European Commission

ENTREPRENEURSHIP EDUCATION: A ROAD TO SUCCESS

A compilation of evidence on the impact of entrepreneurship education strategies and measures

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Contents

Key terms used in this study

Entrepreneurship

The European Reference Framework for key competences for lifelong learning defines entrepreneurship as *'A sense of initiative and entrepreneurship is the ability to turn ideas into action. It involves creativity, innovation and risk-taking, as well as the ability to plan and to manage projects in order to achieve objectives. The individual is aware of the context of his/her work and is able to seize opportunities that arise. It is the foundation for acquiring more specific skills and knowledge needed by those establishing or contributing to social or commercial activity. This should include awareness of ethical values and the promotion of good governance.'*[1]

Entrepreneurship Education

In this study, entrepreneurship education is taken to cover all educational activities '*that seek to prepare people to be responsible, enterprising individuals who have the skills, knowledge and attitudes needed to prepare them to achieve the goals they set for themselves to live a fulfilled life*.'[2]

It hence covers a broad range of activities across all levels of education - from creativity classes in primary education to Business Master Studies.

Impact

In this study the term 'impact' is used in a broad sense: change observed as a direct consequence of an educational activity, on the level of the individual, the institution, the economy, and society.

Theory of change

A theory of change implies that there is causality between inputs and immediate results and outputs, intermediate outcomes and general/global impact. Ideally causal chains can be observed between these.

- ➔ **Inputs:** These are the means used to produce outputs. Inputs include educational initiatives and costs (financial, administrative and human resources), but also costs for the beneficiaries or target population (e.g. co-financing and compliance costs stemming from administrative burden) and costs for third parties (e.g. Member States, intermediary organisations).
- ➔ **Immediate results:** These comprise outputs as well as results. Output is defined as a product, which is delivered through the input. Outputs are linked to operational objectives of an intervention (strategy, measure, etc.). Results are immediate or initial effects of an intervention (strategy, measure, etc.). These occur at the level of direct beneficiaries/recipients of the intervention. Results are linked to specific objectives of the intervention.
- ➔ **Intermediate outcomes:** Short to medium-term effects/outcomes on both direct and indirect beneficiaries/recipients of assistance. Indicators at this level are called impact indicators. These are linked to the intermediate objectives of the intervention.
- ➔ **General/Global impact:** Longer-term and more diffuse effects/outcomes of an

[1] Recommendation 2006/962/EC of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning [Official Journal L 394 of 30.12.2006].

[2] Cf. the terms of reference to this study

intervention (strategy, measure, etc.), linked to the global/general objectives of the intervention.[3] For the purpose of this study, the use of the term 'impact' was not restricted to 'global impact'. In line with the definition above, it was often used to refer to immediate results and intermediate outcomes.

Impact measurement

An impact measurement was taken to be evidence from a study or a research project which shows that initiative 'A' is a cause of the change measured on 'B'. This study draws evidence from several examples of impact measurement. The key requirement was that the studies were able to establish a causal link so that the impact (measured change) was clearly linked to a specific intervention.

A considerable amount of time might have passed between an action (e.g. founding a company or becoming self-employed) and an educational activity. Other contextual and structural factors (family history, economic framework conditions) and other drivers of entrepreneurship outside of the educational system all have the potential to generate impact as well. Yet, robust and credible causal linkages between an intervention and specific changes need to have been established for the evidence to have been cited.

[3] This definition was inspired by the guide 'Evaluating EU activities – A practical guide for the Commission services.

List of acronyms and abbreviations

AT Austria

BE Belgium

BG Bulgaria

CoE Centres of Entrepreneurship

CY Cyprus

CZ Czech Republic

DE Germany

DK Denmark

EE Estonia

EL Greece

ES Spain

EQF European Qualifications Framework

ESF European Social Fund

EU European Union

FI Finland

FR France

GEM Global Entrepreneurship Monitor

HE Higher Education

HU Hungary

IE Ireland

IT Italy

JA-YE Junior Achievement – Young Enterprise

LT Lithuania

LU Luxembourg

LV Latvia

MA Massachussetts (USA)

MIT Massachussetts Institute for Technology

MT Malta

NEET Not in Education, Employment or Training

NFTE Network for Teaching Entrepreneurship /(formerly: National Foundation for Teaching Entrepreneurship)

NL The Netherlands

OECD Organisation for Economic Cooperation and Development

PL Poland

PBL Problem based learning

PT Portugal

RO Romania

SE Sweden

SEECEL South East European Centre for Entrepreneurial Learning

SI Slovenia

SK Slovakia

SMEs Small and Medium Enterprises

UK United Kingdom

VET Vocational Education and Training

Entrepreneurship Education: A road to success

Key evidence from 91 national and transnational research projects

Entrepreneurship education is given a significant role in supporting the main goals of the Europe 2020 strategy; growths and jobs. Therefore, it is important to gather knowledge and evidence from across Europe and elsewhere that shows whether and how impact is achieved.

In 2013 DG Enterprise and Industry commissioned ICF International to conduct a mapping exercise of examples of research on the impact of Entrepreneurial Education. This report presents the outcome of the mapping exercise: 91 studies from 23 countries were identified. Eighty four studies addressed initiatives and actions taken at national level, and seven examples researched the effects of transnational projects operating in several countries.

The prevailing impression that emerged from the evidence collected is that **entrepreneurship education works.** Students participating in entrepreneurship education are more likely to start their own business and their companies tend to be more innovative and more successful than those led by persons without entrepreneurship education backgrounds. Entrepreneurship education alumni are at lower risk of being unemployed, and are more often in steady employment. Compared to their peers, they have better jobs and make more money.

Notably, effects tend to cumulate and lead to acceleration: those who participated in a higher number of entrepreneurship education measures benefited more over time.

The positive impact is not restricted to students and alumni. Besides impact on the individual, evidence from the examples reviewed for this study also shows impact on educational institutions, the economy and society.

A summary of key findings is presented below.

Impact on the individual

➔ **Entrepreneurship education Entrepreneurship helps to boost career ambitions**

- Participants in entrepreneurship education programmes in secondary school change their career aspirations, ambitions for jobs and interest in taking up further education. In the study 'The effects of education and training in entrepreneurship' in **Sweden**, a higher percentage of students taking part in an entrepreneurship programme started university level programmes compared to the control group.
- Secondary education students interviewed for the Evaluation of Enterprise Education in **England** (2007-2010), reported that enterprise education strengthened their confidence and acted as a trigger to subsequently build up their capabilities and develop higher aspirations for life.
- An analysis of data from on programmes provided by the National Foundation for Teaching Entrepreneurship (NFTE) in the **USA** shows that students in secondary education who participated in a NFTE programme are more ambitious regarding occupations and college attendance than students in the control group, and more likely to take initiative and leadership roles. Another study on the NFTE programme found that the drop-out rate for NFTE alumni between the ages of 16–19 is less than the national average (1% versus 3.4%, respectively).
- Evidence for greater confidence and higher ambitions was also found for pupils in primary education. For example, the 'Creativity and innovation in school' programme (UPI) in **Slovenia** led to improved confidence. After the programme, students' showed higher ambitions regarding their choice of secondary education.

- A long-term study on the impact of entrepreneurship education carried out in **Denmark** revealed that students in both primary/lower secondary education that have participated in entrepreneurship education have higher ambitions on their future career choices (job or further education) than those that have not. They became more self-motivating in their efforts in the learning process and they claimed to engage more out of a desire for learning.

➔ **Entrepreneurship education leads to higher employability:**

- A study on the Enterprise Challenge programme in **Ireland** finds that after the programme, three quarters of secondary students participating could correctly recognise the most appropriate behaviour for interviews; 87% of primary students and 65% of secondary students could correctly recognise the characteristics that employers regard as important and seek in their employees; 87% of primary students and 73% of secondary students understood the purpose of a CV.
- The study "Making an impact" from **Canada** finds that alumni of entrepreneurship education programmes are three times more likely than the control group to hold senior and middle management positions, and 25% less likely to be unemployed than individuals in the control group.
- A study from the **USA** shows that entrepreneurship graduates at the University of Arizona were more often employed full-time in high-tech industries than their peers.
- A US study on alumni of the NFTE programme shows that 88% of NFTE alumni between the ages of 25–40 with a high school diploma are employed (compared to 69% national average).
- Graduates from entrepreneurship programmes connected to the Action Plan in **Norway** were less likely to be unemployed than graduates that did not take up entrepreneurship education. The unemployment rate for entrepreneurship graduates within engineering and business management was 2.8% compared to 6.6% for graduates in the control group. Moreover, they were more likely to be in steady employment (73.6% as opposed to 60.8% in the control group).
- In **Denmark,** prior to a long-term measurement launched among Danish students in 2011, a compilation of existing data was undertaken. Based on data from a variety of studies, the report states that people who have been trained and educated in entrepreneurship have a considerably higher income than those who did not receive this type of education. The more training and education, the higher the income - the effects seem to accumulate.
- Very often, this positive outcome is related to the methods used: In a study examining the impact of the problem-based learning approach (PBL model) used at Aalborg University in **Denmark,** 80% of students responded that they learned more while working on the project compared to instruction and lecture-based learning in a classroom. They feel that the project work and the learning associated with it are related to real–life work environments and found the project work useful in acquiring professional and core employability skills.

➔ **Entrepreneurship education leads to improved entrepreneurial skills and attitudes**

- According to the 2012 and 2013 reports of the Danish long-term measurement mentioned in the previous section, entrepreneurship education in **Denmark** increased the entrepreneurial skills and behaviour of primary and lower secondary students regarding. 'Self-efficacy' was taken to be a reliable indicator to predict the likelihood of individuals acting entrepreneurially in the future. Upper secondary students improved their skills on all dimensions on a self-efficacy scale - management skills (planning and financial literacy) and skills that minimise barriers (managing uncertainty and marshalling resources).

- Students that participated in the 'E-Vitamin'-programme in **Spain** had statistically significant higher scores than the control group in self-efficacy, pro-activeness, risk-taking and locus of control.
- The study "Impact: 50 Years of Young Enterprise" from **England (UK)** reported that alumni claimed the course Young Enterprise improved their ability to achieve objectives, cope with problems, deal with change, do business planning, start up a company, build business relationships and networks, innovate, spot opportunities and evaluate ideas.
- The study 'The impact of entrepreneurship education on human capital at upper-secondary level' from **Switzerland** showed that entrepreneurship programmes have a positive impact on students' entrepreneurial competencies such as: the capacity to exploit an opportunity and to develop business ideas; persuasiveness or leadership; team work; persistence; self-organisation; delegation of tasks; meeting deadlines; and, how to deal with problems and find solutions.
- 40% of students in secondary education (general and vocational) in the **Netherlands** assessed that they showed more entrepreneurial behaviour after participating in the programmes launched under the National Action Plan.
- The study 'Opportunity Identification and its role in the Entrepreneurial Classroom' from the **USA** tested the effect of a specific type of training on a persons' ability to generate business ideas and provided evidence that the right training can indeed lead to enhanced opportunity identification and the development of innovative business ideas.

➔ **Entrepreneurship education leads to behavioural change towards higher entrepreneurial intentions**

- The Netherlands National Action Plan also increased the proportion of students that are certain that they want to become entrepreneurs after graduation (from 13% in 2007 to 21% in 2012). In Wales (UK), parallel to the National YES Action Plan, under 25-year-olds showed an increased intention to start a business or to be self-employed (53% in 2012 compared to 42% in 2004).The study 'Entrepreneurship in **Israel**: Theory and Practice' shows that the willingness of MBA students' to engage in entrepreneurship rose significantly after taking part in an elective entrepreneurship course. Students in the sample also indicated that experience in entrepreneurship would potentially increase their future engagement in entrepreneurship. The researchers find it particularly notable that participation in just one entrepreneurship course had such a significant impact on students' perception of entrepreneurship and personal intentions.

➔ **Enhanced intentions to start a business can already be proven at secondary education level**

- The 2012 report of the long-term measurement in **Denmark shows** upper secondary students improve both cognitive and non-cognitive skills related to entrepreneurship. Consequently their level of entrepreneurial intentions increased after the course. Before the course, they perceived the following barriers: 'it takes too much effort', 'the risk of failure is too high' and 'the financial risk is too high'. These barriers were connected to the skills of 'Managing ambiguity', 'Marshalling resources', 'Creativity', 'Planning', and 'Financial literacy'. Improvements of those skills consequently led to higher entrepreneurial intentions.
- In **Flanders** (Belgium)**,** participation in the entrepreneurship education programmes connected to the Flemish Action Plan helped secondary students to develop entrepreneurial intentions. After participating in an entrepreneurship education course, half of the students found having their own company a compelling thought; and 33% of students thought they would indeed realise that wish (the corresponding figure in a pre-survey was 20%).

Impact on the institution

➔ **Institutions implementing entrepreneurship education develop a stronger entrepreneurial culture**

- The project 'Creativity and innovation in school (UPI)' in **Slovenia** helped to establish a creative climate in schools. Principals and mentors agreed strongly that entrepreneurship education had a positive impact on flexibility, innovation process management and creativity of the students as well as the teachers and mentors.
- A study from **Wallonia (Belgium)** on the 'Entrepreneurship Spirit Programme' run by the Walloon Agency for Economic Stimulation (ASE) showed that teachers' and head of schools who received specific training changed their attitudes and raised their interest in entrepreneurship. A higher number of teachers acknowledged that entrepreneurship is useful in subjects related to social sciences (88% versus 70.5% of the non-involved teachers), and at all educational levels. Especially regarding primary education, differences are significant: 84.6% of trained teachers found entrepreneurship important, while only 63.8% of the non-trained teachers did.

➔ **Institutions implementing entrepreneurship education notice a higher engagement of teachers**

- Evidence from cases in **Wallonia (Belgium), South East Europe and England (UK)**[4] indicates that raising the awareness of teachers of entrepreneurship increases the likelihood that they will engage in entrepreneurship, use relevant tools and actions and be more motivated to set-up entrepreneurial activities. Moreover, sensitised teachers seem to be better able to support their students' entrepreneurial learning processes. A comprehensive whole-school approach seems to be especially successful in doing so.
- An Israeli study provides evidence for the impact of the 'Entrepreneurial school' programme at Misgav elementary school in **Israel** on staff motivation and engagement. As main success factors, trust in the principal and a formal and informal reward system in place were identified. Through this, the 'Entrepreneurial school' programme encouraged the school staff to act innovatively, which ultimately led to a shift towards an entrepreneurial school. This was taken to be a precondition for the reported increase of pupils' entrepreneurial skills.

➔ **Institutions implementing entrepreneurship education intensify the engagement of stakeholders**

- The close ties of the Massachusetts Institute of Technology (MIT) in the **USA** with technology-based industries allowed for the development of several spin-offs led by MIT staff and alumni. These ties ensure that MIT staff are closely connected to the relevant business sectors and are up to date with technological innovation and the state-of-the-art.
- When the Misgav elementary school in **Israel** was transformed into an entrepreneurial school, stakeholders gradually took on a more active role, for instance they helped pupils to implement the business ideas developed in the classroom.

Impact on the economy

➔ **Entrepreneurship education supports a higher rate of start-ups and helps creating successful ventures:**

[4] 'Entrepreneurship Spirit Programme' in the Walloon Region of Belgium, Enterprise Education in UK-England, SEECEL

- Graduates from business schools in **Norway** with a major in entrepreneurship are between two and three times more likely to start a business than other graduates. Between 1997 and 2003, several measurements on possible correlations were undertaken. In 1997, it was found that three times more entrepreneurship education graduates started a business compared with other graduates. In later surveys, (2001 and 2003) the differences were found to be smaller. But entrepreneurship majors still remain more than twice as likely to start and own a business as graduates with other majors.
- In **Wales (UK)**, the National YES Action Plan was associated with the start-up rate among 18-24 year olds being higher than the UK average. The Global Entrepreneurship Monitor (GEM) Report reported in 2013 that 9.5% of young Welsh people engaged in early-stage entrepreneurial activity in 2012. The equivalent UK rate was 8.3%.
- The study 'Experiences from participation in JA-YE Company Programmes: What experience did participants in Company Programmes have during their time as company founders – and what happened next?' assessed the results of the JA-YE Company Programme in **Belgium, Denmark, Estonia, Finland, Romania, Norway and Slovak Republic.** By the time they are 25 years old, JA-YE Company Programme alumni demonstrate start-up rates which are about three times as high (15%) than among the average population in Europe (5-6%).
- According to the study 'Impact. 50 Years of Young Enterprise' from **England (UK),** more Young Enterprise alumni end up running their own business. 42% of alumni surveyed started firms compared to 26% in the control group of non-alumni.
- A **US** study undertaken at the University of Arizona in 2000 shows that graduates of the universities' entrepreneurship education programme were three times more likely to get involved in creating new business ventures than their non-entrepreneurship course peers.
- The long-term measurement undertaken by FFE-YE in **Denmark** showed that higher education students that participated in entrepreneurship education more often run a business than those in the control group. In 2012 the number of entrepreneurship students who started their own company during their education increased by 50%, whereas the number of students in the control group doing so decreased by 49.4%. The study also shows that entrepreneurship student led businesses are more sustainable.

➔ **Entrepreneurship education leads to economic impact**

Examples for concrete economic impact were provided by studies from **Sweden, England (UK)** and the **USA.**

- The firms created by alumni of Young Enterprise UK alumni have **higher turnovers**: 12% of alumni firms turned over £500,000 compared 3% of the control group's firms. In addition, 3% of Alumni firms turned over more than £1million, compared to none in the control group.
- The firms created by alumni of Young Enterprise UK **employ more people**: 11% had 51-99 employees compared to 9% of the control group. Two per cent of the alumni had 100-249 employees compared to none in the control group.
- **The annual revenues** (estimated $2 trillion) and **employment footprint** (estimated 3.3 million employees) of the firms founded by alumni of the Massachusetts Institute of Technology (MIT) are equivalent to the 11th largest economy in the world.
- **The impact of MIT alumni goes beyond the US.** The majority of the MIT alumni firms are founded in the US, but not only: for example, 790 MIT alumni firms have been created in Europe, mainly in England, France and Germany often in the software and consulting sectors.

- MIT alumni company sales constitute **25% of the sales of all companies in Massachusetts.**
- **MIT alumni companies are highly active in innovative sectors** such as software, electronics (including instruments, semiconductors, and computers) and biotechnology. About one third of employees in MIT alumni founded firms are in manufacturing, whereas in the USA, manufacturing firms employ less than 11% of total employment.
- Equally, Young Enterprise UK alumni firms **are innovative and at the forefront of modern technology**: 21.2% of alumni firms were digital and 'cloud'-based firms compared to 3% in the control group. Alumni firms are more diverse: Alumni firms ranged from internet sales to advanced engineering, corrosion control and 'retro' tourism. Control group firms were concentrated in fewer sectors.
- The firms started by Young Enterprise Sweden Alumni led to **more job creation:** The mean size of firms started by alumni as sole proprietorships or partnerships is two employees, and the mean size of corporations started by Young Enterprise Sweden Alumni is nine employees. Both figures are significantly larger than the overall mean size of new firms in the Swedish economy in terms of employment. This applies for both corporations and proprietorships/partnerships. According to the results from the first four years of research, alumni-founded corporations are on average 7.5% larger in terms of job creation than the ones in the control group. The respective difference for proprietorships/partnerships is again in favour of JA alumni and reaches 3.5 percentage points.
- The firms started by Young Enterprise Sweden Alumni also **generated more revenues.** The revenues of alumni-funded corporations are on average 20% higher than comparable firms of the control group. The same holds for proprietorships/partnership firms (6% higher for the Young Enterprise Sweden alumni).

Impact on the society

➔ **Entrepreneurship education can help to protect an individual against social exclusion**

- Evidence from evaluation of an arts and cultural activities project in **England (UK)** with children at risk of social exclusion resulted in a marked improvement in the self-efficacy and empowerment of many of the children involved. The researchers hypothesised that by enhancing the children's self-esteem and self-efficacy, the project on the long-term will contribute to their social inclusion.
- The evaluation of the ENTRANCE project implemented in **England (UK), Israel, Hungary and Spain** comes to similar conclusions regarding the protective effect of entrepreneurship education against social exclusion. The ENTRANCE project had a significant impact upon motivation and self-confidence of the young people involved; and its effect was found to be greatest for those students most at-risk of social exclusion. Here as well, the researchers identified that entrepreneurial attitudes such as commitment, determination, creativity and planning will help young people to move away from being at risk of exclusion.

➔ **High annual return on investment for measures and activities in entrepreneurship education:**

- The study "Making an impact" from **Canada** estimated that the entrepreneurship education provider Junior Achievement Canada delivers a 45:1 annual return on "societal prosperity" per dollar invested.

1 Introduction

1.1 The aims and objectives of entrepreneurship education

As a key competence for life, entrepreneurship is prominent on the agenda of the European Commission. DG Education and Culture's (DG EAC) 'Rethinking Education'[5] communication states that all young people should benefit from entrepreneurship education, including 'at least one practical entrepreneurial experience before leaving compulsory education'[6]. The Europe 2020 strategy[7] provides the supporting framework for this, and the 2013 Country Specific Recommendations[8] highlight the importance of the Entrepreneurship Agenda.

The Entrepreneurship 2020 Action Plan[9] states that it is entrepreneurship that makes the European economy more competitive and innovative - new companies and enterprises are seen as the most important source of new jobs and employment. In turn, entrepreneurship education is expected to support Europe in competing globally, returning to economic growth and creating high levels of employment. Including entrepreneurship education in education and training curricula is based on the assumption that education has a role to play in developing and supporting future entrepreneurs.

In its Council Conclusions from December 2014[10], the European Council stresses that both entrepreneurship and education are priorities of the Europe 2020 strategy for smart, sustainable and inclusive growth. Taking into account the definition of entrepreneurship used in the 2006 recommendation on key competences for lifelong learning[11] ('an individual's ability to turn ideas into action'), the Council Conclusions underline that developing an entrepreneurial mind-set can have considerable benefits for citizens in both their professional and private lives.

Consequently, Member States are invited to encourage the development of a coordinated approach to entrepreneurship education throughout the education and training system.

1.2 The main forms of entrepreneurship education

Entrepreneurship education is implemented through different types of input and at varying scales. The main types of input and activities are:

- ➔ **National/regional strategies:** Countries and regions draft strategies or Action Plans formulating specific goals and objectives related to entrepreneurship education. These are complemented and implemented through a range of funded programmes and activities.
- ➔ **Institutional changes:** Educational institutions prioritise content and methods related to entrepreneurship education in teaching and learning (e.g. the 'whole-school approach'). In some cases, this goes together with a changed vision and mission of the institution.

[5] http://ec.europa.eu/education/news/rethinking_en.htm

[6] ibid

[7] http://ec.europa.eu/europe2020/index_en.htm

[8] http://ec.europa.eu/europe2020/making-it-happen/country-specific-recommendations/

[9] http://ec.europa.eu/enterprise/policies/sme/entrepreneurship-2020/index_en.htm

[10] Council conclusions on entrepreneurship in education and training: http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/educ/146196.pdf (original version - EN)

[11] Key competences for lifelong learning (2006): http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11090_en.htm

➔ **Courses and classes:** Schools and universities introduce entrepreneurship education in the form of individual courses and classes. These can take different forms and can be offered either by the institution or by external providers.

1.3 Why is it important to measure impact?

Processes for measuring the impact of entrepreneurship education are often set up in parallel to implementing a programme, initiative or a strategy as part of the overall monitoring. The results are then usually used for the evaluation of a public policy[12]. Impact measurement facilitates both the assessment of the progress and quality of participants' learning, and the programme, initiative or strategy per se.

Measuring the impact of an educational programme or strategy aims at demonstrating if, after the intervention, there is an observable shift. For example, this can relate to participants' knowledge, skills and views; the atmosphere and perceptions that run across the institution; the economy; or, society more generally. Measuring the impact can demonstrate what works and can be used as a basis to explore why it worked (or didn't). Data on and understanding of the impact can function as a feedback loop, stressing possible areas for improvement or that a programme/initiative does not serve its goals and resources should be allocated elsewhere. In times of stringent state budgets, this is of great importance.

Therefore, impact measurement, which encompasses outcomes and results (see section 2.1 on the use of the terms), is a means for evidence-based policy making at governmental and institutional levels. Using pre-set goals as a benchmark, impact measurement can contribute to forecasting expected outcomes of entrepreneurship education. From an institutional/provider's perspective, evidence of what works facilitates the promotion of a programme/initiative and the engagement of sponsors/funding sources (whether public or private).

For example, according to Young Enterprise (UK), the publication of the impact study they ran ("Impact 50 years of Young Enterprise"[13]) significantly supported developments in the organisation during the economic crisis. The results of the impact study increased the interest of policy makers and employers in entrepreneurship and were used by Young Enterprise to promote their work and the entrepreneurship education agenda overall.

Also, where impact is measured systematically and regularly, i.e. the impact of the same programme/initiative is measured on an annual basis, the results can allow for comparison between different years and the assessment of the impact of any changes/corrections made to the content/teaching etc.

1.4 Who benefits from impact measurement?

As monitoring can positively affect all stages of the policy cycle[14], impact measurement offers evidence to be used in policy and practice design, planning, implementing and reviewing. So, measuring the impact of an entrepreneurship education programme or strategy can bring about significant benefits to several stakeholders:

[12] See, for example, Evalsed (2012) The Resource for the Evaluation of Socio-Economic Development; http://ec.europa.eu/regional_policy/sources/docgener/evaluation/guide/guide2012_evalsed.pdf

[13] http://www.young-enterprise.org.uk/about-us/annual-review/

[14] Evalsed (2012) The Resource for the Evaluation of Socio-Economic Development; available at http://ec.europa.eu/regional_policy/sources/docgener/evaluation/guide/guide2012_evalsed.pdf

➔ **The institution launching the programme** or the public authorities that are responsible for specific programmes and/or the strategy, as they can:

- invest resources in programmes/initiatives that prove to have an impact, based on good evidence;
- make the necessary corrections early enough to achieve better results from existing programmes;
- understand the reasons that drive (or do not) impact and take them into consideration when designing relevant policies;
- have realistic expectations from entrepreneurship education: data and insights from impact measurement can highlight that it is not the programme/initiative per se that should be corrected, but the impact expected should be adjusted to what can be realistically expected;
- if impact on the economy and society is measured, public authorities in particular can gain a clear view on how the impact of entrepreneurship education can go beyond the individual/institutional level; and can be linked to other policy areas (such as employment, social policies etc.).

➔ **Educators/trainers,** who can better understand the purpose of their work and what could be achieved through their efforts;

➔ **Participants/learners,** as they feel their opinions matter.

Existing evidence on the positive impact of entrepreneurship education can engage stakeholders such as educators/trainers, training providers, learners, but also parents and labour market actors; this is especially relevant to countries/regions/institutions that have no or little experience of entrepreneurship education. Also, existing evidence on the impact of entrepreneurship education, as provided in this study, can inform stakeholders that entrepreneurship education can have positive impact, regardless of the form of delivery or the level of education (for example, an through an initiative in primary education; a programme in VET or higher education; or a strategy at national or institutional level).

1.5 This study

Given the significant role expected of entrepreneurship education in supporting the goals of the Europe 2020 strategy, DG Enterprise and Industry commissioned a mapping exercise with the aim of gathering knowledge from across Europe and more widely on the impact of entrepreneurship education (especially quantified impacts – on the individual, on educational institutions, on the society and on the economy) and the methodologies of impact assessment utilised in generating this evidence.

Objectives of the study

The study had the following three objectives:

1. **To identify examples of measuring the impact of entrepreneurship education** on micro (individual, institutional) and macro (society and economy) levels through:
   - Systematic country research in all 28 EU-Member States plus 15 Non-EU-countries (literature research plus interviews); and
   - Interviews with high-level experts and academics.[15]
2. To prepare **case studies** that further examine how different types of initiatives have delivered different types of impact, and show how this has been achieved.[16]
3. **To present an overview of the key findings.**

1.6 This report

This report is the final report to this study. It presents the key findings of the research in three main sections; each section presenting evidence for impacts related to a specific type of input:

- ➔ Impact of national and regional entrepreneurship education strategies (Section 3).
- ➔ Impact of institutional changes by prioritising entrepreneurship education (Section 4).
- ➔ Impact of classes; courses and modules of entrepreneurship education (Section 5).

Additionally,

- ➔ Section 2 outlines the means through which it is anticipated that entrepreneurial education can generate impacts.
- ➔ Section 6 presents key trends and observations regarding the methodologies used for measuring impact of entrepreneurship education.
- ➔ A final section, based on the evidence of impact collected, presents key lessons learnt for maximising the impact of entrepreneurship education (Section 7).
- ➔ Annex 1 explains the approach to conducting the research.
- ➔ Annex 2 provides background information to those cases providing evidence of the impact of individual entrepreneurship education measures and initiatives.
- ➔ Annex 3 presents a list of literature and sources used.

[15] More information about the method is provided in Annex 1.

[16] The full set of case studies is available as a separate document.

2 How entrepreneurship education is expected to impact

2.1 Introduction

This section summarises the main assumptions underlying the approach to this study. It clarifies the understanding of the terms used and presents the underlying 'theory of change' on how entrepreneurship education leads to impact at the individual, institutional, economic and societal levels.

2.2 The impacts of entrepreneurship education

In the inception stage, the understanding of the term 'impact' underlying the design of the research was clarified. This process followed existing definitions of evaluative terms, inspired by the guide 'Evaluating EU activities – A practical guide for the Commission services[17].

Definition of key terms

Inputs/activities: These are the means used to produce outputs. Inputs include educational initiatives and budgetary costs (financial, administrative and human resources), but also costs for the beneficiaries or target population (co-financing, compliance costs stemming from administrative burden) and costs for third parties (Member States, intermediary organisations. Measurements can be related to inputs, i.e. when an initiative is trying to enhance the offer of entrepreneurship education.

Immediate results: two types of immediate outcomes can be observed, outputs and results.

- ➔ **Outputs:** Output is defined as a product, which is delivered through the input. Outputs are linked to operational objectives of an intervention (strategy, measure, etc.).
- ➔ **Results:** Immediate or initial effect/outcome of an intervention (strategy, measure, etc.). These occur at the level of direct beneficiaries/recipients of the intervention. Results are linked to specific objectives of the intervention.

Intermediate outcomes: Short to medium-term effects/outcomes on both direct and indirect beneficiaries/recipients of assistance. Indicators at this level are called impact indicators. These are linked to the intermediate objectives of the intervention.

General/Global impact: Longer-term and more diffuse effects/outcomes of an intervention (strategy, measure, etc.), linked to the global/general objectives of the intervention.

The **time dimension** (short, medium and long term) of the effects is specified when relevant.

Entrepreneurship education is expected to contribute to a broad range of policy objectives and to have an impact on many different levels of society and the economy. Concrete policy strategies, programmes and teaching approaches for entrepreneurship education are expected to impact in terms of:

- ➔ more educational offers for entrepreneurship education;

[17] European Commission 2004, http://ec.europa.eu/dgs/secretariat_general/evaluation/docs/eval_activities_en.pdf

- ➔ more educators prepared for entrepreneurship education;
- ➔ more institutions practising entrepreneurship education;
- ➔ more engaged and active citizens;
- ➔ more and new social ventures;
- ➔ more innovative employees adding value to existing enterprises; and
- ➔ increased business start-up rate (particularly amongst young people).

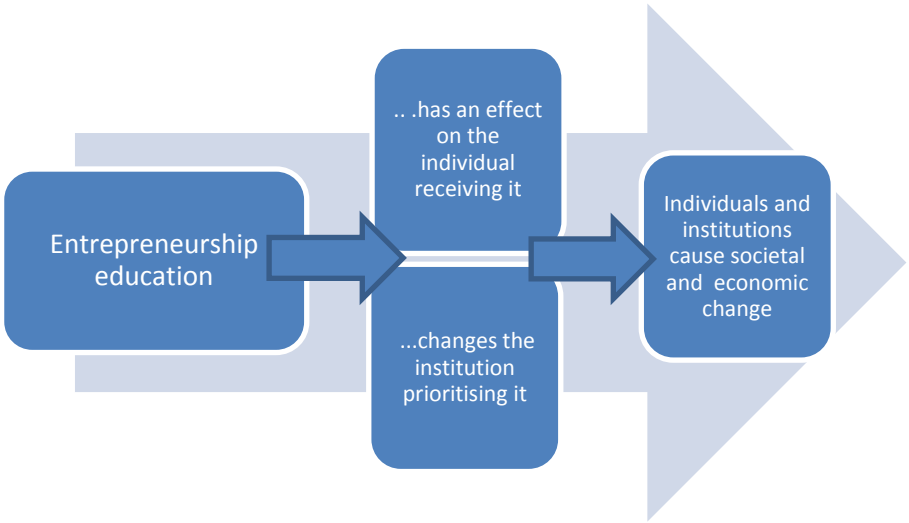
Hence, expectations are multi-layered and spread across several levels:

- ➔ the individual and their knowledge, skills and attitudes – resulting in actions taken by the individual, but also by her/his ability to find a job ('employability') or to start a business;
- ➔ educational organisations and their approach to teaching and learning;
- ➔ societal change and social inclusion;
- ➔ economic growth – relying on both new entrepreneurs and new 'intrapreneurs', who are taken to be innovative employees adding value to existing businesses.

2.3 A 'theory of change' for entrepreneurship education

Based on the above, an underlying theory of change was developed. This is illustrated in Figure 2.1.

Figure 2.1 Simple theory of change triggered by entrepreneurship education



The theory can be summarised as follows:

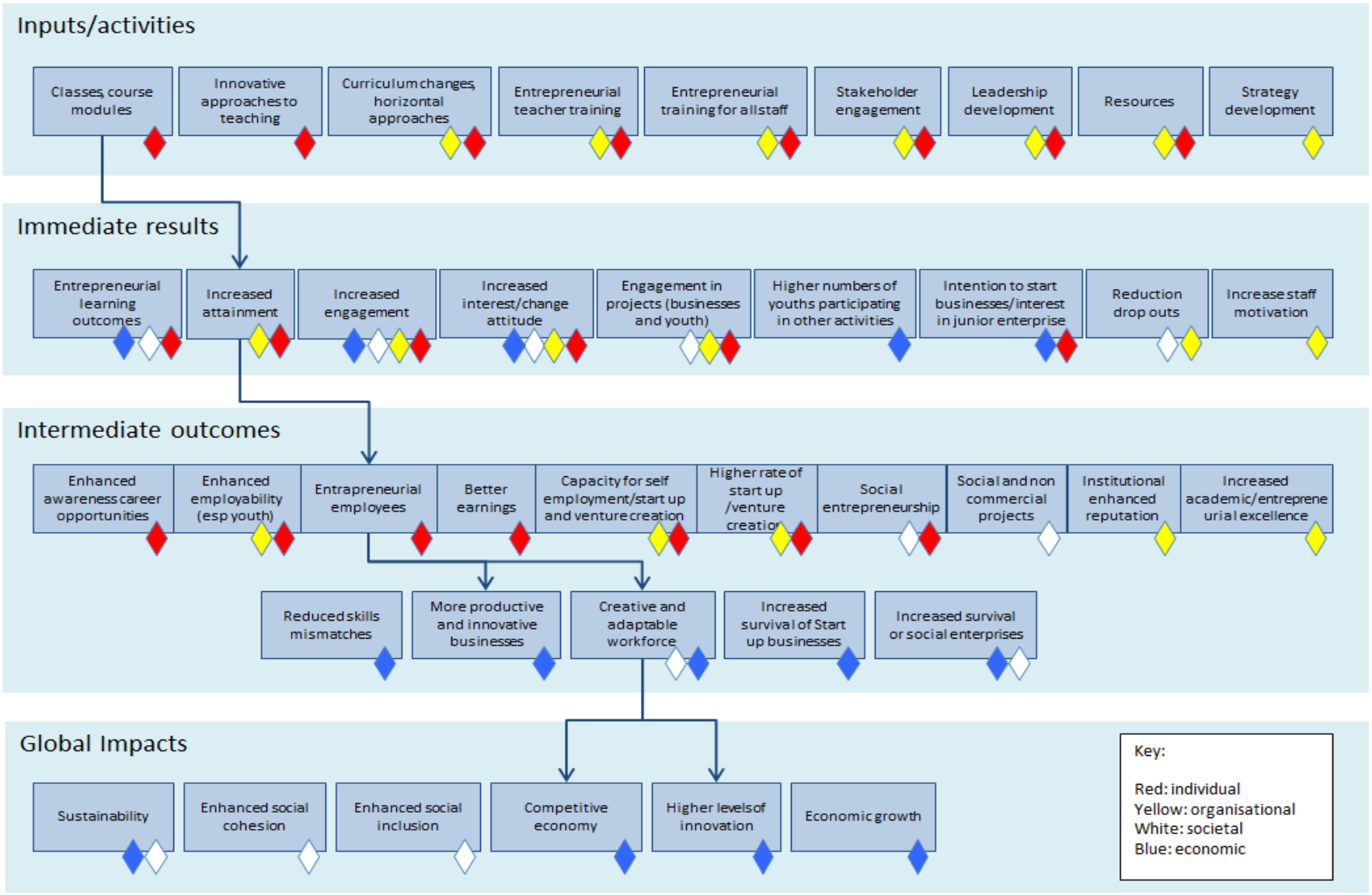
- ➔ It is assumed that entrepreneurship education has an effect on the individual receiving it in form of learning outcomes (knowledge, skills and attitudes), and behaviour.
- ➔ Equally it is assumed to cause a change in the culture of an educational institution.
- ➔ As a consequence of the behaviour and actions of the individuals and institutions, societal and economic change is stimulated.

Through the study, it was aimed to identify reports and examples which illustrate aspects of these chains and relationships. It was anticipated that some measurements may be able to provide evidence of causal links between the different levels, while others would only show impact on one specific level.

The study team defined that a key requirement for establishing a causal chain is that an **impact (measured change) can be clearly linked to a specific intervention.** A considerable amount of time might have passed between an action (e.g. founding a company or becoming self-employed) and an entrepreneurial education activity. Other contextual and structural factors (e.g. family history and economic conditions) and other drivers of entrepreneurship outside of the educational system all have the potential to generate impact as well. Yet, robust and credible causal linkages between an intervention and specific changes need to be established. In other words, evidence is needed which proves that initiative A is a cause for the change measured on B. Figure 2.2 shows a hypothetical example of a causal chain of evidence.

In reality, such chains are often difficult to establish. Nevertheless, during the study, several examples were identified which collected evidence of change on specific levels and pointed to effects on other levels as well (see sections 3-5).

Figure 2.2 Impact mapping – establishing causal chains



3 The impact of national and regional entrepreneurship education strategies

3.1 Introduction

This section presents evidence on the impact of entrepreneurship education strategies identified through the research for this study. It considers the objectives and inputs/activities of entrepreneurial education strategies and presents evidence of their impact on: students; teachers; institutions; the economy; and, society.

Entrepreneurship Education Strategies

An entrepreneurship education strategy was taken to be the existence an official policy document developed by educational and/or other competent authorities at a national, regional or local level. A strategy usually includes:

- ➔ a vision of what it aims to accomplish;
- ➔ specific objectives;
- ➔ the steps and actions to be taken to meet these objectives;
- ➔ the identification of competent authorities and stakeholders;
- ➔ the processes to be followed; and,
- ➔ the allocated budget.

The entrepreneurship education strategies reviewed covered a broad range of programmes and initiatives on all levels and types of education (from primary to adult education and including formal education, non-formal and, informal learning). Five of the impact studies related to strategies examined the effects of several programmes and initiatives within the strategy or showed how institutions utilised the funding. Four other cases focused on measuring the impact of one specific programme.

Additionally, evidence was drawn from three cases concerning broad governmental programmes implemented on a large scale. What differentiates them from the other strategies is the absence of a specific policy document that formulates overarching goals for entrepreneurship education. However, since their scope and impact can be compared to that of a strategy, these examples were included.

Table 3.1 provides brief characteristics of the twelve cases that provided evidence to inform this section.

Table 3.1 The cases providing evidence on the impact of entrepreneurship education strategies

	Type	Cases	Key characteristics	Evidence on impact
1	National Strategy	Foundation for Entrepreneurship - Young Enterprise (FFE-YE), Denmark, 2010-2013, http://www.ffe-ye.dk/	FFE-YE is a national knowledge centre supporting the implementation of entrepreneurial education in Denmark at all educational levels. Relevant target groups include actors from primary and secondary school and higher education.	Impact measurement is annually reported by FFE-YE and so far four impact measurement reports have been published (from 2010 to 2013). Impact is measured in all levels of education at the end of the school year.
2	National strategy	The Entrepreneurship Education National Action Plan 2007-2012 (Netherlands), http://www.rvo.nl/subsidies-regelingen/actieprogramma-onderwijs-en-ondernemen	In 2007, the Netherlands launched a comprehensive National Action Plan that targeted all educational levels and funded a variety of projects in primary, secondary, secondary vocational and Higher Education.	Regular surveys (on a two-year cycle) measured progress against the two main goals of the Action Plan. In addition, several independent evaluations measured the success of the projects funded.
3	National strategy	Action Plan 'Entrepreneurship in Education and Training – from compulsory school to higher education 2009–2014', Norway, 2010-2014, http://www.regjeringen.no/en/dep/kd/documents/reports-and-actionplans/Actionplans/2009/entrepreneurship-in-education-and-traini.html?id=575005	The Action Plan is a broad initiative to further implement entrepreneurship education throughout the whole education system. It is based on a cross-ministerial collaboration, between the Ministry of Education and Research, the Ministry of Trade and Industry and the Ministry of Local Government and Regional Development.	The strategy was accompanied by an ongoing evaluation of its implementation, comprising several impact assessments covering all levels of education (2010-2014).
4	National Strategy	Unlocking the UK talent, Enterprise Education in UK-England, 2008-2011, http://webarchive.nationalarchives.gov.uk/20081201222039/http://www.berr.gov.uk/whatwedo/enterprise/enterprisesmes/enterprise-framework/index.html	A 2008 White Paper formulated policy objectives. Subsequently several funding opportunities were created, distributed by the Department for Children, Schools and Families (DCSF), (then Department for Education (DfE)).	There was a review and evaluation of the impact of enterprise education in secondary schools in England, including the most useful support and tools for ensuring effective teaching and learning.

5	National strategy	Youth Entrepreneurship Strategy (YES) Action Plan, UK-Wales; 2004-2009, 2010-2015, http://business.wales.gov.uk/bigideas/yes-action-plan-2010	The 2010-2014 strategy builds on a previous funding round and has clear objectives to produce more entrepreneurial young people across the country. It includes actions in all sectors of education (from primary to higher education, and both formal and non-formal).	Measures of impact on students through a range of surveys, questionnaires and assessments.
6	Programme related to strategy	South East Europe Centre of Entrepreneurial Learning (SEECEL); 2009-ongoing, http://www.seecel.hr/seecel-s-publication-school-professional-toolkit	SEECEL is an independent, non-profit institution founded in 2009 on the initiative of eight countries (Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia, and Turkey). One of its initiatives is the School Professional Toolkit (SPT) for teaching entrepreneurship at school.	Measures of the impact of the SEECEL School Professional Toolkit (SPT) on four selected schools in each of the eight SEECEL-countries.
7	Programme related to a strategy	Creativity and innovation in school (UPI), Slovenia; 2010-2012, http://www.mgrt.gov.si/si/zgodbe_o_uspehu/arhiv/celoviti_program_spodbujanja_ustvarjalnosti_inovativnosti_in_podjetnosti_mladih/	UPI courses were implemented in primary schools by the Slovenian Chamber of Craft and Small Businesses (OZS); and in secondary schools UPI courses by the higher and vocational business education centre Gea College. They were part of a national programme financed by the Ministry of the Economy of Slovenia and managed by the Public Agency of the Republic of Slovenia for Entrepreneurship and Foreign Investment.	Measures of the impact of the UPI courses on creativity and flexibility of pupils in the participating primary schools.
8	Programmes related to a strategy	Entrepreneurship Education in Secondary School (Belgium-nl) 2008-2009, http://www.vlaanderen.be/nl/publicaties/detail/advies-actieplan-ondernemerschapsonderwijs	As part of the Action Plan Entrepreneurship Education in Belgium-Flanders 2006-2009, a range of projects and initiatives in secondary education were funded.	Compilation of the short-term effects of 21 projects for students in secondary school with differing aims and outreach in the school year 2008-2009.
9	Programme related to a strategy	E-Vitamin-programme, Spain, Region of Castilla y León, 2007-2011, http://www.educa.jcyl.es/VitaminaE/es	The regional government of Castilla y León in Spain launched a regional strategy in 2002 called 'Educate for Entrepreneurship' (Educar para emprender). The E-Vitamin programme was part of the strategy.	Measures of the impact of the programme based on data from 2007/2008 to 2010/2011 on students in lower secondary education.

10	Other	'Entrepreneurship Spirit Programme', Walloon Agency for Economic Stimulation (ASE), Walloon Region, 2011-2014, http://as-e.be/content/le-programme-wallon-esprit-d-entreprendre	The Entrepreneurship Spirit Programme targets all Walloon schools and teachers (at all levels).	Measures of the impact of training and awareness-raising activities on teachers and heads of school.
11	Other	'Entrepreneurial spirit into schools', Germany, 2004-2009, http://www.unternehmergeist-macht-schule.de/DE/DieIdee/Initiatoren/initiatoren_node.html	Between 2004 and 2009, the Federal Ministry of Economy and Technology funded four programmes related to entrepreneurship education (JUNIOR, JUNIOR-Kompakt, German Foundation Contest for Students (DGPS) and Youth Start-up). The programmes were implemented in secondary education in eight German 'Laender'.	Measures of the effects of the training on secondary students' attitudes towards entrepreneurship and discusses challenges related to implementation.
12	Other	Impact of three of entrepreneurship programmes at upper-secondary education level (incl. VET), Switzerland, 2006-2013, http://www.sbfi.admin.ch/berufsbildung/01550/01564/01817/index.html?lang=it&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln1ah2oZn4Z2qZpnO2Yuq2Z6gpJCDen17gGym162epYbg2c_JjKbNoKSn6A--	Between 2006 and 2013, the Swiss government funded three entrepreneurship programmes at upper-secondary education level with different methodological approaches and for different target groups.	Measures of whether entrepreneurship programmes have an influence on entrepreneurial competencies, entrepreneurial knowledge, attitudes towards entrepreneurship and students' intention to create a company.

The main impacts of entrepreneurial education strategies

Impacts on students

All cases identified provided evidence that the programmes and courses related to the strategies led to enhanced entrepreneurial knowledge, skills and behaviour. Students go through a process of 'demystification' of entrepreneurship and get a clearer view on what an entrepreneur is and does. This often leads to greater interest. Courses that use methods which help students to unlock their creativity especially help to develop their entrepreneurial potential. Many entrepreneurship education alumni also show enhanced intentions to start a business after finalising school. For instance, in Wales, during the period of implementation of the YES Action Plan, under 25-year-olds showed an increased intention to start a business or to be self-employed (53% in 2012 compared to 42% in 2004).

Impacts on teachers

Evidence from several cases[18] indicates that raising the awareness of teachers of entrepreneurship increases the likelihood that they will engage in entrepreneurship, use relevant tools and actions and be more motivated to set-up entrepreneurial activities. Moreover, sensitised teachers seem to be better able to support their students' entrepreneurial learning processes. A comprehensive whole-school approach seems to be especially successful in doing so.

Teachers also learn to understand that entrepreneurship is relevant for all educational levels and not just in economic subjects. However, the impact on teachers that were already familiar with entrepreneurial teaching and learning concepts before the intervention is higher than on others.

Impacts on institutions

As a consequence of the Entrepreneurship Education National Action Plan in the Netherlands, between 2007 and 2012 entrepreneurship gained momentum in Dutch schools and universities and a broader range of institutions across all educational levels started practising it. Primary schools showed the largest growth rate (from 50% to 69%); whilst vocational schools and universities showed a slightly lower growth rate, but a very high penetration rate (HE: 80% in 2007, 96% in 2012; VET: 78% in 2007, 96% in 2012).

After the UPI Creativity and innovation Programme in Slovenia, principals and mentors in participating schools agreed strongly that entrepreneurship education has a positive impact on flexibility, innovation process management and the creativity of students.

Pilot projects launched by SEECEL in South East Europe succeeded in promoting innovative approaches to entrepreneurial teaching and learning. Moreover, the projects encouraged schools to intensify their collaboration with the local community, especially with entrepreneurs, and to strengthen their cross-border collaboration with schools in other SEECEL-countries.

Impacts on the economy

Several countries and initiatives measured impacts on the economy. They can be considered forerunners in developing suitable methodologies to tackle this challenge. For instance, there is evidence that the Welsh YES Action Plan

[18] 'Entrepreneurship Spirit Programme' in the Walloon Region of Belgium, Enterprise Education in UK-England, SEECEL

generated a higher rate of start-up/venture creation among young people (9.5% of young Welsh people compared to the 8.3% UK average in 2012); and increased the survival rate of graduate start-up businesses (10.3% of businesses founded in Wales survive compared to the UK average at 5% in 2011).

While the definitive causality of the YES Action Plan is difficult to prove, it is evident that Welsh students' entrepreneurial intentions have grown since 2004 and students in Wales are more likely to set up and sustain their own business than UK students in general.

Similar observations were made in Denmark, where entrepreneurship education students founded more companies with higher longevities than a control group.

Impacts on society

In Norway, the programmes connected to the Action Plan led to a higher number of student companies in rural areas, compared to urban areas. This did not (as yet) lead to societal impact in the form of regional development. Such impact will only be measurable in due time.

The SEECEL pilot projects had an impact on policy development. In all eight participating countries, they led to policy initiatives which promoted the inclusion of entrepreneurship education in school curricula and practices.

In some cases the studies reviewed are on-going and will provide further evidence. For example, the evaluation project related to the Norwegian Action Plan[19] started in autumn 2010, and was scheduled to continue until the end of 2014. Hence, first results were included in this report, but the final assessment is pending.

Other ongoing research projects have not yet published results and therefore were not included. An example is the Swedish programme Ifous.[20] The programme is a three-year development and research programme with the objective to promote entrepreneurial education in the participating schools (27 schools from all parts of the country participate). The programme will run until 2015. Only one survey has taken place so far, so change/impact cannot be assessed yet. However, teachers and school principals already assess that students are more involved in planning and that teachers are more engaged in pedagogic discussions after the launch of the programme.

3.2 The objectives of entrepreneurship education strategies

The entrepreneurship education strategies have objectives related to impact on all four levels considered in this study: individual; institutional; society; and, economy. The strategies and programmes included a broad variety of activities to achieve these objectives.

3.2.1 Objectives seeking impact on individuals

Most of the objectives of the strategies and programmes targeted change in individuals and launched classes, programmes and activities pertinent to entrepreneurship education. The examples reviewed aimed:

- ➔ **To increase the interest of target group(s) in entrepreneurship:** Although expressed differently among strategies, there was a common

[19] Johansen, V. et al. (2012) "Entreprenørskap i utdanningen og oppnåelse av læringsmål"

[20] Entrepreneurial learning - for motivation and success in school (Entreprenöriellt lärande – drivkraft och motivation för framgång i skolan). In: Leffler, E (2014) - Ifous –programmet Entreprenöriellt lärandeus

objective to make pupils/students more interested in entrepreneurship. Entrepreneurship was mostly viewed as an intention to start a business in the future. The objective was directly linked to inputs that raised awareness, offered specific knowledge, and provided hands-on experience and interaction with existing entrepreneurs. For example, in Wales, the YES Action Plan included the development of a website[21] and a campaign to inform students and stakeholders and to promote the Action Plan.

- ➔ **To increase entrepreneurial attitudes and/or behaviour:** One of the objectives of the Entrepreneurship Education National Action Plan in the Netherlands that targeted primary, general secondary and secondary vocational education aimed at supporting the entrepreneurial attitude of students and their teachers. Boosting entrepreneurial attitudes of youth aged 5-25 years old was one of the goals of the Welsh YES Action Plan. The development of 'entrepreneurship spirit' was also an objective of a broad-based initiative in Germany[22] and the Action Plan Entrepreneurship Education in Belgium-Flanders.
- ➔ **To develop entrepreneurial skills** (e.g. self-efficacy, risk bearing and locus of control, spirit of initiative, and dynamism) and abilities (e.g. ability to work as part of a team, develop personal responsibility and self-reliance): Objectives of this type were the focus of projects of entrepreneurial education in the upper secondary education in Switzerland. Increasing entrepreneurial skills (viewed as the ability to detect and utilise an opportunity) was also highlighted by the Norwegian National Action Plan, the Spanish 'E-Vitamin' Programme and in Enterprise Education in UK-England.
- ➔ **To promote creativity and innovation among young people:** The Creativity and Innovation in School (UPI) programme in Slovenia aimed to develop a long-term sustainable model for training young people in the field of creativity, innovation and entrepreneurship at primary and secondary level.
- ➔ **To increase students' intentions to start a business:** An increase in the number of students who declare they have an intention to start a business was part of the objectives of most strategies and programmes.

3.2.2 Objectives seeking impact on teachers and institutions

Some objectives targeted teachers and educational institutions:

- ➔ **To prepare teachers for entrepreneurship education:** The 'Entrepreneurship Spirit Programme' implemented by the Walloon Agency for Economic Stimulation (ASE) targeted teachers (at all levels), since they are considered the best actors to transfer entrepreneurial behaviours to young people. The Spanish 'E-Vitamin' programme involved the development and implementation of materials and a teaching methodology for entrepreneurship education, adapted to the different education levels (primary, lower secondary and upper secondary). The launch of the SEECEL School Professional Toolkit[23] went together with training for teachers and school management teams received training that included details on the project, what each school should do and types of curricula. SEECEL also offers a platform through which teachers, school management and national contact points could communicate and exchange ideas and practices[24].

[21] http://business.wales.gov.uk/bigideas/

[22] 'Entrepreneurial spirit into schools'. In: Josten, Martina, Marco van Elkan: "Unternehmergeist in die Schulen?! Ergebnisse aus der Inmit-Studie zu Entrepreneurship Education-Projekten an deutschen Schulen". 2010"

[23] http://www.seecel.hr/seecel-s-publication-school-professional-toolkit

[24] http://www.seecel.hr/cop

- ➔ **To embed entrepreneurship education in all education levels:** The Foundation for Entrepreneurship-Young Enterprise (FFE-YE) in Denmark aims to promote entrepreneurship across education to embed entrepreneurial abilities in curricula. This objective was shared by the Norwegian National Action Plan for Entrepreneurship Education and the Entrepreneurship Education National Action Plan in the Netherlands.
- ➔ **To change the culture of the institution:** Enterprise Education in UK-England aimed to enhance "a culture of enterprise" in schools.
- ➔ **To engage stakeholders:** The Norwegian Action Plan introduced measures adapted to different types of stakeholders, who could adjust them to local specificities. The FFE-YE in Denmark supported the Start-up Programme that targeted educators. Its goal was to inspire them to engage with the local community, businesses, investors, experts and experienced entrepreneurs.

3.2.3 Objectives seeking impact on the economy and society

Several objectives were broad and addressed change in the economy and society

- ➔ **To increase the rate of start-up/venture creation:** Two of the vision targets of the Welsh YES Action Plan concerned intermediate results, in particular boosting the rate of 'entrepreneurially active young people' as measured by the Global Entrepreneurship Monitor and the creation of start-ups. The other target concerned the increase of the rate of start-ups founded by graduates and their survival rate.
- ➔ **To enhance employability:** The strategy 'Educate for Entrepreneurship' in Spain[25] strongly aimed at enhancing employability as well as entrepreneurship.
- ➔ **To facilitate regional development:** The main objective of the Welsh YES Action Plan was to achieve a cultural shift towards more entrepreneurship in Wales, which would serve the development of the region in the long run. The Norwegian Action Plan expected to achieve positive impact on rural areas.
- ➔ **To foster entrepreneurial literate societies:** SEECEL's vision/objective is to 'foster entrepreneurial-friendly environments and to strengthen the mind-sets for building entrepreneurially literate societies that lead to sustainable economic growth and development'[26]. SEECEL's approach to entrepreneurship and the coordinated and systematic efforts in eight countries are an example of a transnational approach to promoting entrepreneurship education.

The following sections show how far the strategies achieved their objectives at the different levels.

3.3 Impact on the individual student

The main target groups of the entrepreneurial education strategies were students. Evidence was found in relation to the six objectives of strategies and programmes related to individuals: 1) to increase the interest of target group(s) in entrepreneurship; 2) to improve entrepreneurial knowledge, in particular knowledge relevant to business creation, 3) to develop entrepreneurial skills and abilities, 4) to increase entrepreneurial attitudes and/or behaviour, 5) to increase intention to start a business, and 6) to promote creativity, innovation and entrepreneurship of young people. The following sub-sections summarise the evidence for the different educational levels.

[25] Educar para emprender, regional government of Castilla y León. In: Sanchez Iv. (2013) The Impact of an Entrepreneurship Education program on entrepreneurial competences and intention

[26] http://www.seecel.hr/mission-vision-5049

3.3.1 Primary education

Including primary school pupils in entrepreneurship education may seem 'far-fetched', but – provided that appropriate methods are used - it has been very successful. Evidence shows that at primary school level, methods are more important than content.

FFE-YE in Denmark[27] introduced the notion of 'entrepreneurship as a method', as opposed to 'entrepreneurship as an occupation'. Entrepreneurship as a method (especially in primary school) strengthens pupils' non-cognitive entrepreneurial competences, such as creativity, generating new ideas, and how to translate ideas into actions. It does not necessarily aim at increasing pupils' desire to become an entrepreneur, but aims to equip pupils with the creativity and proactivity they need to manage uncertainty and change. To measure how far this was achieved, pupils in primary school were asked about non-cognitive entrepreneurial competences: i.e. How to think creatively; How to come up with new ideas; How to translate ideas into action; and How to start new activities.

Applying 'entrepreneurship as a method' has had a significant positive effect on the pupils' level of connectedness to school, to classmates, and to teachers and on their motivation levels. According to the researchers, the latter indicates that the pupils are increasingly driven by curiosity and self-motivation in their learning process. This means that they engage more out of a desire for learning. The study concludes that teaching of entrepreneurship as a method appears to be more important at primary school level than entrepreneurship as an occupation.

Evidence shows that primary school pupils can benefit in many regards from entrepreneurship education:

➔ **To increase interest and awareness:**

- Projects run under the National Action Plan in the Netherlands increased the understanding of pupils at primary level. After completing the project, two out of three pupils state they now know what an entrepreneur is, and one out of four state they are interested in becoming entrepreneurs themselves.[28]

➔ **To improve entrepreneurial knowledge, skills and attitudes:**

- Programmes that ran under the National Action Plan in Norway positively impacted on pupils' entrepreneurial skills (collaboration skills, creativity and problem solving), compared to a control group.[29]
- In the Netherlands, about one in three students surveyed said s/he became 'more enterprising' (self-assessment).[30]
- According to the 2012[31] and 2013[32] measurements of the FFE-YE, entrepreneurship education in Denmark has increased the entrepreneurial skills and behaviour of primary and lower secondary students regarding all skills related to a 'self-efficacy' scale. Strong correlations with the teaching methods used were observed - especially for younger pupils.. Entrepreneurial intentions of primary and lower secondary education

[27] Young Enterprise Denmark (2013) - Impact of Entrepreneurship Education in Denmark 2012

[28] Panteia (2013) Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs

[29] Johansen, V. et al. (2012) "Entreprenørskap i utdanningen og oppnåelse av læringsmål"

[30] Panteia (2013) Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs

[31] Young Enterprise Denmark (2013) Impact of Entrepreneurship Education in Denmark 2012

[32] Young Enterprise Denmark (2014) Impact of Entrepreneurship Education in Denmark 2013

students were more positively impacted by teaching 'entrepreneurship as a method' – i.e., using methods stimulating creativity and innovation - rather than as 'an occupation' – i.e., teaching business-related skills. The studies conclude that pupils who have experienced an 'entrepreneurship as a method' have also increased their level of connectedness to school, classmates, and teachers.

➔ **To increase creativity and flexibility:**

- Evidence from the 'Creativity and innovation in school' programme (UPI) in Slovenia shows positive impact on pupils' creativity and flexibility.[33] They become more familiar with the innovation process from forming an idea to its realisation, and their attitude towards novelty and innovations became more positive. Their ability to create new ideas increased and they became more prone to the realisation of ideas, hence assuming a 'visionary attitude'. In the post-survey, students also assessed themselves higher than in the pre-survey regarding their ability to adapt to new situations and to work in teams, and regarding their general motivation (determination, persistence and dedication). They are also more familiar with the innovation process and more open to innovation in general.

In some cases, evidence was also provided that entrepreneurship education impacts on primary school pupils' general attitudes towards education and learning.

Greater self-confidence, higher ambitions and more interest in learning

Some evaluations of strategies and programmes provided evidence for greater confidence and higher ambitions of pupils in primary education - a very welcome 'side-effect'. The 'Creativity and Innovation in School' programme (UPI) led to greater confidence: in the post-survey, students' showed higher ambitions regarding their choice of secondary education.[34]

The Danish long-term measurement performed by FFE-YE[35] provided evidence that students in primary/lower secondary education that have participated in entrepreneurship education have higher ambitions for their future career choices (job or further education) than those that have not. They became more self-motivating in their efforts in the learning process and they claimed to engage more out of a desire for learning.

3.3.2 Secondary education

Students in secondary education were frequently addressed in strategies and impacts on them were researched most often. Evidence shows that they were positively affected by entrepreneurship education regarding: 1) their interest in entrepreneurship; 2) their entrepreneurial knowledge, skills and attitudes/behaviour; and, 3) their intentions to start a business. The same 'side-effect' as for primary pupils was observed, they became more interested in education as such and their grades improved.

➔ **To increase the interest in entrepreneurship:**

[33] Halilović, P. (2013) Doktorska disertacija. Učinki inovacijsko-podjetniškega izobraževanja na spodbujanje inovativnosti in smiselnost uvajanja omenjenih vsebin med osnovnošolce v Sloveniji. Maribor: Ekonomsko-poslovna fakulteta Maribor

[34] ibid

[35] Young Enterprise Denmark (2014) Impact of Entrepreneurship Education in Denmark 2013

- Students in secondary vocational education in the Netherlands caught up with university students in that regard: While VET-students were significantly less interested in entrepreneurship than HE-students in 2007 (35% VET-students vs 52% HE-students); VET-students scored higher than university students in 2012 (67% VET-students vs 59% HE-students).[36]
- Dutch students in both general and vocational secondary education also changed their general attitude towards entrepreneurship: 45% of students interviewed in 2012 said their opinions of entrepreneurship and entrepreneurs improved after participating in entrepreneurship education programmes.[37]
- Secondary education students in Germany that participated in the programmes of the Ministry of Economy and Technology self-assessed that the programmes helped them to understand the concept of entrepreneurship and the role of entrepreneurs as part of the economy much better. Their interest in questions of economy and finance at the micro and macro-level increased, they acquired knowledge in both regards and they understood better what it takes to found a company and to be successful (seven out of ten students reported improvements).[38]
- Students that participated in the entrepreneurship education programmes in Belgium (Flanders) have very positive views on entrepreneurs as well: 70.8% have a positive, and 12.8% a very positive image of entrepreneurs.[39]

➔ **To improve entrepreneurial knowledge, skills, attitudes and/or behaviour:**

- In Denmark, the number of lower secondary students showing entrepreneurial behaviour by leading or initiating a project or an activity outside of class (not necessarily a business) increased over time. While no correlation between extra-curricular activities and entrepreneurship education was found in the 2011 measurement[40], the picture changed in 2012[41]. A 78% increase in leading or founding an extra-curricular activity was observed among the entrepreneurship students.
- Upper secondary students in Denmark improved their skills on all dimensions of self-efficacy[42] both management skills (planning and financial literacy) and skills that minimise barriers to entrepreneurship (managing uncertainty and marshalling resources).

[36] van der Aa, R. et al. (2012) Ondernemerschap in het onderwijs, Tweemeting, Eindrapport, Rotterdam, November 2012

[37] Panteia (2013) Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs

[38] Josten, M., van Elkan, M. (2010) Unternehmergeist in die Schulen?! Ergebnisse aus der Inmit-Studie zu Entrepreneurship Education-Projekten an deutschen Schulen"

[39] No pre-survey undertaken.

[40] Young Enterprise Denmark (2012) Impact of Entrepreneurship Education in Denmark 2011

[41] Young Enterprise Denmark (2013) Impact of Entrepreneurship Education in Denmark 2012

[42] Entrepreneurial self-efficacy has been selected by the FFE-YE as the main indicator for impact measurement in upper secondary and higher education. Self-efficacy is a concept from social learning theory which lends itself well to be used in studies as it can be used to scale the extent or strength of a persons' belief about whether or not it lies in his/her own control and ability to complete tasks and reach goals (Bandura 1997). According to the Young Enterprise Denmark 2013 publication, self-efficacy is a good indicator ofthe likelihood of individuals acting entrepreneurially in the future.

- Students that participated in the Spanish 'E-Vitamin'-programme had statistically significant higher scores than the control group in self-efficacy, pro-activeness, risk-taking and locus of control.[43]
- As a consequence of the three programmes in Switzerland, students self-assessed that their skills relevant to developing a business idea and exploiting an opportunity improved – they achieved higher scores in post-tests than in pre-tests.[44]
- The majority of upper secondary students in Norway that have participated in an entrepreneurship education programme believed they have the necessary skills and knowledge to develop a business, in particular soft skills like persuasiveness and leadership.[45]
- 40% of students in secondary education (general and vocational) in the Netherlands assessed that they show more entrepreneurial behaviour after the programmes launched under the Action Plan.[46]
- The evaluation of Enterprise Education in UK-England asked teachers to rate the main areas of impact on a scale of one to ten. According to teachers, entrepreneurship education increases pupils' employability/enterprise skills (mean score of 7.2 out of 10); increases pupils' self-awareness of their own enterprise capabilities (7.1 out of 10), increases pupils' business and economic understanding (7.0 out of 10), and increases pupils' financial understanding (6.6 out of 10). Lower mean scores were recorded for: increasing understanding of the realities of business start-up and employment (6.0 out of 10); and, encouraging young people to consider self-employment/setting up their own business (5.9 out of 10).[47]

But increasing interest and more entrepreneurial knowledge, skills and attitudes does not necessarily mean that the student in question regard entrepreneurship as a suitable career path for them. Students can draw different conclusions from an entrepreneurship education experience.

The demystification' of entrepreneurship

Providing knowledge on what being an entrepreneur really means (challenges, necessary skills etc.) offers students more realistic views. The evaluation of the entrepreneurship education programmes in Switzerland showed a positive impact on students entrepreneurial knowledge and skills, but a slightly negative effect on the number of students who declared to have entrepreneurial intentions (pre- and post-survey).[48] Examples from the literature confirm that this is a well-known effect: Exposure to

[43] Sanchez Ivan. (2013) The Impact of an Entrepreneurship Education program on entrepreneurial competences and intention

[44] The study focused on four types of entrepreneurship-related human-capital assets: entrepreneurship-related personality traits, beliefs, entrepreneurial knowledge and entrepreneurial competencies. For three out of these four areas (excluding entrepreneurial knowledge), key variables were identified and measured through a test with multiple self-reported items measured on a five-point Likert scale i.e. answers were rated on a scale of 1 to 5.

[45] Johansen, V. et al. (2012) "Entreprenørskap i utdanningen og oppnåelse av læringsmål"

[46] Panteia (2013) Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs

[47] McLarty et al. (2010) Evaluation of Enterprise Education in England

[48] Volery et al. (2013) The impact of entrepreneurship education on human capital at upper-secondary level; Journal of Small Business Management 51 (3), pp. 429-0; doi: 10.1111/jsbm.12020

entrepreneurship education can also have counter-effects on the entrepreneurial intentions of participants.[49]

Such findings can be interpreted through the 'demystification lens': Gaining better insights helps students to make better informed career choices. This may mean that some students decide that being an entrepreneur is not for them. These students might be better placed to become an 'intrapreneur' – an entrepreneurial employee.

➔ **To increase the intention to start a business:**

Studies which looked at entrepreneurial intentions found that entrepreneurship education had an impact on that level.

- 30% of students in the Netherlands believed that the projects run under the National Action Plan encouraged them to think about starting a business.[50]
- Students of upper secondary education that participated in programmes in Norway had a higher level of intention than non-participants in being self-employed in the future.[51]
- Participation in the entrepreneurship education programmes connected to the Action Plan in Belgium-Flanders led to students having higher entrepreneurial intentions. While half of the students found having their own company a compelling thought; 33% of students thought they would indeed realise that wish (20% in pre–survey).[52]

Links between creativity, risk-propensity and founding intentions

Evidence from the Flemish Action Plan showed that graduates improve on creativity and innovation. The significance of the effects seemed to be linked with the intensity of the programme. The more intense an activity was - in terms of time and level of engagement - the higher the effect.

This is an important finding as students' company founding intentions seem to go together with creativity and other indicators related to risk-propensity. Those students that state their intention to found a company also self-assessed higher values for creativity, willingness to undertake international mobility and other variables related to risk-taking than their peers.

- The 2012 FFE-YE study from Denmark measured attitudes of upper secondary students participating in a programme which focused on developing both cognitive and non-cognitive skills. Students' level of entrepreneurial intentions increased after the course. Before the course, they perceived the following barriers: 'it takes too much effort', 'the risk of failure is too high' and 'the financial risk is too high'. These barriers were connected to the skills of 'Managing ambiguity', 'Marshalling resources', 'Creativity', 'Planning', and 'Financial literacy'. Girls participating in the programme improved greatly on 'Managing ambiguity' and 'Marshalling resources', while boys improved more on

[49] Fayolle A., et al. (2006) Assessing the impact of entrepreneurship education programmes: a new methodology. Journal of European Industrial Training Vol. 30 No.9, 2006; pp. 701-720

[50] Panteia (2013) Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs

[51] Johansen, V. et al. (2012) "Entreprenørskap i utdanningen og oppnåelse av læringsmål"

[52] Flanders DC Kenniscentrum (2009) Effecto: Stimuleren van ondernemershap in het secundair onderwijs

'Financial literacy' and 'Planning'. For both groups, entrepreneurial intentions grew – for girls more than for boys.[53]

➔ **To increase engagement and achieve better grades:**

As with primary education, evidence was also found in secondary education that entrepreneurship education has very desirable 'side-effects':

- It was found that participating in programmes connected to the Norwegian Action Plan had a positive effect on secondary students' oral and writing skills. The programmes also impacted slightly on pupils' grades in Norwegian, English and mathematics.[54]
- Entrepreneurship education in Sogn og Fjordane County (Norway) triggered a generally positive effect on students' interest in school. Besides increased intentions to found a company, students were also more interested in other parts of the schoolwork and showed higher ambitions to move on to Higher Education.[55]
- High percentages of secondary education students in Germany who participated in the programmes related to the 'entrepreneurial spirit into schools' programme self-assessed that they improved on key competences like teamwork (62%), communication skills (55.2%) and presentation skills (54.6%). Teachers rated this improvement even higher than the students themselves.[56]
- Lower secondary education students in Denmark who have been taught using entrepreneurial teaching methods reported that they feel more connected to school, classmates and teachers and that their motivation to learn increased.[57]

Entrepreneurship education helps to develop greater ambitions for life

Students interviewed[58] for the Evaluation of Enterprise Education in England (2007-2010), reported that enterprise education raised their awareness on what entrepreneurship means for an individual. This strengthened their confidence and was experienced as a trigger to subsequently build up their capabilities and develop higher aspirations for life.

3.3.3 Higher Education

Entrepreneurship programmes in higher education seem to be most likely to have an immediate effect. Students are mature enough to realise entrepreneurial ambitions and to put ideas into practice. Indeed, evidence shows that students were positively affected by programmes/activities running under strategies.

➔ **To increase interest in entrepreneurship:**

[53] Young Enterprise Denmark (2013) Impact of Entrepreneurship Education in Denmark 2012

[54] Johansen, V. et al. (2012) "Entreprenørskap i utdanningen og oppnåelse av læringsmål"

[55] Rotefoss, B. et al. (2009) - Entreprenørskap på høygir! - en evaluering av satsningen på entreprenørskap i grunnopplæringen i Sogn og Fjordane

[56] Josten, M., van Elkan, M. (2010) Unternehmergeist in die Schulen?! Ergebnisse aus der Inmit-Studie zu Entrepreneurship Education-Projekten an deutschen Schulen

[57] Young Enterprise Denmark (2013) Impact of Entrepreneurship Education in Denmark 2012

[58] Qualitative interviews

- In Wales, the National Centre for Entrepreneurship in Education (NCEE) undertook a Higher Education Survey[59] to measure the impact of the YES Action Plan on higher education students' engagement in entrepreneurial activities. In 2012, the rate of students participating in projects was 26% versus 23% in 2010.

➔ **To improve entrepreneurial knowledge, skills, attitudes and/or behaviour:**

- In Denmark, the 2012 measurement showed that students that had participated in entrepreneurship education ('entrepreneurship students') after one year considerably increased their levels on entrepreneurial self-efficacy construct as defined by FFE-YE[60] on all dimensions except financial literacy. Compared to the control group, entrepreneurship students experienced a statistically significant increase in creativity and managing uncertainty.[61] In the same study the 'entrepreneurship students' increased their level of entrepreneurial attitude variable by five percentage points compared to the control group for whom it decreased by 0.5 percentage points.[62] Moreover, several 'entrepreneurship students' participated in extracurricular activities, which suggests that entrepreneurship education has an effect on students' behaviour outside their studies.
- In Norway, recently graduated students who had participated in entrepreneurship education considered that their education contributed to them developing entrepreneurial skills and attitudes. For this group of students, entrepreneurship education was also found to stimulate enhanced creativity and knowledge of innovation processes.[63]

➔ **To increase students' intentions to start a business:**

- In Wales, the intention of under-25-year-olds to start a business or to become self-employed increased since 2004. The Carnegie Trust Enterprising Minds Survey[64] was used to assess the YES Action Plan's impact on young peoples' 'entrepreneurial mind-set'. In 2012, the goal of ranking above the UK average was achieved, 53% of those under 25 years old aspired to become self-employed, an increase from 42% in 2004.
- The Netherlands National Action Plan also increased the proportion of students that are certain that they want to become entrepreneurs after graduation (from 13% in 2007 to 21% in 2012).[65]

3.4 Impacts on teachers

In order to achieve the objectives of strategies, teachers, heads of schools and other school staff have to deliver high quality entrepreneurial education. As

[59] National Centre for Entrepreneurship in Education (NCEE) 2012 Enterprise and Entrepreneurship in Higher Education Survey

[60] Entrepreneurial self-efficacy is defined by FFE-YE as a combination of competences that affect entrepreneurial behaviour. Six dimensions together form this multi-dimensional variable: creativity, planning, marshalling of resources, coping with ambiguity, financial literacy and human resource management.

[61] Based on self-assessment.

[62] Young Enterprise Denmark (FFE-YE, 2013) , "Impact of Entrepreneurship Education in Denmark – 2012"; http://www.ffe-ye.dk/media/45275/Effektmaaling-ef-entreprenoerskabsundervisning-2012.pdf, page 79

[63] Støren, L. A. (2012) "Entreprenørskap i høyere utdanning – erfaringer blant nyutdannede"

[64] Carnegie Trust UK (2012) Enterprising Minds Final Report

[65] van der Aa, R. et al. (2012) Ondernemerschap in het onderwijs, Tweemeting, Eindrapport, Rotterdam, November 2012

'agents of change'[66] they are often mentioned in the objectives of strategies. Consequently, several strategies included the preparation of teachers for entrepreneurship education amongst their objectives.

The 'Entrepreneurship Spirit Programme'[67], run by the Walloon Agency for Economic Stimulation (ASE), includes activities that aim at raising the awareness of teachers/educators in primary, secondary and higher education. Results of the evaluation survey that targeted teachers and heads of schools demonstrated that the programme had a positive effect on their understanding of entrepreneurship, its importance and the relevant teaching methods. Overall, teachers and heads of schools changed their attitudes and raised their interest in entrepreneurship. More specifically, they:

- ➔ showed higher levels of understanding of what entrepreneurship is;
- ➔ acknowledged that entrepreneurship is useful in subjects related to social sciences (88% considered this the case versus 70.5% of the non-involved teachers);
- ➔ acknowledged that teaching entrepreneurship is relevant to all educational levels. Especially regarding primary education, differences are significant: 84.6% of teachers trained in entrepreneurship education find entrepreneurship important, while only 63.8% of the non-trained teachers did.

Under the Entrepreneurship Education National Action Plan in the Netherlands, entrepreneurship became part of teacher's competence profile in all sectors. This was reflected in senior secondary vocational education. The proportion of secondary VET-school teachers receiving additional training in entrepreneurship grew from 17% in 2010 to 22% in 2012. Universities of Applied Sciences were also found to provide training more often, while preparation for entrepreneurship education was least well reflected in teacher training provisions for primary and secondary schools.[68]

The evidence indicated that raising the awareness of teachers of entrepreneurship increases the likelihood that they will engage in entrepreneurship, use relevant tools and actions and be more motivated to set-up entrepreneurial activities. The evaluation of specific projects under the Entrepreneurship Education National Action Plan in the Netherlands[69] that targeted primary, general secondary and secondary vocational education highlighted that:

- ➔ in primary education, teachers' entrepreneurial attitude was positively impacted, although there were teachers who had reservations about the benefits of entrepreneurship education;
- ➔ in secondary education and secondary vocational education, teachers were more convinced of the importance of their role in promoting entrepreneurship education after they were provided with evidence on the positive impact that entrepreneurship education has on students.

[66] Cf the Budapest Agenda for the Development of Entrepreneurial Teachers; in: Entrepreneurship Education. Enabling Teachers as a Critical Success Factor. European Commission 2011. Online: http://ec.europa.eu/enterprise/policies/sme/promoting-entrepreneurship/files/education/teacher_education_for_entrepreneurship_final_report_en.pdf

[67] Entrepreneurship spirit has been defined by ASE as "team spirit, self-confidence, creativity, spirit of initiative, sense of responsibility and perseverance".

[68] van der Aa, R. et al. (2012) Ondernemerschap in het onderwijs, Tweemeting, Eindrapport, Rotterdam, November 2012

[69] Panteia (2013) Spoor I: eindbestemming bereikt? Eindevaluatie 'spoor 1' projecten Ondernemerschap en Onderwijs

Higher commitment of schools to entrepreneurship education leads to higher staff motivation

The evaluation of Enterprise Education in UK-England[70] showed that schools which report higher levels of Enterprise Education embedded into the curriculum also report higher levels of staff motivation. A whole-school approach to Enterprise Education helped to raise teachers' awareness of the value and impact of integrating enterprise within different subjects. The understanding of Enterprise Education as a teaching and learning style improved.

SEECEL tested the opinion of teachers and school management staff[71] regarding the importance of specific elements of entrepreneurial learning in their particular subject and curriculum.[72] Differences were observed related to the subjects and curricula they work with:

- ➔ language curricula: teachers and school management staff working with language curricula changed their opinion in relation to the relevance of all listed skills needed for a new business start-up and also in relation to financing, innovativeness, and business planning;
- ➔ social science curriculum: Only a slight change in opinion was observed on the importance of skills needed for a new business start-up. The largest change occurred in relation to the recognition of the importance of innovativeness;
- ➔ science curriculum: The recognition of the importance of finance for starting a business was the area with the greatest change;
- ➔ arts, technical and physical education curriculum: Slight changes in the opinions of participants were observed, on the importance of skills needed for a new business start-up.

Interviewees underlined that the limited outcomes for social sciences curricula could be attributed to the fact that entrepreneurship related concepts are already embedded in the social sciences. Thus teachers with that focus could be expected to be more familiar in teaching entrepreneurial concepts already before the project, which means they did not change their opinion, but adapted their attitude as to aspects they did not consider before (e.g. innovativeness). This underlines that the pre-conditions of teachers can greatly affect if and how they will be impacted by entrepreneurship education projects/initiatives. Therefore, training on entrepreneurial learning/entrepreneurship should be adjusted to the background of the teachers.

3.5 Impacts on institutions

The strategies researched for this study had three main goals regarding the expected impact on institutions: 1) to embed entrepreneurship education in all education levels; 2) to change the culture of the institution; and, 3) to engage stakeholders. This sub section summarise the evidence in relation to these three objectives.

[70] McLarty et al. (2010) Evaluation of Enterprise Education in England

[71] SEECEL (2013) Entrepreneurial learning: School professional toolkit

[72] The questions regarded prerequisites to start a business.

3.5.1 Embedding entrepreneurship education in all education levels

The Entrepreneurship Education National Action Plan in the Netherlands placed particular emphasis on influencing institutions and encouraging them to offer more entrepreneurship education. Evidence showed that between 2007 and 2012, entrepreneurship became more deeply embedded in the mission statements, programmes and curricula of educational institutions in all sectors. Entrepreneurship education had become a more common feature, and courses were offered by a growing number of education institutions. The number of institutions across sectors that have entrepreneurship implemented in their mission statements grew between from 27% (2007) to 33% (2010).[73]

- ➔ The largest growth from not having enshrined entrepreneurship in the curriculum 'at all' to having done so 'a bit' took place in primary education (50% of primary schools in 2007, 69% in 2012).
- ➔ The percentage of secondary schools with entrepreneurship in the mission and vision grew as well (from 62% in 2007 to 74% in 2012).
- ➔ The sector of upper secondary vocational education started from a high level of implementation already (2007: 78%). In 2012, 96% of institutions this sector offered entrepreneurship education programmes or curricula content.
- ➔ In Universities of Applied Sciences the degree to which institutional management got involved in promoting entrepreneurial education increased by over 18 percentage points between 2010 and 2012.
- ➔ In 2007, 80% of universities offered entrepreneurship education. In 2012, this proportion was 96%.

Hence, as a consequence of the National Action Plan, entrepreneurship gained momentum in Dutch schools and universities and the strategy led to a broader basis of institutions that practice it.

The 'Entrepreneurship Spirit Programme' from the Walloon Agency for Economic Stimulation (ASE) used awareness-raising agents who go to a school, meet the head of school or teacher(s) and present the actions and tools on offer to enhance entrepreneurial spirit. In 2014, 605 out of the 653 target schools (secondary/higher education) had a contact with awareness-raising agents; which was a penetration rate of 93%. ASE measures the number of entrepreneurship-related actions set up in schools which follow these visits. In 2014, 63% of the 653 target schools implemented at least one action or project.[74]

3.5.2 Change the culture of the institution

- ➔ The project 'Creativity and innovation in school (UPI)' in Slovenia supported entrepreneurship courses and clubs. In the opinion of students and mentors, the UPI activities managed to establish a creative climate in the schools. Principals and mentors also agreed strongly that entrepreneurship education has a positive impact on flexibility, innovation process management and creativity of the students as well the teachers and mentors. All questions

[73] Gibcus, P. et al. (2010) Onderwijs en Ondernemerschap, Eenmeting 2010, Petra Gibcus, Maarten Overweel, Sita Tan, Michel Winnubst, Zoetermeer, May 2010; and van der Aa, R. et al. (2012) Ondernemerschap in het onderwijs, Tweemeting, Eindrapport, Ruud van der Aa, Susan van Geel, Etienne van Nuland, Rotterdam, November 2012 .

[74] Newcom (2012) for ASE - Enquête sur l'esprit d'entreprendre dans l'enseignement. Enquête sur la vision des enseignants sur l'Esprit d'Entreprendre – Synthèse des résultats

related to both statements received values between 4 and 5 on a Likert scale, with 5 being the highest value.[75]

- ➔ In 2012, department and faculty heads from Universities of Applied Sciences in the Netherlands reported that they see themselves as entrepreneurs more often than in 2010. Over the same period, their view that entrepreneurship should be part of teachers' competence profiles grew by 11 percentage points.[76]
- ➔ Schools that used the SEECEL School Professional Toolkit (SPT) in a pilot project reported that the change observed went beyond the introduction of new teaching methods. Schools in Bosnia and Herzegovina and Montenegro observed a cultural shift in favour of entrepreneurship amongst the teachers involved. Moreover, the pilot project was perceived as a means to improve the overall level of education offered to children.[77]
- ➔ Impact in SEECEL schools varied depending on the focus of the schools' curricula. Impact was stronger in schools with a curriculum that focused on language learning compared with social science curriculum schools and those specialising in arts, technical and physical education.[78]

[75] Halilović, P. (2013) Doktorska disertacija. Učinki inovacijsko-podjetniškega izobraževanja na spodbujanje inovativnosti in smiselnost uvajanja omenjenih vsebin med osnovnošolce v Sloveniji. Maribor: Ekonomsko-poslovna fakulteta Maribor

[76] van der Aa, R. et al. (2012) Ondernemerschap in het onderwijs, Tweemeting, Eindrapport, Rotterdam, November 2012

[77] SEECEL (2013) Entrepreneurial learning: School professional toolkit

[78] ibid

The multiplication effect

In Bosnia and Herzegovina and Montenegro, the SEECEL projects seemed to have contributed to a cultural shift for the entire teaching staff in the affected schools. Teachers involved in the projects self-assessed that they shared their good practices with colleagues in other classes and levels. Hence, a multiplication effect was achieved.

3.5.3 Engage stakeholders

Evidence from the National Action Plan in the Netherlands[79] showed that:

- ➔ In primary schools, parents were very engaged in implementing the entrepreneurship curriculum: they helped with concrete actions in about half of the schools (51% of primary schools in 2012). The business community was also involved (50% of schools carried out actions with the business community in 2010, 56% in 2012).
- ➔ 70% of secondary schools organised specific entrepreneurial activities and 81% of the schools invited guest teachers from the business community to give lessons.
- ➔ In Universities of Applied Sciences, entrepreneurs gave more guest lectures and teachers had more opportunities to gain practical experience in businesses. At the same time, the business community started playing a much greater role in defining the content and organisation of entrepreneurial education.

Evidence from SEECEL showed that pilot projects encouraged schools to intensify their cooperation with the local (business) community and with schools in other SEECEL countries.[80]

3.6 Impacts on the economy

The strategies and programmes researched formulated a range of goals related to economic impact. Above all, they aimed: 1) to increase the rate of start-up/venture creation; and, 2) to enhance the employability of graduates.

Through these effects, which are connected to an individuals' entrepreneurial skills and behaviour, entrepreneurship education strategies can have an impact on the economy. Such impact can however only be measured after time has passed.

3.6.1 Higher start-up rates

The majority of strategies examined for this study were launched in the last five to seven years and the observations on impact concerned change that had occurred after the first two to four years. This limits the possibility of identifying intermediate outcomes on the economy that can be linked to the strategies overall or to activities within them. Moreover, the students who are the target groups of entrepreneurship education strategies are often still in education. This applies particularly to measures in primary or lower secondary school; where it cannot be expected that beneficiaries have yet created companies, demonstrated entrepreneurial behaviour as employees (intrapreneurship) or achieved higher employability rates than individuals in control groups.

[79] 2012 measurement ('Tweemeting')

[80] SEECEL (2013) Entrepreneurial learning: School professional toolkit

This caveat is especially pertinent in the measurements of impact of the Entrepreneurship Education National Action Plan in the Netherlands. The National Action Plan was launched in 2007 and one of its main goals was to increase the number of students who start up their own business within a period of five years after completing their education. When the measurements took place in 2010 and 2012, success in relation to higher start-up rates was not yet observable. A new measurement will be undertaken in 2014/2015 and relevant results can be expected then.

The limited evidence so far available includes:

- ➔ The YES Action Plan in Wales was specifically promoted as a means of tackling youth unemployment and related economic challenges.[81] It was monitored through a series of international and UK-wide surveys which provided evidence that the start-up rate among 18-24 year olds in Wales is higher than the UK average. The Global Entrepreneurship Monitor (GEM) Report (2013) indicated that 9.5% of young Welsh people engaged in early-stage entrepreneurial activity in 2012.[82] The UK rate was reported to be 8.3%. While this does not prove causality and provide direct evidence of the impact and effectiveness of the YES Action Plan and the GEM sub-sample of 18-24 year-olds may include persons that are not in education, the rate of early-stage entrepreneurs potentially reflects the higher level of exposure to entrepreneurship education activities.
- ➔ The survival rate of graduate start-up businesses in Wales is higher than the UK average. The Higher Education Business and Community Interaction Survey (HEBCIS)[83] monitors the number of graduate start-up companies surviving 3 years across the UK. In 2011 in Wales this was 10.3% compared to the UK average at 5%.
- ➔ The initiatives measured by FFE-YE in Denmark had similar impacts. Statistically significant differences between entrepreneurship students and a control group were observed regarding start-up rates. More higher education students that participated in entrepreneurship education ran a business than in a control group[84]. Between a baseline measurement carried out in 2011, and the second measurement in 2012, the ratio of entrepreneurship students running a company went up by 50 percentage points. In the same time frame, the ratio of students in the control group who were active as entrepreneurs decreased by 49.4 percentage points.[85]

3.6.2 Enhanced employability

The evaluation of the Norwegian Action Plan was informed by an annual national survey on the transition of higher education graduates to the labour market.[86] This survey asked recent graduates about their current position and their satisfaction with the education they went through. Since 2012, questions about entrepreneurial skills and intentions were added to the annual survey. The results were very positive: Graduates from entrepreneurship programmes connected to the Action Plan in Norway were less likely to be unemployed than graduates that did not take up entrepreneurship education; moreover, they were found to be more often in steady employment.

[81] http://www.learningobservatory.com/uploads/publications/828.pdf

[82] Global Entrepreneurship Monitor Special Report: A Global Perspective on Entrepreneurship Education and Training

[83] http://www.hefcw.ac.uk/about_he_in_wales/statistics/business_communities_survey_hebcis.aspx

[84] See Methodology section 6 for details on data collection

[85] ibid

[86] L. A. Støren, L. A. (2012), ”Entreprenørskap i høyere utdanning – erfaringer blant nyutdannede”

Higher employment rates - steady employment

Among graduates from entrepreneurship programmes connected to the Action Plan in Norway, the unemployment rate within engineering and business management was 2.8% compared to 6.6% for graduates in the control group.

Entrepreneurship education graduates were also found more likely to be in steady employment (73.6% as opposed to 60.8% in the control group).[87]

3.7 Impacts on society

Impacts on society that stem from educational activities need time to be observable and measurable. National and regional strategies are likely to generate such impacts because they embody a long-term approach and a variety of input and activities. These often include communication strategies and awareness raising measures.

In broad terms the strategies were anticipated to impact on society in two ways: 1) To facilitate regional development; and 2) To foster entrepreneurial literate societies.

3.7.1 Regional development

The Norwegian Action Plan saw entrepreneurship as a means to transform skills and ideas into activities relevant to the social, economic and cultural context. A key priority of the Action Plan was to stimulate development and growth in all parts of the country; especially rural areas. Measures were concentrated in less urbanised regions with low business foundation rates. Evidence showed major differences and reverse trends between urban and rural regions:

- ➔ in rural regions, as a consequence of the Action Plan, the proportion of students starting mini-companies is higher than in urbanised regions;
- ➔ the same rural regions however still score very low on business foundation rates, while in centralised regions business start-up rates continues to grow.[88]

However, as stated above, the element of time needs to be considered as well. Societal impact in the form of regional development will only become measureable in the long term.

3.7.2 Entrepreneurial literate societies

The vision of the Welsh YES Action Plan explicitly aimed to achieve a cultural shift resulting in more entrepreneurial and intrapreneurial young people. It included a campaign to inform students and stakeholders and to promote the Action Plan. The Enterprise Catalyst data used by YES[89] showed an increase in awareness of enterprise as a training offer and career option. Data in 2011 showed a 16% increase compared to the baseline survey undertaken in 2007. As mentioned in the previous section, more youth involved in entrepreneurial activities and higher start-up rates were also observed. Yet, it remains to be seen how these results will contribute to impact on the society at large in the long term.

[87] Støren, L. A. (2012) "Entreprenørskap i høyere utdanning – erfaringer blant nyutdannede"

[88] ibid

[89] http://wales.gov.uk/about/cabinet/cabinetstatements/2013/yesactionplan/?lang=en

SEECEL explicitly included impact on society in its objectives. In the long run, SEECEL aims to foster 'entrepreneurial literate societies' in its eight member countries.[90] Evidence that this can be achieved was found and policy level changes were initiated.

Pilot projects leading to broader policy initiatives

In all eight SEECEL countries, the activities of SEECEL led to policy initiatives which promoted the integration of entrepreneurship education into school curricula and practices.[91] A 'Charter for Entrepreneurial Learning: the Keystone for Growth and Jobs' was ratified in 2012. This was a notable success of SEECEL.

[90] Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, Serbia, Macedonia and Turkey.

[91] http://www.seecel.hr/; http://www.seecel.hr/eight-seecel-member-states-supported-a-charter-for-entrepreneurial-learning-the-keystone-for-growth-and-jobs

4 The impact of institutional changes prioritising entrepreneurship education

4.1 Introduction

This section describes the effects of entrepreneurship education actions taken and implemented at institutional level by schools (primary and secondary education as well as vocational education and training) and universities.

Evidence was drawn from institutional initiatives that were realised with the means and resources of the school or university. In other examples, schools and universities took part in governmental programmes and developed projects and initiatives based on the programme objectives.

Prioritising entrepreneurship education

Entrepreneurship education actions at institutional level cover a broad range of interventions of different scale. Actions taken by institutions can include:

- ➔ giving entrepreneurship education a high significance in their objectives and mission;
- ➔ establishing a horizontal approach which embeds entrepreneurship across curricula;
- ➔ establishing a subject-specific approach which embeds entrepreneurship in subjects such as economy, business studies, social sciences etc.;
- ➔ modernising the culture of teaching and learning by using innovative and participatory methods which support entrepreneurial skills (for example, self-regulated learning, team work, project based learning, problem-solving under real life conditions, simulation, and learning by doing);
- ➔ carrying out specific entrepreneurship projects or implementing ad-hoc entrepreneurship education actions;
- ➔ establishing greater cooperation with stakeholders from the world of business;
- ➔ providing training and information to teachers and other staff; and
- ➔ providing support to students with entrepreneurial intentions.

The section presents evidence of impacts at the individual level (students, teachers, and other staff members), institutional level, the economy and the society.

Table 4.1 gives brief characteristics of the four cases that provided evidence to inform this section.

Table 4.1 The cases providing evidence on the institutional impact of entrepreneurship education

	Type	Cases	Key characteristics	Evidence on impact
1	National strategy	The Entrepreneurship Education National Action Plan 2007-2012 (Netherlands), http://www.rvo.nl/subsidies-regelingen/actieprogramma-onderwijs-en-ondernemen	In 2007, the Netherlands launched a comprehensive National Action Plan that targeted all educational levels and funded a variety of projects in primary, secondary, secondary vocational and Higher Education. One of the initiatives related to the strategy was the establishment of six 'Centres of Entrepreneurship' associated to universities.	The Centres of Entrepreneurship were evaluated as to their efficiency (mid-term and end-term evaluation). Other activities were evaluated and measured through a series of surveys.
2	Governmental programme	Misgav elementary school (Israel; 2005-2007), http://www.misgav.org.il/	The Experimental Department of the Israeli Ministry of Education funds a programme for schools that want to implement an innovative approach in teaching. These schools are regarded as experimental. Misgav Elementary School received the status of experimental school in 2005.	In 2007, an independent impact measurement was conducted to assess the impact of transformation from conventional towards entrepreneurial schools. Organisational culture, innovativeness of the school, principal's proactivity and pupils' entrepreneurial drives were measured.
3	Institutional initiative	The method of problem-based learning (PBL) at the University of Aalborg (Denmark, 1974-ongoing), http://www.en.aau.dk/About+Aalborg+University/The+Aalborg+model+for+problem+based+learning+%28PBL%29/	Since Aalborg University was first established in 1974, all university programmes have been based on a unique model of teaching and learning: the problem-based, project-organized model also referred to as "PBL - The Aalborg model".	A survey from 2011 measured the skills acquired by students and the impact on their employability.
4	Institutional initiative	The Massachusetts Institute of Technology (MIT), http://web.mit.edu/	The Massachusetts Institute of Technology (MIT) established an entrepreneurial ecosystem that provides comprehensive support to students with entrepreneurial intentions.	A study from 2009 measured the role and impact of the MIT on the local economy.

The main impacts of institutional changes through prioritising entrepreneurship education

Impact on students

Students in educational institutions prioritising entrepreneurship were found to have higher entrepreneurial skills than their peers in 'conventional' schools. Attainment rates and motivation have risen, including in some cases the engagement of parents (for instance in supporting entrepreneurship projects). In the cases of Aalborg University (DK) and the Massachusetts' Institute of Technology (MIT) (USA), improved entrepreneurial skills were found to be the result of learning and working conditions which support team work and problem-solving under real-life conditions. A guidance structure which forms part of an 'entrepreneurship ecosystem' that helps students with all steps related to creating a venture was also found to be a very positive factor.

Impact on institutions

The engagement of heads of schools was found to be highly conducive for institutional change. At Misgav elementary school staff members were rewarded when they engaged in entrepreneurial projects. MIT removed legal barriers to enable staff members to found their own companies, if they wished to. This supported staff motivation.

Over the years, an entrepreneurial culture and ecosystem emerged which ensures that students have support from experienced tutors and mentors available to them at all steps of the start-up process.

The importance of such measures is evident as student entrepreneurs single out networking and mentoring as highly important supportive factors. This includes benefits which stem from institutional business contacts and information networks, and hence strengthened cooperation with business stakeholders:

- ➔ At Misgav elementary school, stakeholders took on an increasingly active role over time, for instance in helping pupils to implement the business ideas developed in the classroom.
- ➔ The close ties of the MIT with technology-based industries allowed for the development of several spin-offs led by MIT staff and alumni. This ensures that MIT staff are closely connected to the relevant business sectors and are up to date with technological innovation and the state-of-the-art.

Impact on the economy and society

The introduction of project work and real–life work environments led to students acquiring professional and core employability skills at Aalborg University.

In the case of MIT, the entrepreneurship ecosystem established had measurable economic results:

- ➔ The total annual revenues (estimated $2 trillion) and the employment footprint (estimated 3.3 million employees) of MIT alumni-founded firms are equivalent to the 11th largest economy in the world.
- ➔ The impact of MIT alumni goes beyond the US: The majority of the MIT alumni firms are founded in the US, but 790 MIT alumni firms were also created in Europe (mainly in England, France and Germany in the software and consulting sectors).
- ➔ MIT alumni companies are often set in highly active and innovative sectors such as software, electronics (including instruments, semiconductors, and

computers) and biotechnology.

➔ Many of the MIT alumni companies are knowledge-based and operate in sectors where patents and research are important. These companies are more likely to hold at least one patent and are more export-oriented than other companies. Therefore, they are considered more likely to have long-term growth potential than companies in other sectors/industries.

4.2 The objectives of institutional changes prioritising entrepreneurship education

Schools and universities connect several expectations to entrepreneurship education. The programmes and actions have objectives related to impact on all four levels addressed by this study: individual, institutional, economy and society.

4.2.1 Objectives seeking impact on individuals

When institutions take an initiative to promote and prioritise entrepreneurship, they do not necessarily aim to achieve institutional change in the first place. Most programmes and actions target first and foremost students. They aim:

➔ **To enhance entrepreneurial skills and attitudes of students:** The changes implemented in Misgav elementary school were based on the belief that an entrepreneurial school environment can impact positively on pupils' beliefs, values and attitudes and can cause a preference for innovation and a proactive disposition.

➔ **To provide students with a better learning environment:** The Problem Based Learning (PBL)-Aalborg Model aimed to give students the possibility for independent learning and working with the business community to solve real-life problems. The PBL learning model also intended to help the students in analysing problems, working in a result-oriented manner and developing team working competences.[92]

➔ **To provide support and guidance to students with entrepreneurial intentions:** The MIT ensured that aspiring students, but also faculty, are supported in turning their business ideas into start-ups.[93]. Aspiring entrepreneurs get continuous guidance, coaching, access to seed funding and networking opportunities. The Centres of Entrepreneurship (CoEs) which were established as part of the Entrepreneurship Education National Action Plan in the Netherlands had similar objectives. Students find guidance and training opportunities for all questions related to venture creation.[94]

4.2.2 Objectives seeking impact on the institution

Naturally, institutional initiatives go together with objectives regarding impact on the institutional level. Through measures promoting and prioritising entrepreneurship, institutions aimed:

➔ **To establish an entrepreneurial ecosystem:** The support measures established by the MIT in the USA and the CoEs in the Netherlands aimed at establishing a comprehensive support system that goes beyond individual student counselling. The MIT ecosystem comprised academic courses,

[92] http://www.en.aau.dk/About+Aalborg+University/The+Aalborg+model+for+problem+based+learning+%28PBL%29/

[93] http://www.mitef.org/s/1314/interior-2-col.aspx?sid=1314&gid=5&pgid=471; cited 31/3/2014

[94] Progress Report on the Education and Entrepreneurship Programme; 2008.

centres, programmes and student groups.[95] The Dutch CoEs focused on directing, organising and facilitating multidisciplinary, institution-wide entrepreneurship education with the goal of encouraging entrepreneurship across educational institutions and sectors.[96] The activities addressed students as well as university staff members.

- ➔ **To enhance the level of innovation and entrepreneurial culture of the institution:** The Israeli concept of experimental schools implemented at Misgav elementary school was based on the idea that schools transform the conventional curriculum by focusing on a subject such as arts, music, ecology or entrepreneurship and established this as a horizontal topic across the curriculum. Experimental schools received additional funding and a mentor was appointed who assisted the school make changes to the curricula and to implement the whole programme over a five-year period. By introducing PBL, Aalborg University aimed to redefine the role of the teacher in the learning process.[97] Rather than communicating knowledge to students, often in a lecture setting, the teacher was instead to act as an initiator and facilitator in the collaborative process of knowledge transfer and development.
- ➔ **To improve or maintain the collaboration with stakeholders:** All cases included an element that aimed at improving the institutions' collaboration with business stakeholders. Misgav elementary school provided children with the opportunity to approach external partners to implement their ideas (for example companies where their parents are working). Aalborg University maintained active relationships with key external organizations that supported the effective implementation of the problem and project based model (businesses, social agencies, governmental agencies, foundations, and other academic institutions). These external contacts provide a source for student problem formulations and project work, and the institution's research and project work also benefits from these external organizations.[98] The Dutch CoE aimed at facilitating collaboration with the business world as well as with other educational institutions. For the MIT, the local community is a very important means to understand and to keep in touch with market needs.
- ➔ **To enhance their reputation and get better access to funding:** Innovative projects with positive results can be disseminated and presented to parents and private investors. In the case of Aalborg University, the MIT and the Dutch CoE, the measures taken were expected to enhance the visibility and reputation of the universities and to bring in additional resources in the form of higher numbers of students, private investments and public funding. Additionally, they might also help to keep high-profile staff members on board or attract new staff recruits with high potential.

4.2.3 Objectives seeking impact on economy and society

Two initiatives formulated explicit expectations as to impact on economy and society:

- ➔ **To enhance the employability of students:** The PBL model aims to enhance students employability by focusing on project work, real - life work experiences and team working competences.

[95] http://www.mitef.org/s/1314/interior-2-col.aspx?sid=1314&gid=5&pgid=471; cited 31/3/2014

[96] Progress Report on the Education and Entrepreneurship Programme; 2008.

[97] Shinde V. and Kolmos An.: Students' experience of Aalborg PBL model - A case study. Paper presented at SEFI annual conference 2011, Lisbon, Portugal.

[98] http://www.en.aau.dk/About+Aalborg+University/The+Aalborg+model+for+problem+based+learning+%28PBL%29/

➔ **To fertilise the local economy:** The MIT sees itself as part of the local economy and defines its role as feeding into the (local) business structure.

4.3 Impact on the individual student

This sub section discusses the findings on impact against the objectives related to the individual as formulated by the initiatives.

4.3.1 Enhanced entrepreneurial skills and attitudes among pupils

Evidence collected suggests that pupils exposed to entrepreneurship education in an entrepreneurial school or university tend to have better/higher entrepreneurial skills than pupils in schools that do not prioritise and promote entrepreneurship education. Students' entrepreneurial skills seem to improve when entrepreneurship is promoted through institution-wide initiatives. Institutional entrepreneurship education initiatives can also impact on students' motivation.

➔ Misgav elementary school activities included teacher training activities through lectures and workshops, as well as activities targeting students (courses, participation in 'entrepreneurship centres, i.e. working groups, mentoring younger pupils). The measures included an 'entrepreneurship centres' project and lessons on developing an innovative and alternative way of thinking. The outcomes were measured by a survey which contained 42 statements and used a five-point Likert scale.[99] The survey questions covered five different dimensions of the 'Entrepreneurial Drive': proactive disposition, preference for innovation, self-efficacy, achievement motivation and non-conformity (using simple and age-appropriate language). The results were compared with a "conventional" elementary school in geographical proximity and with socio-demographic similarities. Misgav pupils achieved higher values on most elements of 'entrepreneurial drive', but had a lower value for non-conformity than their peers. According to the main researcher[100] this could be explained by the fact that these pupils were very engaged in school activities which could have led them to identify with school regulations and procedures as such. This argument is supported by an increased attainment rate. [101]

➔ Anecdotal evidence also points to improved parental engagement at Misgav elementary school – for instance, many parents engaged in students' entrepreneurial projects and, as a consequence, also provided support to activities connected to it. It is worth mentioning though that parents of those pupils who were following the regular curricula without any difficulty were reportedly more supportive of the 'entrepreneurship centres' initiative than those whose children faced challenges in following the regular activities. [102]

➔ The introduction of a horizontal model of PBL in mechanical engineering at the University of Aalborg in Denmark enhanced students' skills related to employability. Based on self-assessment, 79 % of the respondents confirmed that their team work and problem-solving skills improved.[103]

[99] Options available were: 'Strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'

[100] Interview with Sibylle Heilbrunn conducted by ICF on 24 April 2014

[101] Sibylle Heilbrunn, ibid

[102] Sibylle Heilbrunn, ibid

[103] Shinde V. and Kolmos An.: Students' experience of Aalborg PBL model - A case study. Paper presented at SEFI annual conference 2011, Lisbon, Portugal.

4.3.2 Better learning environment

- ➔ An essential feature of the Aalborg PBL model is team work. To facilitate team work, Aalborg University provides each project group with work space and internet access for the duration of the academic term. This space may be individual rooms for each group or larger rooms divided into individual work areas for each group. . The work space can be regarded as offices for students, simulating the working conditions of practicing engineers. Physical space may be supplemented by virtual space. The survey showed that students consider group rooms as one of the important success factors of the PBL model.[104]
- ➔ The measurement of the impact of the PBL model also showed that 93% of respondents agreed that this form of entrepreneurial learning enhanced their motivation.[105]
- ➔ Measurement of the effect of introducing PBL in mechanical engineering at the University of Aalborg showed that students are happy with their studying conditions and that dropout rates decreased. Hence the university benefitted on an organisational level from the introduction of PBL.[106]
- ➔ MIT alumni also stated that the institutional entrepreneurial culture had an impact on their confidence that problems can be solved by high-calibre teams.[107]

4.3.3 Support and guidance to students with entrepreneurial intentions

- ➔ The survey of MIT alumni shows that the MIT entrepreneurship ecosystem encouraged students to become risk-takers and entrepreneurial. The survey also highlights the importance attributed to each element of the ecosystem, whether part of the formal curriculum and other learning opportunities or informal interaction with faculty and students.[108]

4.4 Impact on institutions

The section below discusses the findings against the objectives related to change in the institution that were targeted by the initiatives.

4.4.1 An enhanced level of innovation and entrepreneurial culture of the institution

A comprehensive entrepreneurial culture and environment is important to support an entrepreneurship education initiative in a school or university. This was often found to be a result of the interest, enthusiasm and commitment of the school leadership towards entrepreneurship education. The relationship between teachers and the school leadership is then an important factor to facilitate buy-in and engagement from staff members.

- ➔ This is the case for instance in the Misgav elementary school. Qualitative interviews showed that the involvement and support of the school leadership was ensured because the initiative to change a 'regular' school into an entrepreneurial school stemmed from the school principal.[109]

[104] ibid

[105] ibid

[106] ibid

[107] Massachusetts Institute of Technology and Kauffman Foundation of Entrepreneurship (2009) Entrepreneurial Impact: The Role of MIT

[108] ibid

[109] Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: A Case Study

- ➔ The evaluation of the CoE that were part of the Entrepreneurship Education National Action Plan 2007-2012 in the Netherlands looked at the effects of all six centres combined.[110] A large range and scope of activities was carried out. More than 300 activities were organised to make the students aware of the possibilities of entrepreneurship, to help them acquire the necessary knowledge and skills and to support them in starting their own business. This can serve as proof that the guidance structure improved largely.
- ➔ The study on the role of the MIT[111] reported that entrepreneurship (defined as venture creation), has been promoted for several decades in MIT. The motto of MIT ('Mens et Manus' - mind and hand) underlined the importance attributed to developing applicable knowledge. Faculty was also encouraged to transmit knowledge to industry. Although entrepreneurship has not been a formal institutional policy, MIT has an entrepreneurial ecosystem in place, to ensure that aspiring students, but also faculty, are supported in turning their business ideas into start-ups.

Staff motivation as a success factor: Teachers and tutors as entrepreneurial role models

Trust in the principal and a formal and informal reward system in place at Misgav elementary school in Israel were reported to enhance staff motivation and engagement. This was a major success factor for the shift towards an entrepreneurial school. Consequently, the 'Entrepreneurial school' programme encouraged the school staff to act innovatively, which in turn can be taken as a precondition for the reported increase of pupils' entrepreneurial skills.

At MIT, besides students, staff were also encouraged to be entrepreneurial. The rules and regulations of the faculty were changed to make it possible for faculty and research staff to start their own business; and the support the university offers to budding entrepreneurs was opened to faculty members as well.

4.4.2 Establishing an entrepreneurial ecosystem for students

The study measuring the impact of the MIT stressed the importance of an entrepreneurial ecosystem to support entrepreneurship education in higher education. Interestingly enough, there is no institutional strategy on entrepreneurship as such in MIT. An entrepreneurial ecosystem has been gradually, and systematically developed since the establishment of the institution more than a hundred years ago. Activities as part of the MIT entrepreneurial ecosystem include the provision of academic courses, innovative approaches to teaching, i.e. centres, programmes and students groups. In terms of resources, students/aspiring entrepreneurs have access to continuous guidance, coaching, seed funding and network opportunities.

Entrepreneurship is 'in the flesh and bone' of the institution, which, over the years, has led to the development of an entrepreneurship ecosystem with several means of support to enterprise founders.[112]

[110] Evaluatiecommissie Centres of Entrepreneurship (2012) Evaluatie Centres of Entrepreneurship, Den Haag

[111] Massachusetts Institute of Technology and Kauffman Foundation of Entrepreneurship (2009) Entrepreneurial Impact: The Role of MIT. available on http://www.kauffman.org/~/media/kauffman_org/research%20reports%20and%20covers/2009/02/mit_impact_full_report.pdf

[112] ibid

Networking and mentoring prove to be important means of support to students

The survey tried to uncover which part of the institution's entrepreneurial ecosystem proved to be most useful for each particular alumni entrepreneur.

It showed that the MIT's Entrepreneurial Network (alumni and other members of the local business community) and informal interaction with faculty members was taken to be very important by the respondents This highlights the importance that budding student entrepreneurs attribute to networking and mentoring, which includes **learning from personal experiences as well as benefitting from business contacts and information networks.** The respondents also rated a recently introduced business plan contest as very useful. This shows the importance respondents attribute to practical experience in a safe environment with limited risk.

The example of the CoE in the Netherlands[113] can be used to underline that the century-long process of organic growth that the entrepreneurial ecosystem at the MIT went through cannot be replicated within a limited time frame of a national strategy. The evaluation of the CoE showed that five years after their implementation, only 15% of students in the associated universities were aware of the services the CoEs have on offer. Hence, the visibility of the CoEs was not yet high and some of the Centres did not yet advertise their provisions to an optimal extent (e.g. insufficient information on websites, lack of clarity on how students can get access to services).

The evaluation of the CoEs also tackled the question of whether or not the level of integrating entrepreneurship and related actions in universities would be the same without the CoE grants from the government. The evaluation found that without subsidies, the level of progress would not have been achieved – or would have been achieved much more slowly. The subsidies enabled the Centres to develop new curricular courses and a range of extra-curricular activities.

Notably, five of the seven rejected grant applicants created their own Centre of Entrepreneurship, despite the rejection of grants. It is not known whether these CoEs received grants from counties or municipalities, nor is it known whether the services of these CoEs are similar to the services of the government supported CoEs. However, the evaluation committee took this as a sign that the mere existence of the national grant scheme has worked as a catalyst for developing concrete plans to establish a CoE, regardless of whether the Centres received the grants they applied for or not.

4.4.3 Improved collaboration with stakeholders

Stakeholders' engagement also proved to be key to the visibility of the initiative and, if successful, its effects.

➔ The approach of the Misgav elementary school relied on having stakeholders on-board, with a gradual involvement of 'immediate' stakeholders such as parents, local public authorities (municipalities) and representatives of industry. A couple of years after the start of the programme, these stakeholders started to play a greater role in the programme, i.e. participating pupils approached external partners (e.g. companies in which their parents worked) to implement the business ideas developed in the classroom.[114]

[113] Implemented as one of the tracks of the National Action Plan 2007-2012

[114] Heilbrunn, S. (2010) Advancing Entrepreneurship in an Elementary School: a Case Study

➔ The MIT established close ties with technology-based industries from the start. This was further reinforced in the institutional culture by encouraging faculty and research staff to invest part of their time in developing their own companies. This allowed for the development of several spin-offs, which ensured that MIT staff is closely connected to the relevant business sectors and is up to date with state-of-the-art developments.[115]

4.4.4 Enhanced reputation and better access to funding

An important reason for institutions to engage in entrepreneurship can be examples of other institutions that benefit from the measures taken.

➔ The renowned Charney/Libecap study[116] provided evidence of impact from an entrepreneurship course provided by the University of Arizona in a span of 18 years and shows that the Eller College of Business and Public Administration of Arizona received 34% more external funding than in previous years; and hence benefitted on an organisational level from the introduction of the courses. For Misgav elementary school, the dissemination of results was part of the projects' obligations. Experimental schools were required to 'spread' their innovative ideas to other schools after four years of running the programme. Impact on other schools was expected to enhance the return-on-investment for the Experimental Department of the Israeli Ministry of Education. In turn, this requirement also enhanced the reputation of Misgave elementary school and helped to communicate the outcomes of the project.

➔ The MIT Enterprise Forum was specifically founded to ensure the visibility of MIT's work, it increased the positive feedback received and promoted the gradual collaboration and creation of a forum for interaction with investors. However, MIT alumni tend to be very faithful to their Alma Mater. Good contacts are maintained and many of them invest in the university, not least the successful entrepreneurs.[117]

Supporting entrepreneurship education will likely attract the more entrepreneurially motivated

The study on the role of the MIT over the decades showed that, as the reputation of MIT as an entrepreneurship-promoting institution increased, more entrepreneurial students and staff members were attracted. This self-selection process significantly contributed to the development of the 'entrepreneurial ecosystem'.[118]

4.5 Impact on the economy and society

Usually educational institutions see their role as preparing students for the world of work by helping them to acquire the necessary skills. Aalborg University is an example of a Higher Education Institution that uses methods from the spectrum of entrepreneurship education to achieve this objective.

The MIT is a rather unusual case as it regards itself as part of the local economy and defines its generic role as feeding into the (local) business structure. Hence,

[115] Massachusetts Institute of Technology and Kauffman Foundation of Entrepreneurship (2009) Entrepreneurial Impact: The Role of MIT

[116] Charney, A.,; Libecap, G.D. (2000): Impact of entrepreneurship education. Eller College of Business and Public Administration, University of Arizona. USA

[117] Massachusetts Institute of Technology and Kauffman Foundation of Entrepreneurship (2009) Entrepreneurial Impact: The Role of MIT

[118] ibid

as suggested by the theory of change introduced in section 2.3, it provides an example of an educational institution that sees itself rather as a player than as a stakeholder and explicitly expects to directly impact on the economy.

4.5.1 Enhanced employability of students

In the study related to the PBL model used at Aalborg University[119] 80% of students responded that they learned more while working on their study project compared to instruction and lecture-based learning in a classroom. They felt that the project work and the learning associated with it were related to real–life work environments and found the project work useful in acquiring professional and core employability skills.

4.5.2 Fertilisation of the economy

Findings from the study on MIT alumni[120] showed that the MIT had a very positive impact on its alumni's start-up/venture creations rate.

- ➔ MIT's support in entrepreneurship was identified by the researchers as the 'defining contribution to the Greater Boston entrepreneurial culture'. MIT alumni company sales constitute 26% of all Massachusetts (MA) companies. These companies are high-tech, providing a substantial part of Massachusetts's high-tech environment, helping to attract highly skilled professional and other firms to the state.
- ➔ A virtuous cycle emerges: founders stayed in MA after graduation; and most of them started their business at that location. While less than 10% of MIT undergraduates were from MA, about one third of alumni companies are. MIT alumni companies used cutting-edge technologies in their fields, so reinforcing the high-tech 'cluster' that attracts more people with relevant profiles and relevant companies. This is most obvious in the knowledge-based technology sector (software, biotechnology, internet, electronics etc). Almost two fifths (37%) of the newly founded companies were located in MA in the past 5 years (2000-2005). Other clusters have also been developed in the area (e.g. energy and biotechnology) that, according to the researchers, developed around and centred on MIT alumni companies.

However, the MIT study stressed that the achievements of the entrepreneurs/alumni that affect the economy cannot be directly linked to the learning experience in MIT (i.e., causality was very challenging to prove). It was stressed that other factors, such as attending other high-profile institutions before studying at MIT, had probably also supported MIT alumni to launch sustainable and high-calibre firms.

[119] Shinde V. and Kolmos An.: Students' experience of Aalborg PBL model - A case study. Paper presented at SEFI annual conference 2011, Lisbon, Portugal.

[120] Massachusetts Institute of Technology and Kauffman Foundation of Entrepreneurship (2009) Entrepreneurial Impact: The Role of MIT

The box below summarises the main dimension of the impact of MIT alumni entrepreneurs and their companies.

Eight key facts about MIT alumni entrepreneurs and their companies

1. The **annual revenues** (estimated $2 trillion[121]) and **employment footprint** (estimated 3.3 million employees) of the MIT alumni-founded firms were the equivalent of the 11th largest economy in the world[122];
2. **New company formation by MIT alumni is accelerating.** Among the alumni group reached, alumni from recent years (1990's) started companies at a younger age and closer to their graduation year than 'older' alumni (1950's);
3. Recent MIT alumni were more often **'serial' entrepreneurs'** than alumni from earlier years (reflecting a general trend towards shorter longevity of businesses);
4. The **economic impact per graduate** was higher for 1990's alumni than for alumni from earlier decades (reflecting the economic prosperity of the decade);[123]
5. The impact of MIT alumni goes **beyond the US.** The majority of the MIT alumni firms were founded in the US, but not only: for example, 790 MIT alumni firms have been created in Europe, mainly in England, France and Germany in the software and consulting sectors.
6. MIT alumni companies could be found in a **wide range of sectors, including highly active and innovative sectors** such as software, electronics (including instruments, semiconductors, and computers) and biotechnology, as well as sectors that are not the most 'active' in the US economy. About one third of employees in MIT alumni founded firms were in manufacturing, whilst in the USA, manufacturing firms employ less than 11% of total employment.
7. MIT alumni's companies are **highly innovative and export-oriented.** Many of the MIT alumni companies were knowledge-based, as they operate in sectors where patents and research are important. These companies were more likely to hold at least one patent and were more export-oriented than other companies. Therefore, they were considered more likely to have long-term economic growth than companies in other sectors/industries.
8. MIT alumni company sales constituted a quarter **of the sales of all companies in Massachusetts.**

[121] EUR 1.52 trillion at the time the case study was written. This is a conservative estimate as very strict selection criteria were applied – the founders had to be alive, and companies were excluded if they had merged or were acquired. Based on this strict selection, companies like Hewlett-Packard, Campbell Soup, Intel and AMP were excluded.

[122] As in 2006, year of measurement, (when the records on the companies were updated using Compustat and Dun & Bradstreet).

[123] Those who have founded more than one company. To be included in the sample, all of the companies had to be active when the survey took place.

5 The impact of individual entrepreneurship education measures and initiatives

5.1 Introduction

The previous two sections presented evidence on the impact of entrepreneurship education policy strategies and measures taken at the institutional level. This section considers the impact of entrepreneurship education practice – hence individual courses, measures and initiatives of entrepreneurship education identified during the study.

Similar to the previous sections, this section considers the objectives and inputs/activities of the measures and initiatives and presents evidence of their impact on: students, the economy; and, society.

Individual entrepreneurship education measures and initiatives

Entrepreneurship education practice can take several forms of delivery which include:

- ➔ business master studies;
- ➔ curricular modules, courses or projects; (at all levels of formal education);
- ➔ extracurricular courses or projects (at all levels of formal and non-formal education);
- ➔ creativity classes on diverse topics; and
- ➔ variants in teaching methods.

Working methods from entrepreneurship education are applied in various subjects; the approach is not at all limited to business subjects. For the student, creativity courses and variants in teaching methods especially might not even be evidently 'entrepreneurship education'.

This section presents evidence from 29 different studies, academic articles and other types of sources (see overview in Annex 3). This includes evidence gathered in the case studies undertaken for this study.[124] One case study was undertaken on JA-YE, a provider of entrepreneurship education with 39 national and regional Member organisations in Europe and a strong representation in the USA and Canada.

The JA-YE case study provided many relevant examples of impact measurement carried out across Europe and is therefore referred to extensively.

[124] The case studies are available as a separate document.

The main impacts of individual entrepreneurship education measures and initiatives

Impact on students

Impact on the individual students' entrepreneurial skills and attitudes is one of the best researched aspects of impact of entrepreneurship education. Many studies provided evidence of impact on the individual:

- ➔ **Entrepreneurship education leads to enhanced entrepreneurial skills:** Entrepreneurship programmes in Swiss VET schools were found to have a positive impact on students' entrepreneurial skills such as the capacity to exploit an opportunity and develop business ideas, persuasiveness and leadership, team work, persistence, self-organisation, delegation of tasks, meeting deadlines and problem-solving.
- ➔ **Entrepreneurship education helps to boost entrepreneurial attitudes and intentions:** The study 'Business skills. A survey of JA-YE Participants' found that almost one third (27%) of respondents claimed the programme made them change their plans for the future. Amongst those 27% about half of the students anticipated taking a different career path from what they thought before the course, 25% had become interested in/eager to launch their own business later, about 10% had a clearer view about the type of profession they wanted to follow and another 15% stated they would pursue a career in business.
- ➔ **Entrepreneurship helps to boost career ambitions in general:** Alumni from entrepreneurship programmes were more ambitious regarding occupations and Higher Education attendance than students in a control group, and were also more likely to take initiative and to take up leadership roles. Participation in the programme changed their career aspirations, impacted positively on taking up further education and boasted higher ambitions for jobs and/or entrepreneurial intentions.

Pedagogic elements such as simulation and project-based learning were assessed very positively by teachers, volunteers and staff members. Students in JA-YE programmes considered simulation to be the most important learning element in understanding core economic concepts.

Impact on the economy and society

Evidence of impact on the economy and society was identified through enhanced employability of entrepreneurship education alumni. This is particularly well-documented for alumni of the company programme of Junior Achievement Sweden. Students who ran a training company between 1994-1996 became much better established on the labour market than a control group:

- ➔ 12% of alumni have a higher annual income;
- ➔ 44% more alumni are in managerial positions;
- ➔ alumni have a 20% less likelihood of being unemployed;
- ➔ alumni have a 20% increased likelihood of becoming self-employed.

Participation in entrepreneurship education also has a positive impact on company founding activity. Overall, studies show that participants create more start-ups and ventures than control groups:

- ➔ For instance, according to a study on the impact of entrepreneurship education programmes in higher education in the US, graduates who have taken entrepreneurship courses are about five times more likely to select

careers in entrepreneurship than non-participants (43% participants against 6-10% non-participants).

Entrepreneurship courses also offer a high return-on-investment: A Canadian study measured a 45:1 annual return on 'societal prosperity' per dollar invested.

5.2 The objectives of individual entrepreneurship education measures

5.2.1 Objectives seeking impact on the individual student

Individual measures and initiatives of entrepreneurship education can be seen as educational practice targeting the knowledge, skills and attitudes of the individual. In contrast to strategies and institutional changes, they seek to achieve impact mainly on the student and his or her knowledge, skills and attitudes.[125] Hence this section focuses on presenting evidence of impact on this level.

The entrepreneurship education courses and modules investigated through the research collected for this study expect:

- ➔ **To teach knowledge about entrepreneurship: Learning to understand entrepreneurship** (This covers knowledge of the workings of the economy, background knowledge on the world of work, ethical aspects, business plan, accounting and marketing processes). Several examples from the Higher Education sector target the knowledge of entrepreneurship. For example, Business Master studies and business modules on entrepreneurship (e.g. the Economy and Management Course offered by the Università Bocconi di Milano (IT), or elective modules on entrepreneurship available to Science and Engineering Students at the University of Grenoble (FR)).
- ➔ **To enhance participants' entrepreneurial skills: Learning to become an entrepreneur** This covers planning, organisation, management, analysis, communication, negotiation, working individually and in teams, risk assessment, connecting ideas, mobilising commitment and lateral thinking. This type of approach is chosen by programmes and modules that promote an awareness of self-employment as a career option and motivate young people to begin equipping themselves with the skills, knowledge and experience required for effective business ownership. Widespread examples are the Junior Achievement – Young Enterprise (JA-YE) Company Programme[126] and business plan competitions; e.g. as offered by the Network for Teaching Entrepreneurship (NFTE).[127]

JA-YE Company Programmes and NFTE business plan competitions

A very popular way of delivering entrepreneurship education are the Company Programme offered by the worldwide network of Junior achievement – Young Enterprise (JA-YE); and the business plan competition model offered by NFTE organisations worldwide. These initiatives lead students through the entire process of developing a business idea, developing a business plan, setting up

[125] Cf.: Framework Contract No EAC 19/06 Order 129: Mapping of teachers' preparation for entrepreneurship education. Final Report by GHK for DG EDUCATION AND CULTURE, 2011. P 6-7. Available online: http://ec.europa.eu/education/more-information/doc/2011/mappingsum_en.pdf

[126] http://ja-ye.org/about-ja-ye-europe

[127] http://www.nfte.be/index.php?id=24&L=2, https://www.nfte.com/

the company, offering their services and selling their products, doing budgets and bookkeeping and closing it down (or transferring it to a real-life venture). The programmes often run over an entire school year.

Volunteers from local businesses take part as mentors or experts and share their expertise in the classrooms. At the end of the course, the students can take part in a series of business plan competitions (competition among their peers, regional competition, and national competition).

In some countries this type of education has a long tradition. For instance, in the UK, the US and Canada JA-YE and NFTE programmes have been implemented for many years and have reached a large number of students (e.g. Young Enterprise UK: 3.8 million people from 4 to 25 years-old in the last 50 years; JA-YE Canada: around 2.5 million over a period of 50 years).

In the Nordic countries, the penetration rate is high – for instance, in Sweden and Norway, up to 20% of schools and student cohorts participate in a JA-YE programme per year.[128]

- ➔ **To promote participants entrepreneurial attitudes and behaviour: and learning to become entrepreneurial in a broad sense** (i.e. sense of initiative, independence, innovation, creativity, ambition and drive, self-efficacy, pro-activity, sense of empowerment and determination to meet objectives). Examples for this are creativity classes (e.g. as offered by the UK provider Creativity, Culture and Education (CCE)[129]) which aim at enhancing self-efficacy and empowerment, increasing confidence and self-esteem of children. Similarly, this change is achieved through using participatory teaching methods and learning in 'real-life' situations. This is regarded as conducive to stimulate 'deep level learning'; which in turn is deemed a pre-condition for behavioural or attitudinal change that affects the entire personality of an individual.[130]

5.2.2 Objectives seeking impact on economy and society

Indirectly – through the individual trained and prepared for entrepreneurship – measures and initiatives of entrepreneurship education also seek to impact on the economy and the society.

Many initiatives explicitly formulate the expectation that the training provided will eventually have an impact on the economy and society as well. They argue that entrepreneurship education courses and modules will help:

- ➔ **to raise start-up rates and help create successful ventures:** Teaching entrepreneurship aims to help in raising start-up rates. Moreover, thorough training of future or budding entrepreneurs should help to avoid failure and increase the longevity of companies.
- ➔ **to enhance the employability of participants:** There are initiatives that work with a broader concept of entrepreneurship and which include employability in their goals. For instance, JA-YE Europe states that it 'aims to inspire and prepare young people to succeed in a global economy'.[131]
- ➔ **to increase economic and social impact:** The JADE student network[132] aims to help students in developing technical and interpersonal skills for

[128] As stated in interviews with ICF.

[129] Creativity, Culture and Education. http://www.creativityculturee education.org/http://www.creativityculturee education.org/

[130] Ferre Laevers, University of Leuven, as stated in interview with ICF.

[131] http://ja-ye.org/about-ja-ye-europe

[132] http://www.jadenet.org/, http://www.jadenet.org/

entrepreneurship and to practice corporate social responsibility. This is expected to impact on the productivity of the workforce and to have a positive impact on the business world. NFTE supports social inclusion by specifically addressing youth from disadvantaged neighbourhoods or unemployed young people; aiming to support them in finding their paths to better personal economic and social circumstances through entrepreneurship.

5.3 Impact on the individual student

This sub-section summarise evidence of impact on students' entrepreneurial skills, attitudes, behaviour and intentions to start a company. It also gives examples of the importance of appropriate teaching methods.

5.3.1 Participation in entrepreneurship education facilitates the development of entrepreneurial skills

Evidence was drawn from several studies conducted by members of the JA-YE network that the company programme contributes to enhancing the level of economic and business knowledge of participants:

- ➔ The Canadian study 'Making an impact'[133] highlighted that more than 80% of the alumni regarded Junior Achievement Canada as important in developing their analytical capabilities and business sense; and more than 70% cited Junior Achievement as significantly impacting on the advancement of their skills in financial literacy and budgeting;
- ➔ The same study also measured students' skills development, especially 'how to manage money'. Students also indicated that overall they felt better prepared for the future;
  - They achieved a more thorough understanding of and insight in certain business, financial and economic topics (namely, marketing and market economy) and what is needed to start a company. Students also indicated that they better understood the importance of certain aspects of business life (e.g. strategy and leadership) and the attitudes needed (e.g. perseverance and being responsible);
  - Around two thirds (between 57% and 68%, depending on the country) of students agreed/strongly agreed that their participation in Junior Achievement programmes contributed to the development of their business and life skills.
  - Students' test scores seemed to be linked to their level of agreement with the statement 'Participation in Junior Achievement Programmes has given me a very good insight into what business is all about' (68% average agreement).
- ➔ Similarly, through tests, the transnational study 'Financial literacy. A survey of JA-YE participants'[134] found that among the respondents to the survey (2,943 secondary school students in 12 countries across Europe which participated in programmes of the national JA-YE network members):
  - 70.5% of the students understand the key influence of education and skills on their future income;
  - 74.5% found it easy to understand basic money management (budgeting to save a certain amount of money);

[133] The Boston Consulting Group (2011) 'Making an impact'. Assessing Junior Achievement of Canada's valued creation" The Boston Consulting Group (2011)

[134] JA-YE Europe (2010): Financial literacy. A survey of JA-YE participants

- Between 62% and 71% of students agreed/strongly agreed with the statements, participation 'has given me a very good insight into what business is all about'; 'taught me very well how to manage my money'; 'has improved considerably my problem-solving capacities'; and 'helped me to prepare for the future'. The most frequently mentioned learning effect was 'how to manage money'.

➔ The Italian study 'Youth, economy and entrepreneurial spirit'[135] found that 83% of participants considered that the entrepreneurship programme contributed to develop team working skills.

➔ The UK study 'Impact. 50 Years of Young Enterprise'[136] reported that alumni claimed the courses of Young Enterprise UK improved their ability to achieve objectives, cope with problems, deal with change, do business planning, start up a company, build business relationships and networks, innovate, spot opportunities and evaluate ideas.

➔ A cross country study in six European countries that compared experiences from participation in the national JA-YE Company Programmes[137] highlighted that:

- The majority of respondents found the Company Programme useful with regard to the development of entrepreneurial skills;
- 70 % of respondents stated that the Company Programme had strengthened their team work skills;
- Two thirds of respondents claimed that their problem-solving skills were increased;
- Half (52%) of respondents believed that their decision-making abilities had improved;
- Two thirds of respondents stated that the Company Programme had strengthened their ability in economic thinking;
- More than half (55%) felt that their qualification to run a business had improved.

Similar courses from other providers were found to have similar effects:

➔ A Swiss study[138] showed that entrepreneurship programmes in upper secondary education have a positive impact on students' entrepreneurial competencies such as the capacity to exploit an opportunity and develop business ideas, persuasiveness or leadership, team work, persistence, self-organisation, delegation of tasks, meet deadlines and to deal with problems and find solutions.

➔ A US–study[139] tested the effect of entrepreneurial training on a persons' ability to generate business ideas and provided evidence that the right training can indeed lead to the enhanced opportunity identification and the development of innovative business ideas.

[135] IARD (2007) Giovani, economia e spirito imprenditoriale

[136] Kinston University London / Young Enterprise UK (2012) Impact - 50 years of Young Enterprise

[137] JA-YE (2007) "What experience did participants in Company Programmes have during their time as company founders – and what happened next?"

[138] Volery et al. (2013); The impact of entrepreneurship education on human capital at upper-secondary level; Journal of Small Business Management 51 (3), pp. 429-0; doi: 10.1111/jsbm.12020

[139] DeTienne, D.R., and Chandler, G.N. (2004) - Opportunity Identification and Its Role in the Entrepreneurial Classroom: A Pedagogical Approach and Empirical Test. '

➔ The Dutch study 'The effect of early entrepreneurship education'[140] examined the effect of entrepreneurship education on primary school pupils' skills and attitudes. The study measured improvements of pupils regarding self-efficiency, need for achievement, risk taking, persistence, analysing, pro-activity, creativity and found a significant positive effect especially on non-cognitive entrepreneurial skills of primary school children.

Developing entrepreneurial skills at primary level as a basis for life

The Dutch study 'The effect of early entrepreneurship education'[141] concluded that the development of entrepreneurial skills and attitudes at early stages of life would be a significant influence on subsequent entrepreneurial behaviour in later life. Though this contention remains a hypothesis since the behaviour of participants has not yet been traced over a sufficiently long period.

5.3.2 Participation in entrepreneurship education has a positive impact on educational attainment and grades

➔ The study 'The effects of education and training in entrepreneurship'[142] conducted by Young Enterprise Sweden[143] found that a higher percentage of programme alumni started university level programmes compared to the control group. Participation in the programme changed their career aspirations, impacted positively on taking up further education and boasted higher ambitions for jobs.

➔ The project 'Inventing the Future' at Harvard University collected and analysed data on programmes provided by the National Foundation for Teaching Entrepreneurship (NFTE).[144] It was found that students who participated in a NFTE programme are likely to be more ambitious regarding occupations and college attendance than students in a control group, and were also more likely to take initiative and take up leadership roles.

➔ 99.3% of NFTE alumni over the age of 25 who were taking part in another US study have a minimum of a high school diploma; which is above the national average of 85% of Americans over the age of 25 with a minimum high school diploma. When looking at the group of NFTE alumni who are African American and over the age of 25, the ratio is even better for NFTE alumni: (98.2 vs. 81.4%).[145]

➔ The same study shows that the drop-out rate for NFTE alumni in the age group of 16–19 year-olds is less than the national average (1% NFTE alumni versus 3.4% national average). Hence, the courses seem to correlate positively with students' motivation to stay in education. This tendency is particularly strong for the group of male African-American students in that age group: Among those high school students that participated in a NFTE

[140] Rosendahl Huber, L. et al. (2012) The effect of early entrepreneurship education

[141] ibid

[142] The effects of education and training in entrepreneurship – A long-term study of JA Sweden Alumni labour potential and business enterprise.

[143] Please note: While the official name of the organisation is 'Young Enterprise Sweden', the report 'The Effects of Education and Training in Entrepreneurship' refers to Junior Achievement (JA) Sweden.

[144] Nakkula et al. (2004): Initiating, leading and feeling in control of one's fate: Findings from the 2002-2003 study of NFTE in six Boston Public High Schools. Harvard University. Graduate School of Education

[145] Beary, Vanessa E. (2013): The NFTE Difference: Examining the Impact of Entrepreneurship Education.

course, the dropout rate is 0%, while the national average for African-American students is 5% (both sexes combined).[146]

➔ The UK provider Creativity, Culture and Education CCE conducted a study which found that young people who have attended Creative Partnerships activities have better grades than their peers: On average, they achieve the equivalent of 2.5 grades better progress in primary and secondary education final exams.[147]

5.3.3 Participation in entrepreneurship education courses and modules can lead to behavioural and attitudinal change

Behavioural and attitudinal changes of students following an entrepreneurship course belong to the most widely researched phenomena in the field. Many of the research examples identified address this question.

As stated in previous sections, researchers often link 'entrepreneurial attitudes' to concepts from social learning theory. These lend themselves well to be used in measuring exercises since they can be used to scale the extent or strength of a persons' belief about whether or not it lies in his/her own control and ability to complete tasks and reach goals. One of these concepts is 'self-efficacy' (Bandura 1997, cf. section 3) another one is 'locus of control' (Rotter 1954); hence the extent to which individuals believe in their own ability to change things, and control events affecting them. This can increase students' ambitions.

Through research for this study, many examples from the domain of academic research were identified which aim to develop these concepts further and provide evidence that self-efficacy or locus of control of students improves through entrepreneurship education.

➔ The Swiss study 'The Impact of Entrepreneurship Education on Human Capital at Upper-Secondary Level'[148] showed that entrepreneurship programmes have a statistically significant effect on attitude and beliefs towards entrepreneurship. Students attending the programmes improved their knowledge and views about the business world in general and were found more likely to consider entrepreneurship as a valid career option (perceived desirability). They also tend to feel more capable to start and run a company (perceived feasibility).

➔ The Italian study 'Economic and managerial training and provision psycho-cognitive entrepreneurial behavior'[149] showed that interviewees who attended economics-management studies showed higher average scores in general enterprising tendency (GET2)[150] and self-efficacy perception. Moreover, it was found that education, thanks to the simultaneous impact on knowledge and attitudes, is the most efficient variable in the stimulation of the entrepreneurial phenomenon – more important than having entrepreneurs in the family.

➔ The study 'Business skills. A survey of JA-YE Participants'[151] found that 27% of students participating in JA-YE courses changes their career plans for the future. 40% of those are now sure they aim at higher education studies, and

[146] ibid

[147] http://www.creativityculturereducation.org/the-evidence

[148] Volery et al. (2013); The impact of entrepreneurship education on human capital at upper-secondary level; Journal of Small Business Management 51 (3), pp. 429-0; doi: 10.1111/jsbm.12020

[149] Gigliotti, F.M. (2011) Formazione economico-manageriale e disposizione psico-cognitiva al comportamento imprenditoriale: uno studio empirico

[150] http://www.get2test.net/ http://www.get2test.net/

[151] JA-YE Europe (2010) Business skills. A survey of JA-YE participants

one third of this 40% intends to study business or economics at a university or other higher education institutions.

A few studies look at impacts from a gender-specific perspective:

- ➔ A study on gender effects from Israel[152] provided evidence that among secondary students, boys benefited from the entrepreneurship training (company programme) much more than girls: their entrepreneurial self-efficacy grew stronger, while that of the girls diminished. Also, boys' entrepreneurial knowledge gain was higher than that of the girls, compared to respective gender differences within the control group. The researchers attributed this effect to boys' and girls' perception of what it means to be competitive. While girls were reluctant to compete, boys enjoyed it.
- ➔ A Norwegian study[153] also indicated that the JA-YE Norway company programme has more impact on the male start-up activity as compared to women.
- ➔ On the other hand, the 2012 FFE-YE study from Denmark showed that, encouraged by the programmes, girls can catch up quickly: While they perceived barriers like 'entrepreneurship takes too much effort', 'the risk of failure is too high' and 'the financial risk is too high' stronger than boys before the programme, their entrepreneurial skills and intentions grew comparatively more than for boys.[154]

The intensity of changes however depends to a certain extent on students' own activity and compliance:

- ➔ The study 'Making ideas work' conducted in Liechtenstein[155] examined the effect of the Junior Enterprise company programme on the ability of VET students to think and act entrepreneurially. The results showed that a competence development during the junior enterprise or junior projects (about 6 months), takes place which is expressed in an increase in the activity and action competence. On average, among the surveyed adolescents (16-19 years) this competence shift was moderate. But when focusing on the young people who have voluntarily assumed a leadership role, the development of activity and action skills is much higher. In short: those who lead, learn.

5.3.4 Participation in entrepreneurship education courses and modules increases the intention to start a business

The question if entrepreneurship education courses and modules lead to raised awareness about entrepreneurship, interest in entrepreneurship, and ultimately in an intention to found a company was in the focus of many studies that were identified through this mapping exercise. Evidence that this is indeed the case could be found in several examples.

- ➔ The evaluation of the JA-YE Company Programme in compulsory education in Sogn og Fjordane County (Norway)[156] addressed primary as well as secondary students. In this case, 15.7% of the participating students in primary school state that they have the intention to establish business when they have graduated and, out of these, 44.4% want to establish business in

[152] Bergman, N., Rosenblatt, Z. Erez, M. and De-Haan, U. (2011) - Gender and the effects of an entrepreneurship training program on entrepreneurial self-efficacy and entrepreneurial knowledge gain in Journal Entrepreneurship and Small Business Vol. 13 No. 1 38-54/ 2011

[153] Johansen, V. (2013) - Entrepreneurship education and start-up activity: a gender perspective

[154] Young Enterprise Denmark (2013) Impact of Entrepreneurship Education in Denmark 2012

[155] Baldegger, U. et al. (2012) „Wie Ideen laufen lernen"

[156] Rotefoss, B., Ovesen, S., Nyvold, C.E. (2009) Entreprenørskap på høygir! - en evaluering av satsningen på entreprenørskap i grunnopplæringen i Sogn og Fjordane

the county. Corresponding figures for students in secondary education are respectively 14.8% and 43.3% - hence a little lower.

- ➔ A comparative academic study conducted in the UK and France[157] found that students in the 'programme' group increased their intention towards self-employment, whereas students in the control group did not. However, results showed that intention towards self-employment was not related to actual nascence of a firm at the end of the programme. This could be attributed to the time lag between intention towards entrepreneurship and action. The same study further analysed that
  - Even if they were not decisive for a start-up decision, entrepreneurship programmes can have a triggering effect or contribute to the process of reflection. They allowed to confront pre-established ideas with the reality; and to assess the feasibility of the project. They also equipped participants with specific knowledge and skills.
  - The programmes were also found to have a positive effect on the professional career of those that do not have the intentions to engage in entrepreneurial activities: they acquire knowledge on project management and are more open to the professional and entrepreneurial world.
- ➔ The academic study 'Entrepreneurship in Israel: Theory and Practice'[158] showed that the willingness of MBA students' to engage in entrepreneurship rose significantly after taking part in an elective entrepreneurship course. Students in the sample also indicated that experience in entrepreneurship would potentially increase their future engagement in entrepreneurship. The researchers found it particularly notable that participation in just one entrepreneurship course had such a significant impact on students' perception of entrepreneurship and personal intentions.
- ➔ The transnational study 'Business skills. A survey of JA-YE Participants'[159] found that almost one third (27%) of respondents (across the 15 countries involved) claimed the programme made them change their plans for the future. From those 27%: About half of the students anticipated to take a different career path as they thought before the course, 25% had become interested in/eager to launch their own business later, about 10% had a clearer view about the type of profession they wanted to follow and another 15% stated they would pursue a career in business.

5.3.5 The importance of teaching methods

Since entrepreneurship is regarded as a key competence, the learning outcomes of entrepreneurship education also contain an important set of entrepreneurial attitudes (sense of initiative, independence, innovation, creativity, ambition and drive, self-efficacy, pro-activity, sense of empowerment, determination to meet objectives and others).[160] To nurture such attitudes, it is important to use suitable teaching methods which vary from classical instructor-oriented teaching. Variants are presented in the box below.

[157] Souitaris et al. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. Journal of Business Venturing 22 (2007) 566–591'

[158] Almor, T., Heilbrunn, S. (2013) - Entrepreneurship in Israel: Theory and Practice

[159] JA-YE Europe (2010) Business skills. A survey of JA-YE participants

[160] Seikkula-Leino, J. (2007)), "Curriculum reform and entrepreneurship education", Opetusministeriön julkaisuja 2007:28. Yliopistopaino, Helsinki

Examples of variants in teaching methods

Several pedagogical methods are particularly popular in entrepreneurship education. These include:

- ➔ Participatory methods: Group and peer work, project work or twin classes, role play;
- ➔ Learning by doing and self-organised learning: Co-operative learning, problem-based learning, real world simulation and creative problem solving techniques;
- ➔ Learning outside of the classroom: Study tours and field visits;
- ➔ Bringing the real world into the classroom: Inviting visitors to school;
- ➔ Helping students to unlock their creative and innovative potential.

Evidence that this is indeed the case was provided by several studies.

- ➔ The Swedish study 'Developing entrepreneurial competencies'[161] adopted the view that becoming entrepreneurial requires direct experience, and explores how learning-by-doing can be put to use in Higher Education through action-based approaches (learning by doing). By measuring the effect of action-based entrepreneurial education in incubators at Chalmers School of Entrepreneurship, it proves that the on-going creation of a real-life venture should be the primary learning method for entrepreneurship; as learners become more entrepreneurial through experiencing emotional events throughout the learning experience.
- ➔ The 2012 measurement of the FFE-YE study from Denmark[162] showed that in primary and lower secondary school, entrepreneurship is best taught as a method, hence as innovative teaching in general. As of upper secondary level, it is best taught as an occupation, hence concretely in relation to being and acting entrepreneurial. However, the highest impact is achieved in upper levels of education (including Higher Education), if both aspects – method and occupation - are combined.
- ➔ The evaluation of the Junior Achievement 'Titan Program' in the USA[163] brought to light that particular pedagogic elements of the programme (such as simulation, project-based learning etc.) were assessed very positively by teachers, volunteers and staff members. Students identified simulation as the most important learning element in understanding core economic concepts.
- ➔ In the literature[164], an effect on students' entrepreneurial attitudes and behaviour was assumed by solely using varying innovative teaching methods – even if the teaching content is not related to entrepreneurship.
- ➔ Evidence for this can be also drawn from the evaluation of an arts and cultural activities project,[165] which proved impact on children in foster homes. Four elements of the project were hypothesized – attractive arts activities taught by a skilled artist, the involvement of foster carers and siblings in activities, and targeted planning and design - would, through a

[161] Martin Lakéus (2013) Developing entrepreneurial competencies

[162] Young Enterprise Denmark (2013) - Impact of Entrepreneurship Education in Denmark 2012

[163] Junior Achievement Titan Program; 2007 Evaluation

[164] Seikkula-Leino J., Ruskovaara, E., Ikävalko M., Mattila, J. and Rytkölä, T. (2009), "Teachers as Learners Promoting Entreprenuership Education", Paper submitted to the 20th Biannual NFF Conference "Business as Usual" Turku/Åbo, Finland, August 19-21, 2009, URL: http://developmentcentre.lut.fi/files/muut/NFF_2009.pdf

[165] OPM (2013) - Evaluation of CCE/NCB arts and cultural activities project with looked after children

series of change mechanisms, result in increased self-efficacy and empowerment; increased confidence and self-esteem:

- In general the evidence indicates that the arts and cultural activities resulted in a marked improvement in the self-efficacy and empowerment of many of the children involved. After the project, scores went up by 0.4 points on a 0-5 point scale for 'mastering new skills' and by 0.3 points for 'belief in abilities').
- Similarly, the project resulted in an increase in the confidence and self-esteem of many of the children (scores on a scale of 0-5 points went up by 0.8 points for positive self-image, by 0.3 points for confidence and by 0.7 points for 'deals well with set-backs').

5.4 Impact on economy and society

Entrepreneurship education seems to be effective in leading participants to create ventures at higher rates compared to control groups. Evidence was found in many cases that modules and initiatives help to raise start-up rates.

5.4.1 Raising start-up rates and helping creating successful ventures

The impact of entrepreneurship courses on start-up activities among alumni has been shown in many cases. Evidence shows a trend that entrepreneurship alumni

- ➔ Are more likely to start a business than other graduates;
- ➔ Found their company at a younger age; and
- ➔ Are more successful with their business.

- ➔ Already in 1997, a Norwegian study[166] confirmed that graduates from business schools with a major in entrepreneurship are about three times as likely as other graduates to start a business. The effect of having a major in entrepreneurship seems to be weaker in most recent surveys undertaken by the same team (2001 and 2003), but entrepreneurship majors remain more than twice as likely to start and own a business than graduates with other majors.[167]
- ➔ According to the Swedish study 'The effects of education and training in entrepreneurship'[168] participation in the JA company programme increased the probability that an individual starts a firm later in life by at least 20%;
- ➔ According to a study on the impact of entrepreneurship education programmes in higher education in the US,[169] graduates who have taken entrepreneurial courses were about five times more likely to select careers in entrepreneurship than non-participants (43% participants against 6-10% non-participants).

[166] Kolvereid, L. and Moen, Ø. (1997), 'Entrepreneurship among business graduates: does a major in entrepreneurshipmake a difference?', Journal of European Industrial Training, 21 (4/5), 154–60.

[167] Kolvereid,L. and Bjørn Willy Åmo (2007): Entrepreneurship among graduates from business schools: a Norwegian case. In: Handbook of Research in Entrepreneurship Education, Volume 2: Contextual Perspectives. Edited by Alain Fayolle, University of Lyon.

[168] Wennberg, K., Elert, N. (2012) - Effekter av utbildning i entreprenörskap

[169] Summit Consulting (2009) Toward Effective Education of Innovative Entrepreneurs in Small Business: Initial Results from a Survey of College Students and Graduates. Washington, DC: Small Business Administration Office of Advocacy

- ➔ The study 'Making an impact. Assessing Junior Achievement of Canada's value creation'[170] found that JA alumni are 50% more likely to start their own business. Moreover, JA alumni firms usually had higher longevity than the average Canadian new venture;
- ➔ According to the study 'Impact. 50 Years of Young Enterprise'[171], more Young Enterprise alumni end up running their own business: 42% of alumni surveyed started firms compared to 26% in the control group of non-alumni.
- ➔ The study 'Experiences from participation in JA-YE Company Programmes: What experience did participants in Company Programmes have during their time as company founders – and what happened next?'[172] assessed the results of the JA-YE Company Programme in Belgium, Denmark, Estonia, Finland, Romania, Norway and Slovak Republic. By the time they are 25 years old, JA-YE Company Programme alumni demonstrate start-up rates which are about three times as high (15%) than among the average population in Europe (5-6%).
- ➔ The Norwegian study 'Entrepreneurship education and start-up activity: a gender perspective'[173] evaluated whether former participants in the company programme (CP) in upper secondary school are more likely to be involved in start-up activity compared to non-participants. Results from econometric analyses indicate a positive correlation between participation in CP and start-up activity. The analyses also indicate that CP has more impact on male start-up activity as compared to women.
- ➔ The measurement of the Enterprise Ireland National Student Enterprise Scheme (1984-1988)[174] showed that the participants to the courses had started their businesses at a younger age than those in the control group, were employing a greater number of people and had substantially higher turnover.
- ➔ Young Enterprise Sweden Alumni were much more likely to start more ambitious firms (interpreted as corporations versus proprietorships or partnerships). The rate of those starting a corporation differs significantly between Young Enterprise Sweden Alumni and the control group: male Young Enterprise Sweden Alumni are 60% more likely than the males of the control group to engage in entrepreneurship by starting a corporate firm; female Young Enterprise Sweden Alumni are 80% more likely than the females of the control group.[175]
- ➔ The Charney/Libecap study[176] showed that graduates of the entrepreneurship programme at the Arizona University were three times more likely to get involved in creating new business ventures than their non-entrepreneurship course peers.
- ➔ The comparative study 'Impact of Entrepreneurship Education'[177] showed that the entrepreneurship/venture creation courses had a positive impact

[170] The Boston Consulting Group (2011) Making an Impact. Assessing Junior Achievement of Canada's Value Creation

[171] Kingston University London / Young Enterprise UK (2012) Impact - 50 years of Young Enterprise

[172] Experiences from participation in JA-YE Company Programmes. What experience did participants in Company Programmes have during their time as company founders – and what happened next? (2007)

[173] Johansen, V. (2013) - Entrepreneurship education and start-up activity: a gender perspective

[174] Fleming, P. (1996) Entrepreneurship education in Ireland: a longitudinal study in academy of entrepreneurship journal: European Edns, 2(1). 94-118.

[175] Wennberg, K., Elert, N. (2012) - Effekter av utbildning i entreprenörskap

[176] Charney, A,,; Libercap G.D. (2000): Impact of entrepreneurship education. 2000. Eller College of Business and Public Administration, University of Arizona. USA

[177] Lee et al. (2005) Impact of Entrepreneurship Education: A Comparative Study of the U.S. and Korea. International Entrepreneurship and Management Journal 1, 27-43, 2005

both on Korean and US students, compared to control groups. The study demonstrated statistically significant differences between target and control groups in both countries. The results imply that the cultural context plays a role: American students start from a different level: they are already inclined in creating a venture, have higher self-confidence and recognise the importance of entrepreneurship education. The Korean students, although starting from lower levels of knowledge, intention etc. reached the level of US students after entrepreneurship education.

➔ Results imply that the impact of entrepreneurship courses will be greater in countries with an emerging entrepreneurship culture (Korea) than in countries with a strong entrepreneurship culture (USA).

Two studies suggested that the effect of entrepreneurship education is enhanced if students are additionally active in voluntary, non-curricular activities related to entrepreneurship, such as entrepreneurship clubs and networks:

➔ A study discussing the 'Effects and impact of entrepreneurship programmes in Higher Education' (JADE career survey)[178] from the European Confederation of Junior Enterprises (JADE – an international, non-profit umbrella-organisation of student enterprises across Europe; established and managed solely by students) found that the share of entrepreneurs among JADE alumni was three times higher than among Higher Education students which were not JADE members.

➔ Alumni from NFTE (Network for Teaching Entrepreneurship) participated in an average of five start-up activities in a year. For comparison, a group of university science and engineering students who also took part in a curricular entrepreneurship programme participated in an average of three start-up activities in the same time frame.[179]

5.4.2 Enhancing the employability of participants

Evidence was identified that entrepreneurship programmes impact on the employability of participants in several ways. Entrepreneurship alumni

➔ Are better prepared to find a job;

➔ Are less likely to be unemployed;

➔ Are more often self-employed;

➔ Achieve better positions; and

➔ Have a higher income.

➔ A study on the Enterprise Challenge programme in Ireland[180] found that after the programme:

- Three quarters of secondary students could correctly recognise the most appropriate behaviour for interviews;
- 87% of primary students and 65% of secondary students could correctly recognise the characteristics that employers regard as important and seek in their employees;
- 87% of primary students and 73% of secondary students understood the purpose of a CV.

[178] ibid

[179] Vanessa E. Beary (2013): The NFTE Difference: Examining the Impact of Entrepreneurship Education.

[180] Junior Achievement Ireland. Enterprise Challenge programme 2010/2011. National Evaluation Report

- ➔ A US study on alumni of the NFTE programme[181] showed that 88% of NFTE alumni between the ages of 25–40 with a high school diploma are employed (compared to 69% national average).
- ➔ From the same study it appeared that among NFTE alumni, one out of every five employed individuals is self-employed. With this, NFTE alumni outperform the U.S. self-employment rate where one out of every nine employed individuals is self-employed.[182]
- ➔ The same study provided evidence that NFTE alumni in the US have a higher income:
  - The average annual income of NFTE graduates over the age of 25 with a minimum of a high school diploma was $38,000 USD per year ($24,000 national average for the same group).
  - Male NFTE alumni over the age of 25 made $43,000 a year on average (national average of $30,600 for the same population). Female NFTE alumnae over the age of 25 made $34,000 a year (national average of $18,000 for the same population).[183]
- ➔ The Swedish long-term study 'Practice makes perfect'[184] showed that students who ran a JA training company between 1994-1996
  - were more likely to become managers: 7.4% of Young Enterprise Sweden Alumni were found to be managers 16 years after secondary school, versus 5.1% for the control group. This means that, Young Enterprise Sweden Alumni had a 44% higher probability of becoming managers than the control group;
  - were more strongly established in the labour market: In 2010, 10% of Young Enterprise Sweden alumni and 12% of the control group were "weakly established". The probability of a weak establishment was therefore 12 percentage points lower for alumni compared to the control group;
  - the mean number of days of unemployment was lower for alumni than for the control group. In 2010, the mean number of these days was 7.9 for alumni and 10.1 for the control group. It was concluded that Young Enterprise Sweden Alumni were more than 20 percentage points less likely to be unemployed than the control group.
- ➔ The Canadian study 'Making an impact'[185] finds that JA alumni were three times more likely than the control group to hold senior and middle management positions, and JA alumni are 25% less likely to be unemployed than individuals in the control group.
- ➔ The Charney/Libecap study[186] also showed that entrepreneurship graduates at the University of Arizona were more often employed full-time in high-tech industries than their peers.
- ➔ Based on a compilation of data from several studies,[187] the 2010 FFE-YE-measurement in Denmark stated that people who have been trained and

[181] ibid

[182] ibid

[183] ibid

[184] Wennberg, K. (2008): Practice Makes Perfect? A Longitudinal Investigation of Junior Achievement (JA) Sweden - Alumni and Their Entrepreneurial Careers, 1990-2007"

[185] The Boston Consulting Group (2011) Making an Impact. Assessing Junior Achievement of Canada's Value Creation

[186] Charney, A., Libecap, G.D. (2000) Impact of entrepreneurship education. Eller College of Business and Public Administration, University of Arizona. USA ibid

educated in entrepreneurship have a considerably higher income than untrained. The more training and education, the higher the income.[188]

Hence, participants to entrepreneurship courses may benefit from the training in more than one way.

Paradoxically, the high chances of entrepreneurship graduates to get into well-paid positions as employees can have a detrimental effect on foundation rates of alumni: The Swedish study 'The effects of education and training in entrepreneurship' found that entrepreneurship alumni have a higher probability of attaining a good salary and managerial position as employees, compared to the control group. They would thus have a somewhat greater motivation than the control group to terminate their (student) firms and choose a career as employees, even if their (student) firms tend to be more successful than those of the control group.

5.4.3 Enhancing protective factors against social exclusion

On the long run, impact on society could also stem from changes on attitudes and behaviour which have the potential to better protect students against social exclusion.

- ➔ Evidence from evaluation of an arts and cultural activities project in England (UK) with children at risk of social exclusion resulted in a marked improvement in the self-efficacy and empowerment of many of the children involved (see section 5.3.3). The researchers hypothesised that by enhancing self-esteem and self-efficacy of these children, who were living in foster homes at the time, the project on the long-term will contribute to social inclusion. [189]
- ➔ The evaluation of the ENTRANCE project came to similar conclusions regarding the protective effect of entrepreneurship education against social exclusion. The ENTRANCE project had a significant impact upon the affective domain of the young people involved (motivation, self-confidence and locus of control); and its effect was found to be greatest for those students most at-risk of social exclusion. Here as well, the researchers conclude the impact on entrepreneurial attitudes such as commitment, determination, creativity and planning will help young people to move away from being at risk of exclusion as these are exactly the attitudes that are needed to begin this process.[190]

Yet, both evaluations did not take on a longitudinal approach; hence this hypothesis could not be tested.

5.4.4 Global economic and social impact

Demonstrating links between an educational programme and economic or societal change is methodologically challenging. Global impact on the society and the economy was measured mostly in relation to the type of ventures created by entrepreneurship education alumni, their innovative potential and their turnover.

- ➔ The Charney/Libecap study[191] showed that graduates from the Berger Entrepreneurship Programme at the University of Arizona were significantly

[187] Charney/Libecap 2000, GEM, Young Enterprise Denmark

[188] Other factors were taken into consideration, such as gender, age, other education, and employment.

[189] ibid

[190] Peffers J., Huddleston P., Banfalvy C., Weiss Sh., Aparisi J. (2002). Enterprise and its transfer to combat social exclusion- ENTRANCE. Final Report

[191] Charney, A., Libecap, G.D. (2000) Impact of entrepreneurship education. Eller College of Business and Public Administration, University of Arizona. USA ibid

more apt to be involved in developing new products, and to have spent more time in Research and Development related activities.

- ➔ The Swedish study 'Practice makes perfect?'[192] found that the firms started by Young Enterprise Sweden Alumni led to more job creation. The mean size of firms started by alumni as sole proprietorships or partnerships was two employees, and the mean size of corporations started by Young Enterprise Sweden Alumni was nine employees. Both figures are significantly larger than the overall mean size of new firms in the Swedish economy in terms of employment. According to the results from the first four years of research, alumni-founded corporations were on average 7.5% larger in terms of job creation than the ones in the control group. The respective difference for proprietorships/partnerships was again in favour of JA alumni and reached 3.5%.
- ➔ The same study also provided evidence of higher revenues. The revenues of alumni-funded corporations were on average 20% higher than the comparable firms of the control group. The same held for proprietorships/partnership firms (6% higher for the Young Enterprise Sweden alumni). [193]
- ➔ A similar approach was taken by the study 'Impact. 50 Years of Young Enterprise' from the UK[194], which showed that the YE programmes had significant economic and societal impact.

Facts and figures from 50 years of Young Enterprise in the UK

- ➔ **YE Alumni firms have a larger turnover:** 12% of alumni firms turn over £500,000 compared 3% of the control group's firms. Three percent of Alumni firms turn over more than £1 million, compared to none in the control group.
- ➔ **YE Alumni companies employ more people:** 11% have 51-99 employees compared to 9% of the control group. Two per cent of the alumni have 100-249 employees compared to none in the control group.
- ➔ **YE Alumni firms are more innovative:** 21.2% of alumni firms were digital and 'cloud'-based firms compared to 3% of firms in the control group. Alumni firms were more diverse. Alumni firms ranged from internet sales to advanced engineering, corrosion control and 'retro' tourism. Control group firms were concentrated in fewer sectors, particularly healthcare and education.
- ➔ **YE Alumni are more likely to be serial entrepreneurs:** They are less deterred by the prospect of failing. 49.6% of alumni said boosting sales was the top priority in the downturn while only 5% opted for internal cuts.

The positive impact that entrepreneurship education can have on society was rarely explicitly measured, but rather inferred from other types of impact. For example, increased numbers of new ventures or the creation of job opportunities (which concern economic impact) can be expected to have positive effects on society too, as society benefits from lower rates of unemployment.

[192] Wennberg, K. (2008): Practice Makes Perfect? A Longitudinal Investigation of Junior Achievement (JA) Sweden - Alumni and Their Entrepreneurial Careers, 1990-2007"

[193] Wennberg, K. (2008): Practice Makes Perfect? A Longitudinal Investigation of Junior Achievement (JA) Sweden - Alumni and Their Entrepreneurial Careers, 1990-2007"

[194] OPM (2013) - Evaluation of CCE/NCB arts and cultural activities project with looked after children

Nonetheless, there have been attempts to prove direct impact on societal level.

- ➔ The study 'Making an impact'[195] found that JA Canada delivers a 45:1 annual return on 'societal prosperity' per dollar invested. Researchers estimated the Return on Investment (ROI) of each dollar that the state spent on entrepreneurship education. They took into account not only contributions of alumni/entrepreneurs, but also the costs that are avoided by the state (e.g. social assistance to unemployed), due to the positive career developments of the alumni. The estimates drew on data from national databases relevant to social policy and the labour market. They clearly demonstrated the significance of entrepreneurship education for other policy areas.
- ➔ Society also benefited from positive changes in attitudes towards interaction between communities with different backgrounds that was found in a study conducted by Junior Achievement Ireland.[196]
- ➔ The study 'Effects and impact of entrepreneurship programmes in higher education' showed that the alumni of the student entrepreneur JADE network were more often engaged in volunteer work than members of a control group. Fifty per cent of JADE alumni were engaged in this form of active citizenship, as opposed to 38% in a control group.[197]
- ➔ The same study showed that JADE alumni were also more often engaged in starting a non-commercial project or initiative (social entrepreneurship). Fifty eight per cent of JADE alumni did so, as opposed to 38% in a control group.[198]

[195] The Boston Consulting Group (2011) Making an Impact. Assessing Junior Achievement of Canada's Value Creation

[196] Junior Achievement (2013) Evaluation of KEY and LET programmes, 2012/2013.

[197] European Commission, DG ENTR (2012) Effects and impact of entrepreneurship programmes in Higher Education.

[198] Ibid, page 72

6 How can the impact of entrepreneurship education be measured?

6.1 What methods and tools can be used to measure what type of impact?

Many types of tools can be used to measure the impact of all modes of entrepreneurship education delivery. For example, a survey can be used to measure the impact of an ad hoc initiative (at any educational level), as well as the impact of a strategy. The case study evidence underlines that what mostly shapes the tools and methodology used are the goals of the measurement and the breadth of what is measured. So, the choice of tools should be adjusted to the goals of the programme/initiative, the goals of the measurement and the target group, among other factors.

The six questions below may be used as a compass when selecting the tool and deciding on its content, focus, structure of questions, length and other characteristics.

Compass for selecting research tools

- ➔ What do we want to measure (e.g. the impact of the content or of the teaching method)?
- ➔ Are we interested in collecting qualitative feedback on top of quantitative?
- ➔ Will this measurement take place again next year (i.e. will it regard the systematic measurement of a recurring programme)?
- ➔ If we are interested in assessing the effect on participants' knowledge/skills, which questions are suitable? Which are the most significant skills to check and how will we check their development due to the programme/strategy?
- ➔ Are there any existing theoretical models that could be used as inspiration/basis for our impact measurement?
- ➔ Is one type of tool sufficient to grasp the impact of the programme/initiative at all levels (if aiming at more than one levels of impact, e.g. individual and institutional)?

The analysis based on the examples collected for this study highlights that more than one questionnaire may be needed to grasp the impact of one initiative (e.g. the Misgav case study), since several of the above questions were addressed.

In the broad range of impact measurement examples reviewed, **surveys/questionnaires** were used in most cases. Surveys are flexible tools, as they can be easily constructed and adjusted to each educational programme/measure/strategy. Online surveys also allow participants to reply at a time that is convenient to them and are more cost-effective than paper questionnaires.

- ➔ The questionnaires used in the examples analysed included both closed and open-ended questions. Closed questions (i.e. where participants can choose between pre-defined choices) offer quantifiable results. These are especially useful when questionnaires are run both before and after the programme; quantifiable results allow the identification of any changes in responses that could then be attributed to the programme/measure.

The construction of questionnaires was often based on well-established and validated theoretical models/approaches. For example, the questionnaire used in the SEECEL case study was linked to Bloom's Taxonomy, as were the

entrepreneurial learning outcomes that SEECEL developed. When questionnaires aimed at measuring levels/intensity (for example, of individuals' intention to start a business), researchers often used scales (e.g. Likert-type scales- in the Misgav case study[199], in Boissin and Emin (2006)[200], in Aouni and Pirnay (2009)[201] and in Jones et al. (2008)[202]). Other types of scales were also used, which were constructed by the researchers (for example, in the case of Nakkula et al (2004)[203] that measured the impact of an entrepreneurship programme in schools in Boston). Such scales may be inspired by existing literature (for example, as in the case of DeTienne and Chandler (2004).[204]

However, open-ended questions that offer more qualitative information have also been used and found to be beneficial. They allow the grasping of participants'/stakeholders' reactions and views on the programme or the methodology/tools that were used to measure the impact (e.g. for the impact measurement of the E-Discovery Challenge in the USA).[205]

Other tools identified include:

- ➔ Interviews (with participants, educators or other stakeholders);
- ➔ Observation of participants (e.g. in the 'Développement de l'esprit d'entreprendre' (FR)[206]; the 'Enterprise and its transfer to combat social exclusion- ENTRANCE programme' (ENG, HU, IL, ES)[207], and the STEP project (BE-nl)[208]);
- ➔ Journals/diaries/portfolios (e.g. in DeTienne D.R. and Chandler G.N., 2004 and the evaluation of the ENTRANCE project)[209];
- ➔ Other methods: for example, the experimental method 'Think Aloud protocol' (in Dunchev B., 2012)[210].

In some cases, researchers combined questionnaires with other tools (e.g. qualitative interviews). Examples are the impact study launched by Young Enterprise UK, "Impact - 50 years of Young Enterprise" [211]; the measurement of

[199] Heilbrunn S. (2008) - Advancing Entrepreneurship in an Elementary School: A Case Study. See Annex 2 for more details.

[200] Boissin and Emin (2006), in Xvème Conférence Internationale de Management Stratégique, Annecy / Genève 13-16 June 2006.

[201] Aouni Z., Pirnay, F. (2009): L'Impact de l'exposition a des modeles d'emtrepreneurs sure les antecedents de l'intention entrepreneuriale.

[202] Jones et al (2008) Student attitudes towards enterprise education in Poland: a positive impact; Education +Training Vol.50 No. 7, pp.597-614.

[203] Nakkula M. et al..; Lutyens M.; Pineda C., Dray A., Gaytan F. Huguley J. (2004) Initiating, leading and feeling in control of one's fate: Findings from the 2002-2003 study of NFTE in six Boston Public High Schools. Harvard University. Graduate School of Education.

[204] DeTienne, D.R., and Chandler, G.N. (2004) Opportunity Identification and Its Role in the Entrepreneurial Classroom: A Pedagogical Approach and Empirical Test. Academy of Management Learning and Education, 2004, Vol. 3, No. 3, 242–257.

[205] Hustedde. R.J.,. and Denham. M. (2013) E-Discovery Challenge. More information on the programme on: http://www.uky.edu/Ag/CLD/KECI/edisc/

[206] http://www.experimentation.jeunes.gouv.fr/IMG/pdf/FEJ_Esprit_d_entreprendre___Rapport_d_evaluation_CREDOC_FINAL.pdf

[207] http://ec.europa.eu/research/social-sciences/pdf/finalreport/soe2ct983068-final-report.pdf

[208] Laurynenko, D.,. and Vanderaerden, E. (2011), Een voorstudie met betrekking tot een interventieonderzoek rond het educatieve pakket: Een koffer vol Ondernemingszin (STEP project).

[209] DeTienne, D.R., and Chandler, G.N.(2004) Opportunity Identification and Its Role in the Entrepreneurial Classroom: A Pedagogical Approach and Empirical Test. Academy of Management Learning and Education, 2004, Vol. 3, No. 3, 242–257; and Peffers J., Huddleston P., Banfalvy C., Weiss Sh., Aparisi J. (2002). Enterprise and its transfer to combat social exclusion- ENTRANCE. Final Report, Internet: http://ec.europa.eu/research/social-sciences/pdf/finalreport/soe2ct983068-final-report.pdf

[210] Dunchev, B. (2012) Measuring the impact of entrepreneurial education at Aarhus School of Business and Social Sciences. Aarhus School of Business and Social Sciences, Aarhus, Denmark.

[211] Athayde, R. (2012) Impact - 50 years of Young Enterprise.

the School Professional Toolkit of SEECEL; and, the measurement of the societal impact of the National Action Plan 2010-2014 in Norway[212].

Such mixed methods are more often used when the goal is to address several aspects/types of impact and/or to assess more than one programme (as in the case of a strategy). The following sub-section highlights examples of such approaches, especially regarding entrepreneurship education strategies.

When the goal is to assess the impact of a programme on participants' knowledge/skills, tests can also be helpful. For example, tests with questions on entrepreneurial skills/knowledge were used in several studies conducted by members of the JA-YE network[213], the SEECEL case study, to assess the shift in teachers' knowledge, as well as the UPI case study, where statements regarding creativity were used as indicators of students' understanding of the topic.

6.1.1 Measuring the impact of an entrepreneurship education strategy

The measurement approach needs to be more complex when measuring the overall impact of a strategy, as the latter may touch upon different education levels, institutions, programmes etc.

In **the Netherlands,** the National Action Plan 2007-2012 was evaluated by a series of commissioned surveys and independent evaluations. Separate evaluations ran for primary, secondary and secondary VET ("Track 1) and for higher education ("Track 2"). The commissioned surveys included specific questions for each education level. An e-survey and qualitative interviews also took place to assess the penetration rate of entrepreneurship in educational institutions.

Also, the goals of a strategy can be broader and/or focus more on the macro-level compared to an individual programme. The measurement methods/tools should reflect that.

The **Wales Strategy** used several tools (surveys) to identify the impact of its programmes/initiatives. The Strategy aims to have an impact on individuals (e.g. raise awareness of entrepreneurship) amongst whom relevant surveys are used. Given that the overall goal of the YES Strategy was to create a cultural shift in favour of entrepreneurship, different surveys were used to assess views on entrepreneurship of different age groups (e.g. the Children's Omnibus Survey (for people aged 7-18 years old) and the Annual Wales Omnibus Survey that targets adults). To assess impact on the economic level (perceived as number and viability of new businesses created), the Strategy assessment process used the results of surveys such as the Global Entrepreneurship Monitor (GEM) and the Higher Education Business and community interaction survey (HEBCIS).

The measurement of the impact of the **National Action Plan in Norway** (2010-2014) focused on the impacts on individuals and on society. Impact on individuals (pupils/students) was assessed by targeted surveys. The societal impact was assessed by using results of the individual impact assessments, combined with qualitative interviews.

[212] Johansen V. et al.and Mathisen T. (2012) - Entreprenørskap i utdanningen og oppnåelse av læringsmål; Internet: http://www.ostforsk.no/images/rapporter/142012.pdf

[213] "Business skills. A survey of JA-YE participants" and "Financial literacy. A survey of JA-YE participants"

6.1.2 Impact measurement on the four levels: individual, institutional, economic, societal

This study provides evidence on the impact of entrepreneurship education at four levels: the individual, the institutional, the economic and the societal. Measurement approaches can differ between the four types, although the same tool (e.g. a questionnaire) may be used.

Individual

The vast majority of the literature and country examples that have demonstrated impact of entrepreneurship education have considered the impact on the individual, with the focus on participants in the educational programme/initiative. Impact on the individual can also consider impacts on teachers/school staff (as in the case of SEECEL). The methods used mainly involve questionnaires.

Institutional

The impact on the school/institution has been measured by assessing changes to teachers/other school staff. This is justified because it is the attitudes and behaviour of teachers/school staff that significantly impact on the atmosphere in the school, and the acceptance, promotion and efficiency of entrepreneurship education (through relevant teaching methods and learning outcomes).

The positive impact of the initiative implemented by **ASE (Wallonia, Belgium)** on schools was measured through the increased engagement and interest of teachers in entrepreneurship education.

The **UPI courses (Slovenia)** seem to have established a creative climate in the classrooms, according to a survey that focused on principals, mentors and students.

In **the Netherlands,** the impact of the National Action plan on the engagement of institutions was measured by using an e-survey and in-depth interviews in a representative sample of educational institutions across all education levels.

Society and Economy

Measuring and demonstrating the impact of entrepreneurship education *on the economy and society* is challenging. It is difficult to isolate the effect of a single educational programme or even of an education strategy on the wider economy and society. There is a large number of factors that can influence questions/indicators that consider economic or societal impact. However, measurement on these levels is feasible.

The role of definitions plays a key role here (see sub-section 2.3.1 for more information on the importance of definitions). This is evident from the measurement approaches identified in the research.

The impact on **economy** has been measured by surveys that interpret impact as:

- ➔ development of start-ups/firms by alumni (e.g. the MIT case study, studies from JA-YE network members such as the "Impact. 50 Years of Young Enterprise"; and, the Wales strategy that uses a relevant indicator from the Global Entrepreneurship Monitor annual survey)
- ➔ creation of jobs by the alumni-founded companies (e.g. the MIT case study, and the Swedish study "Practice makes perfect?")[214]

[214] Wennberg, K. (2008): Practice Makes Perfect? A Longitudinal Investigation of Junior Achievement (JA) Sweden - Alumni and Their Entrepreneurial Careers, 1990-2007"

➔ other characteristics of the alumni-founded firms, such as the sector they are active in, and the innovativeness of these sectors etc.

In these cases, results from the surveys to inform impact measurement are compared to relevant data from national statistics (e.g. 'Impact. 50 Years of Young Enterprise' (UK); 'Practice makes perfect?' (SE)). Other studies use external databases, e.g. in the MIT case study, databases Compustat and Dun & Bradstreet for data on public and private companies respectively.

Impact on **Society** is rarely measured, given the methodological challenges of demonstrating a link between a programme and societal change. Nonetheless, there have been attempts to measure and to prove impact on societal level.

The study **"Making an impact. Assessing Junior Achievement of Canada's valued creation"** offers an interesting methodological approach to measuring societal impact. Based on the hypothesis that positive developments in individuals' careers bring about benefits for society (viewed as the local community and the state/country overall) these individuals live in, researchers calculated the Return on Investment (ROI) of one dollar that the state spent on entrepreneurship education. They took into account not only the contributions of alumni/entrepreneurs, but also the costs that are avoided by the state (e.g. social assistance to unemployed), due to the positive career development of the alumni.

The estimates drew data from national databases relevant to social policy and the labour market. In this way, researchers not only achieved an estimate of ROI of investing in JA entrepreneurship education (they **estimated an annual return of 45:1 in terms of societal prosperity for every dollar spent in JA**), but also clearly demonstrated the significance of entrepreneurship education for other policy areas.

Although it is rarely explicitly measured, the positive impact that entrepreneurship education can have on society can be inferred from other types of impact. For example, increased number of new ventures or the creation of job opportunities (which concern economic impact) can be expected to have positive effects on society too, as society benefits from lower rates of unemployment.

Hence, even if impact on society is not systematically measured, implicit effects on additional impact types/levels can be identified.

6.2 Measuring impact of entrepreneurship education: 14 points for consideration

When measuring the impact of entrepreneurship education it is useful to take into consideration elements of good practice and points to avoid, so that evidence collected may lead to robust conclusions. Academic research and in-depth analysis of the case studies conducted for this study has provided insights on the overall approach and how to design, implement an impact measurement methodology. These insights aim at supporting policy makers, institutional authorities, educators or any interested stakeholder. However, the insights/lessons offered in this sub section aim at being *inspiring, not prescriptive*. As with all education-related measurement issues, the importance of country/region/school characteristics should be always be considered. Additionally, to identify impact, the data collected needs to be analysed by using statistical methods and tools. This means there is a need to include specialised researchers/statisticians in the measurement/analysis team.

Impact measurement of entrepreneurship education is a relatively young field of research and implementation. Although each measurement should be adjusted to the context of the country/region/institution within which the programme or strategy runs, as well as to characteristics of the target group (e.g. age group of

respondents), there are some key points that should be kept into consideration and that apply in most cases.

1) Decide on the definition of key terms

Entrepreneurship education covers a broad range of elements and its impacts are linked to changes in attitudes, skills and behaviour. So, before choosing the methodological approach and designing the tool(s) to be used for data collection, the key stakeholders should agree on *what they mean by entrepreneurship impact (e.g. is it firm creation? creative thinking? both? etc.).* Other definitions are also important. If the goal is to measure the shift in entrepreneurial spirit, what does this mean specifically in the context of the programme/initiative/strategy in question? Likewise, all key terms should be defined. As entrepreneurship can also have indirect effects (for example on individuals' perceptions and possibly behaviour) definitions will inform the questions/measurement indicators to be used.

Definition of key terms: 'Entrepreneurial skills/attitudes/competences'

The key terms related to the definition of entrepreneurship and entrepreneurial behaviour were not used consistently across the examples of the measurement of the impact of entrepreneurial education reviewed. For instance, whilst in some examples 'risk-taking' was mentioned as a 'skill' (in some cases referring to 'transversal skills'), in others it was mentioned as an 'attitude' or 'competence'. The report has made clear where appropriate the definitions provided by the researchers undertaking the measurement or used by the developers of the initiative.

2) Decide on the goals of the measurement

The goals of the measurement will define the focus and so, the characteristics of the tools used, the time of launch, stakeholders involved etc. For example, if the goal of the measurement is to prove impact on students' knowledge level of entrepreneurship, the measurement should include tools, sample etc. that serve that goal, such as tests rather than self-assessment.

3) Align the goals of the measurement with the goals of the programme, initiative or strategy

If the goals of the education programme/strategy and those of the measurement of impact are not aligned, the measurement results are unlikely to be either robust or useful.

4) Align the measurement tools with the key definitions and goals of the measurement

If the measurement tools used treat entrepreneurship from a different point of view/definition, then it may not be possible to collect meaningful data at the end. Also, the goals of the measurement of impact should influence how the measurement will be undertaken.

In the **UPI case study in Slovenia**, four distinct samples, reflecting different target groups were developed to serve the goal of the measurement of impact, which was to assess the impact of the UPI courses on students and mentors.

5) Adjust and test the tools and questions used to the target group

It is important to adjust the questions' content and language to the target group (age; educational background etc.). For example, in the UPI case study, the questionnaire was first tested to ensure it was suitable for pupils. Changes were made before launching the final survey instrument. Different questionnaires for

different age groups were used in all examples that included more than one target group (e.g. the ASTEE project[215], the surveys used for the assessment of the Wales Strategy, and the Norwegian National Action Plan).

6) Collect quantitative data

Qualitative data can be beneficial to gain insight into factors affecting impact, but quantitative information allows for the clearer attribution and scaling of impact.

7) Carefully select the sample:

Size: samples need to be sufficiently large, to offer statistically robust results (e.g. in the Netherlands, the evaluations that followed the first/basic measurement identified the need to enlarge the sample). This study has identified impact measurement examples where, despite strong methodologies, small samples raise concerns on the robustness of findings (e.g. in Fretscher et al. (2013) in Germany[216], Dziurzańska, A (2010) in Poland[217] and Dunchev (2012) in Denmark[218]);

Self-selection bias: In order to identify and demonstrate impact a clear, causal link should be evident between the input (programme/initiative) and the outcome/result. To achieve this it is important to eliminate the effects of other factors, besides the entrepreneurship education input. Self-selection may involve focusing on or including in the sample individuals that are already interested in entrepreneurship. So, if positive impact is proved, one could argue that it was not the input per se, but the individuals' pre-disposition towards entrepreneurship that made the difference. To avoid this, especially when focusing on students/pupils, it is advisable to include students that attend an entrepreneurship programme because it is compulsory and does not depend on their choice.

Addressing the self-selection bias

The limitation of possible self-selection bias was addressed in some examples, for example in "The impact of entrepreneurship education on human capital at upper-secondary level" in Switzerland[219], the UPI case study (concerning the control group), and in Stritar, R. (2006)[220] in Slovenia). Also in the surveys of primary and secondary students in the context of the Norwegian Action Plan measurement, researchers singled out students who had attended mandatory and voluntary entrepreneurship education.

8) Include a control group, where possible

To make results more robust, it is advisable to use control groups, where possible[221]. Control groups (usually, individuals that did not participate in the

[215] http://asteeproject.eu/the-project-

[216] Fretscher et al. (2013) Measuring and understanding the effects of entrepreneurial awareness education; Journal of Small Business Management 51(3), pp. 410-428; doi:10.1111/jsbm.12019

[217] Dziurzańska, A. (2010) Wyniki z badania ankietowego Doświadczenia z kształcenia w przedmiocie „Podstawy przedsiębiorczości" wersja skrócona.

[218] Dunchev, B. (2012): Measuring the impact of entrepreneurial education at Aarhus School of Business and Social Sciences. Aarhus School of Business and Social Sciences, Aarhus, Denmark.

[219] Volery et al. (2013); The impact of entrepreneurship education on human capital at upper-secondary level; Journal of Small Business Management 51 (3), pp. 429-0; doi: 10.1111/jsbm.12020

[220] Stritar, R. (2006) Factors influencing the formation of entrepreneurial intentions of university students: The impact of teamwork, Master thesis - University of Ljubljana. Internet: www.cek.ef.uni-lj.si/magister/stritar3147.pdf

[221] Including a control group may not be possible due to the nature/focus of an impact measurement (e.g. in the case study on MIT, where the measurement focused only on MIT, it would not be possible to include a

entrepreneurship education programme under scrutiny) can substantiate that any observed impact on the sample/ treatment group[222] came from the entrepreneurship education programme and not from traits/personal factors of individuals. Comparing the results of questionnaires/tests of people that did not participate in the programme can lead to such conclusions. Therefore, researchers should:

- ensure the control group is matched to the main sample: a control group should bear significant similarities with and not differ substantially from the treatment group. This will help ensure that results are robust;
- make the control group sufficiently large and/or of similar size to the treatment group;
- Include control variables: Taking into consideration key variables/factors that affect entrepreneurial intentions/attitudes/behaviours (e.g. prior work experience, demographic characteristics such as parents' entrepreneurial experience) helps to establish the causality between the programme/training and the observed change. Relevant limitations have been identified in some measurement attempts (e.g. Garalis A. and Strazdiene G. (2007)223, Jones et al. (2008)224, Lee et al (2005)225 and Summit Consulting (2009)226).

9) Rely on renowned statistical tools and techniques

To facilitate the sound analysis of the data, it is preferable to rely on renowned statistical tools and techniques.

10) Ensure a high number of responses

High response rates can be achieved by making the measurement tools (especially questionnaires) more appealing to respondents, by avoiding long questionnaires and many open-ended questions, as participants are reluctant to give long answers.

11) Recognise the benefits and limitations of self-assessment

The vast majority of surveys used for impact measurement rely on self-assessment: participants are asked to evaluate their level of entrepreneurial knowledge/initiative to start-up a firm etc. Individuals' perceptions are a significant element in understanding the effect of an entrepreneurship education programme, because perceptions and self-assessment are linked to self-confidence and can be a good indicator of possible actions to be taken. However, self-assessment is not 'objective' and changes in perceptions do not mean that actual changes in behaviour will occur[227]. This limitation has been identified in parts of the questionnaires used in some of the case studies, such as the

similar group of non-MIT students; or the SEECEL case study, where including a control group would be challenging. Please see Annex 2 for more information on the case studies).

[222] In the literature, the participants in programme are often called "treatment group", to be distinguished from the control group.

[223] Garalis, A.,. and Strazdiene, G.(2007)Entrepreneurial skills development via Simulation Business Enterprise.

[224] Jones et al (2008) Student attitudes towards enterprise education in Poland: a positive impact; Education +Training Vol.50 No. 7, pp.597-614.

[225] Lee et al (2005) Impact of Entrepreneurship Education: A Comparative Study of the U.S. and Korea. International Entrepreneurship and Management Journal 1, 27-43, 2005.

[226] Summit Consulting (2009) Toward Effective Education of Innovative Entrepreneurs in Small Business: Initial Results from a Survey of College Students and Graduates. Washington, DC: Small Business Administration Office of Advocacy.

[227] For example, if students declare they have the intention of starting a business, this cannot be translated to actual rate of businesses that will be created.

SEECEL, the Netherlands Action Plan, the ASE, the Misgav, and other examples from desk research[228].

12) Include a pre- and post- survey: The longitudinal approach

Pre- and post-measurement can provide strong evidence of impact and demonstrate that change took place. This is important for measuring behavioural impact, which implies action, but such change needs time to become evident[229]. Pre- and post- questionnaires can also eliminate some of the disadvantages of self-reported results.

If the aim is to monitor the effect of the programme/strategy in the long run, then more than one post-questionnaire should be used. Such a longitudinal approach, involves the same sample/panel of respondents being followed and their attitudes and behaviour being measured systematically. This is the approach of the Foundation for Entrepreneurship - Young Enterprise (FFE-YE) in Denmark when measuring the impact of entrepreneurship education. Longitudinal approaches can facilitate the measurement of economic and societal impact, as these types of impact concern more macro changes (e.g. number of firms created, their sustainability etc.).

However, all examples found in the research that adopted a longitudinal approach identify the d*ecrease in response rates* as the main challenge (e.g. in the case of the 2nd evaluation of the Dutch National Action Plan, except for Universities of Applied Sciences). This was especially relevant for alumni, whose tracking becomes more difficult after graduation[230]. Other reported challenges are lack of resources to undertake such work.

13) Adjust the number of measurements to the programme's duration

A one-off, short programme cannot be expected to have strong impact after a prolonged period of time. The impact of longer programmes (for example one-year Master programmes) and strategies can be expected to endure longer.

Literature[231] suggests that the impact of a short programme should be measured before and after; but longer programmes should be monitored before; immediately after the end; some months after the end; and even several years after.

14) Causality is challenging to prove

Ideally impact measurement should prove causality, i.e. that entrepreneurship education led to specific changes/results. However, establishing causality is challenging for the education sector as a whole. A broad range of other factors influence an individual's actions and perceptions as well. As perceptions and actions may need time to change, attributing a clear causal link becomes even more challenging. Some of the lessons/insights offered in this section (e.g. use of control groups and control variables, avoiding self-assessment and self-selection etc.) can help prove causality.

Relevant to causality is ***self-efficacy***[232], which measures an individual's or a society's belief on his/her ability to achieve goals. Individuals with high self-efficacy can be expected to be more likely to take over challenging tasks and

[228] Junior Achievement Titan Program; 2007 Evaluation, Internet: http://www.myja.org/programs/evaluation/reports/ja_titan_evaluation.pdf; Oosterbeek H., van Praag M., Ijsselstein A. The impact of entrepreneurship education on entrepreneurship skills and motivation. European Economic Review 54 (2010) 442-454

[229] According to academic researchers interviewed for the purpose of this study.

[230] Volery et al. (2013).

[231] Fayolle et al (2006).

[232] See Bandura, A. (1997) Self-efficacy: The exercise of control.

have high performance aspirations[233]. So, when designing a questionnaire and analysing impact measurement data, the potential bias from self-efficacy should be taken into consideration.

When interpreting results, it is also important not to confuse correlation with causality: for example, if the number of start-ups has increased during the same period that an entrepreneurship education programme or even strategy has been launched, this does not automatically prove that the programme/strategy led to the increase in start-ups. The correlation can, however, be used as basis for further research on causality.

[233] http://serc.carleton.edu/NAGTWorkshops/affective/efficacy.html

7 Key lessons learnt

7.1 The evidence base for the impact of entrepreneurship education

Previous sections have reviewed and demonstrated evidence of impact measurement across a diverse range and level of entrepreneurship education activity in Europe and across the world.

The examples have measured impact in relation to a broad range of inputs on different policy levels (national, regional, local), by different actors (providers, institutions, stakeholders). Despite this diversity, all initiatives shared the core aim of creating entrepreneurial action by individuals and institutions throughout the economy and society.

Whilst sharing this aim, the programmes and projects reviewed differed in content, focus, duration, qualification they lead to, etc. A broad range of impact assessment approaches, measurement tools, indicators, etc. have also been used. There is increasing evidence in line with stronger common understanding of the role and impact of entrepreneurship education[234] of convergence around forms of impact assessment, including the use of stronger evaluation methodologies such as sampling, control groups and longitudinal analysis.

The richness and diversity of studies identified inevitably, make comparison challenging, and has precluded the presentation of common impact data.

7.1.1 Clusters of impact measured

Drawing on the impact mapping structure introduced in Section 2 (see Figure 2.2), an overview of clusters of evidence for the impact of entrepreneurship education can be constructed.

In total, 91 examples of input and impact measurement were identified.

- ➔ Classes, courses, programmes and modules (i.e. individual measures and initiatives) were measured most often (including innovative teaching and learning). 51 out of the 91 examples identified[235] measured impact of this type of intervention. Among those, programmes offered by members of the worldwide JA-YE network (in particular the company programme, cf. section 5) stand out as well researched. In total, 16 studies measured the impact of programmes offered by JA-YE network members.
- ➔ Impact of national or regional strategies or initiatives implemented across a region, a country, or even across several countries (e.g. SEECEL) was measured in 34 examples. These included entrepreneurship training for teachers and other staff and stakeholder engagement strategies.
- ➔ Institutional changes through prioritising entrepreneurship education (curriculum changes, horizontal approaches, strategy development) were measured less often. Only 5 out of 91 examples of this type were identified through research for this study.

The measurements covered different aspects of impact. Mostly these related to the objectives of the activity. As with the inputs, certain types of impact were more often the centre of attention of research projects than others.

- ➔ On the level of **immediate results**, the following aspects of impact were well evidenced:

[234] ICF for European Commission: Expert Group on Indicators on Entrepreneurial Learning and Competence: Final Report. DG Education and Culture Framework Contract 02/10 – Lot 1, Order 63. April 2014

[235] When studies measured impact of several types of input, they were counted more than once.

- entrepreneurial learning outcomes – i.e. a change of knowledge, skills and attitudes;
- Change of level of interest in entrepreneurship;
- Change of level of entrepreneurial intentions; and
- Increased student and staff motivation.

➔ On the level of **intermediate outcomes**, changes in the rate of start-ups and venture creation were best evidenced, followed by evidence for enhanced employability;

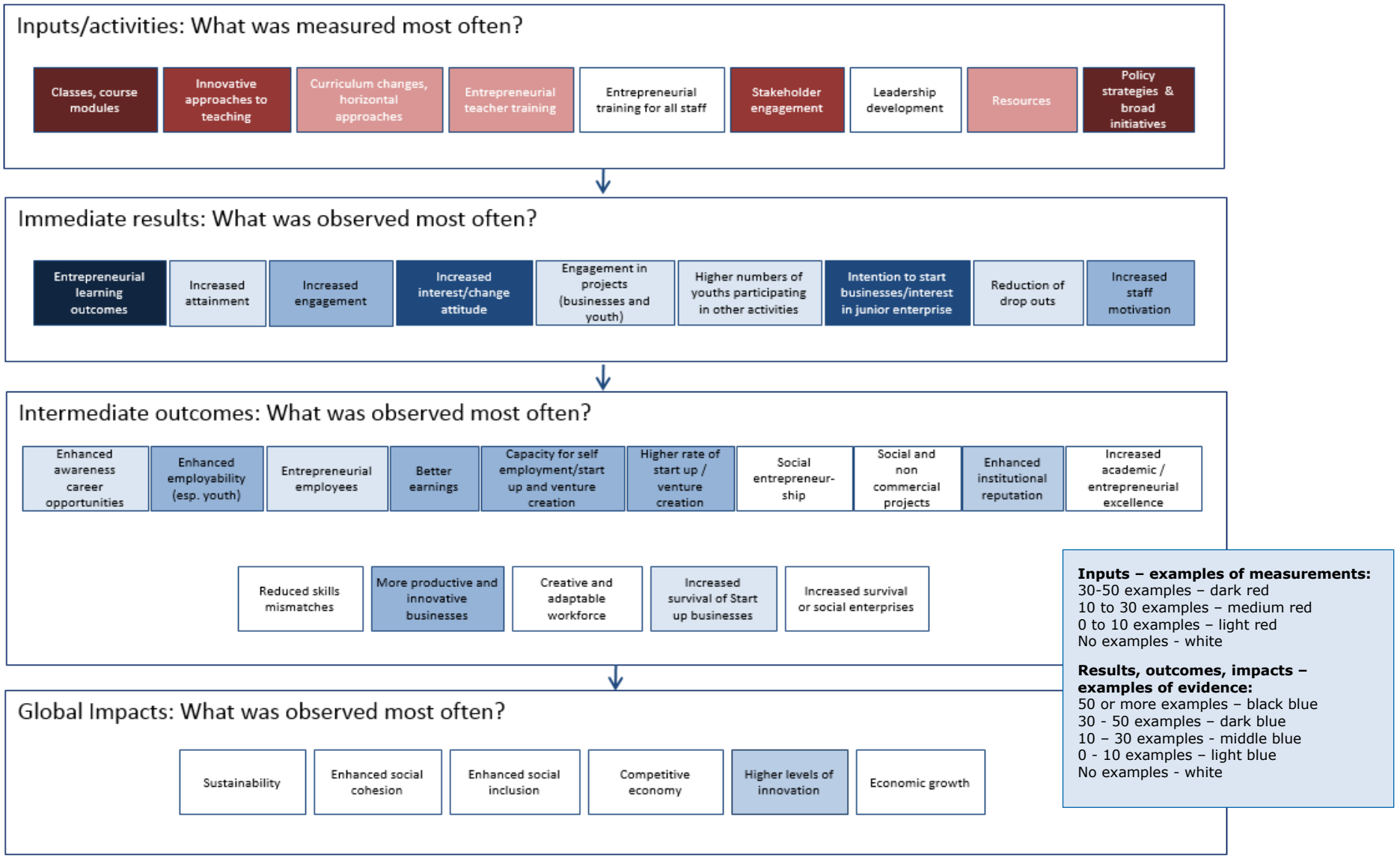
➔ On the level of **global impact**, there was evidence of higher levels of innovation in alumni companies.[236]

Others aspects of the typology provided in the detailed theory of change (Figure 2.2) were measured less often. Consequently, less evidence was available.

Figure 7.1 indicates which clusters of evidence for the impact of entrepreneurship education currently exist.

[236] The terminology provided by the original studies was maintained; no judgement was made. It should however be borne in mind that the terms used in impact mapping are not used consistently across case studies: for example, 'entrepreneurial learning outcomes' may embrace different concepts.

Figure 7.1 Clusters of evidence for the impact of entrepreneurship education



7.2 What type of input leads to what impact?

When looking at the entire body of research conducted to date, it is striking that all types of impact may be expected from all types of input.

Sections 3-5 have shown that national and regional strategies as well as broad initiatives led to impact on the individual, the institutional, the economic and the societal level. The same held true for institutional change and individual measures and initiatives. Impacts (to the extent that they persist over time) are sequential from the key initial impact of creating the potential for entrepreneurial action by an individual.

Change at the broader societal and economic level may be expected to occur indirectly and in due time as a secondary outcome of the initial measure (as outlined in the theory of change in section 2 and summarised in Figure 7.2 below).

Figure 7.2 Simple theory of change triggered by entrepreneurship education

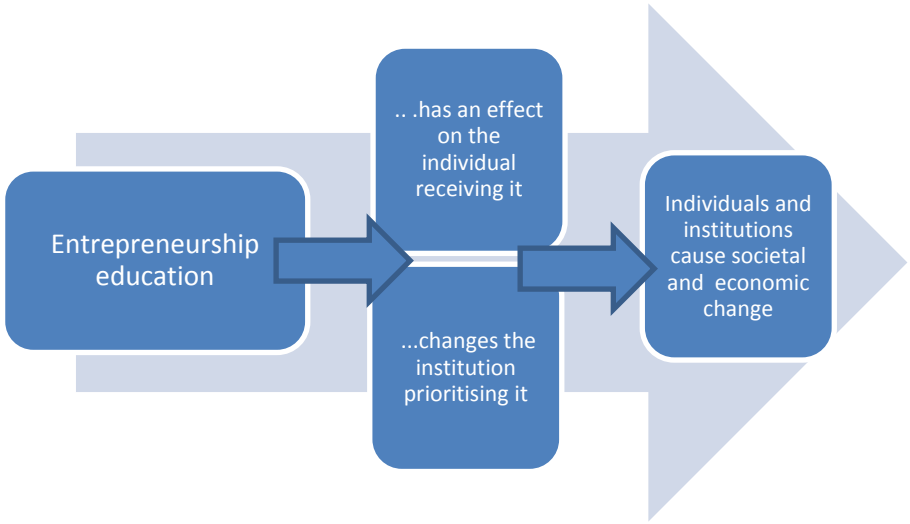


Figure 7.1 showed that available evidence is most common for impacts on the individual; in the form of results and outcomes on the immediate and intermediate level. Global impact on economy and society is less well-evidenced – partly because of time needed to pass between input and impact measured, partly because of the methodological challenges of such impact assessment and partly because entrepreneurship education remains a relatively recent policy field. Policy interventions may have impact on different cohorts of student but, as evidenced by some of the national strategies reviewed, demonstrable evidence of impact of economy and society requires substantial and long run interventions.

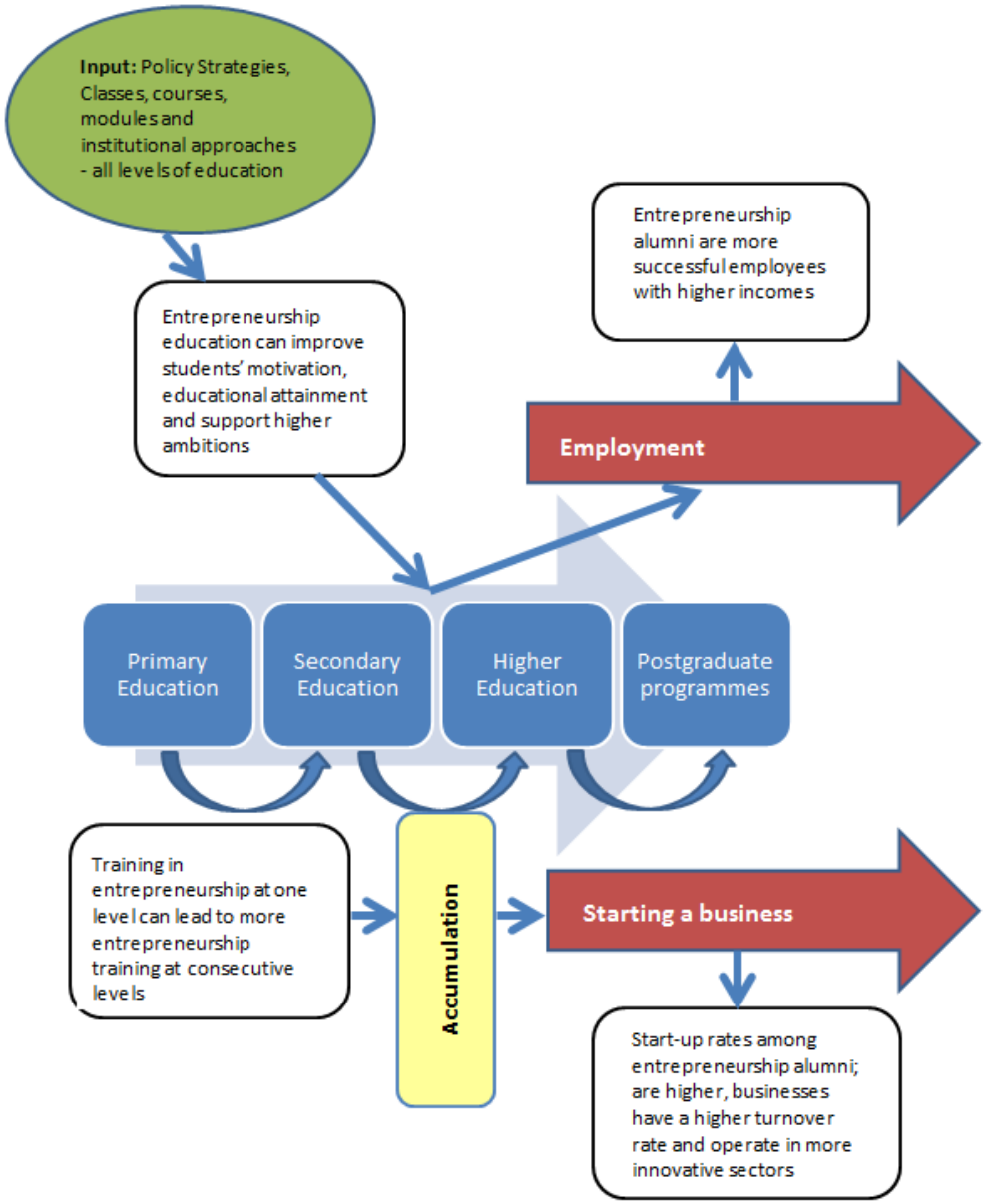
Evidence is provided that measures and initiatives at all levels of education, from primary to post-graduate, may have significant impacts. Furthermore, a large number and variety of education and training offers for different age groups may increase effectiveness. Countries which offer entrepreneurship education at several educational levels (e.g. Denmark, Norway, and the Netherlands), and providers which offer a broad range of programmes for different age levels (e.g. JA-YE network) observed that effects tend to cumulate and lead to acceleration:

- ➔ those who participate in a higher number of measures benefit more over time;
- ➔ with the number of entrepreneurship classes, courses and programmes attended, the likelihood increases that alumni will turn their acquired entrepreneurial knowledge, skills and attitudes into action;

➔ the number of actions started will make a school or university more attractive to investors, stakeholders, high-profile students and staff members – in short: Entrepreneurship leads to more entrepreneurship.

Figure 7.3 shows how the effects of entrepreneurship education accumulate over time and over educational levels.

Figure 7.3 Accumulation of effects over time and educational levels



Source: FFE-YE[237], adapted to this study

Figure 7.3 does not show impact on society because (aside from evidence for the 'side effect' of greater engagement of stakeholders in education) very little evidence was found of how entrepreneurship education supports broader activity in the social sphere.

However, as stated in Section 6, the positive impact that entrepreneurship education can have on society can be inferred from other types of impact. New ventures or creation of job opportunities (which concern economic impact) can

[237] http://eng.ffe-ye.dk/media/45510/pact-of-Entrepreneurship-Education-in-Denmark-2010.pdf

be expected to have positive effects on society too, as society benefits from lower rates of unemployment.

7.3 Maximising the impact of entrepreneurship education: Lessons learnt

When aiming to maximise the impact of entrepreneurship education, the following lessons should be considered:

- ➔ Students can benefit from entrepreneurship education in many regards. They develop entrepreneurial knowledge, skills and attitudes but also become more self-confident in general. Their scholarly and professional ambitions rise, their attitude towards learning improves and they develop more intense relations with the school and their peers. Given these positive findings, it can be concluded that **entrepreneurship education should address all students, not just those who are interested.**
- ➔ **Effects accumulate over time, and are higher when students make several consecutive entrepreneurial learning experiences during their learning pathway.** Hence, students should be offered at least one, but preferably many entrepreneurial learning experiences throughout their studies.
- ➔ **Training on entrepreneurship should be tailored to age groups and educational sectors.** One size (training) does not fit all. Approaches to entrepreneurship education need to be adjusted to age groups, subjects and educational sectors. A longitudinal study from Denmark showed that in primary and lower secondary school, entrepreneurship is best taught as a method, hence as innovative and activating teaching in general. As for upper secondary level, it is best taught as a form of 'occupation', hence concretely in relation to being and acting entrepreneurially. However, **the highest impact is achieved in upper levels of education (including Higher Education), if both aspects – method and 'occupation' - are combined.**
- ➔ **Entrepreneurial training programmes are gender-sensitive.** Evidence suggests that often male students benefit more from 'conventional' training programmes than female students. Hence, developing differentiated training programmes considering gender differences would be worthwhile.
- ➔ **Entrepreneurship is best taught through methods that include learning under real-life conditions**. Evidence shows that entrepreneurship education is most successful if it includes practical experience. Students benefit very much from simulations and tasks requiring concrete problem-solving.
- ➔ **Teachers are key actors.** Students become inspired by role models such as teachers and mentors. Awareness-raising activities for teachers need to be followed-up by tailored training offers. This increases the likelihood that they will engage in entrepreneurship. Activities should go together with the dissemination of relevant tools and methods to further support teachers' motivation and capacity to set-up entrepreneurial activities.
- ➔ **A whole-school approach to entrepreneurship education helps to raise teachers' awareness** of the value and impact of integrating enterprise within different subjects. Schools in the UK with higher levels of Enterprise Education embedded into the curriculum reported higher levels of staff motivation. The understanding of entrepreneurship education as a teaching and learning style improved. Teachers and educational institutions that implement entrepreneurship education overcome their initial scepticism when they see the positive effect on students.

- ➔ **Institutional change towards entrepreneurialism is most effective when both management and teaching staff are 'on-board'.** Evidence shows that a coordinated approach to establish teacher's trust in management is a key success factors for the establishment of an entrepreneurial culture in educational institutions. An incentive system to reward teachers' actions towards effective implementation of the entrepreneurship education strategy was found to be helpful.
- ➔ **To fully achieve economic impact, entrepreneurship education should be embedded in an entrepreneurship ecosystem.** Students' entrepreneurial intentions will be more sustainable if entrepreneurship education is complemented by guidance, access to funding, business networks etc. which support their plans and ideas. Model cases like the MIT excel through a comprehensive entrepreneurship ecosystem and a supportive climate for start-ups.
- ➔ **Networking and mentoring prove to be important means of support.** The case of the MIT shows that students appreciate the 'Entrepreneurial Network' (alumni and other members of the local business community) and informal interaction with faculty members. This highlights the importance that budding entrepreneurs attribute to networking and mentoring, which includes learning from personal experiences as well as benefitting from the business contacts and information networks.
- ➔ **High visibility of support and guidance offers is of crucial importance, especially in the development period.** New services and learning opportunities need to be promoted – especially when they are innovative. An investment in communication and dissemination measures needs to be made to support the uptake and intended change.
- ➔ **Supporting entrepreneurship will bring more entrepreneurship.** While the reputation of an educational institution as an entrepreneurship-promoting institution increases, more entrepreneurial students and staff members will be attracted. This self-selection process significantly contributed to the development of the entrepreneurial ecosystem at MIT.
- ➔ **'What gets measured gets done':** Entrepreneurship education should be an indicator that is part of the official quality assurance procedures of schools and universities. In many cases, educational institutional are more likely to embed entrepreneurship education when they need to report on it and are therefore accountable.

Broad-scale measures for all ages, quality assurance, and measurement of results and impact

Hence, it can be concluded that policy makers and institutional leaders aiming to establish or accelerate entrepreneurship education should aim at:

- ➔ Comprehensive national, regional and institutional strategies;
- ➔ Broad-scale initiatives;
- ➔ Compulsory initiatives at all levels of education – starting with primary;
- ➔ Consecutive entrepreneurial learning experiences tailored to the specific educational sector;
- ➔ Initiatives which support institutions and staff members in the process of change (including staff training and motivation);
- ➔ High visibility of the activities taken;
- ➔ Continuous improvement through quality assurance processes on system level as well as on the level of educational institutions;
- ➔ Regular measurement of results and impact through surveys and evaluation which suitable to the input and the age groups targeted.

Annex 1 Work steps carried out

A1.1 Phases of the study

Research and analysis connected to the study were conducted in four phases:

1. Preliminary research phase (September-October 2013):

The preliminary research phase was conducted as an explorative exercise. Interviews with key experts were conducted and literature was reviewed. This allowed identifying a number of studies, evaluations and other literature, but also possible contacts which provided a starting point for the desk research phase. Conclusions were drawn which allowed for a refinement of the method to this study. The preliminary research phase was concluded with an inception report.

2. Desk research phase (November-January 2013):

The desk research was organised as a systematic country research in all 28 EU-Member States plus 14 Non-EU-countries, combined with a high level mapping (interviews with high-level experts and identification of robust academic examples of impact measurement in entrepreneurship education). Aim of this phase was to identify and screen examples of entrepreneurship education impact measurement (including causal links). The results were compiled in an Excel database. This database provided the source for further analysis and for selection of the case studies.

3. Case study phase (February-April 2014):

Following desk research, 15 examples were selected to undertake in-depth research for case studies. Interviews, review of literature in the original language, and, in some cases, on-site visits were undertaken. Case studies were drafted which described and analysed impacts as observed by the examples of impact measurement. The case studies also highlighted the strengths and weaknesses of the methods used to identify impacts.

4. Final analysis (May-September 2014)

During the final analysis phase, the findings were compared and analysed to highlight and discuss impact observed. Conclusions were drawn about causality and or links to impact factors.

Key points as to what constitutes a robust methodology were summarised and recommendations on how to measure the impact of entrepreneurship education were given.

A1.2 General approach to the desk research

Two strands of desk research were carried out:

1. Systematic country research in all 28 EU-Member States plus 15 Non-EU-countries (literature research plus interviews); and
2. High level mapping including interviews with high-level experts and academics.

The aim of this phase was to identify examples of impact measurement in entrepreneurship education, including causal links – if possible. The results were compiled in an Excel database. This database provided the source for further analysis and for selection of the case studies.

A1.2.1 Country research

Through this study, all 28 EU member States and 15 additional Non-EU countries were screened. This was carried out as follows:

- ➔ All EU Member States were covered (28 countries);
- ➔ SEECEL, the South East European Centre for Entrepreneurial Learning was contacted, and research carried out under the transnational SEECEL umbrella was examined. Furthermore, it was asked in how far the SEECEL Member countries (Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia (the Former Yugoslav Republic), Serbia and Turkey have undertaken measurement on a national level. Following this, Croatia and Turkey were also researched on national level.
- ➔ Additionally, eight Non-European countries were researched: Canada, Israel, Lebanon, Liechtenstein, Palestine, Norway, Russia, and the USA.

Consequently, 43 countries were covered, 37 of which were researched on national level.

As agreed, a snowball approach was used, starting with one interviewee and asking to provide additional contacts - aiming to conduct 3-6 interviews per country with relevant experts well familiar with the topic and its implementation, such as

- ➔ Policy makers (involved in the implementation of strategies and measures, and ideally, their measurement); and/or
- ➔ Experts (education specialists or entrepreneurship education specialists); and/or
- ➔ Researchers/analysts, and/or
- ➔ Stakeholders (e.g. business or employers' organisations); and/or
- ➔ Providers of entrepreneurship education (NGOs, training institutions etc.)

Researchers able to conduct interviews and screen documents in the native language were assigned to the different countries and provided with a guidance note, describing their tasks. Additionally, they were provided with **two templates**:

1. An Excel file to record the examples identified against specific criteria, which was used to build up a database presenting all examples. The compilation of examples led to building the database of examples;
2. A word template to record the number of persons approached; their reactions and the number of interviews conducted.

The interviewees were asked to

- ➔ Identify and share examples where impact has been measured, and
- ➔ Provide other knowledgeable contacts (policy makers, analyst/experts, and practitioners/providers).

It was anticipated that the efforts could lead to a dead end if none of the interviewees knew about relevant examples. In these cases, to ensure sensible use of the time resources, the ICF researchers ceased their efforts after the 3rd interview that did not lead to the identification of a relevant example in the given country.

In parallel to conducting interviews, the country researchers were asked to undertake **desk research for literature in the native language.**

The box below summarises the 'protocol' for the country research:

Protocol for country research

Step 1: Identification of 1-2 relevant policy makers or experts with a good overview per country (ideally with knowledge about different educational levels);

Step 2: Interviews with the 1-2 identified persons, including a query to provide additional contacts;

Step 3: More interviews with contacts provided by them;

Step 4: Desk research - search for examples in national literature and databases, screening for further examples – e.g. as cited in identified cases;

Step 5: Recording of examples identified in Excel database.

It was assumed that a minimum of three and a maximum of six interviews would be conducted for each of the countries; expecting a total of ca. 160 interviews.

In a few countries (e.g. Bulgaria, Cyprus, Malta), despite considerable efforts from the researchers, no interviews could be conducted. This is due to the following reasons:

- ➔ Despite several reminders, the contacted persons did not respond;
- ➔ An interview could not be arranged in the time period available for the research; or
- ➔ The contact persons were not granted permission to carry out an interview with us.

In total, for the country research,

- ➔ 218 persons were contacted;
- ➔ 114 interviews were conducted (mainly phone or e-mail interviews. In a few occasions the opportunity for face-to-face interviews was taken).

Through the interviews and additional desk research, **66 examples of measuring impact of entrepreneurship education were identified.** These were recorded against specific criteria in a database. The database with the examples identified was used to make a selection for the case studies to be carried out.

A1.2.2 High-Level Mapping

The high-level mapping supported two key aims of this study:

- ➔ To examine methods and instruments for evidence collection and evaluation; and
- ➔ To identify quantifiable effects and where possible compare them across countries.

For the high level mapping, we reviewed academic literature that provided information and insights on all study objectives. This high-level literature not only offered examples where the impact of entrepreneurship education has been measured, but also **highlighted state of the art methodologies,** which we will use to offer guidance to policy makers (for example, the methodology used by Souitaris et al., 2007); and included **literature review** on core elements of entrepreneurship, drawing the links between what is important to have an impact; what is taught, and what is measured.

Hence, the findings from this part of the research allowed us to meet another goal, namely to provide educators and policy makers with key points of consideration on what impact measurement of entrepreneurship education should include, what challenges should be taken into consideration etc. to facilitated decision making; responding e.g. to questions like the following:

- ➔ What impact is being measured regarding entrepreneurship education?;
- ➔ Which are the main challenges for measuring its impact?;
- ➔ What are the key trends identified by international, high level literature?;
- ➔ Does *one size fit all*? Is one type/model of impact assessment suitable for all
  - forms of entrepreneurship education?
  - education levels or age groups?
  - institutions/countries?
- ➔ What should educators/institutions/government authorities keep into consideration when designing, selecting and launching an assessment method?

The research was based on findings and well-known sources (literature) from the inception phase. The meta-analysis of Martin et al. (2013) was used as a blueprint for identifying robust examples of entrepreneurship education impact measurement. Additional sources were drawn from interviewees, aiming at covering as many sources as possible from global literature. Annex 3 provides an overview of the literature that was reviewed for the high-level mapping. Additionally, interviews with experts and leading academics were carried out. Some of the interviewees had already been identified during the inception phase but were not available at that time. Additional interviewees were contacted, based on their high level of expertise in the topic of entrepreneurship education.

For the High Level mapping

- ➔ 9 interviews were conducted; and
- ➔ 27 academic articles (two of them only available as abstracts) and other literature were consulted.

Through the High Level mapping, **15 examples of measuring entrepreneurship education were identified.**

Hence, 81 examples in total were identified through the first two research phases.

A1.2.3 Case studies

Following desk research, 13 examples were selected for case studies. Additional research was undertaken (interviews, review of literature in original language, if appropriate, on-site visits). Case studies were drafted which describe and analyse impacts as observed by the examples of impact measurement.

The cases selected all undertook the endeavour to show how a type of input (a policy strategy, an entrepreneurship education class in general or higher education, an extra-curricular activity etc.) - led to immediate results, intermediate outcomes and/or global impacts in one of the areas above; using a solid research approach and methodology. All cases selected stand for measuring the impact of a specific type of initiative (e.g. a national strategy for entrepreneurship education, an initiative to achieve institutional change in a school, a compulsory module on entrepreneurship in VET-schools, an initiative of teacher education etc.).

The aim of the case studies was to

- ➔ Collect facts and figures about the impact of entrepreneurship education on (one or several) different levels (individual, organisation, society, economy): **What change was achieved?);**
- ➔ Collect concrete examples of how concrete strategies and initiatives led to results: **How was that change achieved?);**
- ➔ Gather examples for the use of the measurements results for the review and sustainability of strategies and initiatives: **How were the results of the measurements used?);** and
- ➔ Present more detailed insights into the methodology used for the measurement **(how were the data collected?).**

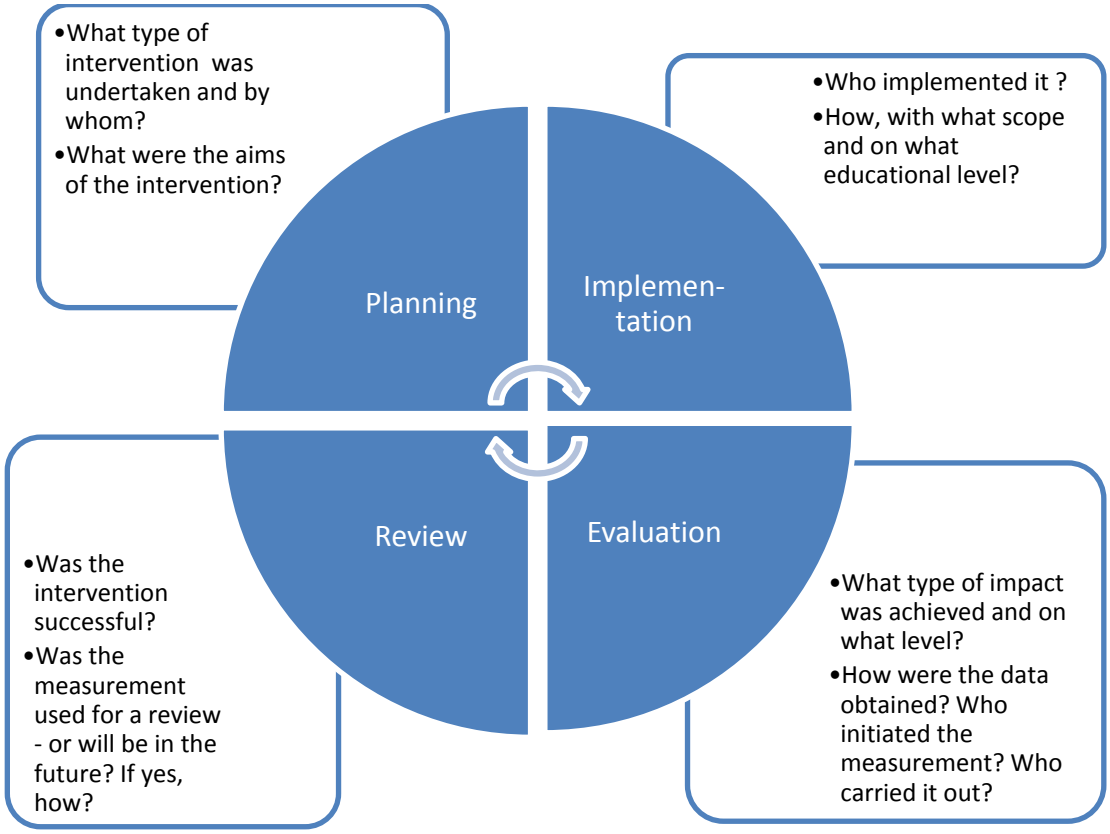
Hence, the **Case Studies focused on the results of the impact measurement**, but also presented information about the input and the way the data obtained were or will be used. Hence, they **tell the 'story' of the strategy/initiative** in relation to the policy cycle (planning / implementation / evaluation / review).

To be able to tell this story, the Case Studies explored the following questions in detail:

- ➔ What type of intervention (policy strategy or educational initiative) was undertaken and by whom?
- ➔ What were the aims of the intervention (policy objectives and/or educational aims)?
- ➔ Who implemented it? How, with what scope and on what educational level?
- ➔ What type of impact was achieved and on what level? What concrete data are there?
- ➔ How were the data measured? Who initiated the measurement? Who carried it out?
- ➔ Based on the measurement results: Can the intervention be considered successful? Did it reach its aims and objectives?
- ➔ How are/were the results of the measurement used: Did they (or will they) support a review of the intervention and/or sustainable implementation? If yes, how?

Figure A1.1 gives an overview.

Figure A1.1 Questions related to phases of the policy cycle



For the Case Studies, **a total of 47 in-depth interviews** were undertaken. Study visits and on-site interviews were carried out in three cases.

Through the interviews and research for the case studies, **10 additional examples of measuring entrepreneurship education were identified.**

A1.3 Final Analysis

During the final analysis phase, the findings were compared and analysed. A final report (this document) was drafted which highlights and discusses:

- ➔ Key forms of entrepreneurship education strategies and initiatives measured;
- ➔ Impact observed on four levels (Individual, institutional, economy, and, society);
- ➔ Causality and links to impact factors - what input has been found to cause what impact, and under what conditions;
- ➔ Transferability and generalizability of the impact (taking account of context conditions);
- ➔ Conclusions and lessons learnt as to maximising the impact of entrepreneurship education;
- ➔ Key points as to what constitutes a robust methodology; and
- ➔ Key points for consideration when measuring the impact of entrepreneurship education.

Annex 2 The cases informing Chapter 5

Table A2.1 provides background information to those 29 cases that were used to provide evidence for impact of individual entrepreneurship education initiatives and measures (Chapter 5).

It shows the educational sector addressed and the country in which the initiative was carried out, describes the key characteristics of the pedagogical intervention and summarises the type of evidence on impact collected.

Table A2.1 The cases providing evidence on the impact of individual entrepreneurship education measures and initiatives

	Educational sector	Cases	Country	Key characteristics	Evidence on impact
1	Higher education	Ferdinando Maria Gigliotti (2011) - Economic and managerial training and provision psycho-cognitive entrepreneurial behaviour: an empirical study	Italy	Economy and Management Course offered by the Università Bocconi di Milano	Measured if a university course in economics and management has an effect on psychological and behavioural aspects that make individuals more willing to identify and exploit business opportunities.
2	Higher education	Souitaris et al. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources.	UK/ France	Different elective modules on entrepreneurship available to Science and Engineering Students at the University of Grenoble	Measured if entrepreneurship education programmes raise entrepreneurial attitudes and intention of students; and investigated in more detail which programme-derived benefits raise entrepreneurial attitudes and intention.
3	Higher education	ALMOR, T., HEILBRUNN, S. (2013) - Entrepreneurship in Israel: Theory and Practice	Israel	Compulsory and elective modules on business subjects in HE	Measured if student's personal entrepreneurial propensity and willingness to engage in entrepreneurship increased
4	Higher education	Martin Lakéus (2013) - Developing entrepreneurial competencies	Sweden	Business education in Higher Education with the on-going creation of a real-life venture as part of formal curriculum	Measured changes in knowledge, skills, attitudes, and how entrepreneurial competencies are developed – with a focus on the role of the real-life experiences
5	Higher education	Charney/Libecap: Impact of entrepreneurship education. 2000.	USA	Specialised programmes in Higher Education	Measured impact through combining data from personal characteristics, educational and employment history, new venture activity and experience with technology transfers and perceptions
6	Higher education	DeTienne D.R. and Chandler G.N. (2004) - Opportunity Identification and Its Role in the Entrepreneurial Classroom: A Pedagogical Approach and Empirical Test.	USA	A strategic management course in Higher Education	Tested any impact of entrepreneurship education/training on the number and innovativeness of opportunities identified.
7	Higher education	European Commission, DG ENTR (2012) Effects and impact of entrepreneurship programmes in Higher Education (JADE career survey)	EU	Entrepreneurship programmes at universities (and JADE - Student organisation)	Measured how programmes and JADE engagement impacts on entrepreneurial knowledge, skills and attitudes, and on becoming an entrepreneur

	Educational sector	Cases	Country	Key characteristics	Evidence on impact
8	Higher education	FLEMING, P (1996) Entrepreneurship education in Ireland: a longitudinal study	Ireland	Several programmes and modules across Ireland that promote an awareness of self-employment as a career option and motivate young people to begin equipping themselves with the skills, knowledge and experience required for effective business ownership	Measured long-term effects of programmes and modules on students.
9	Higher education	Lee et al (2005) Impact of Entrepreneurship Education: A Comparative Study of the U.S. and Korea. International	USA / Korea	Entrepreneurship/venture creation course(s) in Higher Education	Measured differences in intention for venture creation between student groups of heterogeneous cultural backgrounds and between students who have taken entrepreneurship-related courses and those who have not taken them
10	Higher education	Kolvereid L. and Moen Ø. (1997) Entrepreneurship among business graduates:does a major in entrepreneurship make a difference?	Norway	An entrepreneurship major in Higher Education (focussing on business formation, innovation and strategy).	The study measured graduation rates of entrepreneurship alumni by asking them how many firms they had created since graduation.
11	Secondary	Nakkula et al (2004) -Initiating, leading and feeling in control of one's fate: Findings from the 2002-2003 study of NFTE in six Boston Public High Schools.	USA	Classroom-based projects with entrepreneurship curricula that teach career skills in the context of developing a business plan (NFTE programme).	Measured entrepreneurial attitude of students participating in courses
12	Secondary	Vanessa E. Beary (2013) The NFTE Difference: Examining the Impact of Entrepreneurship Education	USA	NFTE programme	Examines the impact of NFTE programmes on the academic achievement and professional success of alumni.
13	Secondary (and primary)	Rotefoss, B. Ovesen, S. and Nyvold, C.E. (2009) – Evaluation of The Company Programme in in compulsory education in Sogn og Fjordane County	Norway	Engaging students in a "real life" project and start a student company in order to develop skills and knowledge related to business start-up and (JA-YE Company programme).	Measured the rate of established student companies, the rate of individuals that have become self-employed or have the intention to.

	Educational sector	Cases	Country	Key characteristics	Evidence on impact
14	Secondary	Lodestar Management/Research Inc.: Junior Achievement Titan Program; 2007 Evaluation.	USA	JA-YE Company programme (Titan programme)	Measured if students helped students to develop knowledge, skills and attitudes to become 'productive citizens and workers'
15	Secondary	Bergman, N. Rosenblatt, Z. Erez, M. and De-Haan, U. (2011) - Gender and the effects of an entrepreneur-ship training program on entrepreneurial self-efficacy and entrepreneurial knowledge gain.	Israel	JA-YE Company programme	Measured the effects of an entrepreneurship training program on entrepreneurial self-efficacy and entrepreneurial knowledge gain from a gender perspective
16	Secondary	Johansen, V. (2013) - Entrepreneurship education and start-up activity: a gender perspective	Norway	JA-YE Company programme	Investigated whether entrepreneurship education in upper secondary schools has an impact on start-up activity 6-8 years after participation and compares the impact on male and female business start-ups.
17	Secondary VET	Urs Baldegger, Ruth Jochum-Gasser, Daniel Mueller (2012) – Making ideas work	Liechtens tein	JA-YE company programme	Examined the effect of a mini-company programme on ability of VET students to think and act entrepreneurially.
18	Secondary	Wennberg, K. (2007) - Practice Makes Perfect - A long-term study of UF-employed entrepreneurial careers in Sweden 1990-2007	Sweden	JA-YE-company programme	Measured the long term behaviour of participants in relation to the public in general with regards to creating and maintaining business.
19	Secondary (and primary)	Junior Achievement Ireland (2011). Enterprise Challenge programme 2010/2011. National Evaluation Report	Ireland	JA-YE-company programme	Measured the effects of the programme in terms of business knowledge and skills and employability
20	Secondary	The Boston Consulting Group (2011) Making an Impact. Assessing Junior Achievement of Canada's Value Creation	Canada	JA-YE Company programme	Measured how many alumni started their own business and the influence of JA in developing ability and desire to do so.
21	Secondary (and higher education)	Kinstgon University London / Young Enterprise UK (2012) Impact - 50 years of Young Enterprise	UK	JA-YE Company programme	Measures what alumni do, what types of businesses do run, and what contribution the course made to their entrepreneurial skills

	Educational sector	Cases	Country	Key characteristics	Evidence on impact
22	Secondary	IARD (2007) – Youth, Economy and entrepreneurial spirit	Italy	JA-YE Company Programme	Measures the development on intention to start-up and entrepreneurial skills as an employee or in personal life
23	Secondary	Financial literacy. A survey of JA-YE participants	Cross-country (12 EU countries)	JA-YE Company programmes and other programmes	Measured impact specifically on financial literacy
24	Secondary	Business skills. A survey of JA-YE Participants	Cross-country (15 EU countries)	JA-YE Company programmes and other programmes	Measured impact specifically on business skills
25	Secondary	What experience did participants in Company Programmes have during their time as company founders – and what happened next? (2007)	Cross-country (6 EU countries)	JA-YE Company Programme	Measured experiences and consequences from participation in JA-YE Company Programmes.
26	Secondary VET	Volery et al. (2013); The impact of entrepreneurship education on human capital at upper-secondary level.	Switzer-land	Stimulate entrepreneurial skills such as spirit of initiative, dynamism and risk bearing and offer insights into the way the social market economy works through curricular content.	Measured effect of several programmes on students' entrepreneurial skills and intentions
27	Primary	Laura Rosendahl Huber, Randolph Sloof and Miriam Van Praag (2012) The effect of early entrepreneurship education	The Nether-lands	Several activities that aim at developing knowledge and a variety of cognitive and non-cognitive entrepreneurial skills, increase awareness of entrepreneurship as a possible career opportunity, and help pupils assess whether entrepreneurship is a suitable career path for them	Measured in how far the activities had an effect on pupils (awareness and entrepreneurship as a career option)
28	Non-formal education	OPM (2013) - Evaluation of CCE/NCB arts and cultural activities project with looked after children	UK	Creativity courses to enhance self-efficacy and empowerment, increase confidence and self-esteem of children	Examined the effect of the creativity course on the well-being and resilience of looked-after children.

	Educational sector	Cases	Country	Key characteristics	Evidence on impact
29	Non-formal education	Peffers J., Huddleston P., Banfalvy C., Weiss Sh., Aparisi J. (2002). Enterprise and its transfer to combat social exclusion-ENTRANCE. Final Report	Cross-Country (4 countries: UK-England, Israel, HU and ES)	The ENTRANCE model/programme targeted 14-19 year-olds in selected institutions in the four countries. A model of "enterprising education", was developed, viewed as both business creation, but also develop knowledge, skills and behaviour that relates to autonomy, creativity, collaboration, decision making skills etc.	Aimed to develop understanding if and how an "enterprise model of learning" can promote the engagement and motivation of youth at risk of social and education/training exclusion. The project also analysed transferability of the model between countries.

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