm, and start more companies.

Performing organisation:

This report was prepared in 2012 for the European Commission - DG Enterprise and Industry by EIM Business & Policy Research (the Netherlands). The core project team consisted of Petra Gibcus, Dr. Jan de Kok, Jacqueline Snijders, Lia Smit and Bram van der Linden.

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Contents

Executive summary

Entrepreneurship education has a positive impact on the entrepreneurial mindset of young people, their intentions towards entrepreneurship, their employability and finally on their role in society and the economy. These are the major results of this study among alumni of higher education institutions in Europe.

The EU 2020 strategy highlights the need to embed creativity, innovation and entrepreneurship into education and proposes a number of actions to unleash Europe's entrepreneurial and innovative capabilities. There is a need to stimulate the entrepreneurial mindsets of young people and to create a more favourable societal climate for entrepreneurship, as the EU is not fully exploiting its entrepreneurial potential. Education has an important role to play in improving the entrepreneurial key competence of European individuals. In the European reference framework, 'Entrepreneurship and a sense of initiative' is one of eight key competences for lifelong learning which citizens require for their personal fulfilment, social inclusion, active citizenship and employability in a knowledge-based society.

Entrepreneurship refers to an individual's ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day-to-day life at home and in society, makes employees more aware of the context of their work and better able to seize opportunities, and it provides a foundation for entrepreneurs to establish a social or commercial activity.

The following objectives are to be reached through entrepreneurship education:
- Improvement of the entrepreneurship mindset of young people to enable them to be more creative and self-confident in whatever they undertake and to improve their attractiveness for employers.
- Encourage innovative business start-ups;
- Improvement of their role in society and the economy.

The demand for entrepreneurial learning has been and is still steadily increasing. However, there are a number of obstacles hindering the uptake of entrepreneurship education, such as a shortage of human resources and funding for this type of education. In addition, there has been a tendency in academic/teaching communities to perceive entrepreneurship education exclusively with learning how to start and run a business. More insight into the impact of entrepreneurship education can contribute to overcome these obstacles.

Better knowledge about the impact of entrepreneurship education is one of the things that Member States are constantly looking for. However, so far there are only a limited number of studies on the effects of entrepreneurship education and many are often from the US and/or project-based. Despite the lack of evidence on the effects of entrepreneurship education, the key role of entrepreneurship education must not be disregarded. In addition to equipping young people with the skills needed for the 21st century, entrepreneurship education is a means to increase social inclusion; it can increase the number of entrepreneurs – social and commercial, and it can be a gateway for a greater integration of the framework for key competences for lifelong learning.

Meanwhile, an increasing number of Member States are implementing national strategies on entrepreneurship education, which creates a platform that provides an opportunity where the impact can be measured in a European context and at policy-level contrary to the project-level. Currently, the Member States are contemplating how they can measure the impact of their policies and here the European dimension can really provide added value. It is important to ensure that Member States are not producing their own individual national measures, but instead join forces to find ways to measure the broad impact of entrepreneurship education.

An assessment of the impact of entrepreneurship education at the level of educational institutions can determine the degree to which it has accomplished its objectives and it justifies the resources committed to it.

In line with the objectives mentioned above, this research focuses on the impact of entrepreneurship education programmes provided by higher education institutions on four dimensions:

1 Impact on the entrepreneurship key competence;
2 Impact on the intentions towards entrepreneurship;
3 Impact on the individual's employability;
4 Impact on society and the economy.

The results presented in this study are mainly based on a survey among alumni of higher education institutions in Europe who have attended entrepreneurship education and a control group of alumni that have not participated in this type of education. The objective is not to compare education programmes.

Nine higher education institutions participated in the survey: Chalmers University of Technology (Sweden), Dublin Institute of Technology (Ireland), Johannes Kepler University of Linz (Austria), J.J. Strossmayera University of Osijek (Croatia), Queen's University of Belfast (United Kingdom), University of Turku (Finland), University of Valencia (Spain), UnternehmerTUM (Germany), Utrecht School of Arts (the Netherlands). In addition, alumni of the European Confederation of Junior Enterprises (JADE) participated. JADE is an international umbrella organisation of junior enterprises established and set up by students.

Alumni who attended entrepreneurship programmes at higher education institutions and the ones represented by JADE are hereinafter called the entrepreneurship alumni. In total 1,139 entrepreneurship alumni (of which 288 are JADE alumni) and 1,443 control group alumni have completed the questionnaire.

Impact on the entrepreneurship key competence

Entrepreneurship education seeks to prepare people to be responsible, enterprising individuals who have the attitudes, skills and knowledge necessary to achieve the goals they set for themselves to live a fulfilled life. The entrepreneurship key competence is a composition of an entrepreneurial attitude, entrepreneurial skills and knowledge of entrepreneurship. The study shows that entrepreneurship education has a positive impact on the entrepreneurship key competence of indi-

viduals (Table 1)[1]. Entrepreneurship and JADE alumni give higher scores on 10 out of 12 characteristics.

Table 1 Self-perception of the Key Entrepreneurship Competence by entrepreneurship alumni, JADE alumni and control group alumni

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Attitude			
Sense of initiative	***	**	*
Risk Propensity	**	***	*
Self-efficacy	=	=	=
Need for achievement	**	***	*
Structural behaviour	**	*	**
Skills			
Creativity	**	**	*
Analysis	**	***	*
Motivation	**	***	*
Networking	**	***	*
Adaptability	**	***	*
Knowledge			
Understanding role entrepreneurs	***	**	*
Knowledge of entrepreneurship	**	***	*

*Note: *** highest, ** medium, * lowest, = equal*

Source: EIM, 2011.

Attitude

An entrepreneurial attitude covers aspects that help individuals to take action including taking responsibility for their own learning, careers and life. The attitude of the alumni is assessed based on the following personal characteristics: sense of initiative, risk propensity, self-efficacy, need for achievement and structural behaviour. Structural behaviour refers to the ability to work in a structured manner as well as the ability to persevere whenever faced with setbacks and obstacles.

In general, alumni are of the opinion that the higher education contributed to develop their sense of initiative, but entrepreneurship alumni assess this contribution higher than the control group alumni (score of 3.9 on a scale from 1 to 5 versus 3.3 of the control group).

[1] For the development of the questionnaire three sources were used: The Flash Eurobarometer, Entrepreneurship in the EU and beyond, the Entrepreneurship Education Monitor (EEM) and the GUESS survey. Therefore, the aspects of entrepreneurial key competence differ slightly from the competence developed by the Commission. For more information, see annex II.

Entrepreneurship alumni assess their risk propensity and their need for achievement higher than the control group alumni, whereas control group alumni score themselves higher on structural behaviour. The score between the groups does not differ significantly regarding the level of self-efficacy.

Skills

Entrepreneurial skills concern skills needed to turn ideas into action. Overall, alumni indicate that the higher education has given them the skills and know-how enabling them to run a business, although the level of application is not estimated very high. Entrepreneurship alumni are again more positive on the contribution of higher education in this respect. (Score of 3.5 on a scale from 1 to 5 versus 2.8 of the control group).
The level of skills is assessed based on the following characteristics: creativity, analysing, motivating, networking and adaptability. Alumni who have attended entrepreneurship programmes rate themselves to be more creative, have more analytical skills, are more capable of motivating others to gain support and assistance in realising opportunities, they have better networking skills and, to a lesser extent they have a great ability to adapt to situations and handle different situations with ease. JADE alumni score themselves significantly higher on networking skills, which can be explained by the activities carried out by these alumni in the junior enterprises they have set up and/or managed during their education.

Knowledge

Knowledge refers to having a broad understanding and knowledge of entrepreneurship including the role entrepreneurs and entrepreneurship plays in modern economies and societies.
Overall, alumni agree that the higher education they have attended contributed to their understanding of the role of entrepreneurs in society. As expected, alumni who have attended entrepreneurship programmes assess this contribution greater (score of 3.7 on a scale from 1 to 5 versus 3.0 of the control group). Entrepreneurship alumni also assess their knowledge of entrepreneurship higher. This means that they consider themselves more capable of distinguishing between good and bad entrepreneurs, they know what entrepreneurship is about and they are more aware of the determinants of successful entrepreneurship.

Gender and age differences

The gender of the alumni has an impact on the assessment of the entrepreneurship competence, in particular on some of the aspects of attitude and skills.
The personal assessment shows change with age. The assessment of the level of risk propensity, need for achievement and the ability to network for example, decreases with age, whereas self-efficacy, structural behaviour and the level of creative skills increases.

Impact on the intentions towards entrepreneurship

The study shows that entrepreneurship education stimulates the intentions of individuals to become an entrepreneur.

Looking forward to a transition to entrepreneurship

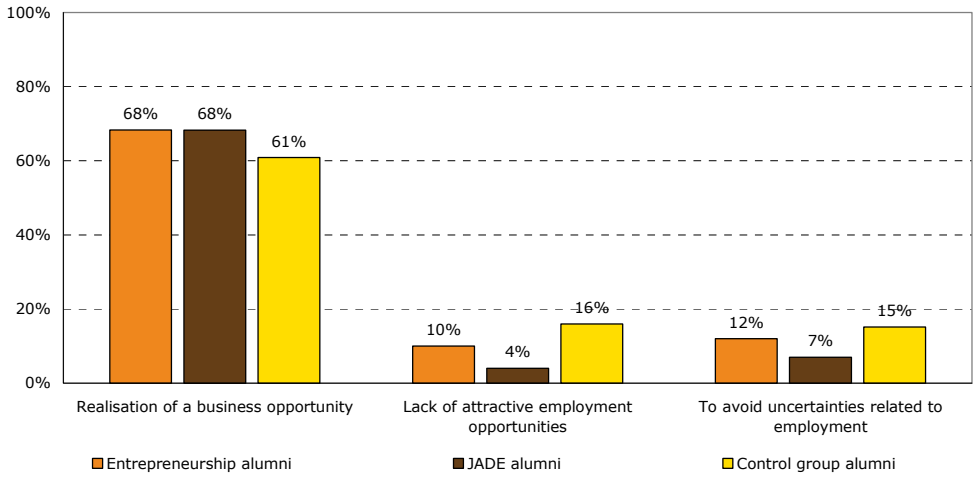
Significantly more entrepreneurial alumni are aiming for a transition towards entrepreneurship than the alumni in the control group. This conclusion is based on

their perception regarding aspects such as their readiness to do anything to become an entrepreneur, having a professional goal to become an entrepreneur, their intention to start an enterprise, the attractiveness of becoming an entrepreneur and the level of satisfaction entrepreneurship is expected to give. JADE alumni are the most eager to become an entrepreneur.

Preference for paid employment versus self-employment

Around 57% of the JADE alumni and 55% of the entrepreneurship alumni have a preference for being self-employed, whereas 42% of the control group prefer to be self-employed. So, there are many potential entrepreneurs.

Figure 1 Reasons for preference for self-employment (n=1,241)



Source: EIM, 2011.

The major reasons for the preference to be *self-employed* are the wish for personal independency, the freedom of choosing time and place of work and the realisation of a business opportunity (Figure 1). The realisation of a business opportunity is more often mentioned by entrepreneurship alumni (68% of the entrepreneurship and JADE alumni and 61% of the control group alumni).
Alumni of the control group that prefer to be self-employed, mention the lack of attractive employment opportunities and avoiding uncertainties related to employment more often than entrepreneurship alumni.

*Alumni in the control group base the preference for self-employment more or less on the disadvantages of being an employee (**push factors**) rather than the advantages of being self-employed (**pull factors**). Entrepreneurship alumni prefer opportunities.*

Alumni who have not attended entrepreneurship education prefer to be an employee for reasons of security and stability. They score higher than entrepreneurship alumni on aspects as availability of regular, fixed income, stability of employment, fixed working hours, protection by social security and/or insurance, dealing with red tape and possible problems with public authorities (Figure 2).

Figure 2 Reasons to prefer to be an employee (n=966)

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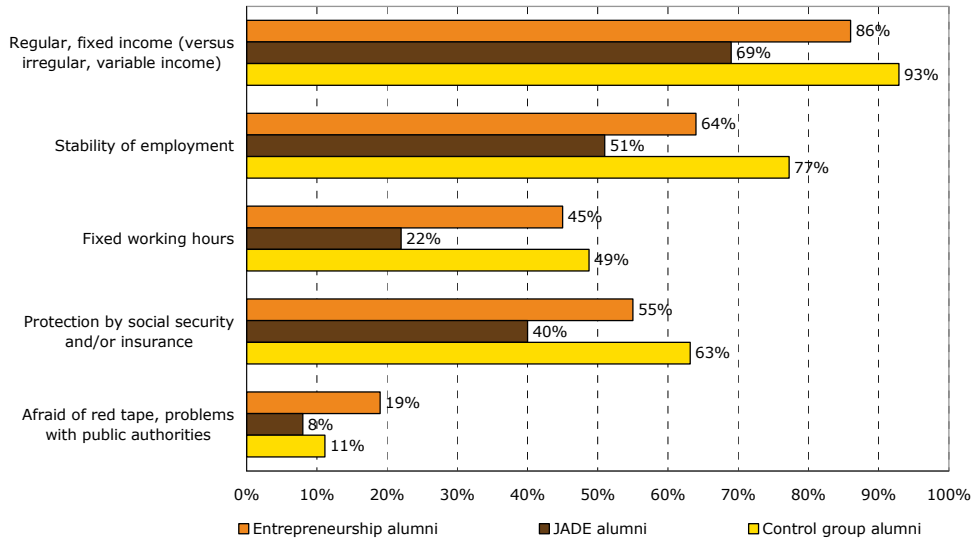


Source: EIM, 2011.

Gender and age differences

The share of male alumni looking forward to entrepreneurship is higher than among female alumni. This is also true for the preference to be self-employed. The preference for self-employment decreases with age.

Impact of entrepreneurship programmes on the individual's employability

Overall, entrepreneurship education seems to have a positive effect on the employability in terms of job experience, creativity in the current job and annual income earned of the alumni presently in paid employment.
It seems to be easier for entrepreneurship alumni to find employment immediately after their graduation and the chance of being unemployed in the first years after graduation is lower. Following entrepreneurship programmes does not have an impact on the international mindset of graduates and does not result in higher job satisfaction.

Job experience

The share of individuals that had one or more periods of unemployment is lower among entrepreneurship alumni (Table 2).

In addition, relatively more entrepreneurship alumni (78% of the entrepreneurship alumni, 66% of JADE alumni and 59% of control group alumni) indicate that they have started their first period of employment immediately after their graduation. These results suggest that it was easier to find paid employment for entrepreneurship alumni.

Table 2 Job experience of the alumni currently in paid employment (n=1,899)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
I have had one period of unemployment	11%	19%	22%
I have had more than one period of unemployment	1%	6%	8%
I started my first period of employment immediately after graduation	78%	66%	59%

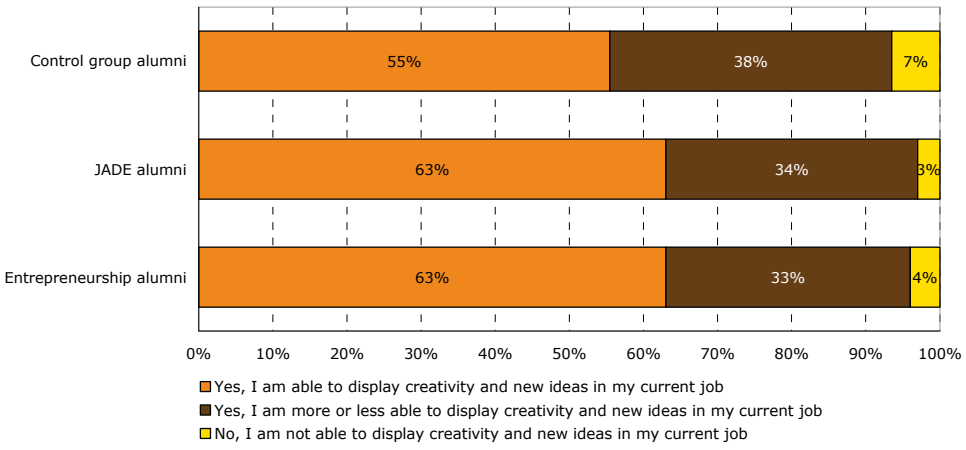
Source: EIM, 2011.

The differences between the groups are not consistent regarding the international mindset. More entrepreneurship alumni have worked abroad for shorter periods (2 years or less), but more control group alumni have worked abroad for longer periods (more than 2 years). This difference can be explained by the fact that entrepreneurship alumni have better developed personal entrepreneurial characteristics, such as flexibility and adaptability.

Creativity in current position

Improvement of the key competence of entrepreneurship is expected to lead to more innovative behaviour. Consequently, more developed entrepreneurial competences put individuals in a position to acquire positions in which more creativity is expected. Therefore, it may be expected that alumni that are in paid employment have positions in which they are able to display creativity and that they can come up with new ideas and that they are able to put them into action. The results show that this is indeed the case; relatively more entrepreneurship alumni have these possibilities in their current positions than alumni in the control group (Figure 3).

Figure 3 Opportunities of alumni currently in paid employment to display creativity and new ideas, by group (n=1,900)



Source: EIM, 2011.

Job satisfaction

Another aspect is the extent to which individuals are satisfied in their current position. Individuals with high employability are in a better position to change jobs; for example, in case they are not satisfied with their position. The job satisfaction of the alumni in paid employment is on average the same for both groups of alumni. However, alumni that have graduated at an older age indicate to be more satisfied.

Annual income

Better developed entrepreneurial competences would also imply that individuals are capable of getting better paid jobs. The share of entrepreneurship alumni that earn an income below the national annual income of individuals with a similar level of education (tertiary) is a bit lower among the alumni currently in paid employment than among the control group alumni (entrepreneurship alumni 18%, JADE alumni 17%, control group 22%). Therefore, entrepreneurship alumni in paid employment have a relatively high income. Female alumni in paid employment have a much lower income than males.

Impact of entrepreneurship programmes on society and economy

Entrepreneurship education is expected to improve the entrepreneurship key competence which will have an impact not only on the role of the individual in the economy (working life) but also in society (social and personal life). A more entrepreneurial role will be played due to entrepreneurship education.
The effects of entrepreneurship programmes on the role in society differ. A positive impact is identified in the extent to which individuals take initiatives to start non-commercial projects outside of work. On the other hand, higher participation in voluntary work seems to be limited.

The survey reveals that entrepreneurship education has an impact on the economy.

The likelihood that entrepreneurship alumni will participate in a business start-up is substantially higher, the frequency with which they set up businesses seems to be higher and they become self-employed earlier in their careers. In addition, the enterprises run by these individuals are perceived as more innovative and the expectations regarding employment growth and turnover growth are higher.

Participation in voluntary work

The impact of entrepreneurship education on society is illustrated by the participation in voluntary work. Entrepreneurship education does not seem to have an impact although JADE alumni are a little more often active as volunteers than the other two groups. The participation in voluntary work is not related to the age of the alumni. Male alumni are significantly more involved than female.

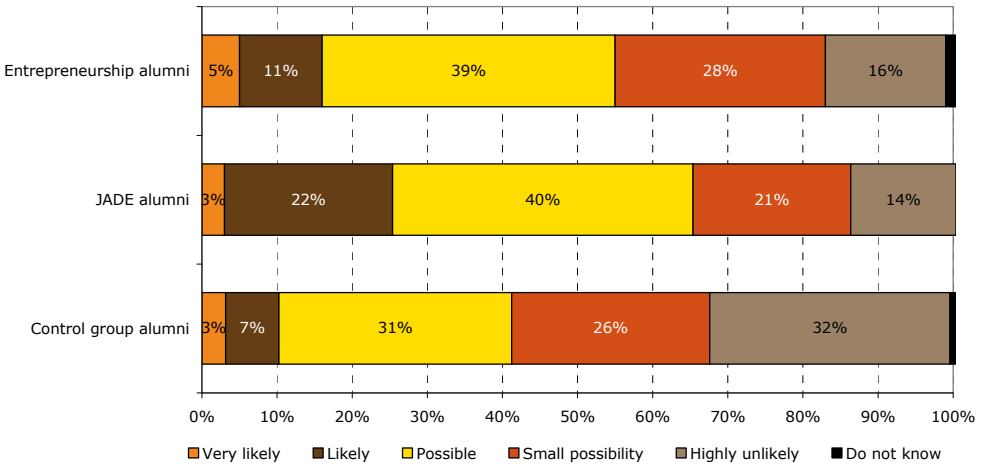
Although there is no difference in the participation between the groups of alumni regarding the participation in voluntary work, there is a difference regarding the extent to which initiatives were taken to start a non-commercial project outside of work. Relatively more entrepreneurship alumni have ever taken this step (49% of the entrepreneurship alumni, 58% of JADE alumni and 38% of control group alumni).

Involvement in business start-ups of employed alumni

The alumni currently in paid employment or without professional activity were asked about their involvement in business start-ups. Approximately one third of the entrepreneurship and JADE alumni who are in paid employment or who are without a professional activity, have tried to accomplish a transition towards self-employment: they once started a business or they are currently taking steps to start one. In the control group this is true for one fifth.

Approximately 39% of the employed entrepreneurship alumni and 57% of the employed JADE alumni indicate that they are thinking about starting up a business, against 24% of the control group. In line with these results, 83% of the entrepreneurship alumni and 86% of the JADE alumni state that it is very likely, likely or that there is a possibility that they will start their own business in the next ten years (Figure 4). In the control group this is true for 67%.

Figure 4 Probability that alumni who are currently in paid employment or without a professional activity will start up a business in the next ten years (n=1,450)



Source: EIM, 2011.

A lot of alumni who are currently in paid employment or without a professional activity are somehow involved in entrepreneurship or are at least thinking about it, but they are currently not self-employed. This indicates that there is much potential.

Although the alumni want to become self-employed, this will not be feasible for all of them for several reasons. The Flash Eurobarometer stresses that the major reason for not becoming self-employed is the lack of finances followed by the current economic climate which is not good for a start-up, lack of a business idea or business opportunities; it does not agree with the family situation or the risk of failure and its legal and social consequences are too large.

Alumni who are entrepreneurs

The impact on the economy through paid employment by alumni is described above. Another part of the impact is determined by the extent to which alumni have started their own enterprises and the characteristics of these enterprises in

terms of innovation and growth. Currently, 8% of the entrepreneurship alumni and 9% of the JADE alumni are entrepreneurs (Table 3). In the control group the majority of the self-employed alumni have liberal professions (for example: lawyers, medical practitioners, accountants and architects), they are freelancers or they are active in the agricultural sector.

Table 3 Percentage of entrepreneurs and liberal professions by group (n=2,582)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Self-employed	16%	16%	10%
Entrepreneurs	8%	9%	3%
Liberal professions and freelancers	8%	7%	7%

Source: EIM, 2011.

Only 5% of the alumni in the survey (a total of 133) are entrepreneurs. Approximately three quarter of these 133 entrepreneurs are active in services. The major share (68%) consists of entrepreneurship alumni. The following results have to be interpreted with care considering the number of enterprises set up by the alumni who were surveyed and they should be considered as indicative. The results are almost all in favour of entrepreneurship and JADE alumni and therefore they are another indication that entrepreneurship education seems to have an effect. Entrepreneurship and JADE alumni start-up their business before graduation, they are more innovative and the current and future business size is larger (Table 4). Exceptions are employment growth in the past and the net annual income which is higher for the control group alumni. This can be explained by the fact that these alumni have been in their current business during a longer period of time than entrepreneurship alumni.

Table 4 Characteristics of entrepreneurs by group (n=133)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Relatives/friends are entrepreneur	***	**	*
Start-up before graduation	***	***	*
Innovation	***	**	*
Current business size	**	***	*
Employment growth in the past	**	*	***
Turnover growth in the past	**	***	*
Ambition: future business size	**	***	*
Net annual income	**	*	***

*Note: *** highest, ** medium, * lowest*

Source: EIM, 2011.

Business history

Entrepreneurship alumni are in business on average during 7.4 years. The control group is in business during a longer period of time: 9.5 years. This was the first business for 4 out of 5 whereas this is true for 3 out of 5 of the entrepre-

neurship alumni. Therefore, alumni who attended entrepreneurship programmes have established more businesses in a shorter period of time. Another interesting characteristic is the number of years between graduation and starting their first business. Entrepreneurship and JADE alumni show a peak in their business start-up just before and right after graduation. Control group alumni start their business between 2 and 5 years after graduation.

Entrepreneurship and JADE alumni started their first enterprise on average before graduation (0.7 years) and control group alumni started on average ***after*** *graduation (2.8 years).*

Level of innovation

Development of the entrepreneurial competence is expected to lead to more innovative behaviour by individuals and consequently this would mean that the enterprises that these alumni are leading are more innovative than other enterprises. This expectation seems to be the case, as relatively more alumni of the entrepreneurship group assess their enterprise as *innovative* in terms of introducing new or improved processes, introducing new or improved goods/services and/or introducing new and improved forms of organisation, business structures and practices.

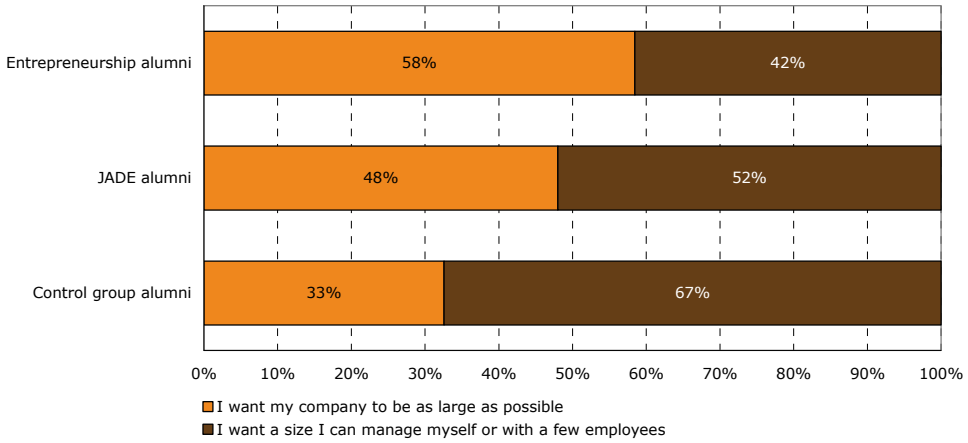
Business size and ambition

In addition, it is expected that entrepreneurs who have attended entrepreneurship education are more *ambitious* regarding the growth of the enterprises. About half of the 133 entrepreneurs have the ambition to allow their enterprise to grow as large as possible and a major part of these entrepreneurs have indeed attended entrepreneurship education.
In terms of full-time employees, the *average size* of the enterprises of the entrepreneurship alumni has 4.2 full time equivalents (FTE), slightly larger than the control group alumni (4.0 full time equivalents). However, employment growth during the last 3 years is higher for the control group. This can be explained by the fact that these enterprises have on average existed longer.
In terms of annual *turnover* growth during the last 3 years, the group differences are opposite: relatively more enterprises run by entrepreneurship alumni experience a turnover growth.
Entrepreneurship alumni turn out to be the most ambitious ones. 58% of the entrepreneurs in this group want their company to be as large as possible in the future. Entrepreneurs in the control group are less ambitious. Two out of three entrepreneurs in this group want an enterprise size that they can manage themselves (Figure 5).

Annual income

The annual net income of entrepreneurship group(s) alumni exceeds the income of the control group alumni.

Figure 5 Ambitions of self-employed alumni entrepreneurs in business growth by group and gender (n=133)



Source: EIM, 2011.

Policy recommendations

Policy should be supportive of entrepreneurship programmes

Overall, it can be concluded that providing entrepreneurship education at higher educational institutions has a positive effect on entrepreneurship. The results underline the importance of the policy of the development of entrepreneurial skills through education in the European Union.

Entrepreneurship education should become obligatory and expanded to all disciplines

The enterprises created by entrepreneurship alumni can be characterised as more innovative, high growth and ambitious, whereas the enterprises established by the control group can be characterised as traditional, stable and less risky. Entrepreneurship education also has a positive effect on the employability of individuals in terms of job experience, creativity in the current job and annual income earned by the alumni who are presently in paid employment and therefore it makes these individuals more attractive to employers.
These results support the argument to make entrepreneurship education at higher education institutions obligatory and expand this type of education to other disciplines than economics and business and business/management administration. This enhancement is already taking place but it should be further continued.

Learning by doing should be an important part of the training

JADE alumni score better in many aspects. This supports the importance of including practical training in the education programmes.

Value the impact on society

Improving the entrepreneurial key competence is expected to have an impact on society. Entrepreneurship education has a positive effect in the extent to which individuals set up non-commercial projects. Entrepreneurship programmes

should therefore not only focus on the use of entrepreneurial competences in working life, but also on the personal and social life.

Specific attention to female students

Female alumni value their entrepreneurial characteristics, skills and knowledge less than male alumni and they are less inclined to become an entrepreneur. Specific attention to this group of students is justified.

Measure impact in more than one period

The impact of entrepreneurship education in this study was only measured on one single time period. Most of the entrepreneurship programmes in the higher education institutions are less than ten years old. Combined with the knowledge that many graduates first want to gain some work experience before considering to start a business, it is likely that, for example more alumni will somehow be involved in entrepreneurship in ten years time than at present. This supports the value of longitudinal research.

1 Introduction

1.1 Background

Europe needs more new enterprises and more innovation. Sustainable growth based on innovation and excellence requires an increasing number of start-ups, which are likely to provide more and better jobs. Cultural aspects need to be taken into account although various factors influence entrepreneurship. Europeans are reluctant to take up opportunities for self-employment and entrepreneurial activities. According to the 2009 Eurobarometer on Entrepreneurship, only 45% of European citizens would like to be self-employed. In the United States these figures are different: 55% of the population would like to be their own boss, while only 36% believe that dependent employment is the best option.

The pace of change in technologies is so fast that it is very difficult or even impossible to predict how the labour market and the business world will evolve; therefore the ability to adapt, to get new ideas and to put these ideas into action, to be pro-active and tolerant to failure will be equally as important as the ability to read, write and calculate are today as they will be in the future. Europe cannot compete in the global economy based on cost. Europe can only stay competitive by investing in people and their capacity to innovate.

Entrepreneurship concerns an individual's ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day-to-day life, both at home and in society, it makes employees more aware of the context of their work and it makes them better able to seize opportunities, and it provides a foundation for entrepreneurs to establish a social or commercial activity.[1]

The following objectives are to be reached through entrepreneurship education:

- Improvement of the entrepreneurship mindset of young people to enable them to be more creative and self-confident in whatever they undertake and to improve their attractiveness for employers.
- Encourage innovative business start-ups;
- Improvement of their role in society and the economy. [2]

Europe 2020 Strategy for smart, sustainable and inclusive growth

As response, the EU 2020 strategy[3] highlights the need to embed creativity, innovation and entrepreneurship in education and it proposes a number of actions to unleash Europe's entrepreneurial and innovative capabilities through the flag-

[1] Commission Communication "Fostering entrepreneurial mindsets through education and learning", COM(2006) 33 final.

[2] See for example Mwasalwiba, Ernest Samwel (2010), Entrepreneurship education: a review of its objectives, teaching methods, and impact indicators, Education + Training, Vol. 52 (1), pp. 20-47.

[3] European Commission (2010), Europe 2020: A European strategy for smart, sustainable and inclusive growth, http://europa.eu/press_room/pdf/complet_en_barroso___007_-_europe_2020_-_en_version.pdf

ship initiatives of "Youth on the Move", "An Agenda for New Skills and Jobs" and "Innovation Union". There is a need to stimulate the entrepreneurial mindsets of young people and to create a more favourable societal climate for entrepreneurship, as the EU is not fully exploiting its entrepreneurial potential. In the European reference framework, 'Entrepreneurship and a sense of initiative'[1] is one of eight key competences for lifelong learning which citizens require for their personal fulfilment, social inclusion, active citizenship and employability in a knowledge-based society. Education has an important role to play improving this entrepreneurship key competence.

Small Business Act for Europe

In June 2008, the Small Business Act (SBA) for Europe was adopted.[2] The objective of the Act is 'to improve the overall approach to entrepreneurship, to anchor the "Think Small first" principle permanently in policy making from regulation to public service, and to promote SMEs' growth by helping them tackle the remaining problems which hamper their development'. The Act includes a framework of measures carried out at EU and Member States levels. The most relevant principles on which it is based in the context of this study are:

- Create an environment in which entrepreneurs and family businesses can thrive and entrepreneurship is rewarded
- Make public administrations responsive to SMEs' needs
- Promote the upgrading of skills in SMEs and all forms of innovation
- Encourage and support SMEs to benefit from the growth of markets.

In February 2011, the SBA review was presented[3]. The most relevant new actions were suggested in the area of promoting entrepreneurship, job creation and inclusive growth.

Programme for the Competitiveness of enterprises and SMEs (COSME) 2014-2020

In November 2011, the European Commission published the proposal for the Programme for Competitiveness of enterprises and SMEs (COSME) 2014-2020.[4] The programme focuses on:

- facilitating Access to finance for Small and Medium-sized Enterprises (SMEs);
- creating an environment favourable to enterprise creation and growth;
- encouraging an entrepreneurial culture in Europe;
- strengthening the sustainable competitiveness of EU enterprises;
- supporting the internationalisation of SMEs and improving their access to markets.

[1] http://ec.europa.eu/dgs/education_culture/publ/pdf/ll-learning/keycomp_en.pdf

[2] The Council's Action Plan for a Small Business Act for Europe, http://ec.europa.eu/enterprise/policies/sme/files/docs/sba/sba_action_plan_en.pdf

[3] Communication from the Commission to the European Parliament, the Council, Economic and Social Committee and the Committee of the Regions, Review of the "Small Business Act" for Europe, Brussels, 23.2.2011, COM(2011) 78 final

[4] http://ec.europa.eu/cip/cosme/

1.2 Assessment of the impact of entrepreneurship education

Demand and supply of entrepreneurship education

The demand for entrepreneurial learning has been and is still steadily increasing. However, there are a number of obstacles hindering the implementation of entrepreneurship education. For one, there is a shortage of human resources and funding for this type of education; therefore it is not possible to meet this demand fully. Action-oriented teaching is labour-intensive and costly, and requires specific training. Also due to the historic development, where entrepreneurship education often started as a course on small business management and it evolved from the business school setting; there has been a tendency in academic/teaching communities to perceive entrepreneurship education exclusively with learning how to start and run a business. Some academics find this entrepreneurship endeavour to be at odds with the general objectives of higher education institutions and therefore they are reluctant to engage in entrepreneurship education. More insight into the impact of entrepreneurship education can contribute to overcome these obstacles.

Better knowledge about the impact of entrepreneurship education is one of the things that Member States are constantly looking for. However, so far there are only a limited number of studies on the effects of entrepreneurship education that are often from the US and/or project-based. Despite the lack of evidence on the effects of entrepreneurship education, the key role of entrepreneurship education must not be disregarded. In addition to equipping young people with the skills needed for the 21st century, entrepreneurship education is a means to increased social inclusion, it can increase the number of entrepreneurs – social and commercial, and it can be a gateway for a greater integration of the framework for key competences for lifelong learning.

Meanwhile, an increasing number of Member States are implementing national strategies on entrepreneurship education, which creates a platform that provides an opportunity where the impact can be measured in a European context and at a policy-level instead of at a project-level. Currently, the Member States are contemplating how they can measure the impact of their policies and here the European dimension can really provide added value. It is important to ensure that Member States are not producing their own individual national measures, but instead that they will join forces to find ways to measure the broad impact of entrepreneurship education.

Importance of assessing impact of entrepreneurship education

An assessment of the impact of entrepreneurship education at the level of educational institutions can determine the degree to which it has accomplished its objectives and justifies the resources that were committed to it. Also, it is important to apply broad impact measures to reflect that the entrepreneurship key competence is a competence for life and not solely aimed at the creation of a new venture. Having a broad impact measure will help to portray entrepreneurship as a broad competence and convince academics that it is also a task for the education system to equip young learners with entrepreneurial mindsets and skills, i.e. a sense of initiative, creativity, tolerance to failure etc. that can be applied to all walks of life and help the youngsters to achieve the goals they set for themselves.

Entrepreneurship education strategies and policies may also require a greater level of commitment of public resources at the level of public policy, and governments will need to be able to justify such expenditure, especially at a time of budget restraints. However, as long as has not been figured out more explicitly what the level of impact of entrepreneurship education is, it will be difficult for EU and Member States to make a systematic effort to implement such policies.

Measurement will help policy makers know where they are now, and it helps them to get where they want to be. However, there is a perceived lack of evidence on the outcomes of entrepreneurship education at policy level; institution level as well as at an individual level, and so far relatively little research has been conducted in this field. This study envisions contributing to fill this information gap and it can be considered as a first attempt for a broader perspective of the effect of entrepreneurship education.

1.3 Objective

The objective of this study is to measure the impact of participation in entrepreneurship education by surveying university alumni who participated in entrepreneurship programmes as well as surveying a comparable control group consisting of alumni that have not participated in entrepreneurship programmes. This research focuses on the impact of entrepreneurship education programmes provided by higher education institutions at four dimensions:

1 Impact on the entrepreneurship key competence;
2 Impact on the intentions towards entrepreneurship;
3 Impact on the individual's employability;
4 Impact on society and the economy.

1.4 Research methodology

The research covers a limited number of entrepreneurship programmes carried out by higher education institutions (HEIs) in Europe. In this section, the research methodology is summarised. A detailed description is included in Annex II. The main steps were:

1 Selection of higher education institutions;
2 Execution of an online survey among alumni graduated from these institutions;
3 Analysis and reporting.

1. Selection of higher education institutions

In 2008, the European Commission published the results of a survey of entrepreneurship in higher education in Europe[1]. In the same year, the European Commission also published the final report of the Expert Group on 'Entrepreneurship in higher education, especially within non-business studies'. In both reports good-practice examples of entrepreneurship programmes were presented.
43 higher education institutions were identified as possible candidates to be included in this study, based on these two reports and additional desk research.

[1] http://ec.europa.eu/enterprise/policies/sme/pro moting-entrepreneurship/education-training¬entrepreneurship/higher-education/index_en.htm

The information of their entrepreneurship programmes as presented on their websites was studied in detail. In addition, all institutions were contacted by mail and when necessary by phone in order to check the qualifications of the programme, to verify the availability of an updated database of alumni to be surveyed and to explore their willingness to cooperate.

A priority list of institutions was developed based on the information and feedback received. A further selection of institutions was made based on the following three criteria, in close cooperation with the Commission: number of alumni, year of starting the programme and geographical distribution. The Higher Education Institutions that are included in this report are listed in Table 1. A short description of the education programmes of these institutions are presented in chapter 2.

Table 5 Overview of involved Higher Education Institutions

❖ Chalmers University of Technology	❖ University of Turku
❖ Dublin Institute of Technology	❖ University of Valencia
❖ J.J. Strossmayera University of Osijek	❖ Unternehmer TUM
❖ Johannes Kepler University of Linz	❖ Utrecht School of Arts
❖ Queen's University Belfast	

In addition to these higher education institutions, members of the European Confederation of Junior Enterprises (JADE) have also participated in the project. JADE is an international umbrella-organisation of junior enterprises established and managed by students.

2. Online survey

The emphasis of the study is on entrepreneurship versus non-entrepreneurship. It is not the objective to compare the different programmes or countries. The sample for each educational institution consists of a group of alumni who participated in an entrepreneurial programme (entrepreneurship alumni) and a group of alumni who did not take part in the programme (control group alumni).

The Flash Eurobarometer[1], Entrepreneurship in the EU and beyond, the Entrepreneurship Education Monitor (EEM) developed by EIM[2] and the GUESS[3] survey were used for the development of the questionnaire. The questionnaire consisted of the following topics:

– Background information;

[1] Over the past 10 years, DG Enterprise and Industry of the European Commission has been studying the development of entrepreneurship in EU Member States and other countries outside Europe, including the US and only recently some Asian countries. More information on the Flash barometer is included in Annex II.

[2] EEM is developed by EIM in 2009. EEM is designed to evaluate and reveal the effects of entrepreneurship education. More information on EEM is included in Annex II.

[3] GUESS stands for Global University Entrepreneurial Spirit Students' Survey. GUESSS is an international research project using a geographical and temporal comparison to investigate the entrepreneurial intention and activity of students. More information on GUESSS, is included in Annex II.

- Psychological profile;
- Self-perception of entrepreneurship;
- Preferences: self-employed or employee;
- Employed or self-employed;
- Job satisfaction;
- Involvement in starting a business;
- Annual income.

The complete questionnaire is included in Annex III. The questionnaire was available in all the relevant national languages. A total of 851 entrepreneurship alumni, 1,482 control group alumni and 288 JADE alumni have completed the questionnaire.

3. Analysis and report

The analysis started with a bivariate analysis of all questions included in the questionnaire. To this end, a large number of standard tables have been prepared, where the variables that are included in the dataset are tabulated against a limited number of control variables: by group (entrepreneurship, control group, JADE); by gender and by age. It turned out that in several aspects the alumni of JADE are different from the entrepreneurship and control group. JADE is considered as a 'second' control group because of these differences. In addition, we took a closer look at the structure to measure competencies. We have used correlation, reliability and factor analysis to do this. The results of these analyses are presented in this report.

Self-selection bias

When comparing groups of alumni who did and who did not follow entrepreneurship education and when measuring the effects and the impact of the entrepreneurship education there will be a bias effect. The source of this bias is the self-selection of students. Those who are interested in and who have a positive attitude towards entrepreneurship will choose to attend the entrepreneurship education. Therefore, the alumni who attended the entrepreneurship programmes will show a relatively high score on entrepreneurship effects. This high score is partially a result of following the programme, and partially influenced by their attitudes and willingness to become an entrepreneur.

In order to determine to what extent group differences result from the self-selection bias, the characteristics of alumni have been analysed regarding the period following their attending higher education institutions. The analysis focuses on personal characteristics (such as the entrepreneurial background of relatives and activities outside work). Alumni who participated in an entrepreneurship course are compared with the control group alumni (who did not receive that type of education) based on these characteristics (Table 6).

Table 6 Background of the alumni by group (n=2,582)

Statement	*Entrepreneurship alumni*	*JADE alumni*	*Control group alumni*
My father or mother is an entrepreneur	34%	32%	29%
There are entrepreneurs in my family	38%	42%	32%
My partner is an entrepreneur	12%	9%	11%
I have friends or acquaintances who are entrepreneurs	53%	55%	41%
I sometimes insist on a discount on already low priced goods when in a shop	29%	31%	27%
I make sure that I know the latest developments in the fields of my hobbies	45%	47%	42%
I want to contribute to organisational activities when I am a member of a club	48%	74%	41%

Source: EIM, 2011.

It turns out that entrepreneurship alumni more often have relatives or friends with an entrepreneurial background than control group alumni. Furthermore, entrepreneurship alumni themselves have an entrepreneurial attitude (for instance towards hobbies) prior to their higher education to a larger extent than control group alumni. These results all indicate that there was already - prior to attending the higher education institution and hence choosing whether or not to attend an entrepreneurial course - a difference in entrepreneurial attitude between entrepreneurship alumni and control group alumni. Therefore, it seems indeed to be a self-selection bias. However, the latitude of the bias seems to be small considering the relatively limited differences in personal characteristics prior to higher education. Therefore, possible effects and impact of entrepreneurship education result to a large extent from attending entrepreneurship courses and to a limited extent from the self-selection bias.

1.5 Characteristics of the respondents

Some main characteristics of the alumni are presented here, based on the questions regarding their background.

Gender

The sample groups contain more male alumni than female alumni. About two thirds of the entrepreneurship alumni and the JADE alumni are male. The gender division in the control group is more evenly distributed (Table 7).

Table 7 Gender of the respondents by group (n= 2,582)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Male	61%	66%	55%
Female	39%	34%	45%
Total	100%	100%	100%

Source: EIM, 2011.

In the analysis we have considered differences by gender and in case differences are found these results are presented in this report. We have also compared women in the entrepreneurship group, the JADE group and the control group. In general entrepreneurship and JADE female alumni outperform female alumni in the control group on almost all aspects. These results are in line with the results found if comparing these groups irrespective of gender.

Age

Alumni were asked about their current age and their age when they graduated (Table 8). It turns out that on average the JADE alumni in the sample are currently younger than both the alumni of the entrepreneurship and the control group. The average age of the entrepreneurship alumni is 32, the average age of the control group alumni is 34 and of those of JADE it is 28. There is hardly any group difference in age when they graduate: the alumni of the three groups graduated on average when they were approximately 25 years old. Therefore, more years have passed for the control group alumni since their graduation than for the entrepreneurship alumni.

Table 8 Age of alumni (n= 2,582)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Current age (average)	32 years	28 years	34 years
- younger than 26	9%	35%	11%
- 26-30	46%	41%	35%
- 31-35	26%	19%	22%
- older than 35	19%	5%	32%
Total	100%	100%	100%
Graduation age (average)	26 years	25 years	25 years
- younger than 23	10%	10%	27%
- 23-24	26%	40%	29%
- 25-26	37%	33%	23%
- older than 26	27%	17%	21%
Total	100%	100%	100%

Source: EIM, 2011.

Areas of education

Almost one third of the entrepreneurship alumni graduated in management/business administration, around one fifth in economics and almost a fourth in engineering services as shown in Table 9. A fourth was educated in engineering services and one fifth in management/business services, of those in the control group. Half of the JADE alumni have graduated in management/business. The majority of the remaining JADE alumni graduated in economics, engineering sciences and computer sciences.

Table 9 Area of education of the respondents by group (n= 2,582)*

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Linguistics	1%	1%	1%
Cultural studies (including religion, philosophy, psychology)	2%	2%	2%
Education / pedagogy	4%	1%	4%
Sports	2%	0%	0%
Medicine and health sciences	1%	1%	6%
Law	4%	5%	7%
Economics	18%	25%	8%
Management/business administration	30%	52%	19%
Other social sciences (e.g. sociology, political science)	3%	5%	6%
Mathematics and natural sciences	11%	4%	7%
Engineering sciences (including architecture)	22%	16%	24%
Computer sciences / informatics	8%	10%	9%
Agricultural sciences, forestry, and nutrition sciences	2%	0%	2%
Art, science of art	3%	1%	1%
Other	10%	6%	15%

** The sum of the percentages is above 100%, because alumni might have graduated in more than one area.*

Source: EIM, 2011.

1.6 Structure of the report

The entrepreneurship programmes of the higher education institutions involved in this project are presented in chapter 2. The impact of entrepreneurship education on the entrepreneurship key competence is presented in chapter 3. Chapter 4 describes the impact on the entrepreneurial intentions. Chapter 5 presents the impact on the individual's employability and chapter 6 discusses the impact of entrepreneurship education on society and the economy. The final chapter con-

tains the key messages including policy recommendations. The report starts with an executive summary.

The annexes include an overview of the literature that was used (Annex I), a description of the methodology that was applied (Annex II) and the questionnaire of the on-line survey (Annex III).

2 Entrepreneurship programmes at higher education institutions

Alumni from a limited number of well-known entrepreneurship programmes run by higher education institutions have been approached. The institutions are located in different European countries. This chapter describes their entrepreneurship programmes.

Chalmers University of Technology (Sweden)

The entrepreneurship education at Chalmers University of Technology offers a wide array of learning within the field of innovation and entrepreneurship. Together with three other schools of entrepreneurship, it closely collaborates during the two educational years regarding cross disciplinary seminars, working groups, etc. Two of these four schools have participated in this study – the Chalmers School of Entrepreneurship and the Göteborg International Bioscience Business School. These two schools share a common and powerful pedagogy of allowing the students to start real ventures as a formal part of the curriculum.

Chalmers University of Technology hosts the Chalmers School of Entrepreneurship (CSE), a 2-years master level programme created in 1997. In 2005 another track was opened in the same master programme, based on the same pedagogy but focusing on bioscience. This was named Göteborg International Bioscience Business School (GIBBS), and it was founded in collaboration with the medical school at the University of Gothenburg. Together, CSE/GIBBS could be described as a hybrid organisation combining pioneering and advanced action-based entrepreneurship education with a new and successful mechanism to commercialise research.

The input into CSE/GIBBS is twofold: specially selected, but inexperienced students, averaging 25 years of age, as well as early-stage R&D-based ideas from universities or corporations which lack entrepreneurial champions. The output so far has consisted of 47 technology ventures with a survival rate of 80%, and around 300 educated entrepreneurs. These ventures had a total turnover of €30 million and around 270 employees in 2010. Common for most of the ventures from CSE is that their initial ideas would have been too early or too vague to be accepted by traditional incubators. This means that the CSE model represents a novel means to create value that would never have been created otherwise.

The development of the action-based pedagogy of CSE/GIBBS was initiated in 1997 by a key faculty at Chalmers University of Technology. It is centred on an advanced form of role-play between student teams and a comprehensive tailored environment. The first year is preparatory and interdisciplinary together with engineering, business, and law and medicine students. The second year consists of an environment which has the following main components:

- A managed team-based process where the students spend one full year during which they are required to try to start a real venture, with the intention to incorporate it and to obtain funding at the end of the year.

- Course modules coordinated with regards to time and content with the team based venture creation process, forming an integrated 60 credit points master's thesis.
- Real-life innovation projects stemming from university research, industry or private innovators that are scouted for and screened by the school and provided to the student teams to be cultivated by them.
- A pairing process where the students are paired together taking into account the need for interdisciplinary and complementary attributes of the individuals.
- A network of coaches, capitalists, service providers, board members, potential customers, alumni, etc. that students engage with during the year of venture start-up.
- Office space for the teams, equipped with computers, telephone, copier.
- Individual and team based reflection sessions with external specialist coaches and with the faculty.
- A reasonable equity share of the company for each student, if it ends up being incorporated.

For more information: www.entrepreneur.chalmers.se

Dublin Institute of Technology (Ireland)

DIT has a strong commitment to the development and support of the knowledge of economy and a proactive approach to building successful links with industry. The creation and transfer of knowledge through training, collaborative and commissioned research, consultancy and the development of campus and non-campus companies form the core of DIT's Industry Programme. DIT's Hothouse will assist companies and entrepreneurs to start and grow businesses based on DIT research and it will assist DIT colleagues and students to commercialise their intellectual property. Hothouse provides incubation space in addition to a range of services and facilities to people who are interested in starting their own business contact. The Professional Development Services team provides innovative training solutions to meet the increasing demands of Ireland's knowledge driven economy, while DIT also has a number of dedicated Centres which address sector-specific training and development needs. The Centres are responsive to market demands and they work closely with industries to provide a leading edge of innovation services to the sector in which they operate. One such centre is the Institute for Minority Entrepreneurship which focuses its efforts on helping people from minority communities to start their own business. In short, DIT currently offers a wide range of entrepreneurship-related services to industries and these are now discussed in greater depth.

Hothouse

Hothouse was established in 2001 and its mission is to assist companies and entrepreneurs to start and to grow businesses based on DIT research, and to assist DIT colleagues and students to commercialise their intellectual property. Some of the key initiatives of Hothouse are:

- The introduction of Annual Commercial Reviews of Research
- The launch of two new Programmes
  - FAST TRACK - concept for commercial licences
  - FAST START - concept to establish a start-up
- The establishment of the DIT Seed Fund
- The introduction of Patent and Licence Recognition Award Events

- Invention Competitions
- Increased commercialisation training in
  - Invention Recognition
  - Collaborative Research Project Management
  - Commercialisation of Research
- Licence negotiation

These activities exist to assist academic staff to identify and commercialise their intellectual property in addition to the range of activities already underway at DIT. Such activities include Patent Training, Concept for Commerce events, Prospect – pre-incubator training, Hothouse incubator training, mentoring, networking, PR assistance, etc. from the Hothouse Incubator. The team also assists academics to identify inventions, protect IP and help them to commercialise their IP, either by searching for licensees or by encouraging them to start their own business with support from the Hothouse programmes.

Prospect
PROSPECT – also established in 2011 – is a training programme that helps researchers from the Dublin Institute of Technology to commercialise their research. The programme offers workshops, business counselling and consultancy to provide the necessary skills and know-how to develop a commercialisation plan for academic research. HOTHOUSE is a year-long programme that provides knowledge-intensive start-ups with the expertise, networks and tools they need to develop highly successful businesses capable of competing in global markets. The FAST GROWTH Programme helps owner/managers of fast-growing companies to deal with the challenges associated with rapid expansion. Almost 50 entrepreneurs have successfully grown their businesses through this initiative in the last three years. Hothouse also has a BES venture capital fund which it uses to support firms at different stages of growth.

Professional Development Services
DIT has established a reputation for successfully organising and delivering valuable, relevant and challenging Continuing Professional Development courses for industries and the professions and playing a key role in their future growth and development by working with and having a flexible response to the identified needs of industrial/professional sectors. The list of CPD programmes is quite extensive and it indicates a significant level of activity in this area by DIT.

Centres and Groups
As a part of DIT's commitment to provide tailored support for industries through research, consultancy, services and facilities, the organisation is home to 32 groups or centres that focus on a specific area of activity. Among these groups, the one of most relevance to this paper is the 'Institute for Minority Entrepreneurship' which was established to offer the different minority groups in Ireland equal opportunity through entrepreneurship education and training. 'Minority Entrepreneurship' has been broadly defined by the Institute to be inclusive of those communities who are generally regarded as being outside of the mainstream Irish society in terms of entrepreneurship. The following groups are considered to be 'minority entrepreneurship groups' by the Institute: Ethnic groups, People with Disabilities, Prisoners, Gay people, Socio-economically Disadvantaged people, Grey people, and Travellers. The primary objective of the Institute is to bring a significant benefit to its target audiences by researching the needs of

these minority entrepreneurship groups, developing appropriate training programmes and materials, and delivering these programmes in the most effective manner possible to each individual group. It has already provided pilot programmes to many of these communities and it has organised a range of seminars and conferences about the concept of offering entrepreneurship as a life option to people whose income opportunities may have been stifled by prejudice, discrimination, harassment or racism.

For more information: http://www.dit.ie/

Johannes Kepler University of Linz (Austria)

The history of entrepreneurship education at the Johannes Kepler University of Linz dates back to 2000, when an endowed chair was assigned to an institute for entrepreneurship. The institute cooperated strongly with a local academic high-tech incubator and the number of entrepreneurship students was so great from the start, that 2003 saw the installation of the Institute for Entrepreneurship and Organisational Development (IUG) at the university. The main target of the institute is to develop the entrepreneurial intention of students and to support them in their career plans as founders, business successors or entrepreneurs. To this end, the IUG has established an entrepreneurship programme, it develops outreach activities for other faculties at the university and it performs research in the field of entrepreneurship. The entrepreneurship programme consists of lectures, specialised courses and seminars, ranging from 18 to 30 ECTS.

The policy of the institute is to cooperate closely with relevant stakeholders, such as the Chamber of Commerce's founders' service centre, start-up centres at local banks and the Junior Chambers. Close ties are also maintained with relevant networks. The practical component of the programme is also safeguarded by providing students with the possibility of guidance in actual start-ups. To this end, the IUG established the Johannes Kepler University start-up centre in 2010 as a contact point for students, alumni and staff interested in starting their own business. In addition, the Academic Start-up Centre Upper Austria has been initiated in 2011. It serves as a pre-incubator to support students from the regional universities who are interested in entrepreneurship. Furthermore, initiatives such as "Bizkick" in which students have to develop and implement their start-up ideas underline the practice-oriented approach of the programme. Finally, the IUG also focuses on outreach activities because surveys have shown a great impact of such extracurricular activities on entrepreneurial intent.

Since 2008, courses in the programme are accessible to both bachelor and master students and an increasing demand has even lead to beginner's courses in the first year of studies. The programme has also been expanded outside the original Faculty of Social Science, Economics and Business and courses and seminars have now also been developed for the Faculty of Technology and Natural Science and even for the University of Fine Arts of Linz. This resulted in a 2010 European Enterprise Award for promoting the entrepreneurial spirit.

Yearly, the entrepreneurship programme of the IUG consists of 30 courses, of both an obligatory and an elective nature. A wide range is covered from introduction to entrepreneurship to business plan seminars, business simulation, specialised seminars focusing on entrepreneurial skills like reputation of management, presentation skills, competency development, sales strategy and training,

specialised topics in law, business development, entrepreneurial finance and marketing, business succession, etc. Seminars focusing on the theoretical side of entrepreneurship include research seminars for students writing their theses on entrepreneurship. Lectures are often contributed by practitioners and experts from the start-up support organisations, as well as IUG graduates because the objective of the programme is to encourage active contacts and networking with entrepreneurs.

For more information: www.iug.jku.at

J.J. Strossmayera University of Osijek (Croatia)

Entrepreneurship has already been the focus of research at the Josip Juraj Strossmayera University in Osijek since the 1980's. In 2000, this resulted in the Graduate Programme of Entrepreneurship, aimed at developing the entrepreneurial capacity of young people with the goal of increasing entrepreneurial behaviour and the creation of small- and medium-sized enterprises (SMEs) in Croatia. The approach of the four-semester programme stems from the belief that entrepreneurship is the unity of knowledge and skills to notice opportunities, and the capability to turn these into ventures. Therefore, its main direction has always been towards knowledge, skills for the identification and solution of problems and to generate and exchange ideas. The programme's objective is to connect the current knowledge of entrepreneurship with problems from real business life, in the profit and non-profit sector.

Therefore theoretical knowledge of the different stages of development of a business venture is combined with practical assignments through active participation by the students. Each of the four semesters focuses on another stage, from generating a business idea to the growth of the organisation. Practical relevance is further ensured by the strong links the programme fosters with SMEs through a close collaboration with the local Centre for Entrepreneurship, the Osijek Business Incubator and the Policy Centre for Small- and Medium-Sized Companies and Entrepreneurship (CEPOR). Furthermore, experienced entrepreneurs follow the programme side-by-side with students who are eager to hone their entrepreneurial skills. Students are also encouraged to participate in extracurricular activities, in order to raise their awareness on the environment and the importance of volunteering.

Since its initiation in 2000 the programme has seen several changes. A redesign in 2005 introduced the bachelor and the master system according to the Bologna reform. Whereas before, the programme only consisted of a master's degree phase, the J.J. Strossmayera University now provides a complete vertical package of entrepreneurship education. A new Innovativeness and Entrepreneurship doctoral programme was introduced in 2010, resulting from the cooperation with other European universities in a TEMPUS joint project. In eleven years time the structure of the student body has also changed greatly. Initially, the majority of the students had an economic background and came from the surroundings of Osijek. Now, students with a degree in different disciplines make up 45% of those enrolled and the range of the institution has become more regional, spreading to other Balkan countries such as Bosnia Herzegovina and the Republic of Macedonia.

For more information: www.psopefos.hr

Queen's University Belfast (United Kingdom)

St Mary's University College, Belfast, is an independent Higher Education institution established by the Catholic Church in Ireland. Its mission is 'to make a distinctive contribution of service and excellence, in the Catholic tradition to higher education in Northern Ireland'. The College provides undergraduate courses in teacher education and the Liberal Arts, and a range of postgraduate programmes in the field of teacher education. The College is dedicated to widening the access to higher education, enabling participation, and promoting economic regeneration and social development as important ways of facilitating conflict resolution and peace in Ireland. These goals arise from the College's commitment to be an educational, religious, cultural and social resource for the local community and to show concern for the poor and powerless. The College is also committed to promote a rich international dimension.

St Mary's is a College of Queen's University Belfast (QUB) and operates as a School within the University's academic structure. Therefore, the College's academic policies are articulated within the wider framework of the University's policy goals. Queen's University has been very active in the promotion of entrepreneurship education within the University and St Mary's has played its part in this activity. Students participate in the QUB Certificate in Entrepreneurship as a part of St. Mary's University.

St Mary's is fully convinced of the need for entrepreneurship education and it has adopted a comprehensive policy to build and expand upon existing policies, informed by recognised good practice in entrepreneurship education. The policy seeks to promote a strong, holistic and integrated approach that takes into account the growing demand for skills such as entrepreneurship, creativity and leadership.

St Mary's is committed to ensure that its graduates ,will gain a detailed knowledge of their subject area through their programmes of study and selected extracurricular activities and develop a range of transferable skills, abilities and experiences that will equip them for high quality, challenging employment.

St Mary's intends that all undergraduate students, and where appropriate, postgraduate students, will have had the opportunity to compile evidence of their development throughout their study programme and through selected extracurricular activities and evaluate the skills-related outcomes of their work.
In September 2011 St Mary's launched a new qualification in Entrepreneurial Learning designed to enable its student teachers to develop and enhance their knowledge, understanding and pedagogy. The main stimulant for the Entrepreneurial Learning Certificate has been the 2006 EU OSLO Agenda for Entrepreneurship Education in Europe 2020. The main reference point in the United Kingdom was the Davies Report, commissioned by the then Chancellor Gordon Brown, which provided the context for the subsequent reform of the Curriculum. The key elements of this new qualification in Entrepreneurial Learning are in the first place that they will enable students to consolidate their knowledge and understanding of appropriate content; and in the second place to develop a coherent and critical appreciation of their practice. The new qualification is intended to supplement the formal B.Ed degree in the context of Entrepreneurial Learning

and the intention is that the Certificate will be completed over the first three years of the degree.

St Mary's is currently completing a review of its degree programmes. The intention is that entrepreneurship education will be one of the key themes embedded within the revised degree programmes for all its student teachers who will pursue their career in schools with pupils in ages that range from 4 to 18.

For more information: www.qub.ac.uk and www.stmarys-belfast.ac.uk

University of Turku (Finland)

Students at the University of Turku were able to study entrepreneurship-related courses at the Department of Management even before 2005. However, from that year onward specific entrepreneurship programmes are being taught, which consist of an exhaustive range of courses. The studies provide the student with a comprehensive picture of entrepreneurship as a research field and they provide basic knowledge of the subject, both at the practical level and the theoretical level. The students are also exposed to real life experience during the introductory studies by having them practice their business development skills, recognition of opportunity and exploitation skills in a form of a practicum.

Lectures are provided partially by external teachers within a range of research and administrative positions at the university, and guest lecturers from partner universities are also actively invited to visit the classes. The programmes are attended by students who are keen on developing their entrepreneurial skills, entrepreneurial youngsters who already run a small business and entrepreneurs who want to brush up on their knowledge on the subject.

The active student-based network Boost Turku forms a part of the programmes' link with practical reality. Young entrepreneurs and entrepreneur-minded people share their knowledge in the network. It strives to be an easy-access open society for any kind of academic entrepreneurial matter, with the ultimate goal of creating new start-up companies among university students in the city. This goal is achieved by developing students' hands-on skills in different areas of knowledge related to start-ups and helping them with the concrete steps that are required to be taken to start your own successful growth business. A broad network of students, mentors and start-ups has been set up to support this goal. The Boost Turku network also actively organises extracurricular activities in close cooperation with the entrepreneurship programmes. Activities include business plan competitions, entrepreneur speaker events and visits to different stakeholders.

The entrepreneurship programmes at the University of Turku cover the full academic range and consist of bachelor, two-year master, post-graduate and even MBA studies. Courses cover subjects ranging from new business models and different perspectives of entrepreneurship to finance risk and the creation of a new venture for 3 to 6 ECTS each. Students can also opt for electives in such fields as innovation and entrepreneurial financing during the programmes. Courses in the master's phase also focus on language, communication and methodology, and the core is innovation and knowledge-based new venture creation and development. Finally, individual entrepreneurship courses are also included in the different curriculums across the university.

The post-graduate studies provide the student with familiarity in the field of science and its social significance, as well as with the development, basic problems and research methods in the field. Increasingly significant are the combined impact of innovations and entrepreneurship in addition to the generation of rapid growth in expertise-intensive firms.

Finally, the year 2008 saw the initiation of an innovation and entrepreneurship study module, which can be chosen as a 25 ECTS minor in several master's degree programmes. The module provides the student with a comprehensive picture of current issues in the field of innovation and entrepreneurship with special emphasis on ICT and related industries.

For more information: www.tse.fi and www.boostturku.com

University of Valencia (Spain)

The University-Enterprise Foundation of Valencia (ADEIT) was created in 1989 with the specific objective of strengthening relations between the University of Valencia and the business sector. ADEIT has been working on the detection of needs for research, development and technology within this broad objective to manage postgraduate and specialization courses and to promote the inclusion of labour among its students either by inclusion in the employee labour market, or through self-employment.
Most of the activities developed by ADEIT are supported by a sponsorship consisting of members of the University of Valencia as well as of some of the most representative enterprises and entities of the Community of Valencia.

In 1999 ADEIT has created the Entrepreneurial Chair of the University of Valencia (Cátedra de Cultura Empresarial) that aims to promote and boost the teaching of dissemination of an enterprise culture, encouraging the development of enterprise activities and thus contribute to the creation of companies. A wide variety of activities, such as seminars and lectures, are provided on behalf of the Entrepreneurship Chair for students to engage in the topic of entrepreneurship.

"Who can be an entrepreneur?" is a course of short duration performed on behalf of the Entrepreneurial Chair that has the objective to provide students with a closer approach to entrepreneurial activities. This course counts with a wide range of guest lecturers that report their real-life experience as entrepreneurs and managers.

The Summer School of ADEIT is specifically targeted at university teachers. The objective is to foster entrepreneurship educational practices and to create a broad network of discussion about innovative methods for entrepreneurship education and training. This Summer School also counts with the participation of researchers from different institutions, entrepreneurs and employers.

For more information: www.adeit.uv.es

UnternehmerTUM (Germany)

The Technical University of Munich (TUM) characterises itself as *the* entrepreneurial university and since 1998, entrepreneurship has been the flagship of its mis-

sion and activities. Students of all disciplines are encouraged to think and act in an entrepreneurial way and the main objective of the university is to inspire and empower its students, academics and alumni to do so.

The UnternehmerTUM was founded in 2002 to act as an entrepreneurship centre for innovation and creation and it is the central institution for entrepreneurship education on both a scientific and an applied level. Its view is that entrepreneurship acts as a bridge between science and industry and can serve as a means to implement research results into marketable products and services. Hence, UnternehmerTUM focuses on the entrepreneurial qualification of students, researchers and professionals and seeks to developed and foster potential in this area. Seminars, lectures, workshops, conferences and corporate qualification programmes are offered in this context, ranging from 3 to 90 ECTS.

The practical nature of entrepreneurship is emphasised through courses in which students work in interdisciplinary teams to develop and implement business concepts to create innovative, marketable products and services. Business plans are also given their due importance and students are to develop their business ideas and assess their marketability in a team. Individual coaching is provided to develop the students' personalities. Furthermore, guest lecturers are invited to share their real-life experiences. Finally, the UnternehmerTUM initiates growth-oriented start-ups and assists its entrepreneurs with building new companies.

The programme targets students at all phases of their academic careers, as well as at researchers and in the case of the MBA programme, even at professionals and entrepreneurs. Courses and programmes cover entrepreneurial subjects such as recognition of opportunity, innovation management and leadership as it is taught by experts, as well as the coaching and mentoring of students.

For more information: www.unternehmertum.de

Utrecht School of Arts (The Netherlands)

While the Utrecht School of Arts (HKU) has no specific entrepreneurship programme, its faculty of Arts and Economics provides several courses targeted at teaching its students the entrepreneurial skills that are required in an industry where people are often self-employed and to work on a freelance basis. These courses are not restricted to only this faculty and all five of the institution's faculties spend some degree of attention to entrepreneurship. The goal of the HKU is to have provided each and every student with the opportunity to evolve into a professional entrepreneur, while entrepreneurship is a broad concept. Not only does it include the skills that are required when starting a business, but it also provides an entrepreneurial mindset.

Fulfilment of this objective is attained by having the students work in practical situations with real clients, analyse case studies and have contacts with enterprising alumni. The curriculum consists of a mixture of basic theory, hands-on practice and experiences taught by entrepreneurs. Therefore the courses are interesting, not only for the students attending the school in all the phases of their studies, but also for young entrepreneurs with their own start-ups. The subjects range from creative entrepreneurship to stimulate an entrepreneurial mindset in the creative industries to young entrepreneurship, aimed at introducing students to entrepreneurship in a protected environment.

While the Utrecht School of Arts has no specific entrepreneurship programme, it does exploit the Centre for Entrepreneurship in the Creative Industries (COCI). The centre initiates, supports and coordinates the development of educational reforms and services focused on entrepreneurship for students and alumni in the creative industries.

The HKU also provides an extra-curricular master class in entrepreneurship that is specifically targeted at designers, both students and young entrepreneurs. The participation is based on voluntary subscription, followed by a selection procedure and the master class targets fourth year bachelor or master students. Students are taught about personal entrepreneurship, experience of the type of entrepreneur they themselves are and acquiring the necessary skills to become an entrepreneur via the cooperation with outside stakeholders such as the Taskforce Innovation in the Utrecht Region, Utrecht Province and Dutch Game Garden. The master class may result in real-life start-ups depending on the level and the ambition of the students.

For more information: www.hku.nl, www.coci.nl and http://xprof.hku.nl/masterclass

JADE

JADE – the European Confederation of Junior Enterprises is an international, non-profit umbrella-organisation of European enterprises established in 1992 and managed solely by students of higher education institutions. Currently the network consists of 15 Confederations and Consultative Members from Europe, a total of up to circa 300 Junior Enterprises.

A Junior Enterprise is a student association in which students have the opportunity to add practical experience to their theoretical skills, as well as to develop entrepreneurship at an early stage by running professional studies for companies and by managing the organization itself. Students from different fields of studies (from business and economics, to engineering, IT and communication) can indeed develop some technical and soft skills which are essential for their future careers, as well as get an early contact with the business world in these small and medium sized enterprises.

The Junior Enterprises, recognised as 'best practice' by the European Union under the Oslo Agenda for Entrepreneurship Education have the key function of bridging the gap between academia and real business world, thus enforcing practicality and relevancy of higher education.

The impact of the Junior Enterprise concept grows every year, as the revenues of the largest business structures reach the million-Euro bar. Moreover, the impact on society is important since it influences the future of young people while it contributes to enhance their academic studies through practical experiences within the Junior Enterprises.

The 20,000 European students who are engaged in a Junior Enterprise are known as Junior Entrepreneurs and they are between 18 and 25 years old. Those students are developing an entrepreneurial mindset as well as many other skills in a personal, social and employment-related perspective while studying for a bache-

lor's degree or for a master's degree. The Junior Entrepreneurs are able to enhance their leadership and team-working skills, as well as their pro-activity, creativity and professionalism while managing their own organisation.

The number of Alumni Junior Entrepreneurs now reaches one million people after 45 years since the creation of the first Junior Enterprise. These former Junior Entrepreneurs who have been through this non-formal Entrepreneurship education process are currently working in different workplaces, from their own company to the management of other people's firms.

For more information: www.jadenet.org

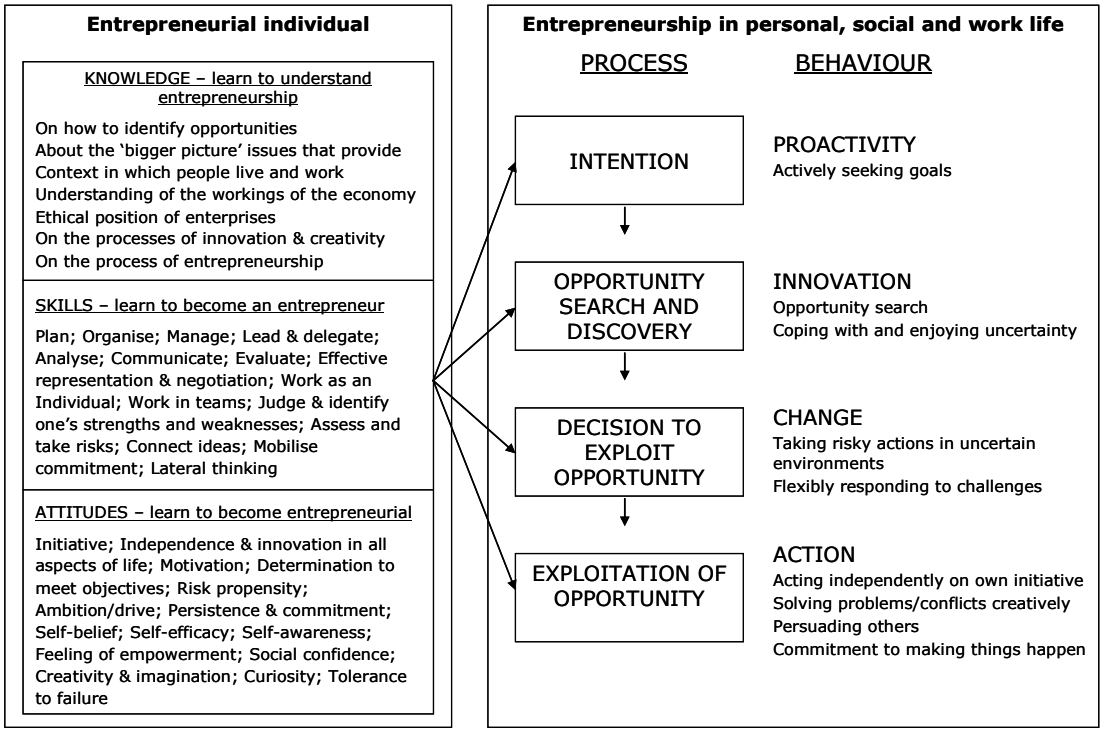
3 Impact on entrepreneurship key competence

3.1 Introduction

Entrepreneurship and sense of initiative: the entrepreneurship key competence

In the European reference framework 'Entrepreneurship and a sense of initiative'[1] is one of eight key competences for lifelong learning which citizens require for their personal fulfilment, social inclusion, active citizenship and employability in a knowledge-based society. In the framework (see Figure 1), the key competence 'sense of initiative and entrepreneurship' is defined as "an individual's ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives. This competence supports individuals, not only in their everyday lives at home and in society, but also in the workplace in being aware of the context of their work and being able to seize opportunities, and it is a foundation for more specific skills and knowledge needed by those who establish or contribute to social or commercial activity. This should include awareness of ethical values and promote good governance".

Figure 6 The elements in entrepreneurship education



Source: Elaborated from Heinonen & Poikkijoki (2006). An entrepreneurial-directed approach to entrepreneurship education: mission impossible? Journal of Management Development, Vol. 25, issue 1 by incorporating issues from EC (2007), NESTA (2009), Key competences for lifelong learning – European Reference Framework and The identification and measurement of innovative characteristics of young people and European Commission (2007), Key competences for lifelong learning, European Reference Framework.

[1] http://ec.europa.eu/dgs/education_culture/publ/pdf/ll-learning/keycomp_en.pdf

Entrepreneurship education

Entrepreneurship education seeks to prepare people to be responsible, enterprising individuals who have the knowledge, skills and attitudes necessary to achieve the goals they set for themselves to live a fulfilled life. Therefore, entrepreneurship education focuses on knowledge, skills and attitudes of students which all together make up the entrepreneurship key competence, as described in Figure 1. Entrepreneurship education is not necessarily directly focused on the creation of new businesses, although graduate start-ups are one of a range of possible outcomes.

Knowledge refers to the need to have a broad understanding and knowledge of entrepreneurship, including the role entrepreneurs and entrepreneurship plays in modern economies and societies. *Skills* refer to the need to learn how to become an entrepreneur. It concerns skills needed to turn ideas into action, whereby it is important to make a distinction between soft entrepreneurial skills (e.g. social skills) and hard entrepreneurial skills (e.g. drafting a business plan). *Attitudes* refer to the need to learn to become entrepreneurial. It deals with the need for individuals to develop certain attitudes that will help them to take action, including taking responsibility for their own learning, careers and life.

Primary education determines to a large extent the entrepreneurial mindset of people, whereas at a higher educational level one of the main purposes of entrepreneurship education is to develop entrepreneurial skills.

Entrepreneurship education will include at least one or more of the following elements:

1 Foster those personal attitudes and skills that form the basis of an entrepreneurial mindset and behaviour (creativity, risk propensity, self-confidence, independence, etc.);
2 Raise awareness of students about self-employment and entrepreneurship as possible career options;
3 Use practice-based methods, where students are involved in project work and/or in activities outside the classroom (linking them with the business world or with the local community);
4 Provide basic business skills for self-employment or self-management, and knowledge of how to start and develop a commercial or social venture successfully.

Entrepreneurship education should not be confused with general business and economic studies, as its goal is to promote creativity, innovation and self-employment. Entrepreneurial programmes offer students the tools to think creatively, to be an effective problem solver, and to communicate, to network and to lead. Entrepreneurship is not necessarily a topic - it is also a different way of teaching and of helping young people to fully develop their potential.

The intended goals of entrepreneurship education and intervention logic are further elaborated in the 2010 Commission's report 'Towards greater cooperation in coherence in entrepreneurship education'.[1] Teaching and learning entrepreneurial

[1] European Commission (2010), DG Enterprise and Industry, Towards greater cooperation in coherence in entrepreneurship education.

competences, business management skills and know-how, will lead to enhance self confidence and self-motivation, to become more adaptable and creative individuals, to have a more positive attitude towards risk taking and enhanced business and management skills. In turn this will lead to a greater active citizenship, a more creative and adaptable work force and more potential entrepreneurs. The global impact will be enhanced social cohesion, more productive and innovative businesses and an increased rate of business start-ups and survivals and greater employment opportunities in SMEs.

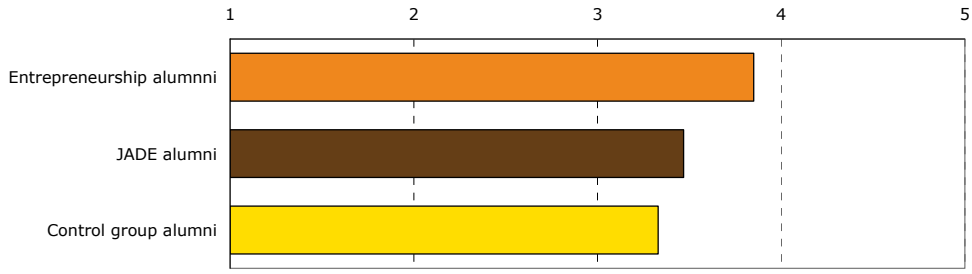
3.2 Attitudes

3.2.1 Introduction

One of the three elements of the entrepreneurship key competence is attitudes: to learn to become entrepreneurial as shown in Figure 6. This element deals with the need for individuals to develop certain attitudes that will help them to take action, including taking responsibility for their own learning, careers and life.

Alumni are asked whether 'their higher education had helped them to develop their sense of initiative - a sort of entrepreneurial attitude' as a first indication of attitude. Figure 7 shows that entrepreneurship alumni judge their higher education to be more helpful to develop their sense of initiative than control group alumni. Attending entrepreneurial courses can be a logical reason. Male alumni score the role of their higher education in developing a sense of initiative higher than female alumni.

Figure 7 My higher education helped me to develop my sense of initiative – a sort of entrepreneurial attitude (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

However, the term attitude has a very broad meaning and therefore more insight is needed in the relevant components determining the attitude. . Many studies have focused on the attitude of successful entrepreneurs.[1] Several statements which refer to the entrepreneurship attitude, were developed and presented to the alumni of the higher education institutions, based on these studies. Four

[1] For example Hornaday, J. and J. Aboud (1971), Characteristics of successful entrepreneurs, Personnel Psychology, Vol. 24, pp. 141-153 and Brockhaus, R.H. (1982), The psychology of the entrepreneur, in: Encyclopedia of Entrepreneurship, pp. 39-57, Englewood Cliffs: New Jersey.

components could be distinguished through factor and reliability analysis[1]: risk propensity, self-efficacy, need for achievement and structural behaviour. Average scores are computed[2] for each of these components. The results are presented in this section of chapter 3.

3.2.2 Risk propensity

Risk propensity is an attitudinal component that refers to an individual's tendency to take risks in his/her actions that varies across distinct decision context.[3]

Although risk propensity is one of the dominant themes in entrepreneurship literature, agreement on the risk propensity of entrepreneurs is far from unanimous.[4] Researchers found contradicting conclusions and were not able to show convincing support of whether entrepreneurs are risk takers or as risk averse as other people.[5] Very few studies have shown statistically significant differences between entrepreneurs and non-entrepreneurs in their risk-taking propensity[6]. Some assert that there has been little empirical evidence for the claim that entrepreneurs should have a higher risk propensity than managers.[7] Nevertheless, this individual psychological trait continues to be discussed as an important variable for understanding entrepreneurial behaviour.[8]

Risk propensity of alumni

The risk propensity of alumni of the higher education institutions is presented in Figure 8. The level of risk propensity is based on the answers to the following four statements:

- I am willing to take risks;
- I tend to take my chances, even when I run the risk of bearing a considerable loss;

[1] See Annex II for further explanation.

[2] The statements could be scored from 1 (does not apply) to 5 (strongly applies)in the questionnaire; results are significant at 1% level.

[3] Curşeu, Petru L., Patrick A.M. Vermeulen and René M. Bakker (2008), The psychology of entrepreneurial strategic decisions, in Vermeulen, Patrick A.M. and Petru L. Curşeu (Ed.), Entrepreneurial Strategic Decision-Making: a Cognitive Perspective, pp. 41-67, Edward Elgar: Cheltenham.

[4] Curşeu, Petru L., Patrick A.M. Vermeulen and René M. Bakker (2008), The psychology of entrepreneurial strategic decisions, in Vermeulen, Patrick A.M. and Petru L. Curşeu (Ed.), Entrepreneurial Strategic Decision-Making: a Cognitive Perspective, pp. 41-67, Edward Elgar: Cheltenham.

[5] Gibcus, Petra, Patrick A.M. Vermeulen and Elissaveta Radulova (2008), The Decision-making Entrepreneur: A Literature Review, in Vermeulen, Patrick A.M. and Petru L. Curşeu (Ed.), Entrepreneurial Strategic Decision-Making: a Cognitive Perspective, pp. 11-40, Cheltenham: Edward Elgar.

[6] Brockhaus, R.H. (1980), Risk taking propensity of entrepreneurs, Academy of Management Journal, Vol. 23 (3), pp. 509-20 and Low, M. and I. MacMillan (1988), Entrepreneurship: past research and future challenges, Journal of Management, Vol. 14 (2), pp. 139-161.

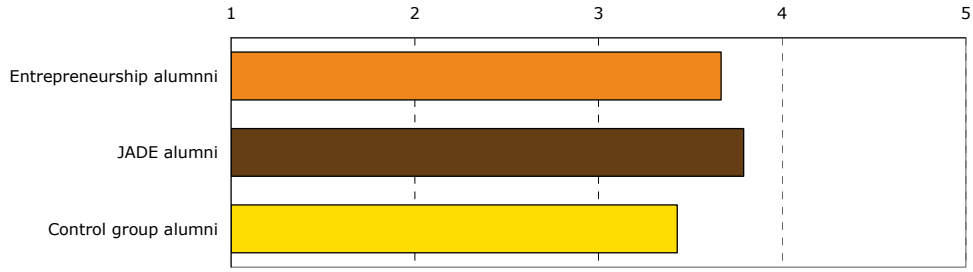
[7] Busenitz, L.W. (1999), Differences between entrepreneurs and managers in large organizations: biases and heuristics in strategic decision-making, Journal of Business Venturing, Vol. 12 (1), pp. 9-30.

[8] Gibcus, Petra, Patrick A.M. Vermeulen and Elissaveta Radulova (2008), The Decision-making Entrepreneur: A Literature Review, in Vermeulen, Patrick A.M. and Petru L. Curşeu (Ed.), Entrepreneurial Strategic Decision-Making: a Cognitive Perspective, pp. 11-40, Cheltenham: Edward Elgar.

- I realise new things deliberately;
- When I discover opportunities, I bring them to fruition.

Alumni who have attended entrepreneurship education and JADE alumni score themselves significantly higher on risk propensity than alumni in the control group. JADE alumni give themselves the highest score for risk propensity. This means that on average this group of alumni are willing to take more risks than the other groups. Alumni in the control group are more risk averse.

Figure 8 Risk propensity of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

Female alumni score themselves lower on risk propensity than male alumni (Table 10). Females in the control group show the lowest score on risk propensity. Male JADE alumni have the highest risk propensity.

Table 10 Risk propensity of alumni by group and gender (n=2,582)*

	Male	*Female*	*Total*
Entrepreneurship alumni	3.7	3.6	3.7
Control group alumni	3.5	3.4	3.4
JADE alumni	3.8	3.7	3.8
Total	*3.6*	*3.5*	*3.5*

** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

There is also a significant difference in risk propensity when the current age of alumni is compared. Alumni of 25 years and younger give the highest score, 3.7, on risk propensity. If the alumni become older the score on risk propensity gradually decreases. A possible explanation can be that as the age of alumni increases the chance that they have to support a family increases. In order to do this they will need income stability which contradicts risk-taking.

3.2.3 The need for achievement

Research underlines that the two core aspects of entrepreneurship are the need for achievement and the attitude toward risk. The need for achievement is the capacity to set high personal though obtainable goals, the concern for personal achievement rather than the rewards for success and the desire for job-relevant feedback ('how well am I doing?') rather than for attitudinal feedback ('how well do you like me?').[1] Hornaday and Aboud (1971) reported that in comparison with men in general, entrepreneurs have stronger needs for achievement. Successful entrepreneurs score high on the need for achievement by striving adequately for performance and if necessary, by competing. They build their company with their professional goals in mind.[2]

There are 'negative and positive' factors to start a business. Negative or 'push' factors include unemployment and frustration. Among the positive or 'pull' factors the need to achieve or innovate, plus the desire to gain control over one's destiny are the most important factors.[3] Moreover, empirical research showed that the entrepreneurs who initially were driven by 'push' factors have a higher failure rate.[4]

Furthermore, Shaver and Scott (1991) consider the achievement motivation. From his prospective the main characteristic of the business initiators is the high need for achievement which he defines following McClelland (1961) as a preference for challenge, acceptance of personal responsibility for outcomes and innovativeness.[5]

The need for achievement of alumni

The analysis showed that the need for achievement can be assessed by the scores on the following statements:

- I want to achieve more than most other people want to achieve;
- I am ambitious.

The need for achievement is different if alumni have attended entrepreneurship education. Alumni of JADE and entrepreneurship programmes give themselves a higher score for the need for achievement than alumni in the control group (Figure 9).

[1] Papadakis, V., S. Lioukas and D. Chambers (1998), Strategic decision-making processes: the role of management and context, Strategic Management Journal, Vol. 19 (2), pp. 115-147.

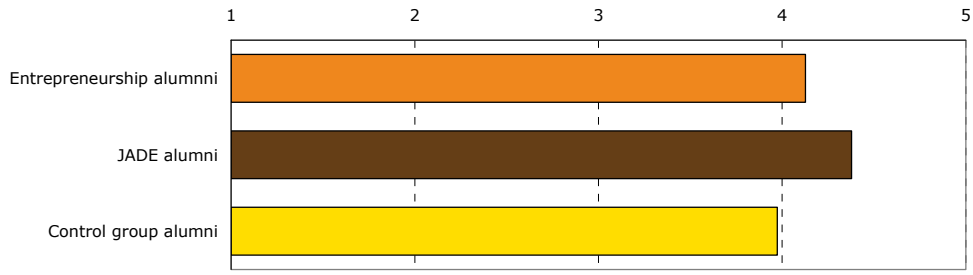
[2] Hornaday, J. and J. Aboud (1971), Characteristics of successful entrepreneurs, Personnel Psychology, Vol. 24, pp. 141-153 and Oosterbeek, Hessel, Mirjam van Praag and Auke IJsselstein (2010), The impact of entrepreneurship education on entrepreneurship skills and motivation, European Economic Review, Vol. 54, pp. 442-454.

[3] Shapero, A. and L. Shokol (1982), The social dimensions of Entrepreneurship, in: C. Kent, D. Sexton and K.H. Vesper (eds.), The Encyclopedia of Entrepreneurship, Englewood Cliffs, NJ: Prentice-Hall, pp. 72-90.

[4] Brockhaus, R.H. (1980), Risk taking propensity of entrepreneurs, Academy of Management Journal, Vol. 23 (3), pp. 509-20.

[5] Shaver, K.G. and L.R. Scott (1991), Person, process, choice: the psychology of new venture capital, Entrepreneurship Theory and Practice, Vol. 16 (2), pp. 23-45.

Figure 9 The need for achievement of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

Male entrepreneurship alumni have a higher need for achievement than female entrepreneurship alumni (Table 11). There are no significant differences between male and female alumni from JADE.

Table 11 Need for achievement of alumni by group and gender (n=2,582)*

	Male	*Female*	*Total*
Entrepreneurship alumni	4.2	4.0	4.1
Control group alumni	4.0	3.9	4.0
JADE alumni	4.4	4.4	4.4
Total	*4.1*	*4.0*	*4.1*

** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

The need for achievement decreases as the age of the alumni increases. Likely, older alumni do not have the urge to prove themselves because they already have a lot of experience. In addition, personal circumstances like having a family possibly influence the need for achievement as well. JADE alumni 25 years or even younger have the highest need for achievement. They scored their need for achievement with a 4.5. But also entrepreneurship alumni in this age group have a high score on the need for achievement: 4.3.

3.2.4 Self-efficacy

Self-efficacy is the belief in one's ability to perform certain tasks successfully.[1] Self-efficacy – self belief, self assurance, self awareness and feelings of empowerment – is essential for both social learning (acquiring appropriate positive attitudes) and social confidence (believing in one's idea and waiting to take it forward). Self-efficacy has gained momentum in the entrepreneurship literature as a crucial personal attribute of people who recognise and exploit opportunities.[2]

[1] Bandura, A. (1997), Self-efficacy: The exercise of control, New York: Freeman.

[2] Chell, Elizabeth and Rosemary Athayde (2009), The identification and measurement of innovative characteristics of young people: development of the Youth Innovation Skills Measurement Tool, London: NESTA.

Entrepreneurs score significantly higher on self-efficacy than non-entrepreneurs.[1] Successful entrepreneurs are usually convinced that they can bring every activity to a successful end. Also, they feel that they can control their own success which does not depend on others.[2]

Equal circumstances could be assessed as full of opportunities by people with high self-efficacy but burdened with costs and risks by people with low self-efficacy.[3] Self-efficacy helps to determine how much effort people will spend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations.[4] Self-efficacy represents a serious cognitive bias because it leads to the false perception of a very low possibility of failure while it is an important prerequisite for entrepreneurial actions.[5]

Self-efficacy of alumni

The level of self-efficacy is based on the cluster score of the following statements:

- When I try hard enough, I can always manage to solve difficult problems;
- In demanding situations, I can usually think of solutions;
- No matter what comes my way, I am usually able to handle it;
- I can rely on my ability to solve problems.

The level of self-efficacy is the same for the three groups. On average, self-efficacy scores 4.2 (Figure 10). However, there are gender differences regarding self-efficacy. Male alumni give themselves a significant higher score on self-efficacy than female alumni: 4.3 versus 4.2. The level of self-efficacy seems to increase with age. This may be related to the fact that older alumni have more experience. Alumni who are 25 years and younger score themselves a 4.2 on self-efficacy, whereas alumni who are 35 years and older score 4.3 on this element of attitudes.

[1] Markman, Gideon D., Robert A. Baron and David B. Balkin (2005), Are perseverance and self-efficacy costless? Assessing entrepreneurs' regretful thinking, Journal of Organizational Behavior, Vol. 26, pp. 1-19.

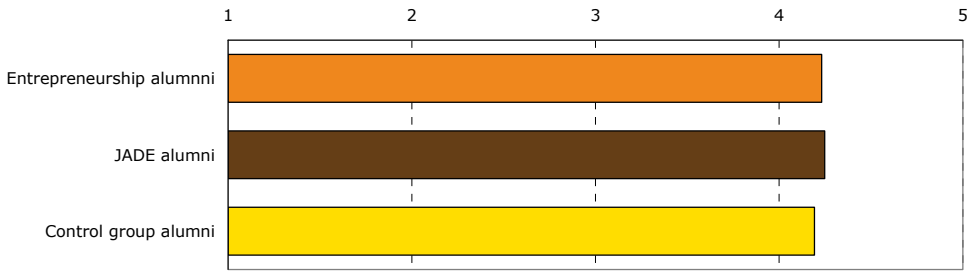
[2] Oosterbeek, Hessel, Mirjam C. van Praag and Auke IJsselstein (2008), The impact of entrepreneurship education on entrepreneurship competencies and intentions, Tinbergen Institute: Amsterdam/Rotterdam.

[3] Chen, C.C., P.G. Greene and A. Crick (1998), Does entrepreneurial self-efficacy distinguish entrepreneurs from managers?, Journal of Business Venturing, Vol. 13 (4), pp. 295-316.

[4] McCarthy, A., F. Schoorman and A. Cooper (1993), Reinvestment decisions by entrepreneurs: rational decision-making or escalation of commitment? Journal of Business Venturing, Vol. 8 (1), pp. 9-24.

[5] Brockhaus, R.H. (1980), Risk taking propensity of entrepreneurs, Academy of Management Journal, Vol. 23 (3), pp. 509-20.

Figure 10 Self-efficacy of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are not significantly different.*

Source: EIM, 2011.

3.2.5 Structural behaviour

Here. structural behaviour is defined as both the ability to work in a structured manner and the ability to persevere whenever faced with setbacks and obstacles (perseverance)[1]. Perseverance helps entrepreneurs to maintain a high level of endurance and to overcome snags and setbacks in their business.[2]

Structural behaviour of alumni

The level of structural behaviour is based on the scores on the following statements:

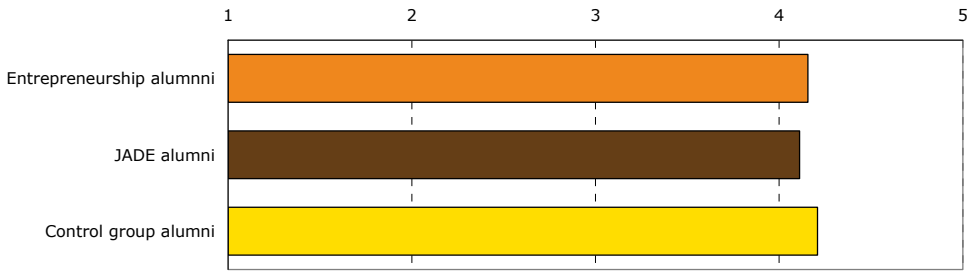
- When I start something, I carry it out until it is finished;
- I dislike unfinished work;
- I work in a structured manner;
- I am able to make realistic plans.

Alumni in the control group show the highest score regarding structural behaviour (Figure 11). The alumni that have attended entrepreneurial courses and the JADE alumni are lagging behind a little on this element of attitude.
One explanation can be that entrepreneurial individuals have more ideas and are more creative, but less structured in their thinking process.

[1] Stoltz, P.G. (1997), Adversity quotient: Turning obstacles into opportunities, New York: John Wiley & Sons.

[2] Brockner, J., and J. Guare (1983), Improving the performance of low self-esteem individuals: an attributional approach, Academy of Management Journal, Vol. 26 (4), pp. 642–656 and McGrath, R. G. (1999), Falling forward: real options for reasoning and entrepreneurial failure, Academy of Management Review, Vol. 24 (1), pp. 13–30.

Figure 11 Structural behaviour of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

On average, female alumni score higher on structural behaviour than male alumni (Table 12). Female alumni of JADE show the highest score on structural behaviour whereas male alumni of JADE show the lowest score.

Table 12 Structural behaviour of alumni by group and gender (n=2,582)*

	Male	*Female*	*Total*
Entrepreneurship alumni	4.1	4.2	4.2
Control group alumni	4.2	4.3	4.2
JADE alumni	4.0	4.3	4.1
Total	*4.1*	*4.3*	*4.2*

** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

There are no age differences with regard to the perception of structural behaviour: the scores on structural behaviour are approximately the same for the comparable age groups.

3.3 Skills

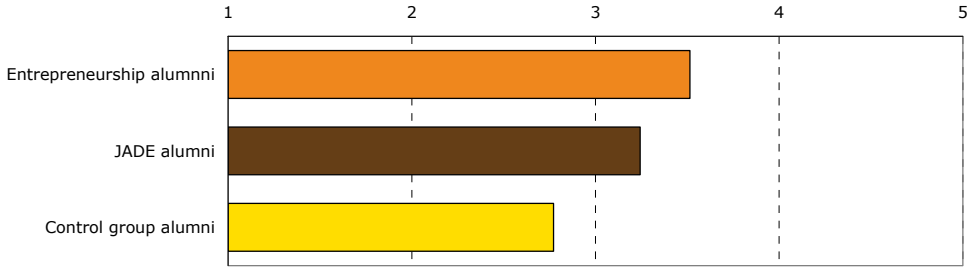
3.3.1 Introduction

One of the main purposes of entrepreneurship education at a higher education level should be to develop entrepreneurial skills and mindsets. Research shows that it is important to capture a mindset and attitudinal approach rather than a set of personality traits. Skills are the second of three elements that make up the entrepreneurship key competence (see section 3.1): how to become an entrepreneur. It is possible to teach students in higher education 'how to' be entre-

preneurial by helping them to develop the entrepreneurial skills that are needed to turn ideas into action.[1]

Alumni are asked as a first indication of (entrepreneurial) skills whether their higher education gave them skills and know-how that enable them to run a business. Figure 12 shows that, of the three groups, entrepreneurship alumni give their higher education the highest scores on the learned skills and know-how - although all groups of alumni rate the contribution as relatively limited (between 2.8 and 3.5 on a scale from 1 to 5). Male alumni, more than female alumni are of the opinion that their higher education gave them the skills and know-how that enabled them to run a business.

Figure 12 My higher education gave me the skills and know-how that enable me to run a business (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

The online survey contained several statements about entrepreneurial skills. Again, through factor and reliability analysis, the number of statements are reduced (see annex II). This resulted in five entrepreneurial skills: creativity, analysis, motivation, networking and adaptability. We present average scores for each skill.

3.3.2 Creativity

Creativity is defined in several ways. Creativity is the ability to connect ideas, to tackle and solve problems, and curiosity.[2] Creativity is the ability to adopt views from different perspectives and to see and try out new possibilities based on observations of (changes in) the environment. Moreover, creativity reflects the capability to turn problems into new opportunities. It is an important ingredient for successful entrepreneurship. There is a consensus that creativity is a necessary

[1] Chell, Elizabeth and Rosemary Athayde (2009), The identification and measurement of innovative characteristics of young people: development of the Youth Innovation Skills Measurement Tool, London: NESTA

[2] Bird, B.J. (1995), Towards a theory of entrepreneurial competency: advances in Entrepreneurship, Firm Emergence and Growth 2, 51-72 and Driessen, M.P. (2006), E-Scan Ondernemerstest: Beoordeling en ontwikkeling ondernemers competentie, Entrepreneur Consultancy: 's-Graveland.

condition for innovation.[1] Individual creativity is regarded as a basic requirement for company creativity, and thus indirectly responsible for successful innovation.[2]

Creativity of alumni

The level of creativity is a clustered score on the following statements:
- I often come up with new ideas;
- I openly question how things can be improved;
- I have a vivid imagination.

The entrepreneurship alumni have significantly higher scores on creativity than control group alumni (Figure 13).

Figure 13 Creativity of alumni by group (n=2,582)*

** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

In each group, male alumni consider themselves more creative than female alumni. Male entrepreneurship alumni rate themselves on average with a 4.1 on creativity. Female alumni in the control group have the lowest score on creativity: 3.9. Alumni who are 35 years and older, score their level of creativity the highest, which suggests that the level of creativity increases by age.

3.3.3 Analysing

A critical skill in making decisions is to analyse problems and to separate main and side issues. The analytical ability enables individuals to seek opportunities, to invent and to plan. The ability to analyse means that the entrepreneur is able to carefully weigh the pros and cons, to recognise patterns and consequences, to recognise constraints and to think about alternatives.[3]

[1] Oosterbeek, Hessel, Mirjam C. van Praag and Auke IJsselstein (2008), The impact of entrepreneurship education on entrepreneurship competencies and intentions, Tinbergen Institute: Amsterdam/Rotterdam and Chell, Elizabeth and Rosemary Athayde (2009), The identification and measurement of innovative characteristics of young people: development of the Youth Innovation Skills Measurement Tool, London: NESTA..

[2] Nyström (1979), Creativity and innovation¸ Chichester, UK: John Wiley & Sons.

[3] De Jong, J.P.J. (2008), Ondernemen met Toekomst: Resultaten Scan Ondernemerschap, EIM: Zoetermeer.

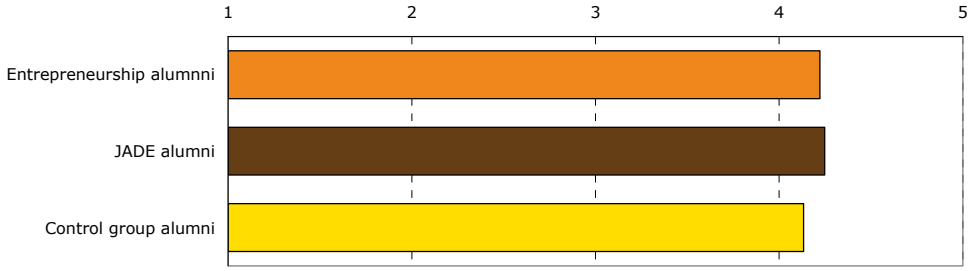
Analysing by alumni

The score on the skill of analysing is based on the scores of the following statements:

- I am able to make high quality analyses;
- I tend to see the broad outlines quickly in a pool of information;
- I can list and weigh advantages and disadvantages well.

Entrepreneurship alumni claim to have more analytical skills than alumni in the control group (Figure 14). JADE alumni show the highest score on analysing.

Figure 14 Analysing of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

Male alumni have given themselves higher scores on analysing than female alumni. The age of the alumni shows no significant difference on analytical skills.

3.3.4 Motivation

The ability to motivate others is important in order to gain support and assistance in realising opportunities. Motivation means encouraging and coaching people in achieving their goals. Motivation not only refers to people within the internal environment (employees, staff etc.) but also generally to people in the external environment.

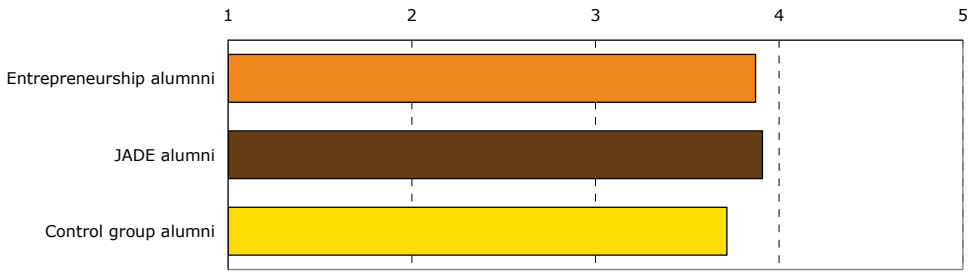
Motivating by alumni

The extent to which the alumni are able to motivate others is determined based on the scores on the following statements:

- I can stimulate the participation of others (without forcing them);
- I am able to enthuse people;
- I have a hard time motivating others;
- I am able to mobilise others to do as I wish.

Entrepreneurship alumni judge themselves as more capable of motivating others than alumni in the control group. JADE alumni rate themselves as the best motivators of the three groups (Figure 15). These results can be explained by the fact that JADE alumni participate in running junior enterprises and therefore they already have more practical experience motivating stakeholders, including the students involved in the junior enterprises.

Figure 15 Motivating of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

There are no significant gender or age differences regarding motivating.

3.3.5 Networking

Networking is a socio-economic activity by which groups of people recognise, create, or act upon opportunities. Networking is about creating and maintaining contacts with people outside.

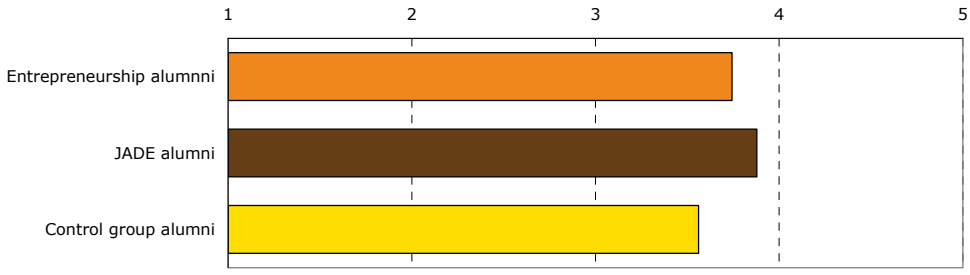
The score for the ability to network is based on the scores on the following statements:

- I try to meet people who may be important for me;
- I am an active networker;
- I maintain contacts outside my inner circle;
- I like to talk to people who I do not yet know.

Networking by alumni

JADE is a network of junior enterprises and therefore alumni of JADE already have practical experience networking and they are more aware of the importance of this aspect. JADE alumni have the highest score on networking (Figure 16) compared with the other groups. Entrepreneurship alumni rate themselves with higher scores on networking than alumni in the control group.

Figure 16 Networking by alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

It turns out that there are no differences in the networking skills of female and male alumni. However, age does matter. Alumni who are 25 years and younger, give themselves the highest rates on networking skills. As the age of the alumni increases, there is a decrease in the scores on networking.

3.3.6 Adaptability

Personal adaptability is defined in the existing literature as mastering more core activities, which simultaneously describe a process. These activities include for example: observation, interpretation, anticipation and response. They cover the process of action - reaction.[1] Successful entrepreneurs react to changes they observe in their environment, such as new clients' needs or new competitors in their market.[2]

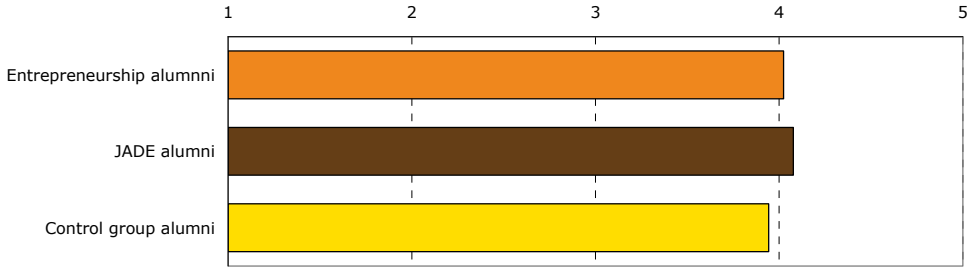
Adaptability of alumni

The level of adaptability is a clustered score based on the following statements:

- I am flexible;
- I easily anticipate and adapt to unforeseen events;
- I am able to handle different situations easily.

The adaptability of alumni differs among the three distinctive groups. JADE's alumni tend to have the highest amount of adaptability. Alumni that have attended entrepreneurship courses consider themselves more adaptable than alumni in the control group (Figure 17).

Figure 17 Adaptability of alumni by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

Male and female alumni do not differ in their adaptability skills. Furthermore, there is also no age difference on adaptability.

[1] Driessen, M.P. (2006), E-Scan Ondernemerstest: Beoordeling en ontwikkeling ondernemers competentie, Entrepreneur Consultancy: 's-Graveland.

[2] Oosterbeek, Hessel, Mirjam van Praag and Auke IJsselstein (2010), The impact of entrepreneurship education on entrepreneurship skills and motivation, European Economic Review, Vol. 54, pp. 442-454.

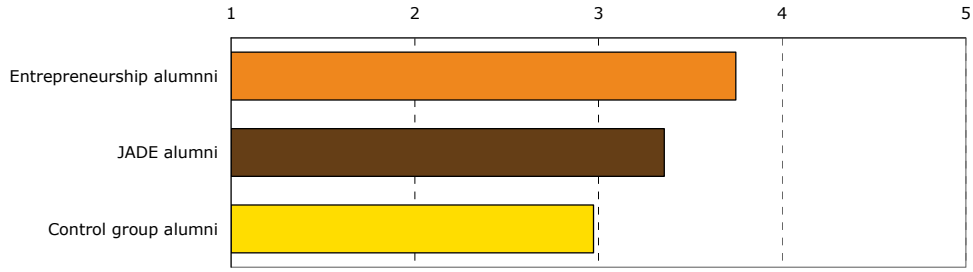
3.4 Knowledge

3.4.1 Introduction

The third of the three elements that make up the entrepreneurship key competence (see section 3.1) is knowledge: to learn to understand entrepreneurship. Knowledge is defined as having a broad understanding and knowledge of entrepreneurship, including the role entrepreneurs and entrepreneurship plays in modern economies and societies.

Alumni are asked as a first indication of attitude whether their higher education has helped them to better understand the role of entrepreneurs in society. Figure 18 shows that entrepreneurship alumni rate the role of their higher education more helpful in understanding the role of entrepreneurs in society than control group alumni.

Figure 18 My higher education helped me to better understand the role of entrepreneurs in society (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011

Male alumni more than female alumni are of the opinion that their higher education helped them to better understand the role of entrepreneurs in society. Furthermore, the younger the alumni the higher they rate this statement.

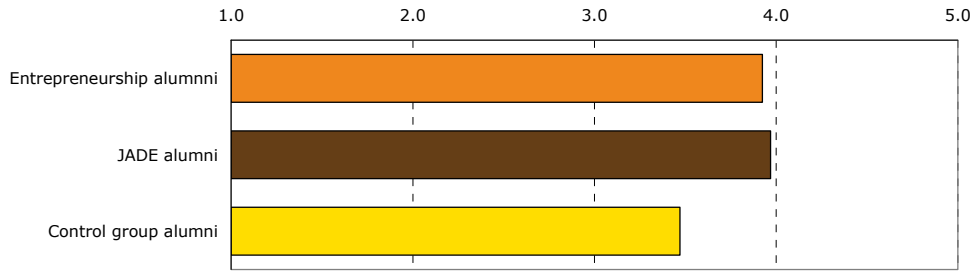
3.4.2 Knowledge of entrepreneurship

Alumni have scored on the following three statements in order to determine their knowledge of entrepreneurship:

- I know what defines successful entrepreneurship;
- I know little of what entrepreneurship is about;
- I am able to distinguish between good and bad entrepreneurs.

It turns out that alumni of the two entrepreneurial groups have a significantly better knowledge of entrepreneurship. In other words, in their opinion they are better capable of: distinguishing between good and bad entrepreneurs, knowing what entrepreneurship is about and knowing what defines successful entrepreneurship (Figure 19) than control group alumni.

Figure 19 Knowledge of entrepreneurship by group (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011

4 Impact on intentions towards entrepreneurship

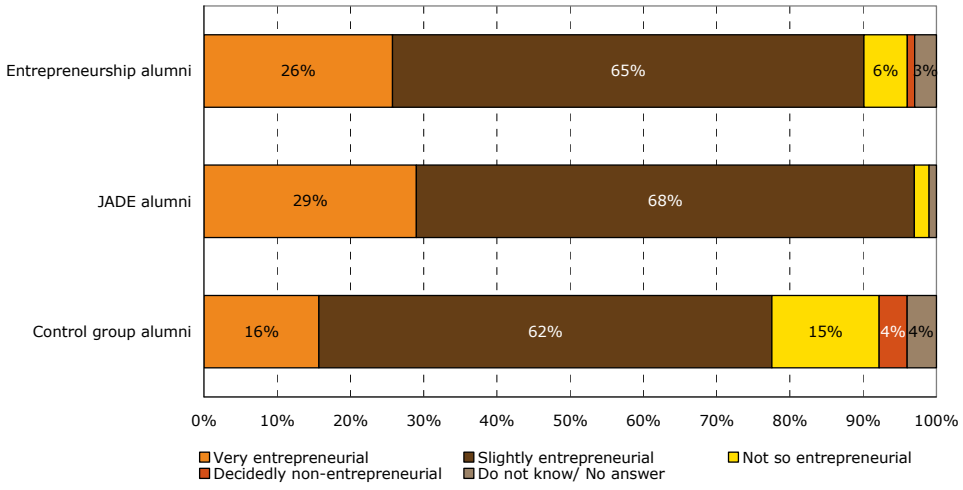
4.1 Introduction

The impact of the entrepreneurship programmes on the intentions of alumni towards entrepreneurship is presented in this chapter. These entrepreneurial intentions provide an indication as to what extent alumni want a transition towards entrepreneurship. Entrepreneurial intentions can be expressed both in terms of the self-perception of the alumni towards (a transition to) entrepreneurship and their current preference for employment.

Alumni are asked as a first indication of entrepreneurial intentions to what extent they consider themselves entrepreneurial persons. As a reminder: being entrepreneurial is defined as having the ability to turn ideas into action, including creativity, innovation and risk-taking as well as having a strong sense of initiative and tolerance to failure.

It turns out that alumni of the entrepreneurial group(s) consider themselves much more an entrepreneurial person than alumni of the control group (Figure 20). 90% of the entrepreneurship alumni consider themselves slightly or very entrepreneurial. On the other hand, only three quarter of the control group alumni consider themselves a slightly or very entrepreneurial person. Male alumni consider themselves more as an entrepreneurial person than female alumni. There are no significant age differences.

Figure 20 Entrepreneurial self-perception by group (n=2,582)



Source: EIM, 2011.

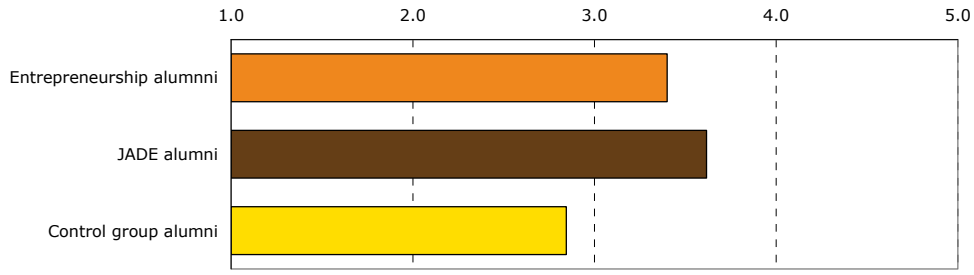
4.2 Intentions towards entrepreneurship: self-perception

One way of indicating the entrepreneurial intentions is to ask alumni about their self-perception towards entrepreneurship. Several statements were used in order to measure the self-perception. The statements were clustered into two structures. The first structure is the clustered score on the following four statements:

- I am ready to do anything to become an entrepreneur;
- My professional goal is to become an entrepreneur;
- I have no intention of ever starting a firm;
- I am not entrepreneurial.

It turns out that entrepreneurship alumni have a stronger desire for a transition towards entrepreneurship than control group alumni (Figure 21). JADE alumni have an even stronger desire for a transition towards entrepreneurship than entrepreneurship alumni. Furthermore, male alumni outscore female alumni. There are no significant age differences.

Figure 21 Intentions towards entrepreneurship by group, construct 1 (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

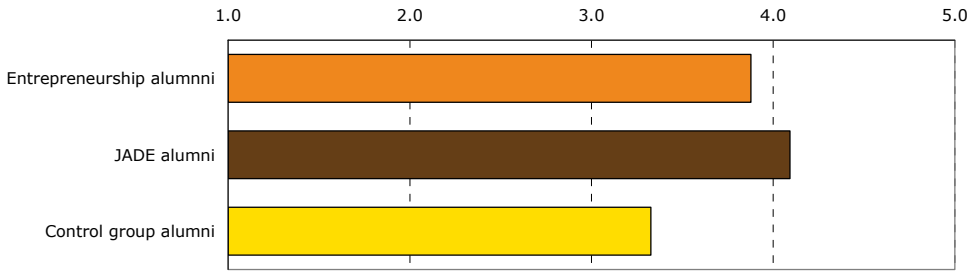
Source: EIM, 2011.

Another – very similar - way of indicating the intentions towards entrepreneurship is the clustered score on the following four statements:

- A career as an entrepreneur seems attractive to me;
- I think that entrepreneurship would provide great satisfaction;
- Among various options, I'd rather be an entrepreneur;
- I am negative towards entrepreneurship.

The clustered score for these four statements also shows that entrepreneurship alumni have a stronger desire for a transition towards entrepreneurship than control group alumni (Figure 22). On average they are less negative towards entrepreneurship, they have a stronger desire to be an entrepreneur among various options, they think more often that entrepreneurship will give them great satisfaction and they see more often the attractiveness of a career as an entrepreneur. Again, of the three groups, JADE alumni have the strongest desire towards entrepreneurship.

Figure 22 Intentions towards entrepreneurship by group structure 2 (n=2,582)*



** Scale: 1 (does not apply) – 5 (strongly applies); results are significant at 1% level.*

Source: EIM, 2011.

4.3 Intentions towards entrepreneurship: employment preference

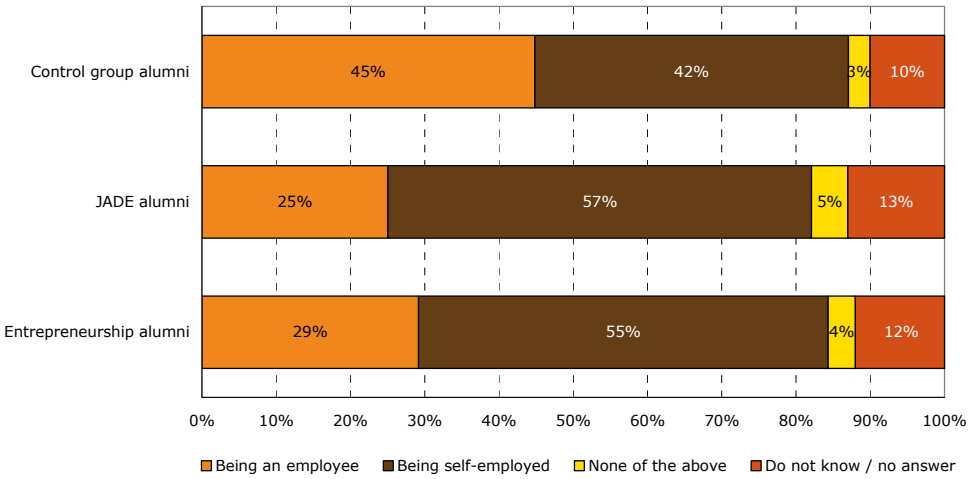
Alumni's intentions towards entrepreneurship can also be expressed by their employment preference: if they had the choice at this moment, would they rather be an employee, be self-employed or none of these?

Again the results are quite similar: it turns out that there is a significant difference between the employment preferences of the entrepreneurial group(s') and the control group (Figure 23). More than half of the entrepreneurial group(s) alumni have a preference for being self-employed at this moment, whereas only 42% of the control group prefer to be self-employed. Simultaneously, not even a third of the entrepreneurial group(s) alumni prefer being an employee, whereas almost half of the control group wants to be an employee.

There are relatively few respondents in this sample who prefer to be an employee in comparison with respondents in the Flash Eurobarometer 2009[1]. About 37% of the alumni prefer to be an employee versus 49% of European citizens in Flash Eurobarometer 2009. This difference may be influenced by the fact that the sample in the Flash Eurobarometer is a random sample and in this study the sample is not random. There is a bias towards the group of entrepreneurship alumni. The objective of this study is to compare personal and professional developments of alumni who have participated in entrepreneurship courses with personal and professional developments of alumni that did not participate in these courses. The emphasis is on entrepreneurship vs. non-entrepreneurship and not a comparison of programmes or country levels.

[1] The Flash Barometer measures the development of entrepreneurship in EU Member States through a comparison between the opinions of European citizens and those outside of Europe, especially the US and some Asian countries. The 2009 edition covers 36 countries in total: the 27 EU Member States, two candidate countries: Croatia and Turkey, three EFTA countries: Iceland, Norway and Switzerland, the US and three Asian countries: China, Japan and South Korea. It covers topics such as the development of entrepreneurship, how entrepreneurial mindsets are being fuelled and what encourages people to become entrepreneurs. It provides data about public attitudes on issues such as entrepreneurship, entrepreneurial education, risk-taking, start-ups, obstacles to entrepreneurship and business failures. Over 26,000 randomly selected respondents aged 15 and over were interviewed.

Figure 23 Employment preference by group (n= 2,582)



Source: EIM, 2011.

There is also a significant difference in employment preference between male and female alumni (Table 13): much more female alumni prefer being an employee than male alumni. Simultaneously, much more male alumni prefer being self-employed than female alumni. These gender differences in employment preferences were also visible in the Flash Eurobarometer 2009. Also other researches show fewer women than men intend to or start businesses and more are dissuaded by fear of failure[1]. Compared to men, fewer women believe there are many opportunities for entrepreneurship and that they have the capabilities for this endeavour. Women prefer to avoid risks and are less competitive than men[2].

Furthermore, there is also an age difference in employment preference: alumni tend to prefer being self-employed when they are relatively young and the preference shifts towards being an employee when they become older. The responsibility of supporting a family increases with age and hence the need for a stable income can be one of the explanations.

[1] Donna J. Kelley, Candida G. Brush, Patricia G. Greene and Yana Litovsky (2010), Global Entrepreneurship Monitor 2010 Report: Women Entrepreneurs Worldwide, GEM.

[2] For example Werner Bönte and Monika Jarosch (2011), Gender differences in competitiveness, risk tolerance, and other personal traits: Do they contribute to the gender gap in entrepreneurship?, Schumpeter School of Business and Economics, University of Wuppertal or Ingrid Verheul, Roy Thurik, Isabel Grilo and Peter van der Zwan (2011), Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality, Journal of Economic Psychology.

Table 13 Employment preference by gender (n=2,582)

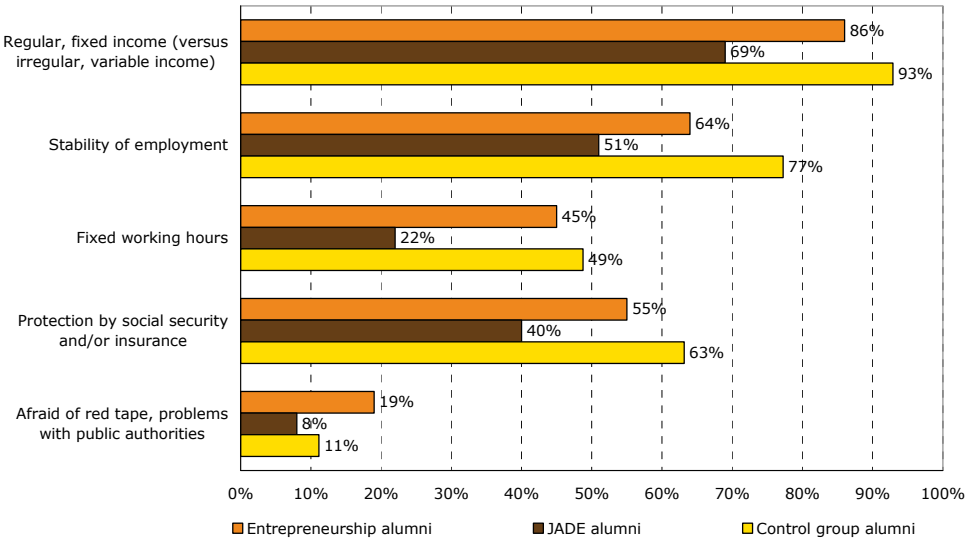
	Male			*Female*		
Employment preference	*Entrepre-neurship*	*JADE*	*Control*	*Entrepre-neurship*	*JADE*	*Control*
Being an employee	21%	22%	39%	42%	31%	52%
Being self-employed	64%	62%	49%	41%	48%	34%
None of the above	4%	5%	3%	3%	5%	3%
Do not know / no answer	11%	12%	9%	14%	16%	11%
Total	100%	100%	100%	100%	100%	100%

Source: EIM, 2011.

Reasons for employment preference

Alumni are also asked for the reasons concerning their employment preference. It turns out that a significant group difference occurs for several reasons – both in the case of reasons for paid employment and the reasons for self-employment preference. In general, alumni mainly have a preference for being in paid employment because of the guarantee of a fixed and regular income. Other reasons (among others) are stability of employment, the fixed working hours, the protection by social security/ insurances and the fear for problems with public authorities. It turns out to be a group difference because of all these reasons. Control group alumni mention these reasons for being an employee more often than entrepreneurship alumni - apart form the reason 'afraid of problems with public authorities' where results are opposite (Figure 24).

Figure 24 Reasons for the preference of being an employee (n=966)*



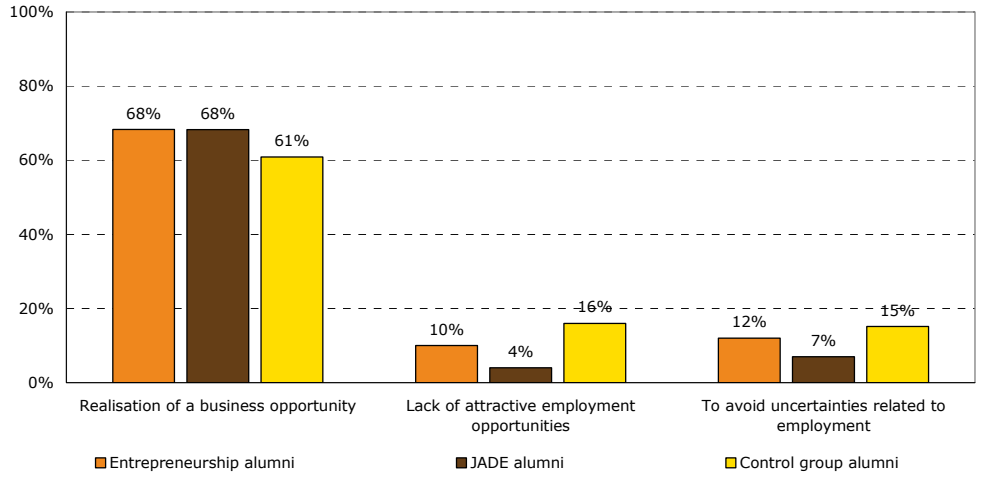
** Results are significant at 1% level.*

Source: EIM, 2011.

Reasons for the preference of self-employment

The main reason why alumni prefer to be self-employed is their wish for personal independence. Other reasons (among others) are realisation of a business opportunity, lack of attractive employment opportunities and avoidance of uncertainties related to employment. It turns out to be a group difference because of all these reasons. Realisation of a business opportunity is more often mentioned by entrepreneurship alumni, whereas alumni of the control group more often mention a lack of attractive employment opportunities and avoidance of uncertainties related to employment (Figure 25). This suggests that alumni in the control group base the preference for self-employment more or less on the disadvantages of being an employee (push factors) rather than the advantages of being self-employed (pull factors) and vice versa.

Figure 25 Reasons for the preference of self-employment (n=1,241)*



** Results are significant at 1% level.*

Source: EIM, 2011.

5 Impact on the individual's employability

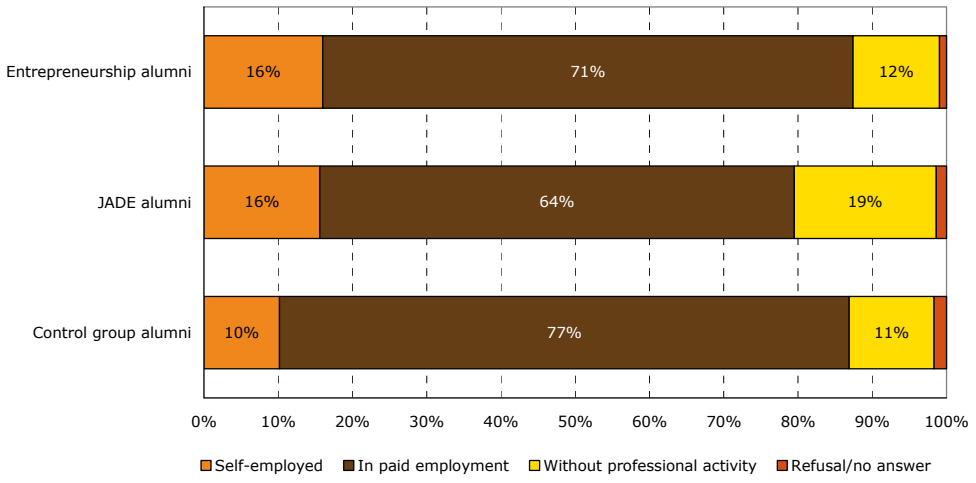
5.1 Introduction

Improving the entrepreneurship key competence is expected to increase the employability of individuals. Employability is the extent to which an individual is in a position to find a first job, to maintain a job and find a new job in paid and/or in self-employment. There is a broad range of aspects to measure employability. In this study we have focused on job experience, job satisfaction, annual income and involvement in business start up of the alumni who are in paid employment.

5.2 Current occupation

A total of 16% of the entrepreneurship alumni is currently self-employed,[1] whereas 71% is in paid employment (Figure 26). However, there are however group differences: the entrepreneurship groups contain significantly more alumni who are self-employed than the control group. Only 10% of the control group alumni is self-employed. At the same time, there are more control group alumni in paid employment than entrepreneurship group(s) alumni. Furthermore, currently there are more male alumni self-employed than female.

Figure 26 Current occupation by group (n=2,582)



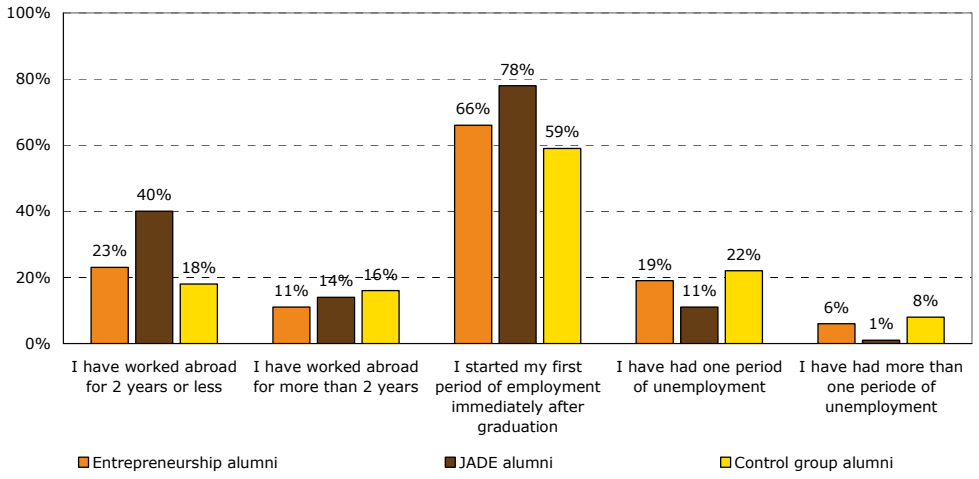
Source: EIM, 2011.

[1] The self-employed are entrepreneurs and liberal professionals (for example lawyers, medical practitioners, accountants and architects), freelancers or the self-employed are active in the agricultural sector.

5.3 Job experience

One of the characteristics of an individual's employability is the extent to which an individual is capable of finding his or her first job.

Figure 27 Job experience of alumni currently in paid employment (n=1,899)



Source: EIM, 2011.

More entrepreneurship alumni than control group alumni started their first period of employment directly after their graduation (Figure 27).[1] This could be considered as an indication of 'better' employability of entrepreneurship alumni. Furthermore, control group alumni experienced one or more periods of unemployment more often than entrepreneurship alumni. Apparently entrepreneurship alumni on average either remain a longer time in an occupation or they are able to switch jobs more easily. There are more control group alumni who worked abroad for a period of more than two years, whereas there are more entrepreneurship alumni than control group alumni who worked abroad for two years or less.

On average more male alumni worked abroad for a period of more than two years than female alumni and more often they started their first period of employment immediately after their graduation than female alumni. Significantly more female than male alumni have had one period of unemployment[2]. There is also a significant age difference: currently the older alumni are those who have worked abroad more often for a long period of time and those who have had more often a period of unemployment after their graduation. There is a logical explanation for the second result: chances of being or becoming unemployed are greater as more years have gone by since their graduation.

[1] Significant at 5% level.

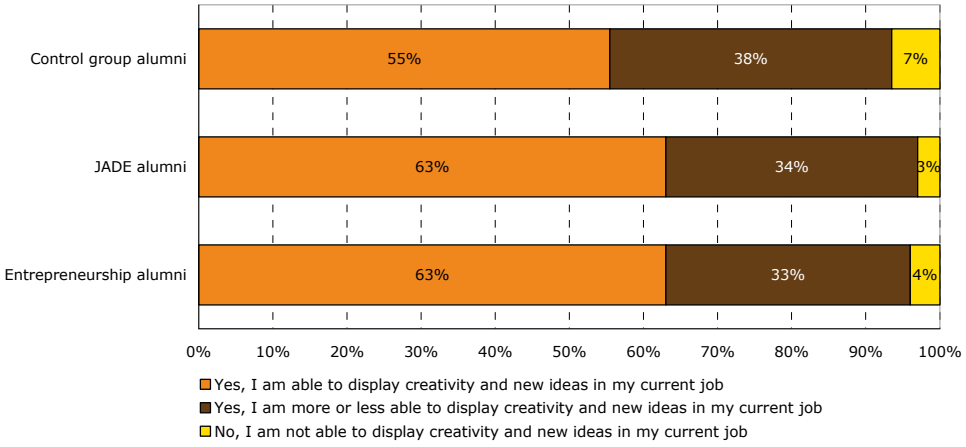
[2] Significant at 5% level.

5.4 Innovative and creative positions

Improvement of the entrepreneurship competence is expected to lead to more innovation in work life. Consequently, individuals are expected to get positions in which employees have more opportunities to display creativity and to come up with new ideas in the current job and to put them into action. These individuals are in a better position to maintain their jobs through this entrepreneurial attitude.

It turns out that significantly more entrepreneurship group(s) alumni have opportunities to display their creativity and to come up with new ideas in the current job than control group alumni (Figure 28). There is also a gender difference: male alumni in paid employment have better opportunities in their current jobs to display creativity and come up with new ideas than female alumni. There are no significant age differences.

Figure 28 Opportunities of alumni currently in paid employment to display creativity and new ideas by group (n=1,900)*



** Results are significant at 1% level.*

Source: EIM, 2011.

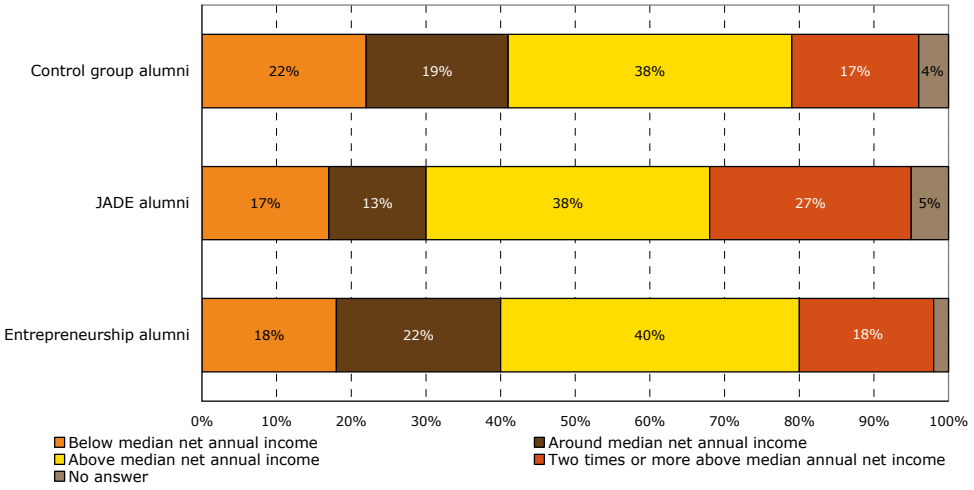
5.5 Job satisfaction

Another characteristic is the extent to which the individual is satisfied with his or her current job. For example, individuals with high employability are in a better position to change jobs in case they are not satisfied with their position. It turns out that there are no group differences regarding job satisfaction: on a scale from 1 to 10 both entrepreneurship group alumni and control group alumni rate their job satisfaction on average between 7.1 and 7.3. There is not a gender difference either. However, there is a graduation age difference: it seems that the older the alumni are when they graduate the more satisfied they are with their job. A reason might be that because of extra specialisation in their study they graduated at a later date, but they know better what job they want and hence they are more satisfied once they have accomplished that job position.

5.6 Annual income

Higher employability would also indicate that individuals are capable of getting better paid positions[1]. There is a slight group difference in favour of the entrepreneurship alumni in terms of annual net income of currently employed alumni: there are fewer alumni in the latter group who indicate that their annual net income is below the median annual net income of persons with tertiary education in their country (Figure 29). The gender differences are clearer: female alumni in paid employment have a much lower annual net income than male alumni.

Figure 29 Net annual income of alumni currently in paid employment by groups (n=1,899)



Source: EIM, 2011.

[1] The annual income also represents the value of the marginal product of an alumnus if labour markets are efficient. See Charney, Alberta, Gary D. Libecap and Karl Eller Center (2000), The impact of entrepreneurship education: an evaluation of the Berger Entrepreneurship Program at the University of Arizona, 1985-1999, Eller College of Business and Public Administration, University of Arizona: Tucson, Arizona.

6 Impact on society and economy

6.1 Introduction

Improvement of the entrepreneurship key competence is expected to have an impact on society and economy, apart from higher employability. Improvement of this competence will have an impact on society through the behaviour of individuals in their social and personal life. The impact on the economy will take place via jobs that are filled and by the creation of new firms. Attention is paid in the previous chapter to the jobs that the alumni will fill. The impact on the economy of currently employed alumni as well as currently self-employed alumni is presented. The impact of the employed alumni is based on the following characteristics: the alumni's past involvement in starting a business and the alumni's future plans considering starting a business. The impact of the entrepreneurs is based on the following characteristics: the number of new firms, the level of innovation of these firms, the number of jobs created by these new firms and the annual growth rates both in terms of turnover and employees.

6.2 Impact on society

Participation in voluntary work

Entrepreneurship education is expected to improve the entrepreneurship key competence which also will have an impact on the role in society (social and personal life). Whether this impact exists is illustrated by the participation in voluntary work. This work can consist in being a volunteer in school, in the local community, in politics, employee volunteering or environmental volunteering.
It turns out that there are only slight differences between the entrepreneurship alumni group and the control group regarding volunteer work (Table 14). In both groups approximately 4 out of 10 alumni are involved in (some sort of) volunteer work.
A lot of JADE alumni are involved in volunteer work compared with these groups: over 50%. There are only slight age differences, but there are huge gender differences in volunteer work: male alumni are significantly more involved in volunteer work than female alumni.

Participation in non-commercial work

Also, male alumni are more often involved in an initiative to start a non-commercial project outside their work, such as starting a charity or a hobby club. There are also group differences in starting a non-commercial project: half the entrepreneurial group alumni versus only 38% of the control group alumni have had an initiative to start a non-commercial project. JADE alumni are scoring even better than entrepreneurship alumni concerning starting a non-commercial project.

Table 14 Voluntary and non-commercial activities by group and gender (n=2,582)

	Group			Gender	
	Entrepreneurship	*JADE*	*Control*	*Male*	*Female*
Voluntary work experiences	39%	53%	38%	43%	36%
Non-commercial project initiatives	49%	58%	38%	48%	38%

Source: EIM, 2011.

6.3 Impact on the economy

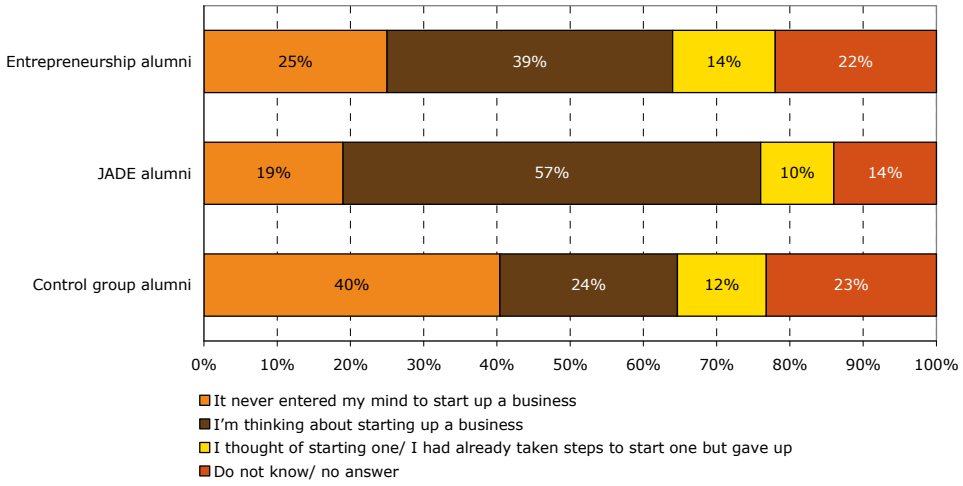
6.3.1 Employed alumni

Three quarter of the alumni are currently in paid employment. In order to determine to what extent alumni in paid employment have had an impact on the economy, we analysed whether they have already tried to accomplish a transition towards self-employment. Approximately one third of the employed entrepreneurship group(s) alumni once started a business or they are currently taking steps towards starting one versus only 18% of the control group alumni. Furthermore, male alumni score better than female; Flash Eurobarometer 2009 showed similar gender results.

In addition, alumni in paid employment or without a professional activity were asked about their involvement in self-employment. A relative large part of the control group alumni, 40%, indicate that it never entered their minds to start a business (Figure 30). On the other hand, 57% of JADE alumni indicate that they are thinking about starting a business. Entrepreneurship alumni are in between. At the same time, more female than male alumni indicate that it never entered their minds to start a business, whereas more male than female alumni do think about starting a business. A much larger part of the respondents (65%) in the FLASH Eurobarometer indicated that it never entered their minds to start a business.

Figure 30 shows that many alumni who are currently in paid employment or without a professional activity are somehow involved in entrepreneurship or at least they are thinking about it, but they are currently not self-employed. This indicates that there is a large potential among alumni to become self-employed in the future. However, it will not be feasible for all of them to become self-employed because of several reasons. The Flash Eurobarometer 2009 stresses that the major reason for not becoming self-employed is the lack of finances. Also, the current economic climate is not good for a start-up, the lack of a business ideas or business opportunities, or it does not agree with the family situation or the risk of failure and its legal and social consequences are too big so that in the end these are important reasons for not becoming self-employed.

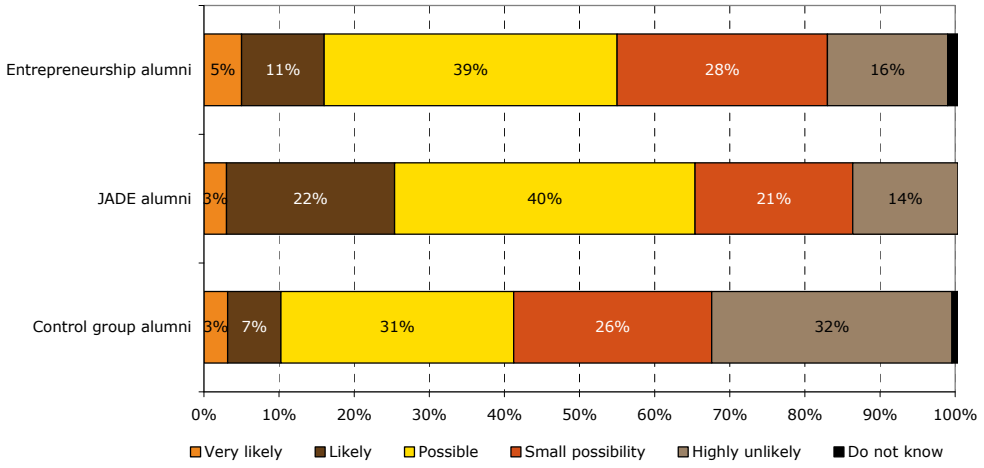
Figure 30 Involvement of alumni who are currently in paid employment or without a professional activity in starting a business by group (n=1,604)



Source: EIM, 2011.

Approximately 70% of alumni who have never started their own business indicate that they have never helped someone else either to start a business. There is a group difference as well: more alumni in the control group indicate that they have never helped someone else to start a business than alumni in the two entrepreneurial groups. There are no gender and age differences.

Figure 31 Likeliness that alumni who are currently in paid employment or without a professional activity will start a business in the next ten years (n=1,450)



Source: EIM, 2011.

Finally, alumni in paid employment or without a professional activity have indicated what the likeliness is that they would start their own business within the next ten years. Significantly more alumni in the control group indicate that it is highly unlikely for them to start their own business within the next ten years

(Figure 31). Moreover, 25% of JADE alumni indicate that it is (very) likely for them to start their own business within the next ten years. Significantly more female than male alumni indicate that it is highly unlikely for them to start a business within the next ten years.

6.3.2 *Entrepreneurs*

A total of 16% of the entrepreneurship alumni and JADE alumni in the survey are self-employed, whereas 10% of the control group are self-employed. Currently, 8% of the entrepreneurship alumni and 9% of the JADE alumni are entrepreneurs (Table 3). The remaining self-employed are liberal professionals (for example lawyers, medical practitioners, accountants and architects), freelancers or they are active in the agricultural sector. 3% of the alumni in the control group are entrepreneurs and the majority of the self-employed alumni are liberal professionals.

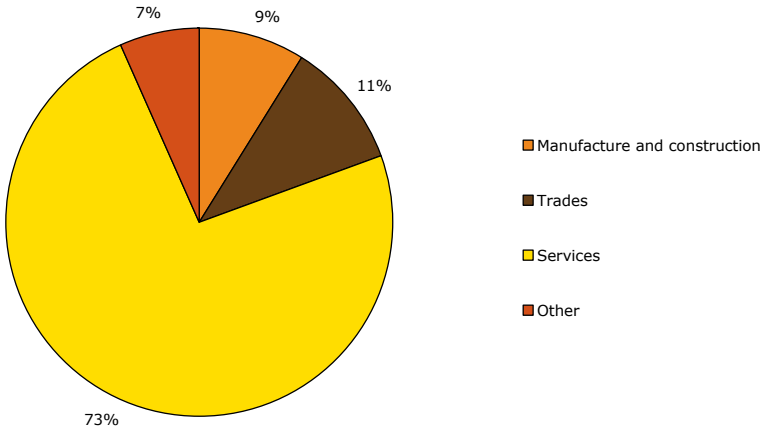
Table 15 Percentage of entrepreneurs and liberal professionals by group (n=2,582)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Self-employed	16%	16%	10%
Entrepreneurs	8%	9%	3%
Liberal professionals and freelancers	8%	7%	7%

Source: EIM, 2011.

The entrepreneurs have been asked for more detailed information about their business to measure the impact of new enterprises on the economy. The following results in this section only consider those alumni who are entrepreneurs: the owner of a shop, a craftsman, the owner or co-owner of a firm with or without a staff is taken into account. This causes the number of entrepreneurs to decrease from 324 to 133. These 133 entrepreneurs consist of 65 entrepreneurship alumni, 25 JADE alumni and 43 control group alumni. The entrepreneurs are mainly active in services (see Figure 32).

Figure 32 Core activity of enterprises set up by alumni (n=133)



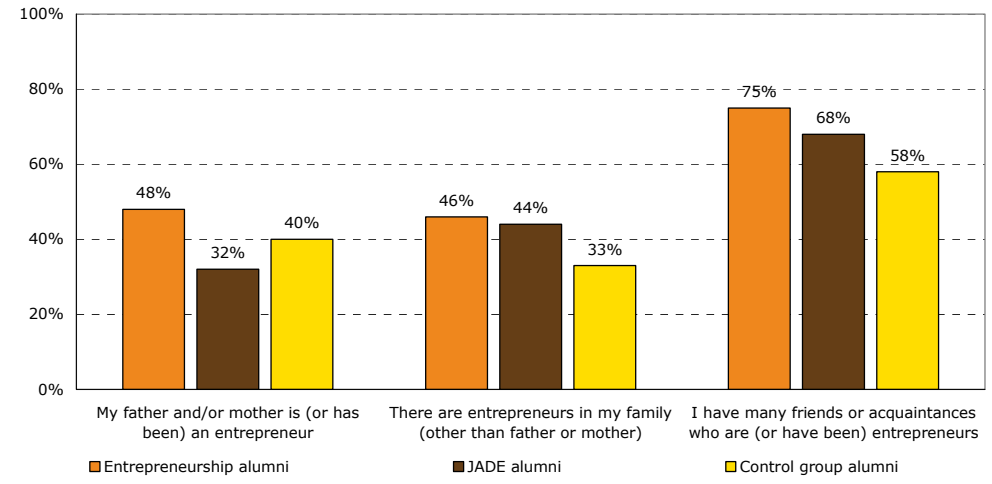
Source: EIM, 2011.

The results have to be interpreted with care and are indicative considering the number of entrepreneurs in the sample. However, the results are almost all in favour of entrepreneurship and/or JADE alumni, which means that entrepreneurship education seems to have an effect, and that is why they are presented.

Entrepreneurial background of relatives and friends

Experience with entrepreneurship can be influenced by the entrepreneurial background of parents, other relatives or friends. Relatively more entrepreneurship and JADE alumni have entrepreneurial parents, relatives or friends than those of the control group alumni (Figure 33). For instance, three quarter of the entrepreneurship alumni have many friends or acquaintances who are or who have been entrepreneurs versus only approximately 60% of the control group alumni.

Figure 33 Entrepreneurial relatives, friends or acquaintances of alumni who are currently an entrepreneur by group (n=133)



Source: EIM, 2011.

Business history

Those alumni who indicate that they are currently an entrepreneur are asked about their business history (see Table 16). Control group alumni have been in business for a longer period of time than entrepreneurship alumni: 9.5 years versus 7.4 years. However, their current business is also their first business for 86% of the control group alumni, whereas this is the case for only approximately 60% of entrepreneurship and JADE alumni. On average, entrepreneurship alumni are in their current business for 5 years and the control group alumni for 8 years. Therefore, alumni of the two entrepreneurship groups have established more businesses in fewer years than those of the control group alumni. It remains unclear whether this is because of failure of their businesses and afterwards starting a new business or because of a successful business being sold to a new owner. Also significantly more female than male alumni indicate that their current business is their first business and female alumni are in business for more years than the male alumni. May be this is because of the relative risk-aversion of females: they rather stay with their current business.

Table 16 Business history of entrepreneurs by group (n=133)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Number of years in business (average)	7.4	5.2	9.5
Current business is first business	60%	64%	86%
Number of years in current business (average)	5.0	3.1	8.0

Source: EIM, 2011.

Another interesting characteristic within the business history of self-employed alumni is the number of years between graduation and start-up of the first business (Figure 34). It turns out that entrepreneurship and JADE alumni show a peak in first-business start-up immediately after graduation. There are also many alumni in this group who have started their first business even before they went to higher education. Control group alumni have waited a few years longer before they decided to start-up their first business. There is a peak between 2 and 5 years after graduation.

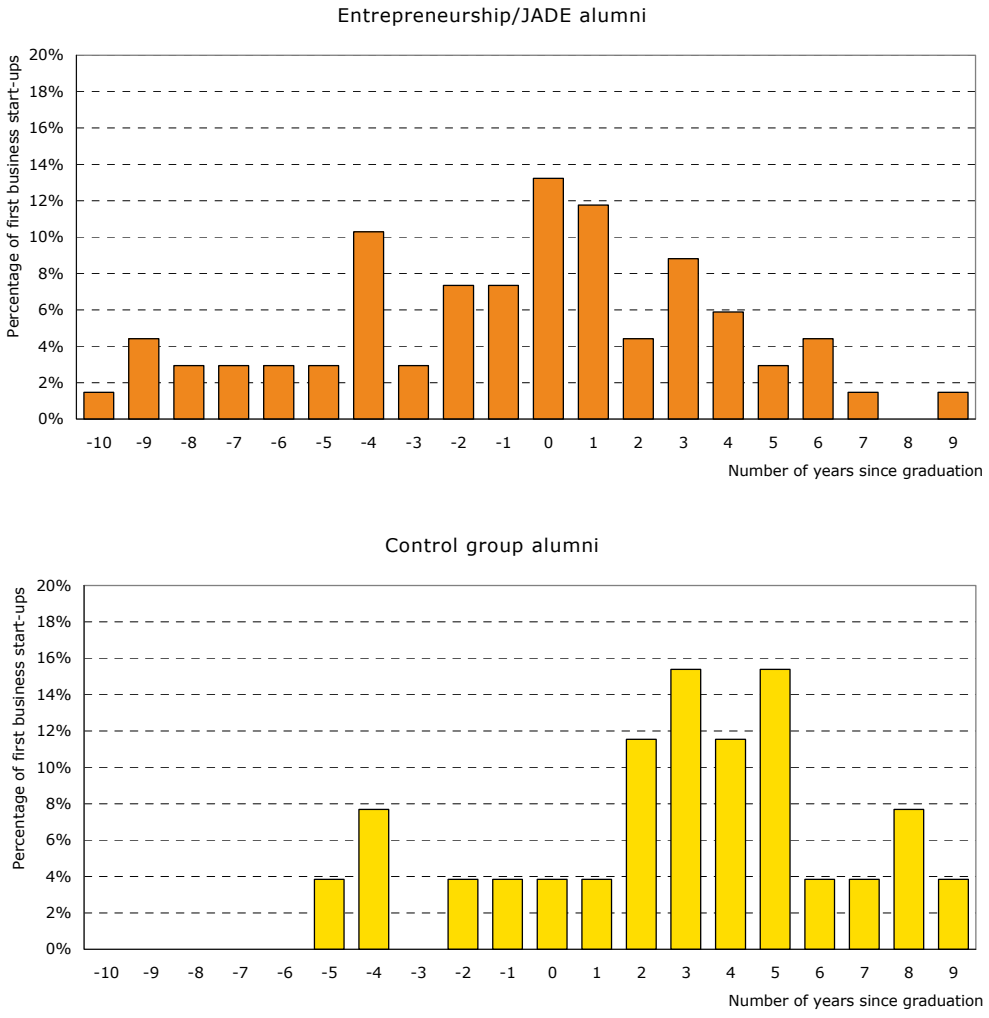
The average number of years between graduation and start-up is negative in the case of entrepreneurship and JADE alumni (-0.7). This means that entrepreneurship alumni started their first business on average well *before* their graduation date. Many higher education institutions already offer courses in business start-ups and students start their business during these courses. Control group alumni start their first business on average approximately 2.8 years *after* their graduation.

Level of innovation

An important factor for growth of an economy is the level of innovation. Improvement of the entrepreneurship key competence is expected to lead to more innovation in work life. The definition as defined in the Oslo Manual[1] is used for the definition of innovation at a firm level. An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations, according to the Oslo Manual.

[1] Oslo Manual; guidelines for collecting and interpreting innovation data, 3rd edition, OECD and Eurostat. An important change in the third edition of the Oslo Manual is the removal of the word 'technological' from the definitions, since this would limit responses of innovative SMEs in the services sector, for example.

Figure 34 Number of years after graduation that alumni needed to start-up their first business by entrepreneurship/JADE alumni and control group alumni (n=133)



Source: EIM, 2011.

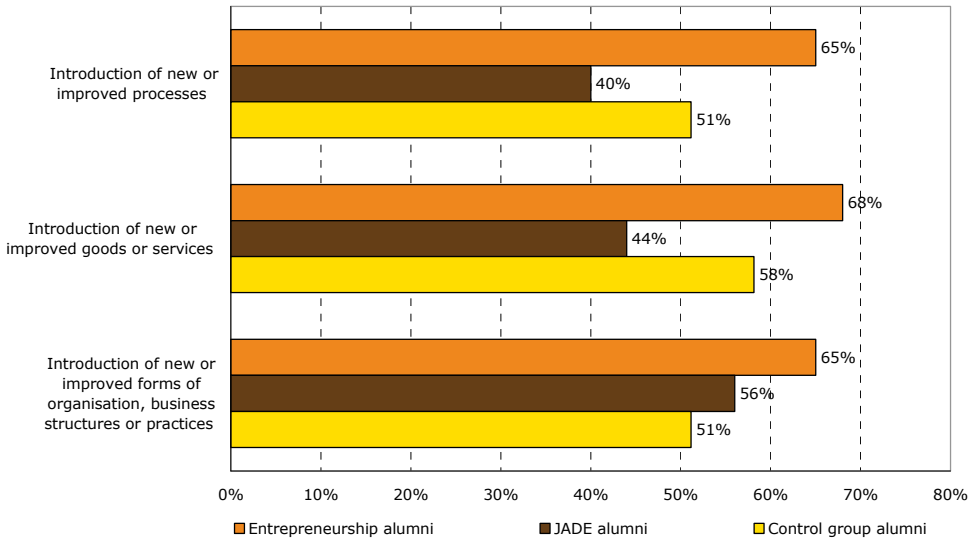
The level of innovation of businesses of currently self-employed alumni is assessed (see Figure 35) based on this definition. It turns out that self-employed entrepreneurship group(s) alumni seem[1] to have more innovative businesses than self-employed control group alumni in terms of introducing the following to their enterprises during the last three years:

- new or significantly improved processes;
- new or significantly improved goods or services;
- new or significantly improved forms of organisation, business structures or practices.

There also seems to be a gender difference: male alumni have more innovative enterprises than female alumni.

[1] There are too few cases: differences between the three groups are not significant.

Figure 35 Level of innovation of enterprises set up by group (n=133)



Source: EIM, 2011.

Current business size

The entrepreneurs are asked about the size of their enterprises to measure the impact on employment. On average, entrepreneurship alumni seem[1] to have slightly more full-time employees than alumni in the control group: 4.2 full time equivalents versus 4.0 full time equivalents. Around 60% of the employment that was created is found in enterprises run by entrepreneurship alumni.

Table 17 Average job creation by entrepreneurs by group (n=77)

	Entrepreneurship alumni	*JADE alumni*	*Control group alumni*
Average number of jobs created (in FTE)	4.2	5.4	4.0

Source: EIM, 2011.

A more accurate group and gender comparison can be made based on the *annual percentage* change in employees in their enterprises during the last three years. Enterprises of control group alumni show the best results: an average annual employee growth percentage of almost 23% versus only 13% in case of entrepreneurship group alumni (and 11% of JADE group alumni). Also, enterprises of male alumni have a higher annual employee growth than enterprises of female alumni.

However, in terms of annual *turnover* growth during the last three years the group differences are opposite. On average entrepreneurship alumni generated a

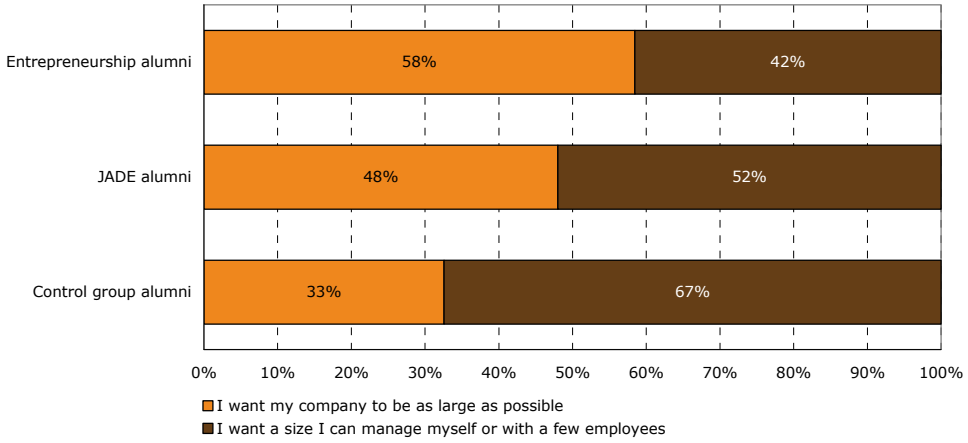
[1] There are too few cases: differences between the three groups are not significant.

50% annual turnover growth versus only a 34% annual turnover growth of the control group alumni (and 47% of JADE group alumni).

Future business size

Improving the entrepreneurship key competence is expected to lead to more ambitious individuals. The results show that self-employed entrepreneurship alumni have higher *ambitions* of business growth than the control group alumni (Figure 36). The latter rather want a company that they can manage themselves or with a few employees than a company that is as large as possible. More than half of all male entrepreneurs want their company to be as large as possible, whereas only a third of all female alumni want their company to be as large as possible.

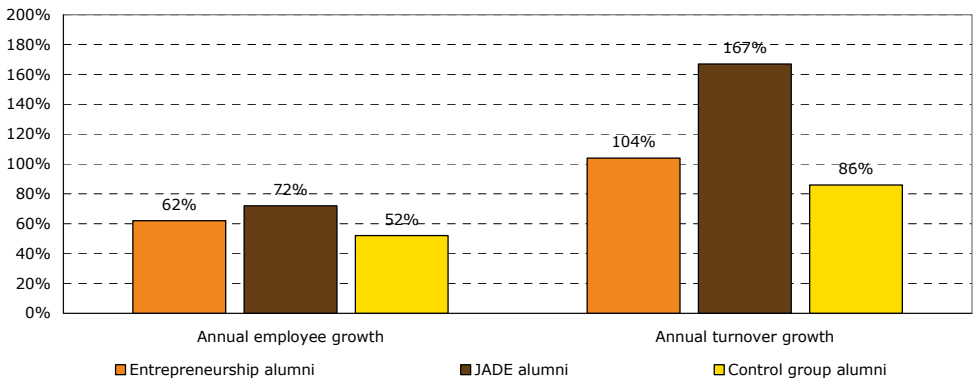
Figure 36 Ambitions of entrepreneurs alumni in business growth by group (n=133)



Source: EIM, 2011.

The group difference is also confirmed by the expected annual growth rate estimation looking three years ahead: entrepreneurship alumni make a significantly higher estimation of the annual growth rate of their companies than control group alumni – both in terms of employees and turnover (Figure 37).

Figure 37 Estimated annual growth in terms of employees and turnover (n=64)

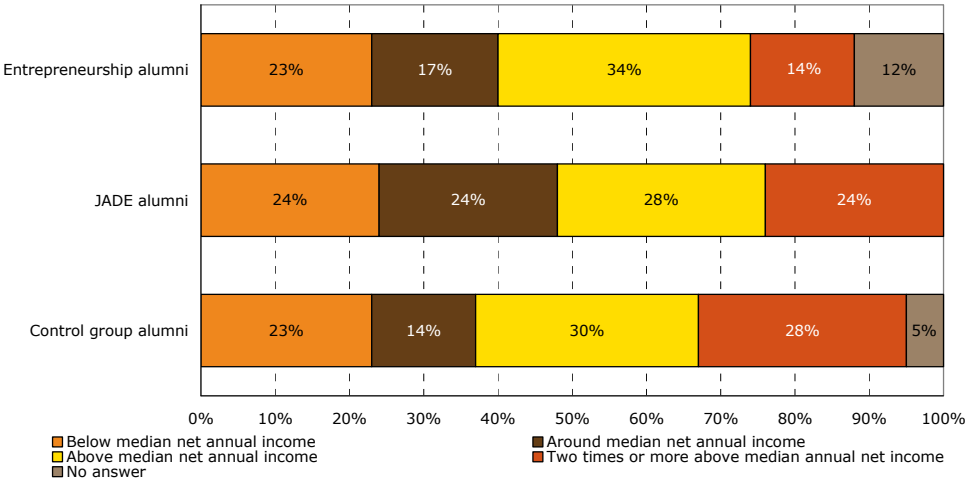


Source: EIM, 2011.

Annual income

A final indicator of the impact on the economy is the annual net income of entrepreneurs. It seems that the annual net income of control alumni exceeds the income of entrepreneurship group(s) alumni: more control group than entrepreneurship group alumni indicate that their annual net income is above of or twice as much or more above the median annual net income of persons with tertiary education in their country (Figure 38). One explanation can be that on average the control group alumni established their own business much earlier than the entrepreneurship alumni (see Table 16). Therefore, the control group alumni have overcome pitfalls and setbacks a longer time ago and they are now getting more return on their investments than the entrepreneurship alumni. Another (similar) explanation can be that the enterprises of entrepreneurship alumni have (at least in the short term) a lower annual income because of the costs resulting from the relative high level of innovation.

Figure 38 Net annual income of entrepreneurs by group (n=133)



Source: EIM, 2011.

7 Key messages and policy recommendations

7.1 Key messages

Entrepreneurship concerns an individual's ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day-to-day life at home and in society, it makes employees more aware of the context of their work and better able to seize opportunities, and it provides a foundation for entrepreneurs to establish a social or commercial activity.

The following objectives are to be reached through entrepreneurship education:
- Improvement of the entrepreneurship mindset of young people to enable them to be more creative and self-confident in whatever they undertake and improvement of their attractiveness for employers;
- Encourage innovative business start-ups;
- Improvement of their role in society and the economy.

The purpose of this study is *to measure the impact of participation in entrepreneurship education at higher education institutions on four dimensions:*
1 Impact on the entrepreneurship key competence;
2 Impact on the intentions towards entrepreneurship;
3 Impact on the individual's employability;
4 Impact on society and the economy.

The results are based on a survey among higher education alumni who participated in entrepreneurship programmes as well as surveying a comparable control group consisting of alumni who have not participated in entrepreneurship programmes. In addition, alumni of JADE participated.

Entrepreneurship education has a positive impact on the entrepreneurial mindset of young people, their intentions towards entrepreneurship, their employability and finally on their role in society and the economy. These are the major results of this study among alumni of higher education institutions in Europe.

The key messages and policy recommendations are presented in this chapter.

Entrepreneurship education improves the entrepreneurship key competence

Entrepreneurship alumni have better entrepreneurial skills and more knowledge of entrepreneurship

The entrepreneurship key competence is defined as a composition of an entrepreneurial attitude, entrepreneurial skills and knowledge of entrepreneurship. Entrepreneurship programmes at higher educational institutions focus in particular on learning entrepreneurial skills and improving the knowledge on entrepreneurship, since these elements can be trained at a later age. Entrepreneurship alumni score themselves higher on both of these aspects.

Entrepreneurship alumni score higher on 10 out of the 12 characteristics of the entrepreneurship key competence

The survey results underline the assumptions that entrepreneurship programmes have a positive impact on the development of all three elements of the entrepreneurial key competence. Entrepreneurship alumni assess their personal entrepreneurial characteristics - such as sense of initiative, risk propensity, self efficacy and need for achievement - higher. They also score themselves higher on having entrepreneurship skills, such as creativity, analysis, motivation, networking and adaptability. Finally, these alumni indicate that they have more knowledge of entrepreneurship and the role of entrepreneurs in society.

Entrepreneurship education improves the intentions towards entrepreneurship

Relatively more entrepreneurship alumni have a stronger desire for a transition towards entrepreneurship

Entrepreneurship programmes stimulate the intentions of graduates to become entrepreneurs: alumni who attended entrepreneurial courses have a stronger desire for a transition towards entrepreneurship than those who did not.

Relatively more entrepreneurship alumni prefer to be self-employed

Around 57% of the JADE alumni and 55% of the entrepreneurship alumni have a preference for being self-employed, whereas 42% of the control group prefer to be self-employed.

Entrepreneurship alumni search for opportunities.

In case of the entrepreneurship alumni the preference for being self-employed is based on the advantages of entrepreneurship (*pull factors*) rather than the disadvantages of being employed (*push factors*), whereas the opposite is true for alumni who did not attend entrepreneurship courses. The realisation of a business opportunity is more often mentioned by entrepreneurship alumni (68% of the entrepreneurship and JADE alumni and 61% of the control group alumni).

Alumni who have not attended entrepreneurship education choose more security and stability. In working life, they value aspects such as the availability of a regular, fixed income, stability of employment, fixed working hours, the protection by social security and/or insurance, rather than dealing with red tape and possible problems with public authorities, more than entrepreneurship alumni. These aspects are more secure in paid employment than in self-employment.

Entrepreneurship education has a positive impact on the individual's employability

It is easier for entrepreneurship alumni to find a position in paid employment

The survey results show that it seems to be easier for entrepreneurship alumni to find employment immediately after their graduation (78% of the entrepreneurship alumni, 66% of JADE alumni and 59% of control group alumni). They also experience less periods of unemployment than alumni who did not attend entrepreneurial courses.

Entrepreneurship alumni have positions in which the display of creativity and new ideas is expected

Attending entrepreneurship programmes increases the opportunity to fill positions in paid employment in which individuals are able to display creativity and new ideas and where they are able to put them into action. In addition, it increases the perspectives for better paid jobs. However, attending entrepreneurship programmes does not result in higher job satisfaction.

Entrepreneurship education has an impact on society and on the economy

Entrepreneurship education does not influence participation in voluntary work, but it does influence initiatives to start non-commercial projects.

The impact of entrepreneurship education on society via voluntary work such as volunteering at schools, in local communities, politics and the environment seems to be limited. On the other hand, attending entrepreneurial courses seems to have a positive impact on society via initiatives to start non-commercial projects (49% of the entrepreneurship alumni, 58% of JADE alumni and 38% of the control group alumni).

The chance that entrepreneurship alumni who are currently in paid employment will participate in a business start-up is substantially higher than for those in the control group alumni.

The impact of entrepreneurship education on the economy turns out to be positive. Entrepreneurship alumni who are currently in paid employment have more often been involved in the start of a business and/or are thinking about starting an enterprise. It can be concluded that the chance that entrepreneurship alumni who will participate in a business start-up is substantially higher than for those in the control group alumni.

The chance that entrepreneurship alumni will become an entrepreneur is higher

5% of the alumni who have been surveyed (a total of 133) are entrepreneurs (not including liberal professionals and freelancers). The majority of these entrepreneurs have attended entrepreneurship education. Currently 8% of the entrepreneurship alumni, 9% of the JADE alumni and 3% of the control group alumni are entrepreneurs.

Enterprises set up by entrepreneurship alumni are more innovative and the owners are more ambitious in terms of turnover and employment growth

Entrepreneurship alumni become self-employed at an earlier stage in their careers and the frequency with which they set up businesses seems to be higher among alumni who are currently running a business. The enterprises run by these individuals are characterised as more innovative and the expectations regarding employment growth and turnover growth are higher.

Entrepreneurs who have not attended entrepreneurship programmes have set up their business at a later stage in their careers. The volatility in business ownership by these entrepreneurs is much lower and the enterprises that were set up are on average larger in terms of number of employees. The latter can be explained by the fact that control group alumni have been active during a longer period of time in their current business than entrepreneurship alumni. The ambitions regarding employment growth and turnover growth are lower and they characterise their enterprises as less innovative than those of entrepreneurship alumni.

7.2 Policy recommendations

The policy should support entrepreneurship programmes

It can be concluded in general that providing entrepreneurship education at higher educational institutions has a positive effect on entrepreneurship. The results underline the importance of the policy on the development of entrepreneurial skills through education in all EU Member States as it is presented in the Programme for the Competitiveness of Enterprises and small and medium-sized enterprises (COSME) and in the Europe 2020 strategy Agenda concerning new skills and jobs. Member States should stimulate and give full support to higher education institutions to develop entrepreneurship programmes.

Providing entrepreneurship education should become obligatory and should be extended to all disciplines

The enterprises created by entrepreneurship alumni can be characterised as being innovative, having high growth and ambitious, whereas the enterprises established by the control group can be characterised as being traditional, stable and less risky.

Apart from that, entrepreneurship programmes also have an impact on entrepreneurship in a broader sense, by stimulating entrepreneurial and innovative capabilities of individuals in paid employment. The survey results show that the employability, the entrepreneurial attitude and innovative and creative capacities of individuals have been positively impacted by the offering of entrepreneurship programmes. This made these individuals more attractive to employers.

These results show that there is an argument to make entrepreneurship education obligatory and to broaden the inclusion of entrepreneurship programmes into other disciplines in which individuals are trained for paid employment such as engineering sciences and agriculture sciences, forestry and nutrition sciences or social sciences. In recent years an extension of entrepreneurship education into other disciplines is already taking place in some countries. This extension is also visible in the institutions which participate in this study. This extension should continue in all Member States.

Learning by doing should be an important part of training

JADE is the European Confederation of Junior Enterprises. A Junior Enterprise is a student association in which students have the opportunity to add practical experience to their theoretical skills, as well as to develop entrepreneurship at an early stage by running professional studies for companies and managing the organisation itself. In these SMEs, students from different fields of studies (from business and economics, to engineering, IT and communication) can develop some technical and soft skills essential for their future careers, and also to get an early contact with the business world.

JADE alumni score better in many aspects than the other group of entrepreneurship alumni and the control group alumni. These results support the importance of including practical training in the education programmes.

Value the impact on society

Improving the entrepreneurial key competence is also expected to have an impact on the social and personal life of individuals and consequently on society. Attending entrepreneurship education does not impact the extent to which indi-

viduals participate in voluntary work according to the survey, although the participation in non-commercial projects seems to be affected in a positive manner. This can be explained by the fact that the entrepreneurship programmes focus on the use of entrepreneurial competences in working life. Governments can stimulate education institutions to broaden this focus to personal and social life.

Specific attention to female students

The entrepreneurship and JADE female alumni outperform female alumni in the control group on almost all aspects. However, the survey shows that female alumni value their entrepreneurial characteristics, skills and knowledge less than the male alumni. In addition, female alumni are less inclined to become an entrepreneur. These gender differences are found in the entrepreneurship group, the JADE group and the control group. These results are important in the context of the objectives which the Commission has set in COSME to stimulate female entrepreneurship. Specific attention to this group of students is needed.

Measure impact in more than one period

In this study the impact of entrepreneurship education was measured only on one single moment. Most of the entrepreneurship programmes on the higher education institutions are less than ten years old. We also know that many graduates first want to gain some work experience before they even consider starting a business. For example it is likely that in ten years time more alumni will be involved somehow in entrepreneurship than there are at this time. Longitudinal information should be collected in order to measure the impact of entrepreneurship education.

Effects and impact of entrepreneurship programmes in higher education