



Emerging Skills and Competences- A transatlantic study

EU-US Study for the European Commission

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Contents

Résumé	6
Glossary of key terms used	8
Policy Brief - Emerging Skills and Competences - A transatlantic study.....	10
1.1 Methodology.....	11
1.2 Key Findings	11
1.3 Conclusions and recommendations.....	13
2 Emerging Skills and Competences- A transatlantic study.....	20
2.1 Study objectives	20
2.2 Target Audience.....	20
2.3 Co-operation context.....	20
2.4 Methodology.....	21
2.5 Structure of the report	22
3 Comparative overview of the US and EU education systems	23
3.1 Overview of the US education systems	23
3.2 Overview of the European education and training systems.....	25
4 Emerging Skills needs - a comparative overview.....	29
4.1 European perspectives on emerging skills needs	29
4.2 US debates on emerging skills needs.....	31
4.3 Frameworks for emerging skills in the USA	33
4.4 The 21 st century framework for skills - an overview.....	35
4.5 Competence and outcome based education – Europe-USA	38
4.6 A US perspective on forecasting and anticipation of skills	41
5 Responsive education systems – ways forward	44
5.1 Institution-level measures	44
6 Forecasting and anticipation studies – a comparative overview of policy initiatives	48
6.1 Forecasting and anticipation of skills needs in Europe.....	48
6.2 Forecasting and anticipation of skills needs in the USA.....	49
6.3 Use of anticipation studies in the USA.....	54
7 Adjusting to current and emerging demands	55
7.1 Ad-hoc adaptability or systemic innovation capacity - new institutional challenges?	55
7.2 Innovation cultures – critical factors.....	55
7.3 Adjustments in teaching and learning processes	57
8 Current and emerging skills demands	59
8.1 Adaptability.....	59
8.2 Professional skills and competences	60
8.3 International skills.....	60
8.4 Multicultural skills and competences.....	61
8.5 Language skills and competences.....	62
8.6 Organisational skills and competences.....	63
8.7 Employability	64
8.8 Basic skills.....	66
8.9 Innovation and entrepreneurship	66

9	The role of transatlantic collaboration.....	75
9.1	Benefits	75
9.2	Barriers.....	76
10	Conclusions and recommendations.....	78
10.1	21 st Century skills in a globally more connected world- emerging trends!.....	78
10.2	Multidisciplinary learning.....	79
10.3	International orientation.....	80
10.4	Key competences – 21 st century skills- of growing importance across the Atlantic.....	81
10.5	Accountability and performance.....	83
10.6	Entrepreneurship in education.....	85
10.7	Anticipation of skills.....	87
Annex 1: Literature Sources		90
Web Sources		94
Annex 2 - Case Studies		96
Aalto University Finland.....		97
Denmark- <i>Prognose Puljen</i>		102
Biopharma industry-university co-operation – South East England		105
Skills needs in the Automotive Value Chain in Europe		110
Michigan Regional Skills Alliances		115
Milwaukee Creative industries.....		121
Meeting global challenges through education- the case of MIT- Energy Initiative- MITEI.....		127
Annex 3 - Inventory of European Practices on Anticipation of Skills		130
Approach adopted		130
Labour market context.....		130
Applying the results from forecasting, foresight and other research activities		133
Approaches to anticipating skills needs across European countries		138

Résumé¹

This report presents research findings from a transatlantic comparative study on Emerging skills and Competences. The study contributes to the on-going policy dialogue between the US Department of Education and the European Commission, DG Education and Culture on the future strategic direction of education and training systems. More specifically, the study explores approaches adopted to make education and training systems more responsive to emerging skills needs to match future demands in more globalised labour markets. Through exploratory interviews with a range of stakeholders and through a limited number of illustrative case studies, the study has identified a number of promising practices emerging on both sides of the Atlantic. An inventory of European practices of forecasting and anticipation of emerging skills was prepared as part of the study.

On both sides of the Atlantic, institutions and industry representatives see key competences and/or 21st century skills as key to employability, regardless choice of study.

The discourse on 21st century skills is rooted in debates about the competitiveness of the USA in a global economy, which has gradually become more skills intensive. Already in the 80s this led to debates about whether the K-12 system was able to ensure that high school students would graduate with the right type of skills and competences to succeed in a rapidly changing labour market or as the basis for further study. Whereas key competences in Europe are a central feature of lifelong learning policies at the EU level and in Member States – the discourse on lifelong learning has never really gained a foothold in the USA as part of the 21st century skills agenda. There are major similarities between 21st century skills and key competences for example regarding the role that industry has played a strong role in promoting broader skills and competences. In the EU, key competences have a dual focus – contributing to employability of the individual and providing the foundation for active citizenship. Key competences as defined in the EU are comprehensive, spanning teaching and learning from early age to post-retirement, and irrespective of whether teaching and learning occur within the formal education system, on-the-job, or as part of civic and leisure time activities. The EU policy initiatives on key competences within the overall strategies on lifelong learning have had an accelerating effect on reform agendas in vocational education and in tertiary education in the Member States. Legislative changes comprise revision of curriculum and guidance, teacher training initiatives, and the development of new education programmes (GHK 2010). In the USA, the 21st century skills framework includes civic literacy. Civic literacy is often actively promoted by NGOs, for example in activities to develop digital literacy (Shapiro 2009). In the public debate about 21st century skills in the USA it is nevertheless the employability aspects of 21st century skills that have received the most attention. In the USA the 21st century skills debates have had a catalytic role in reforms of the K-12 system and in workforce training as part of broader economic development policies in several states, but with noticeable differences from state to state. In Europe, policies pertaining to the agenda on new skills for new jobs are driving reforms of educational systems and institutional practices to an extent, which is not seen in the USA according to several informants. Reasons are that the federal and state governments traditionally have had limited influence on policies pertaining to the tertiary sector, and furthermore that governance mechanisms for the post-secondary education systems are impacted by a strong belief in market forces. All the US stakeholders interviewed stated that they could simply not imagine that policy makers at the federal or the state level would commission a skills anticipation study in order to try and influence the dimensioning or the content of a post-secondary programme due to institutional cultures and governance arrangements deeply rooted in a strong belief in market forces. Reforms in the tertiary sector in the EU have in recent years led to growing institutional autonomy and market orientation though with substantial differences from Member State to Member State.

In Europe, the competence based education agenda is generally perceived as enabling innovations in teaching and learning environments. In the USA, there has been a more critical

¹ A glossary of key terms can be found at the end of this résumé.

debate among researchers and education practitioners about the underlying philosophy of competence based education. Some of the concerns are that competence-based education is bureaucratic, that it relies excessively on standardisation, and that it masks the quality differences of the various colleges and universities.

Both the Americans and European stakeholders see external partnerships as a central feature in responsive education systems. External partnerships are also seen as playing an enabling role, offering students opportunities to acquire 21st century skills through real-world challenges and problems as illustrated in some of the case studies. Experts, industry and educational providers on both sides of the Atlantic recognise that public-private partnerships and an entrepreneurial culture are deeply grounded in the institutional fabric of the USA post-secondary education providers.

At the state level there are multiple examples of anticipation and forecasting of skills in the context of regional economic development –often driven by restructuring efforts and as the basis for workforce development initiatives. In the USA and in Europe, there are multi-disciplinary research environments concerned with the broader aspects of globalisation and its impact on jobs, skills and equity (US Science Foundation 2008). Foundations in the USA play a strong role in funding such studies.

At the federal level the US Department of Labor has developed a very comprehensive searchable database on labour market projections, and it also manages O*NET. The O*NET programme is the nation's primary source of occupational information. It is dynamically updated and contains information on hundreds of standardised and occupation-specific descriptors as well as career exploration tools. Many studies have been published within the O*NET framework, and these are often used by state or city authorities as the basis for local economic development initiatives where workforce development is one of the components. American university staff interviewed believe that their close relations with employers as well as with their board and alumni are their most important sources for staying attuned to labour market dynamics. When community colleges and state- or local authorities cooperate on regional economic development, O*NET sources or other types of skills forecasting studies are often used, whereas it is generally not the case when it comes to the planning of associate degrees, where they tend to rely on their strong links to the labour market.

From the study, a number of themes emerge where the EU-US co-operation on education could provide a unique platform for further analysis and development of innovative approaches pertaining to a 21st century agenda on education and lifelong learning.

An overview of these proposals can be found in the last part of the report, and they are summarised in the policy brief following the glossary list.

Glossary of key terms used

This list of terms is by no way exhaustive. It is primarily a list to help the US reader, as a number of terms are used in this report, which are very specific to European policies in education and training.

Assessment of learning outcomes: the process of appraising knowledge, know-how, skills and/or competences of an individual against predefined criteria (learning expectations, measurement of learning outcomes). Assessment is typically followed by validation and certification (Cedefop).

Competence: the ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development) (Cedefop).

Credit system: the instrument designed to enable accumulation of learning outcomes gained in formal, non-formal, and/or informal settings, and facilitate their transfer from one setting to another for validation and recognition. A credit system can be designed; by describing an education or training programme and attaching points (credits) to its components (modules, courses, placements, dissertation work, etc.), or by describing a qualification using learning outcomes units and attaching credit points to every unit (Cedefop).

Employability: the combination of factors that enable individuals to progress towards or get into employment, to stay in employment and to progress during career (Cedefop).

EQAVET: The European Quality Assurance in Vocational Education and Training.

European credit transfer and accumulation system (ECTS): a systematic way of describing a higher education programme by attaching credits to its components (modules, courses, placements, dissertation work, etc.), to:

- make study programmes easy to read and compare for all students, local and foreign;
- encourage mobility of students and recognition of formal, non-formal and informal learning;
- help universities to organise and revise their study programmes.

(Cedefop)

European credit system for vocational education and training (ECVET): a device in which qualifications are expressed in units of learning outcomes to which credit points are attached, and which is combined with a procedure for validating learning outcomes. The aim of this system is to promote:

- mobility of people undertaking training;
- accumulation, transfer and validation and recognition of learning outcomes (either formal, non-formal or informal) acquired in different countries;
- implementation of lifelong learning;
- transparency of qualifications;
- mutual trust and co-operation between vocational training and education providers in Europe.

(Cedefop)

European qualification framework for lifelong learning (EQF): a reference tool for the description and comparison of qualification levels in qualifications systems developed at national, international or sectoral level (Cedefop).

Key skills / key competences: the sum of skills (basic and new basic skills) needed to live in contemporary knowledge society (Cedefop).

Learning outcomes/ learning attainments: the set of knowledge, skills, and/or competences an individual has acquired and/or is able to demonstrate after completion of a learning process, either formal, non-formal or informal (Cedefop).

Lifelong learning: all learning activity undertaken throughout life, which results in improving knowledge, know-how, skills, competences, and/or qualifications for personal, social and/or professional reasons (Cedefop).

Mutual recognition of qualifications: the recognition by one or more countries or organisations of qualifications (certificates, diplomas, or titles) awarded in (or by) one or more other countries or other organisations.

Qualification framework: an instrument for the development and classification of qualifications (e.g. at national or sectoral level) according to a set of criteria (e.g. using descriptors) applicable to specified levels of learning outcomes (Cedefop).

Recognition of learning outcomes: formal recognition, the process of granting official status to skills and competences either through the:

- award of qualifications (certificates, diploma or titles); or
- grant of equivalence, credit units or waivers, validation of

gained skills and/or competences (Cedefop).

Social partners: employers' associations and trade unions, forming the two sides of social dialogue (Cedefop).

VET: Vocational Education and Training. In Europe vocational education and training has different configurations across Member States in terms of which levels it is offered at, programme profiles, and governance arrangements.

Terms specific to the US Context

ACE: American Council on Education.

Associate Degree: a one- or two-year programme which leads to a qualification at the post-secondary level. It is often run by community colleges and some four year colleges. Many community colleges have credit transfer arrangements with universities or 4-year colleges so that associate degrees count as credit transfer. The associate degrees are often taken by second chance students, who as working adults choose to return to education to obtain a post-secondary qualification. Community colleges play a central role in local economic development all over the USA and often offer a range of extension services to enterprises, and many play a central role in promoting equity and in social capital formation at the local level.

FIPSE: Fund for the Improvement of Post-secondary Education.

High performance work organisation: work settings relentlessly committed to excellence, product quality, and customer satisfaction (Department of Labor).

K-12 system: the US education system from kindergarten through 12th grade.

Partnership for 21 Century Skills (P21): The Partnership for 21st Century Skills is a national organisation that promotes 21st century readiness for every student. As the United States continues to compete in a global economy that demands innovation, P21 and its members provide tools and resources to help the U.S. education system keep up by fusing the three Rs and four Cs (critical thinking and problem solving, communication, collaboration, and creativity and innovation).

Post-secondary system: comprises community colleges, university colleges, universities and post-doc institutions in the USA (Department of Education).

SCANS: Secretary's Commission on Achieving Necessary Skills (Department of Labor).

21st century skills: the skills needed in the 21st century workplace, and the reforms required to enable the education systems to support the development of those skills. The skills were identified through a process involving educationalists, business leaders, and employer organisations.

1. Policy Brief - Emerging Skills and Competences - A transatlantic study

This section provides a summary on a comparative study on institutional and policy approaches to addressing emerging new skills needs in Europe and in the USA.

The past 25 years has seen major economic transformations in Europe and in the United States. The economies of Europe and the USA have to a large extent gone through similar changes. Whereas the EU and the USA previously relied on the dominance of agriculture, fishery and manufacturing, the economies in both the USA and in Europe have become much more service-intensive, enabled not least by the penetration of ICT. This has allowed companies to deconstruct integrated value chains and outsource a range of work functions where the most favourable cost/quality solution could be found. The developments have on one hand led to growth in low value-added manual service jobs, but on the other hand increased the demand for sophisticated skills required to implement and manage the technology. Changes driven by the deployment of ICT and increasing globalisation have at the same time led to a stronger transatlantic socio-economic integration.

Both in the USA and in the EU there has been a growing debate and concern whether education and training systems sufficiently equip young people with the right skills for the 21st century work place and a world, which is increasingly complex – and interconnected. A strong skills base is in this sense increasingly seen as a lever of sustainable competitiveness driven by changing globalisation dynamics and ICTs, as a critical parameter to. Numerous committees, alliances in the EU and in the USA calling for improved responsiveness in education and training systems to be geared to what has been defined as the knowledge economy.

In 2006, an agreement was signed between the EU and the USA renewing the co-operation programme in higher education and vocational education and training. One of the aims of the agreement in addition to exchanges and development of curriculum has been to enable policy dialogue on common priority issues.

In 2009, the first policy dialogue on Education and Training was held within the transatlantic co-operation agreement. The anticipation and identification of emerging skills sets and educational models and practices conducive to the development of these emerging skills including assessment frameworks were some of the joint priorities identified. In the USA much of the debate has focused on the outcomes of the K12 system in the context of a changing economy. Within the community college system, ground-breaking work has been piloted to test new forms of assessments systems supportive of demonstrating 21st century skills in practice with support from the US department of Education as well as from private foundations. In Europe the Agenda for New Skills and Jobs provides a framework for a range of studies and awareness raising activities and pilot projects, all situated in the "Europe 2020" strategy for smart, inclusive and green growth and in the "Education and Training 2020" work program.

The policy discussion that took place during the meeting in 2009 resulted in a signed declaration with proposals for joint actions - one of those actions proposed being a study on approaches to the anticipation and identification of labour market skills and the assessment and recognition of these skills in the USA and in the EU.

Subsequently a comparative and exploratory study was commissioned aimed to:

... review and compare promising practices in the field of anticipation, identification and validation of skills to match emerging labour market needs and to make education and training systems more relevant and more responsive. The study should also analyse areas where a

convergence of efforts could be noticed to move to education, training and qualification systems based on competencies and learning outcomes.

1.1 Methodology

The study was originally envisaged to be carried out by a team of American and European researchers. Due to budget constraints at the time the study was launched, the European team has undertaken both the US and the EU components of the study.

The study consists of the following elements:

- **Seven case studies**, three in the USA and four in Europe, to illustrate the span in approaches to anticipation of skills and other methods to improve the responsiveness of education systems spanning vocational education, workforce development, and higher education in the United States and in Europe. In addition, some examples of practice have been included in the main report.
- A total of **23 interviews** were conducted with relevant actors in the field of transatlantic collaboration on education:
 - European experts in education;
 - American experts in education;
 - European project managers of transatlantic collaboration programmes;
 - American project managers of transatlantic collaboration programmes;
 - HR-representatives or innovation directors of multinational companies with locations in the USA and in Europe;
 - Former exchange students.
- An inventory on anticipation and forecasting of skills needs in the EU.

Case studies and respondents were chosen in consultation with the European Commission. The study team comprises Pat Irving from GHK who carried out the inventory study, and John Lauritzen and project manager Hanne Shapiro, Danish Technological Institute, who carried out the other components of the study and wrote the main report.

From the outset, the European Commission and the US Department of Education have emphasised the exploratory nature of the study aimed to feed into the ongoing policy debate between the US Department of Education and the European Commission as well as into future joint curriculum projects and exchanges. It is important to bear in mind that the variations of both policies and institutional practices across the United States and in Europe are considerable. The study thus highlights some trends, rather than providing an in-depth analysis on topics pertaining to new skills for new jobs.

1.2 Key Findings

The debates on the EU framework initiative *New Skills for New Jobs* and the US initiative on *21st century skills* have evolved as part of the discourse about the combined effects of new patterns of globalisation, developments of ICT, and liberalisation of trade. In particular the second and third wave of outsourcing in combination with the rapid growth of the tertiary education sector in Southeast Asia has led to a growing concern about whether the education and training systems are sufficiently geared to meet the changing demand for skills and as a prerequisite to future competitiveness. On both sides of the Atlantic, institutions and industry representatives see key competences and/or 21st century skills as the key to future employability. The human capital and skills-driven logic of education has become more dominant in the public discourse, driven especially by industry groups and to some extent at the expense of the broader personal value of education, as some respondents comment the situation.

In the USA, the broad policy debate on 21st century skills has its roots in the development of the K-12 system and its aims to ensure that high school graduates have the skills and competences necessary for employment and employability. In Europe, key competences are embedded in European lifelong learning strategies from early age to post-retirement, in that context with a dual emphasis on employability as well as key competences for active citizenship. As in the USA, industry has here played a strong role in highlighting the changing nature of skills and the needs for educational reform. Both in the USA and in the EU, employer groups have sponsored surveys to further position and advocate the need for change and reform of education systems to better promote a changing skills agenda with a stronger emphasis on a broader foundation of skills and competences and as a precondition to succeed in the 21st century workplace. Newer reports and country studies illustrate how key competences are emerging in continuing education and training measures in the EU, especially in the context of skills and competences pertaining to employee and market-led innovation. In a number of states in the USA, regional economic development initiatives have been implemented in which education policies, labour market policies, and economic policies are aligned in coherent integrated strategies. It is characteristic that many of these initiatives build on the assumptions about the importance of broader foundation skills - in the USA called 21st century skills - and with a focus on career clusters and in many instances in support of cluster policies. Yet the debate on employee-led innovation – or innovation from the shop floor - and the role of workforce development is referred to less frequently by US experts and industry and institutional representatives, although the notion of the high performance workplace has been prominent in US workforce development initiatives for many years. One explaining factor could be the visibility of lifelong learning policies in the EU - more recently also in the discourse of the nature of service innovation and organisational innovation (DG Enterprise 2011). In Europe, debates and initiatives to address changing skills needs tend to be more policy driven than in the USA. However, both in the USA and in the EU, various industry groups have actively promoted the changing skills agenda. In the EU, the European framework for lifelong learning and supportive instruments such as the European Qualification Framework (EQF) have had an enabling impact on national policies and institutional practices, which would not be seen in the USA according to interviewed experts due to the different roles that public policy plays in reforms of the tertiary education system.

External partnerships are perceived by both the American and European stakeholders as playing a central enabling role in realising learning environments, offering students opportunities to acquire 21st century skills through real-world challenges and problems. Experts, industry, and educational providers on both sides of the Atlantic recognise that public-private partnerships and an entrepreneurial culture are deeply grounded in the institutional fabric in the USA institutions. In recent years both the European Commission and Member States have actively supported a stronger university industry co-operation aligned also to policies and actions in support of a stronger entrepreneurial culture in Europe, the Year of Creativity, Entrepreneurship and Innovation in 2009 being just one example.

The European Commission has commissioned a range of European skills anticipation studies at the sectoral level, and with Member States and social partners a number of awareness and dissemination activities have taken place. Cedefop, the European agency on vocational education, has played a pivotal role in stimulating the awareness and uptake of good practices on early anticipation at Member State level. It is furthermore characteristic that the strong involvement of the social partners in many of the initiatives has substantially contributed to the uptake of anticipation methods in national and regional education and labour market policies, and more recently also as a component in innovation policies (Shapiro 2010). In the USA the federal and the state role in tertiary education is minimal, whereas numerous forecasting studies and labour market projections are undertaken as part of labour market policies in the USA, also at a federal level. In order to support employment policies, the US Department of Labor has developed a very comprehensive searchable database on labour market projections, and it manages O*NET, the primary source of occupational information. Several organisations and regional authorities are using O*NET to project changes in occupational profiles. One project involving US Department of Labor (DOL) and several other organisations has linked O*NET data with Bureau of Labor Statistics (BLS) occupational projections in order to project future skill demands and potential skill gaps in different states.

O*NET offers a range of services useful to job seekers, employers, for career guidance purposes, and for education and training providers - particularly to plan workforce development. Within the O*NET framework, research projects are continually commissioned to ensure that the occupational classification in O*NET matches the dynamics of the labour market. The department of Labor has for example commissioned studies to capture and assess the impact of the greening of the economy. Another example is a study commissioned under president George W. Bush linked to the presidential Job Growth initiative. Information from O*NET and data from the BLS and the Census Bureau are used to analyse supply and demand of skills in local labour markets (Tsacoumis 2007).

In a number of EU countries the ongoing monitoring of labour markets to better capture emerging skills demands has become very elaborate in recent years. Examples of these are the UK sector Skills Councils, *FrequenzNet* in Germany, and the Irish Sector Futures Groups supported by FAS. Studies are regularly commissioned in a range of countries not only as part of education and active labour market policies, but also at times to inform regional innovation policies or as part of cluster support initiatives. One of the European case studies on the automotive sector comprises a number of regional studies. In several states in the USA forecasting of skills often occur as the basis for large scale economic development initiatives, often driven by restructuring efforts and as the basis for planning workforce development. Both in the USA and in Europe there are several multi-disciplinary research environments concerned with the linkages between a changing economy and its impact on jobs and skills. At the end of 2005 the European Commission DG Employment and US Department of Labor took joint initiative to convene researchers and policy analysts to discuss approaches to addressing changing skills needs in the context of global sourcing.

Competence and outcome based education models have led to a quest for new approaches to assessments. In Finland for example, assessment in tertiary vocational education – the polytechnics, - has shifted from traditional testing to what is called local demonstration assessments, and in Denmark self-assessment has become an important part of promoting learning-to-learn competences in upper secondary vocational education. Nevertheless, in the publication on the Shift to Learning Outcomes in Europe (Cedefop 2009c), the authors conclude that new models of assessments only emerge slowly. There are similarities in approaches and rationale for such efforts in the EU and the USA, such as improving access for disadvantaged learners by recognising learning that has occurred in informal or non-formal settings, increasing the efficiency of workforce development measures, or demonstrating accountability in terms of demonstrating the outcomes and impact of a particular measure. At the institutional level, multiple projects have been implemented both in the EU and in the USA to improve assessment methods so individuals improve their opportunities to document their full set of skills and competences regardless of how they have been obtained. One of the methods used on both sides of the Atlantic is 'e-portfolios'. From the study, a number of themes emerge where the EU-US co-operation on education could provide a unique platform for further analysis and development of innovative approaches pertaining to a 21st century agenda on education and lifelong learning.

1.3 Conclusions and recommendations

From the background literature study and the interviews and case studies a number of themes emerge, which could inspire further actions in the transatlantic co-operation either implemented through the programme measures or through the ongoing strategic policy dialogue. On the one hand, convergence can be noted in a range of areas pertaining to the debate about changing skills and jobs; on the other hand, there are fundamental differences in institutional practices and in policies. The EU-US partnership in education could therefore be an ideal teaching and learning innovation platform for both practitioners and policy makers, further exploring institutional processes and practices for promoting key competences/21st century skills in post-secondary education - be it upper secondary vocational education or tertiary education. The partnership could also be a platform for collecting more evidence on a range of topics related to the agenda of changing skills and competences.

This could be done through a strong connection between pilot projects, commissioned studies linked to the pilots - and as a third element policy dialogues also involving external stakeholders.

1.3.1 Multi-cultural and international key competences

Key competences and 21st century skills are to a great extent driven by a growing awareness of the impact of globalisation in terms of the overall job turnover and reconfiguration of labour markets.

Graduates from vocational education institutions and from universities can increasingly expect to deploy a broad set of competences in all professional areas, and many will at some point in life work in an international company as part of their career trajectory. The institutional focus on key competences and on 21st century skills is an important step in that direction, as is international mobility, but few students are likely to have such an experience through their study. Key competences are not just employment related, but are also associated with civic engagement and community development in Europe as well as in the USA.

1.3.2 Key competences and 21st century skills - of growing importance across the Atlantic

Company staff, institutional representatives, and students see key competences and United States 21st century skills as being of growing importance for employability. Only a few mention the importance of key competences for civic engagement and personal growth. However, a few European institutional representatives are concerned about the risk that the increasing emphasis on employability will lead students to become much more instrumentalist in their view of education- and as such lose out on personal growth opportunities. Several mention that exchange programmes span opportunities for personal growth as well as employability because students are brought in situations that are unfamiliar to them in many dimensions. Nevertheless, among the institutional representatives interviewed there is not much evidence that the notion of key skills/ 21st century skills has been an explicit focus in existing transatlantic partnerships.

The study shows that the debate about competence based education has been more critical in the USA and has raised important and fundamental questions about evidence and justifications of the value added of competence based approaches. Competence and outcome based approaches have ramifications on teacher qualifications and assessment approaches, an area of concern in both the USA and in the EU (Cedefop 2009c; OECD 2010).

Both EU and US institutions recognise that key competences are critical to students' future employability. Some teachers believe that key competences cannot be acquired in an institutional setting whilst others recognise that a growing emphasis on key competences/21st century skills will require changes in the design of teaching and learning processes and teachers' qualifications. However, there is little evidence that these emerging trends are a central feature in existing projects and transatlantic partnerships.

Proposal for joint action

Several interviewees have advocated the need for a fundamental shift in teaching and learning environments if education is going to play a more systemic role in furthering an entrepreneurial mind-set in students. In particular, the MIT and the Aalto case studies are best practice example of how deep transformation of institutional cultures and practices requires leadership and commitment, but that such transformation processes also yield major benefits for students, teachers and external stakeholders. The transatlantic partnership between the US Department of Education and the European Commission, DGEAC, could provide a strategic framework for testing and measuring the impact of innovative organisational and pedagogic models to develop and sustain entrepreneurial institutional cultures including partnership models and aspects relating to the training of teachers.

Some of the characteristics of such learning environments are:

- Research-informed teaching uses action-based research models in multi-disciplinary learning processes to help solve complex, comprehensive, and interconnected problems;

- Learning beyond the campus walls and in new partnership models;
- Discovery which is useful beyond the academic community and service that directly benefits the public;
- Students working on projects with real clients, applying their specialist subject skills and receiving course credits for their work. The community becomes part of the teaching process and benefits from the students' work;
- New boundary crossing organisations and structures are developed as part of the learning environment;
- ICT is an integrated feature in teaching and learning processes.

Within the action line of joint development of curriculum, funding could be prioritised to carry out a feasibility study to explore opportunities for developing transatlantic curriculum that builds on teaching and learning in multidisciplinary problem-based settings. Changing teaching and learning environments demand new teacher qualifications and assessment models.

The transatlantic co-operation could provide an ideal framework for pilot activities with focus on innovative methods of teacher training enabling teachers to design teaching and learning processes based on a key competences/21st century skills approaches. In that context it would be of value to analyse and collect best practice examples of tests and final exams that mirror the growing focus on key competences/21st century skills. The activities and outcomes of the Working group on Assessment of Key Competences set up by the European Commission could provide a valuable contribution to such joint work.

It is also proposed to conduct a joint study to thoroughly assess benefits and barriers to competence based higher education and vocational education from the perspective of teachers, students, researchers, and industry, with a view to expanding the evidence base on competence based education and its value added. One of the key themes to be addressed is the feasibility of mainstreaming and scaling competence based education and assessment approaches within the existing institutional regimes.

1.3.3 Accountability and performance

It is interesting to note that several informants in both Europe and the USA see American students as much harder-working and disciplined about their studies. An American visiting professor is discouraged with what he perceives as a lack of performance culture, judged from his experiences as a visiting professor in a Nordic business school.

"It is hard to ensure progress and student excellence, because students are left far too much to decide for themselves and against their own good for example if they wish to show up to a class or not, or how much work they put into an assignment- and you are not supposed to pace the students to make them excel, and there is a lack of a professional culture even when it comes down to whether standard technical equipment works or not."

- American visiting professor

There are several factors that could be at play, according to some sources, for example differences in financing. European education policies differ in many respects from American policies in the provision of higher education studies: higher education institutions in Europe are predominantly publicly funded, somewhat similar to how compulsory K-12 education is funded in the United States. It is suggested that a sense of public entitlement and taxpayers' rights to accountability therefore permeates Europe and the accountability culture in European higher education, at times leading to micro-management according to some respondents. In the USA, private and state higher education institutions, which includes community colleges, tend to be run much more independently of federal and state authorities, although it should be noted that across the EU, reforms in the higher education sector have resulted in much larger institutional autonomy, and in some countries, for example the Netherlands, have resulted in more market-led structures,

The areas in which institutional autonomy has been strengthened differ from country to country. In Germany the first major step was the shift from earmarked funding to block grants, whereas the UK reform of the university sector initially focused on four key areas: (1) capacity and capability building; (2) accountability to stakeholders; (3) staff equality and diversity; and, (4) sustainable human resources management (Maassen 2006). In the USA the institutional accountability culture is primarily focused on the different sponsors - the students and their parents, former alumni, foundations, etc. Some respondents therefore suggest that American higher education institutions by definition focus on strong relations with external partners. A European institutional representative states that the nature of external relations is at times “*as a marriage enacted by government*” and mandated by legal statutes.

Some informants believe that different funding regimes of higher education are the key reasons to different approaches to performance orientation in the USA and in Europe.

The differences are perceived as having a major impact:

“Here in Denmark - they do nothing but check, check, check – the government decides on everything, there is so little autonomy compared to in the USA, so I really think it kills innovation and excellence - even impacting the professionalism of the support infrastructure in a negative way.”

- American visiting professor

Proposal for joint action

In Europe as well as in the USA, new student profiles are found in higher education institutions and in vocational education institutions. They can be part time, working, or they can have families influencing study behaviours. These new student profiles pose new requirements to institutional practices, but they also enrich the overall teaching and learning environment – especially as more experientially based education has come to play a stronger role. For these reasons there is also a joint interest in exploring the boundaries of competence and outcome based learning environments with a view to expanding educational opportunities for new target groups, but also in the context of developing learner-centred experience-based pedagogical models

In the USA, competence based assessment models tend to be situated between an accountability culture whereby on the one hand competence based assessments are used to inform quality improvements in teaching and learning approaches, and on the other hand are used as a means to improve access for non-traditional students. There is a growing body of knowledge on the correlation between employee driven innovation, key competences, and the quality of the learning environment- which applies to the highly skilled professionals as well as the shop-floor worker (OECD/CERI 2011). It is therefore proposed to jointly develop and test assessment models that can feed into quality development of competence and outcome based curriculum and into guidance models for non-traditional student cohorts.

Competence and outcome based education offers immense new opportunities for innovation in educational models and processes spanning informal, non-formal, and formal education and training. The study clearly shows that across the Atlantic it is widely recognised that competence and outcome based education holds many potentials that also challenge traditional educational practices. It would therefore be of advantage to set up a virtual transatlantic clearing house with the use of social media where practitioners, researchers, and policy makers could share resources and knowledge concerning the range of topics and tools linked to emerging skills and competence based education. Post-secondary institutions would benefit from a richer access to tools and methods that have been developed such as competence based assessments or personal competence portfolios, and from opportunities to share experiences with other institutional practitioners. For researchers and policy analysts this would provide a platform for sharing new research findings which could inform educational policy, and it would enable new research findings to be made available to educational practitioners.

1.3.4 Entrepreneurship in education

According to the informants interviewed, professors and teachers at community colleges in the USA more often have personal entrepreneurial experience than those in the EU. Sometimes they are entrepreneurs themselves, they may mentor start-ups, or they are involved in incubator environments on the campus. This allows for larger opportunities to integrate entrepreneurship in a structured real-life environment. Entrepreneurship education is increasingly changing from being taught as a subject where students acquire knowledge about entrepreneurship to a situation where entrepreneurship education is more project and case-based. In EU and in the US, entrepreneurship education is increasingly perceived as something broader than developing the skills to start a business.

Aside from specific projects on entrepreneurship education, entrepreneurship and innovation have so far not become more widely embedded in a wider range of joint projects in the transatlantic co-operation.

Transatlantic co-operation could be a unique framework for jointly developing generic models and multi-disciplinary curricula integrating entrepreneurship in natural sciences, creative arts, health services, and teacher education and training programmes, as these study areas in Europe tend to have been less of a priority than business and engineering studies. It could also be of value for institutions in the USA and in Europe collaborating on entrepreneurship education to jointly develop a network of former graduates who have become successful entrepreneurs in different fields and who are ready to function as mentors within the EU-US co-operation.

Proposal for joint action

At a policy level, it is proposed to identify, in collaboration with the Kauffmann Foundation², newer successful *next practice examples* on entrepreneurship education including social entrepreneurship aimed at untraditional target groups, not least youth at risk or the immigrant population. Broad dissemination of guidelines and good practices through different channels could stimulate the development of entrepreneurial components in the preparation and development of new joint programme initiatives, and could substantially contribute to policy developments in the field.

1.3.5 Anticipation of skills

Measures to anticipate skills are seen both in the United States and in Europe. The Department of Labor in the USA is the key actor in the projection of long term labour market forecasts. Very refined and searchable data are available on occupational projections, factors linked to labour force productivity, outcomes of workforce development, composition of the labour force, international labour force comparisons, etc. Sector-based anticipation studies such as those commissioned by the European Commission are generally not found in the United States. At the state or the regional level there are several examples of how anticipation of skills is embedded in broader economic development initiatives. The *Michigan Works Association* and the *Michigan Skills Alliance* are just two examples of how public policy makers, employers, educators, and other types of organisations at the state level join forces to ensure the availability of a qualified workforce matching emerging demands. The European CLEPA Case study provides examples of how a European-wide initiative captures changes in the automotive industry within the context of restructuring. The study has an elaborated regional approach in regions where the automotive industry traditionally has played a strong role. In the review of literature, several examples of foundation-commissioned multi-disciplinary research and exchanges on the nature of change in workplaces and in jobs are found

² <http://www.kauffman.org>. The Kauffman Foundation is among the thirty largest foundations in the United States with an asset base of approximately \$2 billion. The key focus of the foundation is entrepreneurship policies and practices

on both sides of the Atlantic. It remains a question however, if the knowledge triangle - understood as the link between research, education and innovation - functions optimally. Interviews conducted with both US and European institutional representatives indicate that methodologies to anticipate skills and studies on anticipation are used to a limited extent by US and European institutions – one major exception being regional anticipation studies undertaken in the context of restructuring and workforce development in the USA.

Proposal for joint action

A recent study from the OECD suggests that those regions capable of integrating regional economic, labour market, and education policies are more successful in terms of sustainable development. On that background, it is proposed that the transatlantic partnership could provide a framework for mutual discussion and exchange of promising practices with a view to jointly developing integrated models for workforce development in the context of regional innovation. The role of vocational education provision to adults as part of the dynamics of regional innovation systems is a theme that seems so far to have been less addressed in the transatlantic partnership. The Network TA3³, which is a partnership between USA community colleges and European technical colleges and *fachhochschulen*, could potentially be a fruitful platform for such a measure. In fact, the TA3 Alliance was originally funded with modest seed funding from US Department of Education and the European Commission, and is still running today.

This study includes innovative best practice examples of the role of post-secondary vocational institutions in regional innovation systems. It is proposed to build on such practices to organise a joint event with particular focus on how regional policy makers and education providers can use anticipation methods and existing studies as the basis for workforce development, and more broadly as input to formulation of demand-driven institutional strategies.

Proposals for Joint Action

All stakeholders agree that competences and abilities pertaining to an international mindset are of growing importance both for success in the 21st century workplace and as part of active citizenship. Study findings indicate that the international and multicultural dimension of exchange visits is primarily perceived as developing personal abilities, whereas other dimensions to internationalisation and multiculturalism - apart from language skills - seem to be less explicit for students and professors alike, except in business studies.

It is therefore proposed to jointly explore the nature of international and multicultural dimensions in curriculum in different programme streams (science, business studies, humanities, arts, engineering, and social sciences). Secondly, it is proposed to identify and test teaching and learning processes that are conducive to developing key competences /21st century skills relating to internationalisation and multiculturalism. The purpose would be to identify and develop some best practice examples that could strengthen the value of transatlantic exchange initiatives, for example also exploiting the use of ICT.

A high-level transatlantic policy seminar possibly with the involvement of other international stakeholders such as UNESCO, OECD, the World Economic Forum, and some of the bigger educational foundations, could be used to elaborate ideas and scenarios that could guide further development.

Labour markets are constantly changing and being reconfigured, shaped by a range of forces such as global specialisation, penetration of ICT in all parts of the economy, and more recently the great global challenges such as health, climate, and access to clean water. Capturing these changes in labour market monitoring systems on an ongoing basis poses a range of challenges to policy

³ <http://www.ta3online.org/about/>

makers both in the EU and in the USA, particularly because traditional occupational classification systems and skills taxonomies are impacted. In the EU, one of the main initiatives under the umbrella of the Commission's New Skills for New Jobs initiative is the ESCO initiative involving DG Education and Culture and DG Employment (DG Employment 2010)⁴. The aim is to develop a multi-lingual methodology and taxonomy linking skills competences and abilities to occupations. The ESCO initiative marks the shift to the new labour market paradigm based on skills and competences rather than on traditional educational input measurements (qualifications). Coupled with an approach to measure educational attainment based on the European Qualification framework (EQF), the ESCO standard will create greater coherence between lifelong learning and employment policies.

Within the transatlantic partnership on education it is proposed to set in motion a high level initiative to share knowledge about the use of different research methods to identify emerging new occupations and shifts in occupations within the framework of respectively O*NET and the ESCO initiative. It would be of value to share promising practices on tools and strategies used to identify growth opportunities and project occupational growth as the economy recovers in the EU and in the USA. It would also be of value to avoid skills mismatches in the context of restructuring. To improve the impact of such an initiative it would be of benefit to involve the EU-US working group on employment and labour market related issues.⁵

⁴ EMPL D-3/LK D(2009) ESCO Facts Sheets

⁵ The U.S. — EU Working Group on Employment and Labor-Related Issues was established in 1996

2 Emerging Skills and Competences- A transatlantic study

2.1 Study objectives

This exploratory study, commissioned by the European Commission, DG Education and Culture (DG EAC), aims to contribute to the ongoing policy dialogue between the US Department of Education and DG EAC on the future strategic direction of education and training systems. More specifically the study explores how education and training systems go about anticipation, identification and validation of skills to better match future demands in the labour markets and in the context of changing patterns of globalisation.

2.2 Target Audience

Through exploratory interviews with experts, policy makers and institutional representatives, a number of promising practices have emerged on both sides of the Atlantic, and interviewed stakeholders have shed light on the policies and processes, which are critical to sustaining innovations in the institutional offer. In some areas convergence can be noted in policies and practices pertaining to an agenda on new skills for the 21st century workplace, and more broadly to the growing need for an entrepreneurial culture in all parts of our societies. On the other hand, public policy plays a different role in post-compulsory education and workforce training in the EU than in the USA, and there are different traditions for public-private partnerships in the field of education in the USA than in Europe. The study therefore offers a number of lessons that can feed into ongoing policy dialogues and reflections about the future direction of our education systems in a world which is increasingly interconnected. The study also includes a number of examples and reflections that can inspire education providers and industry representatives in their ongoing dialogues about strategies and practices that promote competences required in the 21st century workplace and in the society at large. Seven best practice case studies from the USA and from the EU. In addition, an EU-based inventory of practices for forecasting and anticipation of skills has been prepared as part of the study.

2.3 Co-operation context

An agreement in June 2006 renewed EU-US co-operation through the Atlantis Programme⁶ for another eight-year period (2006-2013). The overall aim is to promote understanding between the peoples on either side of the Atlantic and improve the quality of their human resource development.

Managed jointly by the European Commission (through the Executive Agency for Education Audiovisual and Culture) and by the US Department of Education, FIPSE⁷ activities include:

- **Transatlantic Degree:** the programme supports partnerships between EU and US institutions to establish joint study programmes – including joint/double degrees – and exchanges of students and staff;
- **Excellence in Mobility projects:** these provide funding to joint consortia for student mobility;
- **Policy-oriented Measures:** these address comparative higher education and vocational training issues, and promote dialogue on recognition of qualifications and accreditation;
- **The Schuman-Fulbright scholarships:** these allow highly qualified professionals to study or train on the opposite side of the Atlantic, in areas of specific relevance to EU-US relations.

⁶ http://eacea.ec.europa.eu/bilateral_cooperation/eu_us/programme/about_eu_usa_en.php

⁷ The Fund for the Improvement of Postsecondary Education (FIPSE)

In 2009 the first EU-US Education Policy Dialogue was held in Washington, D.C. with comprehensive discussions about education policies and programmes⁸. A joint statement was signed following the meeting in Washington, D.C. One of the future actions identified was a joint study to compare and to analyse approaches to anticipation and identification of labour market skills and how the assessment and recognition of these skills occur in the USA and in the EU. The agreed objectives of a joint study were to ***“review exchange and compare good practices in the field of anticipation, identification and validation of skills, to match future labour market needs and to make education and training systems more relevant and more responsive. The study will in particular examine the convergence of efforts, from both sides of the Atlantic, to move to education, training and qualifications systems based on competencies and learning outcomes.”***⁹

This comparative study is an outcome of the policy discussions that took place in 2009 between the European Commission representatives and officials from the US Department of Education.

2.4 Methodology

The study was originally envisaged as having a USA research counterpart to the European research team. Due to budget cuts in the Department of Education in the United States, it was not possible to carry out the study with an American research team. In consultation with the European Commission, the European team carried out the comparative analysis for both the USA and Europe based on a deep knowledge about the USA Education systems and multiple contacts to both experts and institutions.

Seven case studies have been completed: three in the USA and four in Europe. The case studies have been chosen to illustrate the range of approaches that may be adopted by institutional representatives or by the public sector to improve the responsiveness of education systems and to better accommodate new target audiences and their demands. The case studies therefore include examples from the tertiary sector, upper-secondary vocational education, labour market workforce development, and further education offered by a university.

A total number of 23 interviews were conducted with relevant actors in the field of transatlantic collaboration on education:

- European experts in education,
- American experts in education,
- European project managers of transatlantic collaboration programmes,
- American project managers of transatlantic collaboration programmes,
- HR-representatives and/or directors for corporate innovation strategy in multinational companies with locations in the USA and in Europe,
- Former exchange students.

The inventory of forecasting and anticipation methods has been completed based on examples from the EU. However, in the report there are descriptions of US anticipation and forecasting studies which have been used in the context of regional restructuring and to elaborate sound workforce development measures.

Case studies as well as interviewees were chosen in consultation with the European Commission. The study team comprises Pat Irving from GHK who carried out the inventory study, and John Lauritzen and project manager Hanne Shapiro, who carried out the other components of the study and wrote the main report.

⁸ http://ec.europa.eu/education/news/news1854_en.htm

⁹ Citation from the joint statement following the EU US policy meeting in Washington D.C. 2009

From the outset, the European Commission and the US Department of Education intended that the study be exploratory in order to capture emerging trends and practices. Given the richness in data sources available for this study, it is important that readers bear in mind that the variations in policies and institutional practices across the United States and in Europe are considerable, so the observations and conclusions build on observations and trends rather than in depth analysis of the actual situation across Europe and in the USA.

2.5 Structure of the report

To situate the findings of the study, the first two chapters provide an overview of the vocational and higher education system in the USA including the pattern of mobility of US students from the USA to Europe. It is followed by an overview of education and training systems in Europe and it includes an overview of trans-Atlantic mobility patterns of European students.

- Chapter 1 is a policy brief summarising key findings and proposed policy options.
- Chapter 2 introduces study objectives, target audience, and the methodologies deployed.
- Chapter 3 provides a comparative overview of education and training systems in the USA and in the EU.
- Chapter 4 presents a discussion on how the topic of emerging skills has been addressed in the USA and in the EU.
- Chapter 5 presents a brief characteristic of responsive education systems.
- Chapter 6 presents a comparative overview on forecasting and anticipation of skills.
- Chapter 7 includes a discussion on adjustability capacity.
- Chapter 8 provides coverage of emerging skills as seen from the perspective of respondents.
- Chapter 9 provides a brief coverage of value added of the transatlantic co-operation pertaining to the debate on new skills and competences for new jobs.
- Chapter 10 comprises conclusions and proposals for possible joint actions in the transatlantic partnership.

The study team wishes to thank everyone in the USA and in the European Union who have contributed to this study.

3 Comparative overview of the US and EU education systems

For those readers not familiar with the US post- secondary education system, this section provides a brief introduction.

3.1 Overview of the US education systems

The USA does not have an integrated national system of education. Rather, each of the 50 states has its own system. The total system is large, with over 4000 institutions according to the American Council on Education (ACE)¹⁰. The institutions may be divided into three key groups:

- Public, primarily state-owned (examples: University of California, Berkeley, or State University of New York);
- Private (not for profit): these include a wide mix of foundations (e.g. Harvard and Princeton), faith-based (e.g. Notre Dame), and other foundations;
- Private (for profit): this group has seen a rapid increase recently and includes the University of Phoenix.

The market plays a more dominant role in both public and private institutions than it does in European Education and training system. While each institution might seek its appropriate niche in the market, all institutions need to attract revenue from a diversity of funding sources.

Post-secondary education¹¹

Community Colleges: Most are publicly funded, and they are a vital part of the post-secondary education system, serving almost half of all undergraduate students in the USA. Community colleges provide open access to post-secondary education, prepare students for transfer to four-year institutions, provide workforce development and skills training as well as extension services in the context of regional economic development or cluster development, and offer non-credit programmes. They vary in size and play a vital role towards the US government's widening participation agenda.¹²

Baccalaureate colleges: The most common group are the liberal arts colleges dominated by the private sector, accounting for nearly 70 per cent of enrolments; they offer bachelor's degrees. Many have endowments and some have affiliation with a religious faith. Enrolments are relatively small.

Master's colleges and universities: While some institutions offer doctorates, most provide undergraduate and master's degree courses. Their students tend to be selected from communities nearby and they offer many part-time study options. In total they enrol about 14 per cent of higher education students.

Doctoral institutions: Research and doctoral universities grant doctoral degrees and provide a wide range of baccalaureate and master's degree courses. Research universities include some of the best known (e.g. Harvard and Stanford). Those that are publicly funded are the 'flagship'

¹⁰ <http://www.acenet.edu/AM/Template.cfm?Section=Home>

¹¹ On terminology: in the description of the US system the term *post-secondary education* is commonly used comprising the associate vocational degrees offered by community colleges as well as baccalaureate colleges and master's colleges and universities and doctoral institutions. In this study in the description of European systems the term *tertiary education* refers to the vocationally oriented polytechnics, university colleges, universities, and speciality institutions. The term *vocational education* refers to upper secondary vocational education and continuing vocational education including labour market courses offered by vocational training institutions.

¹² For more information, please refer to the American Association of Community Colleges (AACC)

institutions in each state. Public and private doctoral institutions enrol 43 per cent of all students in four-year colleges.

Other types of institutions: There are a number of other post-secondary institutions that include those that offer specialised courses in single disciplines, military academies, and some special institutions that were federally led, e.g. historically black colleges and universities.

For-profit providers: For-profit institutions primarily offer vocational programmes that result in certificates rather than degrees. Of the more than 2,400 for-profit institutions counted by the U.S. Department of Education, 500 offer two-year associate degrees and 320 offer bachelor's and/or graduate degrees.

International students

In 2010, the U.S. hosted 20% of the 3.3 million students worldwide who are pursuing higher education outside their home countries. The U.K. has the next largest portion, with 13 % of the total, followed by France (8%), Germany (7%), China (7%), Australia (7%), Canada (4%) and Japan (4 %). Europe was in 2010 the largest host region of international students, receiving 39 % of all globally mobile students. However, the majority of international students at European tertiary education institutions come from other countries in Europe and app.77% of mobile students from Western Europe remain within Western Europe (Chow P. 2011). The United States continues to host more international students than any other country in the world. Together, the top three sending countries—China, India and South Korea—comprise nearly half (44%) of the total international enrollments in U.S. higher education. Canada, Taiwan and Japan each represent close to 4% of the total international student population according to figures from Institute of International Education. Saudi Arabia is now the seventh leading sending country, moving up from tenth position last year and reflecting the Saudi government's substantial investment in study abroad scholarships. Increases in enrollments of 6% or less were reported from India, Vietnam, Turkey, U.K., Brazil, France, Nigeria, Malaysia and Venezuela. Vietnam's 2% increase was relatively small compared to the more than 45% increases it had shown in the previous two years. Students from India increased by 2%, which was a lower rate than in previous years; however, they remain the second largest international group, with tens of thousands more students from India in U.S. higher education than from any other country except China.

Top Places of origin

Place of Origin	2008/2009	2009/2010	% of total	% Change
World total	671.616	690,923	100%	+ 2,9%
China	98.235	127.628	18.5%	+ 29.9%
India	103.260	104.897	15.2%	+1.6%
South Korea	75.065	72.153	10.4%	- 3.9%
Canada	29.697	28.145	4.1%	-5.2%
Taiwan	28.065	26.685	3.9%	-4.9%

Source: Open Doors Fact Sheet 2010¹³

In 2010 Brazil was ranked as number 14 in terms of country of origin for international students in the USA. Another BRIC country, Russia was placed as number 25. Germany had the highest flow of European students in the United States in 2010 with 9.548 students a small drop from the previous year. The UK was ranked as number 13 with 8.861 UK students studying in the USA, a 1.8% increase from the previous year.

¹³ <http://www.iie.org/en/Research-and-Publications/Open-Doors/Data/Fact-Sheets-by-Region>

The number of US students who studied in Europe in 2008 was 147,676, an increase from 1987/88 when 47,005 studied in Europe¹⁴.

Table 3.1 Top destinations for US Students

Rank	Destination	2007/2008	2008/2009	%total
1	UK	33.333	31.342	12%
2	Italy	30670	27831	10.5%
3	Spain	25.212	24.169	9.3%
4	France	17.336	16910	6.5%
5	China	13.165	13.674	5.3%
6	Australia	11.142	11.140	4.3%
7	Germany	8.253	8.330	3.2%
8	Mexico	9.928	7.320	2.8%
9	Ireland	6.881	2836	2.6%
10	Costa Rica	6.096	6.363	4.4%

Source: Open Doors 2010 Fact Sheet Europe

3.2 Overview¹⁵ of the European education and training systems

Tertiary education institutions:

Europe has around 4 000 tertiary education institutions, with over 19 million students and 1.5 million staff. National governments are responsible for their education and training systems and individual universities organise their own curricula.

There are basically four kinds of tertiary institutions in Europe:

- Universities
- Institutes of applied sciences such as *fachhochschulen* and polytechnics, university colleges which offer vocational programmes targeting the private or the public sector or both
- Specialty institutions such as music and art conservatories and medical schools
- Institutions between upper secondary and lower tertiary- such as the Danish Trade Academies (*Erhvervsakademier*), corresponding to associate degrees.
- Private tertiary institutions, particularly found in former Eastern Europe.

Vocational education institutions¹⁶

Apart from vocational tertiary level institutions, this study also includes vocational institutions at upper secondary level, institutions that offer both accredited and non-accredited continuing vocational training.

The American reader should note that with a growing policy focus on excellence in vocational education and training (VET) combined with the impact of lifelong learning policies, boundaries

¹⁴ National center for Education statistics, USA, <http://nces.ed.gov/programs/coe/2010/section5/table-ssa-1.asp>

¹⁵ On the open method of coordination, see for example:
<http://www.timeshighereducation.co.uk/story.asp?storyCode=205279§ioncode=26>

¹⁶ The American reader should note that the vocational offer is also offered at the lower secondary level and as part of a 12 year uniform education program, for example in Sweden, and somewhat similar to the US K-12 system

between VET and higher education (HE) and between the ordinary and the continuing education and training system are gradually blurring.

In 1999, 29 European countries initiated through the Bologna Declaration¹⁷ a system of reforms in tertiary education in Europe. One of the goals of the Bologna Process has been to harmonise certain aspects of tertiary education within participating countries so that degrees are comparable, credits are transferable, and students, teachers, and researchers can move freely from institution to institution across national borders. Its aim has been to replace the varied degree programmes in existence, which typically have taken 5 or more years to complete, with a standard 3-year bachelor's degree and a 2-year master's degree and with a standardised credit system. The Bologna Process is also stimulating discussion about reform of the U.S. tertiary education system particularly regarding the value-added of qualification systems (Adelman 2008).

By 2008, tertiary education reform in Europe comprised more than 45 countries, but it is still in progress in many countries and in many fields, and the impact is still uncertain. Many countries have established regulations for reform, but implementation of changes is ongoing, particularly in some disciplines. In many European countries, law and medicine have not moved to the 2-cycle (bachelor's and master's) structure.

The Bologna Declaration is a voluntary undertaking by each signatory country to reform its own education system. The open method of coordination provides a framework that allows the identification and dissemination of good practices and support for Member States in the pursuit of more effective university systems.

The Bologna Declaration comprises a broad framework of actions contributing to the development of the European Higher Education Area (EHEA¹⁸):

- Adoption of a system of easily readable and comparable degrees, also through the implementation of the Diploma Supplement, in order to promote European citizens' employability and the international competitiveness of the European higher education system.
- Adoption of a system essentially based on two main cycles, undergraduate and graduate.
- Establishment of a system of credits - such as in the ECTS system.
- Promotion of widespread student mobility.
- Promotion of mobility by overcoming obstacles to the effective exercise of free movement.
- Promotion of the necessary European dimensions in higher education, particularly with regards to curriculum development, inter-institutional co-operation, mobility schemes and integrated programmes of study, training and research.

The Bologna Process¹⁹ has accelerated the modernisation of tertiary education in Europe. This also includes measures to improve collaboration between universities and enterprises as well as innovations in curriculum and teaching methods, for example the inclusion of entrepreneurship in existing qualifications and industry placement schemes.

The Commission has played an enabling role in developing the tertiary education sector in Europe through programme funding, research funding, and awareness raising activities and studies. This funding currently includes the 7th framework programme for research and development²⁰, the Lifelong Learning Programme, the Competitiveness and Innovation Programme, and the Structural Funds²¹ focusing on the least developed regions.

¹⁷ <http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf>

¹⁸ <http://www.ehea.info/>

¹⁹ On the Bologna Process, see for example:
http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11088_en.htm

²⁰ http://cordis.europa.eu/fp7/home_en.html

²¹ http://europa.eu/legislation_summaries/regional_policy/provisions_and_instruments/l60014_en.htm

In the field of education and training the European Commission has signed bilateral agreements such as the EU-US bilateral agreement. The bilateral agreement provides the framework for the Atlantis programme as described in the beginning of the report.²²

The number of students from Europe to the USA decreased by 2.9% from 2009-2010 to a total of 85.084 students.

Table 3.2 Open Doors: Institute of International Education - European student mobility to the USA²³

Country of origin	2009/2010 total	% enrolled in undergraduate programme	% Change
Austria	994	32.5%	+ 9.4%
Belgium	845	42.1%	-1.5%
Cyprus	586	36.0%	-15.8%
Czech Republic	828	43.7%	-10.5%
Denmark	989	33.6	-1.0%
Estonia	220	57.3%	-18.5%
Finland	663	48.9%	-12.0%
France	7716	31.1%	+ 4.0%
Germany	9548	33.7%	-1.4%
Greece	1827	31.9%	-3.1%
Hungary	664	42,2%	-2.4%
Ireland	1212	32.6%	14.4%
Italy	4072	24.8%	3.2%
Latvia	286	57.3%	10.6%
Lichtenstein	8	75%	0%
Lithuania	361	52.9%	-14%
Luxemburg	56	55.4%	-35.6%
Malta	32	46.9%	-13.5%
Netherlands	1830	39.9%	-2.1%
Poland	2264	45.9%	-18.3%
Portugal	1015	38.8%	4.2%
Romania	2204	32.8	15.6%
Slovakia	466	47%	-14.5%
Slovenia	192	45.8%	-3.5%
Spain	3971	26.9%	3.2%
Sweden	3116	62.9%	-5.0%
United Kingdom	8861	47.6%	1.8%

²² http://eacea.ec.europa.eu/bilateral_cooperation/index_en.php

²³ <http://www.iie.org/en/Research-and-Publications/Open-Doors/Data/~media/Files/Corporate/Open-Doors/Fact-Sheets/Region/Europe%20Region%20Fact%20Sheet%202010.ashx>

Vocational education and training in the EU

Faced with challenges such as intensified global competition, high numbers of low-skilled workers, challenges regarding dropouts from compulsory education, and an ageing population, vocational education and training (VET) is one of the core elements for preparing individuals for today's society and for ensuring Europe's future competitiveness and innovation whilst also contributing to social inclusion. Such vocational education and training²⁴ offered at many levels and in many forms for both youth and adults is an essential part of the EU's 'Education and Training 2020' work programme and the agenda *for New Skills for New Jobs*²⁵.

The Commission acts together with EU Member States and other countries to strengthen VET across Europe. The Copenhagen Declaration²⁶, agreed in 2002, lays out the basis for co-operation in VET, with 33 European countries involved and within the Open Method of Coordination. Both the Bologna Process and the Copenhagen Declaration has provided a strong impetus for national reform processes in education.

The European Qualification Framework²⁷ has been a driver and catalyst for national reform in terms of implementing national overarching National Qualifications Frameworks in support of outcome and competence based education systems- and within the framework of lifelong learning.

Within the Copenhagen Process²⁸ there are a number of instruments which are implemented in Member States or which are in the process of being implemented²⁹ to enhance the transparency, recognition, and quality of competences and qualifications, and to facilitate the mobility of learners and workers. These include such instruments as the European Qualifications Framework (EQF), Europass, the European Credit System for VET (ECVET), and the European Quality Assurance Reference Framework for VET (EQAVET).

²⁴ For in-depth coverage of vocational education at the Member State level, Cedefop offers an extensive source of publications and studies on VET in Europe. See for example <http://www.cedefop.europa.eu/EN/Information-services/vet-in-europe-country-reports.aspx>

²⁵ http://ec.europa.eu/education/news/news1110_en.htm

²⁶ The Copenhagen Declaration: http://ec.europa.eu/education/pdf/doc125_en.pdf

²⁷ http://ec.europa.eu/education/lifelong-learning-policy/doc44_en.htm

²⁸ The Copenhagen Declaration: http://ec.europa.eu/education/pdf/doc125_en.pdf

²⁹ http://ec.europa.eu/education/index_en.htm

4 Emerging Skills needs - a comparative overview

4.1 European perspectives on emerging skills needs

In support of European lifelong learning policies and recognising that learning occurs in formal, informal, and non-formal contexts, one of the more important policy measures was the passing of the recommendations concerning key competences from 2006³⁰. The introduction of policy actions pertaining to key competences in Europe has had a considerable impact across Member States on reforms of curriculum on teachers' education and training, and gradually also on new more learner-centred assessment approaches. Key competences are a combination of knowledge, skills, and attitudes perceived as essential in a knowledge society and aimed to improve employability and civic participation in the context of lifelong learning.

Eight key competences

The framework defines eight key competences and describes the essential knowledge, skills and attitudes related to each of these. The key competences are:

- **communication in the mother tongue**, the ability to express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form (listening, speaking, reading and writing) and to interact linguistically in an appropriate and creative way in a full range of societal and cultural contexts;
- **communication in foreign languages**, which involves, in addition to the main skill dimensions of communication in the mother tongue, mediation and intercultural understanding.
- **mathematical competence and basic competences in science and technology**. Mathematical competence is the ability to develop and apply mathematical thinking in order to solve a range of problems in everyday situations, with the emphasis being placed on process, activity and knowledge;
- **digital competence**, which involves the confident and critical use of information society technology (IST) and thus basic skills in information and communication technology (ICT);
- **learning to learn**, is the ability to pursue and organise one's own learning, either individually or in groups, in accordance with one's own needs, and awareness of methods and opportunities;
- **social and civic competences**, which refers to personal, interpersonal and intercultural competence and all forms of behaviour that equips individuals to participate in an effective and constructive way in social and working life. It is linked to personal and social well-being.
- **sense of initiative and entrepreneurship**, which is the ability to turn ideas into action. It involves creativity, innovation and risk-taking;
- **cultural awareness and expression**, which involves appreciation of the importance of the creative expression of ideas, experiences and emotions in a range of media (music, performing arts, literature and the visual arts).³¹

The evolution of a policy dialogue on new skills and jobs

The importance of skills to sustainable competitiveness and inclusive growth is not a new EU policy agenda. The European Round Table of Industrialists (ERT) has in that context played a particular role advocating a revitalisation of education and curricula throughout education systems in Europe

³⁰ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006H0962:EN:NOT>

³¹ More information about European education and training tools and reference frameworks may be found at http://ec.europa.eu/education/lifelong-learning-policy/doc40_en.htm

to better equip citizens to live and work in the 21st Century³². The report stressed the need for greater co-operation between industry and educational institutions, as well as the importance of technical and professional education and lifelong learning³³. In fact, many of the arguments and the underlying rationales of the early reports from the European Round Table of Industrialists are quite similar to the policy rationale pertaining to the current EU Strategy 2020 “EU Strategy for Smart, Sustainable and Inclusive Growth”³⁴.

Forecasting and anticipation of skills needs in Europe

A responsive education and training system is one of the central components of the renewed Lisbon Agenda. The capacity to monitor and anticipate changing labour market needs, which has been part of the European Employment Strategy since its launch in 1997 is one of the core elements in a responsive education and training system. In the review of the 2003 strategy, the European Employment Task Force called for greater co-operation between national forecasting agencies and for the establishment of a European network for skills needs forecasting.

European changing skill needs has nevertheless remained a challenge and concern in European policy making in the attempt to achieve wider social and economic objectives of cohesion and competitiveness in the European Union. The Council Resolution on *New Skills for New Jobs* (15 Nov. 2007) draws attention to the practical steps that need to be taken in education and training to provide citizens with better opportunities to succeed on the labour market. These cover three areas: equipping people with the skills necessary for new jobs; working on transparency, validation and on the identification of training needs; and the need for a better anticipation of skills needs and gaps on the labour market.

The 2008 Commission Communication (COM (2008) 868) on *New Skills for New Jobs* and the associated Staff Working Document highlighted the importance of skills upgrading for Europe’s recovery from the crisis and longer term economic growth and social cohesion. Highlighting themes that emerged in the subsequent 2020 strategy, the Commission Communication acknowledged the potential of the low carbon economy and the knowledge economy as drivers for economic growth and sustainable employment, while recognising that globalisation, an ageing population, increasing urbanisation and rapidly evolving social structures have accelerated the pace of labour market change. The focus of the COM and the subsequent work on *New Skills for New Jobs*³⁵ provided an impetus on examining the mechanisms in place at both the Member State and European levels for monitoring, assessing, and anticipating skills needs, and matching labour supply and demand.

The Communication from the Commission states that ways of matching skills to jobs should be improved due to a growing mismatch between labour supply and demand. The Commission Staff Working Document that accompanied the Communication identified skills anticipation, monitoring, and matching practices across Member States and at the European Union levels.

When the Commission communication on *New Skills for New jobs* was launched, 16 European skills anticipation studies had been commissioned by DG Employment.³⁶ The studies have a sectoral focus and followed a common methodology. The methodology consists of the following steps:

³² European Round Table of Industrialists (1989) *Education and European Competence*

³³ http://www.ert.be/working_group.aspx?wg=15

³⁴ http://ec.europa.eu/europe2020/index_en.htm

³⁵ For fuller coverage, please see the inventory developed for this study, and for example *New Skills for New Jobs* Policy initiatives in the field of education: *Short overview of the current situation in Europe* published by Eurydice, November 2010, http://eacea.ec.europa.eu/education/eurydice/documents/thematic_reports/125EN.pdf

³⁶ Cedefop 2009b. For an overview of the 16 sector studies, and broader EU discussions on methodological issues, changing socio-economic contexts and implications for employment and skills demands, see https://www.nche.gov.mt/MediaCenter/PDFs/1_Book.pdf

- Foresight methodology common to all sectors
- Analysis of past trends, SWOT and drivers of change
- Scenarios and implications for job functions' future skills needs and volume of employment
- Strategic implications for companies and education & training institutions
- Recommendations to stakeholders
- Discussion and validation by experts panels

EU Sector studies - anticipation of skills

Parallel to the initiatives of DG Employment, Cedefop played a pivotal role in methodological developments on forecasting and anticipation of skills needs – which has also impacted activities in the Member States. Since the first initiatives, Cedefop has updated its medium term skills forecast published in 2010, and in 2010 the Expert Group on New Skills for New Jobs also published a report prepared for the European Commission (EC 2010). Both reports advocate a need to build bridges between the worlds of work and education and training.

European sectoral anticipation studies undertaken in the context of New Skills for New Jobs:

Textiles, wearing apparel and leather products
 Printing and publishing
 Chemicals, pharmaceuticals, rubber and plastic products
 Non-metallic materials
 Electromechanical engineering
 Computer, electronic and optical products
 Building of ships and boats
 Furniture and others
 Electricity, gas, water & waste
 Distribution, trade
 Hotels, restaurants and catering
 Transport
 Post and telecommunications
 Financial services
 Health and social work
 Other services, maintenance and cleaning
 And two pilots: automotive and defense

(Source: <http://ec.europa.eu/social/main.jsp?catId=784&langId=en>)

The Eurydice study regarding anticipation of skills from 2010 (Eurydice 2010a) confirms that the identification of future skills requirements and the integration of this information into the planning of education and training provision have intensified. Both the Copenhagen Declaration regarding vocational education and training and the Bologna Process have had an impact on the uptake of skills anticipation methods. At the Member State level, anticipation and forecasting of skills has become a pertinent agenda.

4.2 US debates on emerging skills needs

Discussions about employability skills have evolved over several years in the United States as in Europe. In the United States the main thrust of the debate, for example in “*The Nation at Risk*” (National Commission on Excellence in Education 1983), has focused on the skills and competences of high school graduates in the transition to the labour market or to upper secondary vocational or general education. A number of reports have been published since 2000 calling for rapid improvements in K-12 and higher education to prepare young people with the higher skills

said to be required in the future (Business–Higher Education Forum, 2003; Partnership for 21st Century Skills, 2005).

The debate on the skills base of the American population has occurred in three distinct phases (Finegold 2007):

- The era of *A Nation at Risk* (National Commission on Excellence in Education, 1983), from about 1983 to about 1996. This era was characterised by concerns about the perceived low quality of U.S. education and its effects on the global competitiveness of U.S. manufacturing firms and workers, especially relative to Japan and Germany.
- The era of the “war for talent” from about 1997 to about 2001, when the rapid growth of the nation’s information technology industry, together with the impending retirement of the highly educated baby boom generation, drove concerns about skill shortages.
- The era of *The World Is Flat* (Friedman, 2005), from about 2001 and continuing today, characterised by concerns about the loss of highly paid professional and technical jobs to other nations.

In the early 1990s, the notion of *employability skills* became prominent, referring to those skills needed by individuals to effectively respond to the demands of the workplace. Employability skills comprise such skills as reading, writing, mathematics, listening, and a number of higher-order thinking skills (Department of Labor, 1991).

During the past five years, a series of reports have been published in the USA stating that skill demands of work are rising due to rapid technological change and increasing global competition. The argument therefore is that rapid improvements in K-12 and higher education are needed to prepare young people with the higher skills said to be required for the coming century (for example Business–Higher Education Forum, 2003; Partnership for 21st Century Skills³⁷, 2008). The National Academies report *Rising Above the Gathering Storm* (National Research Council, 2007) argues that to meet growing global competition for high-skill, high-wage jobs, the government should increase funding of research and development and strengthen the science and mathematics education of the nation’s future workforce. The *America Competes Act* (Public Law 110-69), signed into law in August 2007, is perceived by USA researchers as designed to carry out the recommendations of that report (Hilton 2008).

As previously mentioned, surveys and qualitative studies are undertaken on a regular basis at a state level and at the institutional level, as are tracer studies of graduates. It is a very dominant way for institutions to “navigate” according to market needs and to remain in contact with alumni, who play a much stronger role in the USA than in Europe in terms of endowment to universities and colleges.

In an employer survey conducted in 2006 regarding future demands for knowledge, skills and competences, *foreign languages* is perceived as a basic skill that will “increase in importance” ranking it higher than any other basic skill required by USA employers (Conference Board of Employers 2006). When asked to select which emerging content areas will be “most critical” in the near future, roughly half of the employer respondents selected *Use of Non-English Languages as a Tool for Understanding Other Nations, Markets, and Cultures* (49.7 %), and *Demonstrate Understanding of Global Markets and the Economic and Cultural Impacts of Globalisation*.

The table below shows USA employers’ perceptions of developments in demand for skills and competences. The skills, knowledge, and abilities identified by American employers as critical are quite similar to the type of competences defined in Europe as key competences.

³⁷ <http://www.p21.org/>

Table 4.3 Ranking of skill, knowledge and abilities according to increasing demands

Basic Knowledge and Applied Skills		
1.	Critical Thinking/Problem Solving	77.8%
2.	Information Technology Application	77.4%
3.	Teamwork/Collaboration	74.2%
4.	Creativity/Innovation	73.6%
5.	Diversity	67.1%
6.	Leadership	66.9%
7.	Oral Communications	65.9%
8.	Professionalism/Work Ethic	64.4%
9.	Ethics/Social Responsibility	64.3%
10.	Written Communications	64.0%

(Source: Conference Board of Employers 2006)

4.3 Frameworks for emerging skills in the USA

The Department of Labor and its Secretary's Commission on Achieving Necessary Skills³⁸ (SCANS) compiled the most widely known report of workplace competences. Through the SCANS methodology a job analysis was essentially carried out for the economy as a whole (Cappelli & Rogovsky, 1994). The purpose was to identify a set of core skills and competences across all jobs and occupations in order to include a vocational component in the K-12 curriculum. The SCANS initiative has influenced the design of a number of government sponsored training schemes such as the Job Training Partnership Act³⁹ and the School-to-Work Opportunities Act⁴⁰. The SCANS methodology also informed the Reform of the Danish Vocational Education system in 2000.

The objective of the SCANS effort was to create a nationally recognised set of employability skills by students, employers and educators. To this end, SCANS sought to develop a valid criterion-referenced assessment system that would provide an accurate and predictive framework that could measure an individual's capabilities.

SCANS

The SCANS initiative⁴¹ was one of the first efforts undertaken to identify the skills and competences needed by individuals to be successful and competitive in the workplace. However, a number of other studies have also examined this issue. It is instructive to reflect briefly on some of this research both to get an understanding of the extent of the research in this area and as a means of highlighting some of the important skill themes that emerge.

³⁸ <http://wdr.doleta.gov/SCANS/>

³⁹ <http://www.doleta.gov/grants/sga/97-012sga.cfm>

⁴⁰ *School-to-Work Opportunities Act*: Industry Association/Business

⁴¹ See for example *What Work requires of Schools- A SCANS Report for America 2000*, <http://wdr.doleta.gov/SCANS/whatwork/whatwork.pdf>

Table 4.4 SCANS Foundation Skills and Competencies

Foundation Skills	SCANS Competencies
Basic Skills	Allocates resources
Writing	Allocates Time
Reading	Allocates Money
Arithmetic & Mathematics	Allocates Material and Facility
Listening	Resources Allocates Human
Speaking	Resources
Thinking Skills	Information
Creative Thinking	Acquires and Evaluates Information
Decision Making	Organises and Maintains Information
Problem Solving	Interprets and Communicates Information
Seeing Things in the Mind's Eye	Uses Computers to Process
Knowing How to Learn	Information
Personal Qualities	Interpersonal
Self Esteem	
Self Management	Participates as a Member of a Team
Integrity	Teaches Others
	Serves Clients/Customers
	Exercises Leadership
	Negotiates to Arrive at a Decision
	Works with Cultural Diversity
	Systems
	Understands Systems
	Monitors and Corrects Performance
	Improves and Designs Systems
	Technology
	Selects Technology
	Applies Technology to Task
	Maintains and Troubleshoots Technology

SCANS- a competence based skills framework

The SCANS Competencies and Foundation Skills were introduced as a voluntary framework. As can be seen from the above table the SCANS competences have similarities to the European Key Competences. In Denmark the SCANS initiative was influential in shaping the Danish Vocational Education Reform 2000.

In 2002 the debate on competences became prominent once more through the *Partnership for 21st Century Skills*. The initiative aimed to serve as a catalyst to position 21st century readiness at the centre of US K12 education by building collaborative partnerships among education, business, community, and government leaders. The partnership comprises the US Department of Education and AOL Time Warner Foundation, Apple Computer, Inc, Cable in the Classroom, Cisco Systems, Inc., Dell Computer Corporation, Microsoft Corporation, National Education Association, SAP, a number of member companies and individuals. As was the case with the SCANS initiative, the Partnership for 21st Century Skills also focuses on the K12 system (the US compulsory education system of kindergarten and grades one through twelve- that is until high school graduation).

The proposed framework comprises core subjects including what is called *21st Century Themes*. It describes the skills, knowledge and competences students must master to succeed in work and life. It is a quite detailed blend of content knowledge, specific skills, and competences. In comparison to the European framework of key competences, the 21st century framework is conceptually broader. Among experts and USA project managers of transatlantic projects, there are various views as to how much an impact the 21st century framework has on the K-12 system, and the extent to which the framework will have impact on the post-secondary education given the institutional autonomy of universities and community colleges. The following provides an overview of the framework, which in many ways resembles the previous SCANS initiative:

4.4 The 21st century framework for skills - an overview

The framework proposed consists of core subjects and a range of 21st century interdisciplinary themes- composed of skills, knowledge and competences. Since many European readers will likely not be familiar with the framework, a full coverage is provided:

CORE SUBJECTS

- English, reading or language arts
- world languages
- arts
- math
- economics
- science
- geography
- history
- government & civics

In addition to these subjects the framework includes what is called ***21st century interdisciplinary themes*** which are proposed integrated in the core subjects:

• **Global Awareness**

- o Using 21st century skills to understand and address global issues
- o Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles
- o Understanding other nations and cultures, including the use of non-English languages

• **Financial, Economic, Business and Entrepreneurial Literacy**

- o Knowing how to make appropriate personal economic choices
- o Understanding the role of the economy in society
- o Using entrepreneurial skills to enhance workplace productivity and career options

• **Civic Literacy**

- o Participating effectively in civic life
- o Exercising the rights and obligations of citizenship at local, state, national and global levels
- o Understanding the local and global implications of civic decisions

• **Health Literacy**

- o Obtaining, interpreting and understanding basic health information and services and using such information and services in ways that enhance health
- o Understanding preventive physical and mental health measures
- o Using available information to make appropriate health-related decisions
- o Establishing and monitoring personal and family health goals
- o Understanding national and international public health and safety issues

• **Environmental Literacy**

- o Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it
- o Demonstrate knowledge and understanding of society's impact on the natural world
- o Investigate and analyze environmental issues, and make accurate conclusions about effective solutions
- o Take individual and collective action towards addressing environmental challenges)

LEARNING AND INNOVATION SKILLS

Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more complex life and work environment in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.

• CREATIVITY AND INNOVATION

Think Creatively

- o Use a wide range of idea creation techniques (such as brainstorming)
- o Create new and worthwhile ideas (both incremental and radical concepts)
- o Elaborate, refine, analyze and evaluate own ideas in order to improve and maximise creative efforts

Work Creatively with Others

- o Develop, implement and communicate new ideas to others effectively
- o Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- o Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas
- o View failure as an opportunity to learn;

Implement Innovations

- o Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur

• CRITICAL THINKING AND PROBLEM SOLVING

Reason Effectively

- o Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Use Systems Thinking

- o Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Make Judgments and Decisions

- o Effectively analyze and evaluate evidence, arguments, claims and beliefs
- o Analyze and evaluate major alternative points of view
- o Synthesize and make connections between information and arguments
- o Interpret information and draw conclusions based on the best analysis
- o Reflect critically on learning experiences and processes

Solve Problems

- o Solve different kinds of non-familiar problems in both conventional and innovative ways
- o Identify and ask significant questions that clarify various points of view and lead to better solutions

• COMMUNICATION AND COLLABORATION

Communicate Clearly

- o Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- o Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- o Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- o Utilise multiple media and technologies, and know how to judge their effectiveness
- o Communicate effectively in diverse environments (including multi-lingual)

Collaborate with Others

- o Demonstrate ability to work effectively and respectfully with diverse teams
- o Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal
- o Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

People in the 21st century live in a technology and media-suffused environment, marked by various characteristics, including: 1) access to an abundance of information, 2) rapid changes in technology tools, and 3) the ability to collaborate and make individual contributions on an unprecedented scale. To be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking skills related to information, media and technology.

• INFORMATION LITERACY

Access and Evaluate Information

- o Access information efficiently (time) and effectively (sources)
- o Evaluate information critically and competently

Use and Manage Information

- o Use information accurately and creatively for the issue or problem at hand
- o Manage the flow of information from a wide variety of sources
- o Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

• MEDIA LITERACY

Analyze Media

- o Understand both how and why media messages are constructed, and for what purposes
- o Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors
- o Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media

Create Media Products

- o Understand and utilize the most appropriate media creation tools, characteristics and conventions
- o Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments

• ICT (Information, Communications and Technology) LITERACY

Apply Technology Effectively

- o Use technology as a tool to research, organize, evaluate and communicate information
- o Use digital technologies appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy
- o Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies

LIFE AND CAREER SKILLS

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.

• FLEXIBILITY AND ADAPTABILITY

Adapt to Change

- o Adapt to varied roles, job responsibilities, schedules and contexts
- o Work effectively in a climate of ambiguity and changing priorities

Be Flexible

- o Incorporate feedback effectively
- o Deal positively with praise, setbacks and criticism
- o Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments

• INITIATIVE AND SELF-DIRECTION

Manage Goals and Time

- o Set goals with tangible and intangible success criteria
- o Balance tactical (short-term) and strategic (long-term) goals
- o Utilize time and manage workload efficiently

Work Independently

- o Monitor, define, prioritize and complete tasks without direct oversight

Be Self-directed Learners

- o Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise
- o Demonstrate initiative to advance skill levels towards a professional level
- o Demonstrate commitment to learning as a lifelong process
- o Reflect critically on past experiences in order to inform future progress

• SOCIAL AND CROSS-CULTURAL SKILLS

Interact Effectively with Others

- o Know when it is appropriate to listen and when to speak
- o Conduct themselves in a respectable, professional manner

Work Effectively in Diverse Teams

- o Respect cultural differences and work effectively with people from a range of social and cultural backgrounds
- o Respond open-mindedly to different ideas and values
- o Leverage social and cultural differences to create new ideas and increase both innovation and quality of work

• PRODUCTIVITY AND ACCOUNTABILITY

Manage Projects

- o Set and meet goals, even in the face of obstacles and competing pressures
- o Prioritize, plan and manage work to achieve the intended result

Produce Results

- o Demonstrate additional attributes associated with producing high quality products including the abilities to:
 - Work positively and ethically
 - Manage time and projects effectively
 - Multi-task
 - Participate actively, as well as be reliable and punctual
 - Present oneself professionally and with proper etiquette
 - Collaborate and co-operate effectively with teams
 - Respect and appreciate team diversity
 - Be accountable for results

• LEADERSHIP AND RESPONSIBILITY

Guide and Lead Others

- o Use interpersonal and problem-solving skills to influence and guide others toward a goal
- o Leverage strengths of others to accomplish a common goal
- o Inspire others to reach their very best via example and selflessness
- o Demonstrate integrity and ethical behavior in using influence and power

Be Responsible to Others

- o Act responsibly with the interests of the larger community in mind

(Source: http://www.p21.org/documents/P21_Framework_Definitions.pdf)

It is noticeable that the terminology used by the SCANS Committee and later by the 21st Century Skills Alliance is heavily influenced by a competence based educational philosophy.

4.5 Competence and outcome based education – Europe-USA

The notion of competence based education is not new. It can be tracked to behaviourists such as Skinner, but has since then become a growing policy focus. The EU policy agenda on lifelong learning and the instruments and tools to support lifelong learning have at the Member State level driven reforms, paving the way for competence and outcome based policies and practices in education. In particular, the European Qualification Framework (EQF) has enabled these developments; each of the eight levels in the qualification framework descriptor are defined in terms of learning outcomes, which denotes a shift from inputs (lengths of a learning experience, type of institution) to what a person holding a particular qualification actually knows and is able to do.

In European policy circles the rationale of competence and learning outcomes orientation is that such approaches can better:

- support the match between the needs of the labour market (for knowledge, skills and competences) and education and training provision;

- facilitate the validation of non-formal and informal learning;
- facilitate the transfer and use of qualifications across different countries and education and training systems;
- provide a common reference framework which can improve mobility in Europe, recognising that Europe's education systems are so diverse that comparisons based on inputs, for example length of study, are impracticable;
- improve genuine access to lifelong learning for diverse target groups;
- improve the dialogue with employers about skills issues.

In the United States, the SCANS committee and later the Partnership for 21st Century Skills⁴² are both examples of initiatives which have aimed to improve the quality of the K12 system⁴³, but which have also had an impact beyond the K12 system.

Recent research on the deployment of competence based outcomes frameworks in the USA (Calhoun J. 2008) indicates that there are four main drivers that have set the agenda for competence based approaches in education. These are:

- The changing workforce and workplace with growing focus on behaviourally-based and measurable skills that are transferable across occupations and perceived as critical to job performance,
- Reforms and changing rhetoric in education policy in the past 10 years. In 2005 for example, the US Secretary of Education, Margaret Spellings, formed the Commission on the Future of Higher Education: 1) to ensure that the nation's students would be equipped with the skills for success in the 21st century, and 2) to develop a comprehensive strategy for postsecondary education that would better serve America and address the economic and workforce needs for our nation's future (DOE 2006a),
- Evolving accreditation requirements and growing pressure from private sector providers concerning the use of certifications.
- New groups of learners

Various articles and research suggest that in the community college systems and within the health sector, the skill/ competence based focus on educational and professional development are widely used. Among the Fortune 500 companies in the USA, core competence employee expectations have increasingly been specified, which has impacted workforce development provision offered by Community Colleges (Vorhees, 2001).

The Goals 2000: Educate America Act (P.L. 103-227)⁴⁴ was signed into law on March 31, 1994. The Act provided resources to states and communities to ensure that all students reached their full potential. Congress appropriated \$105 million for Goals 2000 for the fiscal year 1994. In the first year, individual states submitted applications describing the process by which the state would develop a school improvement plan, make sub-grants to local schools, as well as grant awards for pre-service and professional development.

Goals 2000 also created a National Skill Standards Board⁴⁵ to act as a catalyst for the development of rigorous occupational standards. The Board was given the task to identify broad occupational clusters and create a system of standards, assessment, and certification for each cluster. The skills certificate was intended to give students the portable, industry-recognized credentials described in

⁴² <http://www.p21.org/>

⁴³ The K-12 system refers to the education system from kindergarten through 12th grade – which if completed leads to high school graduation. K-12 offer may include vocational components.

⁴⁴ <http://www2.ed.gov/legislation/GOALS2000/TheAct/index.html>

⁴⁵ <http://wdr.doleta.gov/opr/fulltext/95-voluntary.pdf>

the School-to-Work Opportunities Act of 1994⁴⁶ that indicates mastery of skills in specific occupational areas.

Since then, a nine-tiered competence framework was jointly developed by the National Association of Manufacturers with the Department of Labor. The framework and a range of supportive tools can be accessed from the Working for America Institute⁴⁷.

The Advanced Manufacturing competence framework includes nine levels or TIERS as the levels are called:

- **Tier 1 Personal Effectiveness Competences** are essential for all life roles and not restricted to those needed in the workplace. They include attributes such as: Integrity – displaying accepted social and work behaviours; Motivation – demonstrating a willingness to work; Dependability/Reliability – displaying responsible behaviours at work; and willingness to learn – understanding the importance of learning new information for both current and future problem-solving and decision-making.
- **Tier 2 Foundation Academic Competences** include cognitive functions and thinking styles and apply in varying degrees to all industries and occupations in manufacturing. They cover: Applied Science – using scientific rules and methods to solve problems; Basic Computer Skills – email, word processing, spread sheets, etc.; Applied Mathematics/measurement – using math to solve problems; Reading for Information – understanding written sentences in work-related documents; Business Writing – using standard business English; Listening to and Following Directions; Locating and Using Information; and Speaking/Presentation – communicating with co-workers and supervisors.
- **Tier 3 Workplace Competences** cover knowledge, skills and personal traits generally applicable to a larger number of occupations and industries in manufacturing. They address Business Fundamentals – how money is allocated to perform the work and how businesses function. Specific competences include: Teamwork; Adaptability/Flexibility; Marketing and Customer Focus; Planning/Organising; Problem Solving/Decision Making and Applied Technology – using equipment to produce the product, all in a manufacturing business context.
- **Tier 4 Industry-Wide Technical Competences** cover the technical competences that cut across all sectors of manufacturing and are necessary for developing an “agile” workforce (for what is typically referred to as “high performance companies”) rather than following a single occupational career ladder. Technical competences actually refer to the knowledge and skills important in all sub-sectors of manufacturing.
- **Tier 5 Industry-Sector Technical Competences** refer to an additional sub-set of knowledge and skills needed to perform in a specific industry, such as food processing, plastics, etc.
- **Tier 6 Occupation-Specific Knowledge Areas** is a further refinement of knowledge and skills needed for an occupation or group of occupations in certain industries and would be seen as further occupational training specific to certain jobs in certain industries. Therefore, they reflect the need for specialised competences in a particular industry, such as paper, chemical, auto, etc.
- **Tier 7 Occupation-Specific Technical Competences** are the technical skills required for a specific occupation. These match most closely to apprenticeship and journey level credentials as well as certain specialty skills such as metalworking. Any training aimed at increasing or broadening the skills of such workers would relate to this tier.
- **Tier 8 Occupation-Specific Requirements** are additional requirements needed for work in a particular occupation. An example would be, holding a state license to operate a high pressure boiler.
- **Tier 9 Management Competences** are the knowledge and skills needed to be a competent manager in a specific industry or firm. Examples would be leadership and supervisory competences.

⁴⁶ <http://www.fessler.com/SBE/act.htm>

⁴⁷ http://www.workingforamerica.org/toolkit/competency_models.asp

Similar changes in accreditation standards have also taken place across the core health professions of dentistry, medicine, nursing, and pharmacy. Since about 2002-2003, standards for these professions reveal a change of emphasis from knowledge-oriented content areas and disciplines to competences, skills sets, and performance outcomes, with nearly all addressing the need for competence-based curricular specification in some form.

Some interview sources believe that the use of competence based outcomes will become more prominent in the years to come – and not only for the K-12 system to better cater for different target groups. The same informants claim that the major challenge will be the development of teachers' competences to be able to plan teaching and learning processes building on the notion of competence based outcomes and secondly the development and use of tests and assessments aligned to the philosophy of competence based education.

In the USA there has been a much more prominent discussion on the value-added of a competence based approach, which has not been seen in the EU. In the USA, the concept of competence based education has been criticised by researchers and education representatives. Opponents see competence based education as bureaucratic and as relying too much on standardisation. Furthermore, it is perceived as being too reductionist as not fulfilling the promise of linking education and the labour market, and that it masks the quality differences of the various colleges and universities.

The EU-US partnership provides a framework for a fruitful ground for discussing the policy and practical implications of competence based education. The development of pre-service and in-service teacher training curriculum could be piloted through the programme measures within the transatlantic partnership. It would be of joint value to include activities to develop and/or test new models of learned centred assessments building on research and expert activities that have been implemented in recent years in the EU and the USA as part of the competence based education agenda. Work undertaken on new assessment forms in the context of key competences in the EU and similar expert activities in the USA could provide additional value for such joint efforts.

4.6 A US perspective on forecasting and anticipation of skills

The US economy was transformed over the past two decades, giving rise to the question “does the United States have what it takes to remain a world-class competitor?”⁴⁸

It is a common public belief in the USA that a diverse and responsive post- secondary education system is first and foremost developed through strong market forces, and public policy thus plays a minor role in post-secondary education compared to the situation in the EU. The core value is in that sense *institutional autonomy*. Interviews with US experts strongly confirm such views. The role public policy plays in setting the agenda on emerging skills such as *New Skills for New Jobs* is not conceivable for any of the US experts interviewed. Reasons are that any such measure indirectly could be perceived in the USA as a first step to interfering with market forces and the planning autonomy of the institutional boards. Nevertheless, under President Barak Obama a number of measures have been taken under *the Higher Education 2020 Initiative* to promote that the US by 2020 will have the highest number of college graduates in the world⁴⁹. The growing policy focus on the post-secondary system should also be seen in the context of a report published by the International Monetary Fund in 2010 (Batani et. al. 2010)⁵⁰. The analysis found that skill mismatches have risen sharply during this recession, with considerable heterogeneity across states.

⁴⁸ Advances in Developing Human Resources Vol. 4, No. 2 May 2002 121-132, copyright 2002, Sage Publications.

⁴⁹ <http://www2.ed.gov/about/overview/budget/budget10/finaid/index.html?exp=4>

⁵⁰ To read more about current policy debates on post-secondary education see:
<http://www.changemag.org/Archives/Back%20Issues/2011/May-June%202011/first-in-the-world-full.html>

The desk research undertaken in this study shows that numerous reports and studies on labour market projections have been published, particularly by the Department of Labor. The reports are frequently used to inform labour market policies at the State level and as such also as a basis for major workforce development initiatives. In terms of dimensioning the offer from universities and community colleges, US experts and institutional representatives are not aware whether or not the same reports play any kind of strategic role. In particular, the public-private partnerships at times also involving NGOs are in many instances at state level the catalyst for forecasting skills needs to spur economic development and often in the context of restructuring, be this under the umbrella of a green economy or with a base in regional cluster strategies as the following two examples illustrate.

Upjohn Institute - Skills for a green Economy?

Within the OECD LEED initiative, researchers from Upjohn Institute of Employment Research have undertaken a study to assess what a low-carbon economy could mean to jobs and skills demands. The study has focused on sectors of job creation and job destruction, asking whether a low-carbon economy necessarily will lead to a lower job growth or if the green economy could entail the next wave of job growth and innovation provided the right skills are available, and examining which skills would likely be in demand.

The study seeks an answer to what a green economy might look like in terms of changes in products, processes, and services, and what a green employee might look like in terms of knowledge, skills, and competences.

The overall purpose of the study has been to examine key principles of regional labor market monitoring and forecasting to support evidence based policy making.

(Source: Eberts 2010).

The Department of Employment undertakes labour market monitoring to inform labour market policies at the state and federal levels, feeding into the labour market monitoring system O*NET⁵¹, which provides detailed updated information about the skills requirements for different occupations. A number of foundations commission studies linked to issues relating to skills supply and demand. One example is a report from 2010 by the Georgetown University Center on Education and the Workforce (Carnevale et al 2010). The study provides a highly detailed forecast, which shows that as the economy globally struggles to recover and jobs slowly return, there will be a growing disconnect between the types of jobs employers need to fill and numbers of Americans who have the education and training to fill those jobs. The report forecasts that by 2018, 63% of all jobs will require at least some post-secondary education, employers will need 22 million new workers with post-secondary degrees, and the USA will fall short by three million workers without a dramatic change in course. This translates into a deficit of 300,000 college graduates every year between now and 2018.

⁵¹ <http://www.onetonline.org/>

Texas Clustering Initiative

The State of Texas Clustering initiative is another example of a regional economic development skills-based strategy striving to attract and retain the following clusters:

- Advanced Manufacturing
- Aerospace and Defense
- Biotech and Life Sciences
- Information and Computer Technology
- Petroleum refining and chemical products
- Energy

A major US based consultancy firm has worked with state authorities on the identification of a workforce development plan aimed to identify the numerical demand for a skilled workforce within those clusters as well as an identification of the type of skills in demand across the clusters - and as a basis for the planning of TEXAS Workforce Commission.

http://www.twc.state.tx.us/news/ti_wfplan.pdf

(Source: The conference Board of Employers 2006)

5 Responsive education systems – ways forward

This chapter draws mainly on the interviews conducted and the seven case studies. The first part of the chapter provides a comparative discussion on institutional measures to improve the responsiveness of education and training systems so to better address emerging skills needs. The second part of the chapter comprises a comparative overview of policy initiatives in Europe and in the USA to forecast skills needs, and how such initiatives have evolved over time.

5.1 Institution-level measures

Interaction with employers (projects, placements, funding, boards, etc.)

The interviewed experts, multinational companies, representatives and managers of trans-Atlantic education projects generally agree that close and ongoing interaction between education providers and employers is the best way to ensure that education providers have insights in current and emerging skills requirements. Such partnerships enable students to get better opportunities for work placement for shorter or longer periods. According to most of the interviewees, work placement schemes are critical for future employment. There is no doubt that education institutions increasingly focus on and feel more compelled to professionalise relationships with industry to be able to deliver the product that students and their parents increasingly expect as an outcome of education. Parallel to this, *the war for talent* has compelled those industries that depend on high skilled scientists to focus strategically on their relationships with the education sector. For some multi-nationals in particular, strategic partnerships are based on a very selective choice of a global leading edge universities – recognising that a growing pool of high skilled graduates across the globe are ready to become global nomads to kick-start a future career. (Brown Phillip et al, 2011).

“We have an entire office exclusively handling our relationships with education institutions around the globe. So collaboration with these institutions is definitely a major priority for us.”

–recruitment manager, multinational company

All informants agree that these relationships are generally more common and better developed and integrated in institutional strategies in the USA than in the EU. The reason lies in the very foundation on which the two education systems rest, according to most informants. European education providers in tertiary education and in school-based vocational education are most commonly government-financed - though with decreasing involvement of the government in many EU countries, for example Finland and the Netherlands where major reforms have been implemented resulting in tertiary education institutions becoming much more market driven, also in terms of governance arrangements. US institutions rely heavily on private sector financing and on student funds. This creates a relationship of mutual dependency, where education providers depend on business funding and where companies in turn depend on and expect providers to at any time be able to deliver the right skills needed- if not there are other providers ready to take their place. This applies to community colleges and universities in the USA, and in that sense the post-secondary education sector has become much more of a market in the USA than in Europe, though with some recent level of convergence, as mentioned previously.

“Our American partner university has very strong relationships with the industry. They have a huge advantage over us here. We have an advisory board and we have guest lecturers from the industry coming here. But they do a much better job integrating the industry in their daily operations”

– project manager at European university

According to the interviewed experts and transatlantic project managers, businesses in the United States generally have a substantial influence on shaping the content of the curricula at the education institutions. The primary means are the institutions' Boards of Trustees, curriculum committees, and various forms of corporate partnerships. Apart from this direct top-down involvement, businesses are often a part of the daily operations of education institutions in the form of joint research projects, guest lectures, or the provision of internships.

"In the United States, the companies are an integrated part of the universities. In Europe, companies and universities are two separate actors"

– project manager at European university

Whereas some respondents see a close relationship with industry as a key to increased responsiveness, others are more sceptical. Respondents indicate the risk that curriculum ends being too industry focused so that students do not obtain sufficient transferable skills, the risk of universities losing their independence, and that the close dependency on industry contributions builds on the assumption that industry is capable of identifying needs within the medium to long term.

5.1.1 Building relationships

Relationships with employers are, according to a number of the interviewed experts, vital in securing an ongoing dialogue between suppliers and demanders of skills, but may occur at the expense of seeing education as something broader- as *"building"*⁵². As a couple of European education providers notice-

"The students loose something very vital, if everything becomes a matter of skills, and not related to learning and education out of curiosity and lust for learning- in the end that could cost us some of the really world class researchers- who do not have such an instrumental attitude to learning."

expert with profound knowledge about European and American education systems

Other means of maintaining long-term and deep relations with the private sector are the alumni networks used extensively by US education institutions. Through these, education institutions keep in contact with former students now working in different companies. These donate to the school, give guest lectures, and participate in various activities with current students.

"Alumni networks are crucial tools when it comes to being connected with the industry. And in US, they are good at that."

– expert

In Europe, the relationship between education institutions and businesses has received increased attention in recent years. However, as mentioned earlier, partnership models are still generally not as developed as in the United States. The key to obtaining funds for US institutions has been the ability to demonstrate value-added of those investments, be it in the form of average salary levels of former graduates, entrepreneurship success stories, or commercial outcomes of research co-operation. In the EU there are prominent examples of how dialogues with industry have informed education policy, also in the Member States – Career Space⁵³ and the following e-skills initiative⁵⁴ are examples of how industry players have gained a strong voice in education policy in the EU. Within the European Sector Competitiveness Agenda⁵⁵, human capital has increasingly been more

⁵² German terminology to denote the importance of education as personal development- and different from the focus on skill- with focus on the labour market and the economic value of skills.

⁵³ http://www.eaeeie.org/theiere/meeting_wien/Curriculum_Development_Guidelines.pdf

⁵⁴ <http://ec.europa.eu/enterprise/sectors/ict/e-skills/>

⁵⁵ <http://sectorcompetitiveness.com/index.php/sector-competitiveness-studies/>

in focus in commissioned sector competitiveness studies. Therefore, the policy agenda on skills is very broad in Europe pertaining to employment, education and industry policies. In the past ten to fifteen years, education providers in Europe have increasingly aimed to develop a closer collaboration at the institution level. Of the interviewed EU education institution representatives, a number of them today consult with industry on curriculum content, use industry guest lecturers, and make use of internships, work placements and apprenticeships. Some also have industry advisory boards and research projects with industry partners. Alumni networks are, however, rare, and if they exist, they tend to be much looser and much less institutionalised than in the United States. In the public discourse, Europe has often been portrayed as lagging behind the United States when it comes to relationships between education institutions and industry. This picture has rapidly been changing in Europe, enabled also by a policy framework that actively encourages public-private partnerships, and in many Member States also by major reforms in the tertiary education system giving institutions more autonomy. Not least many of the professional tertiary education institutions such as the German and Austrian *Fachhochschulen* (polytechnics) build their success on strong partnerships with industry, enabling them to become locomotives in cluster formation in regional innovation systems.

Public-private education partnerships in Europe are still at various levels of development. Much of the rhetoric and policy initiatives in Europe concerning university-industry partnerships have focused on improving demand orientation and responsiveness in the education sector. However, as one university that has worked extensively on improving industry relations points out – *it takes two to tango*, meaning that industry partners also have to understand the economics of further education. Being a public institution does not mean that the development of a highly specialised course with only a few attending is viable unless industry is ready to pay and to professionalise its assessments of skills needs if a further education market is to flourish, according to the university professor. In that respect some of the European informants believe that partnerships in the USA are more equal, and that European Institutions often and not quite fairly are blamed for not being responsive, without fully recognising the requirements of real industry commitment.

Overall, there does seem to be a system difference between European and American education systems in this regard. At the same time, however, there are large variations from (member) state to (member) state and from institution to institution on both sides of the Atlantic. In Europe, some experts and project managers stated that collaboration with the private sector is larger in VET than in HE and larger in Western Europe than in Eastern Europe. In the US, the variation is not as much from state-to-state but rather among the wealthier TIER One Universities and those struggling with poor funding streams. But although there might be less industry involvement at the lower-tier institutions in the US, it is still mentioned to be fairly high compared to European standards. But as previously mentioned, there is concern among some experts and institutional representatives in the USA and in the EU about the best possible models of co-operation between industry and universities to also maintain independence and the medium term perspective on developments, which could impact curriculum fundamentally.

“Here in the US, we bring businesses in to tell us which skills they need. But we get today’s skills, not tomorrow’s”

– expert

Close collaboration with employers is undoubtedly a crucial source of information in assessing current and future skills needs, but at the same time experts and programme managers underline the importance of not hinging the entire curriculum content on industry needs. Several institutional representatives believe that companies tend to think relatively short-term and subsequently risk asking education institutions to provide what they currently need, not taking into account the time delay from when the needs for a new occupational profile are identified until a graduate with the required competences is ready to enter the labour market. Another aspect, according to both experts and education providers in the EU, is that industries at times expect education programmes to include very specific skills at the expense of broader and transferable skills critical to employability medium term. Some experts suggest that this is a symptom of a market for further

education not yet developed to the same level as in the USA. There is thus an emerging risk that curricular elements are proposed to be included in a master's degree programmes which should rightly be part of a further education offer, resulting in curriculum overcrowding. Finding the right balance between responding to industry needs and still ensuring that students obtain generic and transferable skills seems to be a critical point for the further development of industry – education providers partnerships.

6 Forecasting and anticipation studies – a comparative overview of policy initiatives

This section provides a discussion about policy initiatives on forecasting and anticipation of skills needs. The section discusses similarities and differences in approaches and the type of arguments and public debates that have informed these discussions.

6.1 Forecasting and anticipation of skills needs in Europe

As skills demands in the labour market for a range of occupations have been changing with increasing pace, skills forecasting- and anticipation studies have since the early 1990s become an important instrument in public policy in Europe to better match supply and demand. As early as in 1990, the Industrial Research and Development Advisory Committee of the Commission of the European Communities (IRDAC) published a report that became highly influential on education policies in Europe⁵⁶. The report stated that *“the information revolution...is rendering much of the previous education and training obsolete or simply irrelevant. It is salutary to note that even if useful knowledge has a half-life as long as ten years, intellectual capital is then depreciating at 7%/year (which is a much higher rate than the recruitment of new graduates), with a corresponding reduction in the effectiveness of the workforce”* (IRDAC, 1990, pp. II). Also in Member States, policy concerns regarding the rapid pace of change in skills need became more prominent in the 1990s. In the UK, the government set up a National Skills Task Force to help create a National Skills Agenda. In their first report they remark: *“We live in an age of global competition and constant change. We must seek to achieve a high skill, high value added economy as the recipe for national competitiveness. For a truly dynamic economy, we must keep the skills of our people ahead of the curve.”* (National Skills Task Force, 1998, p. 5).

Since then considerable public resources have been invested in developing methodologies to improve forecasting and anticipation of skills typically with a medium to long term perspective. Initiatives such as the Cedefop network *SkillsNet*⁵⁷, the French Initiative *Observatoires prospectifs des métiers et des qualifications*⁵⁸, the German initiative *Frequenz.net*⁵⁹ and the British *Sector Skills Councils*⁶⁰ are just some examples of how the human capital agenda has influenced public policy in the EU – in many instances building on close collaboration with the social partners.⁶¹

Within the EU initiative on New Skills for New Jobs the ESCO initiative is one of the flagships of the European Commission and a joint effort between DG Education and Culture and DG Employment and Social Affairs. The ESCO⁶² initiative is aimed to be a key tool in the European labour market, in that it will bring the spheres of education and labour together in the development of a structured approach to skills, competences, and occupations, replacing traditional approaches to labour market information systems based on qualifications. ESCO is intended to provide a common understanding of skills and competences related to specific occupations aimed to enhance the matching of jobseekers to jobs across Europe. From an educational policy perspective, similar shifts in education and training systems towards the measurement of learning outcomes, based on

⁵⁶ IRDAC, 1990. Skills Shortages in Europe. IRDAC opinion. Brussels: CEC

⁵⁷ <http://www.cedefop.europa.eu/en/identifying-skills-needs/index.aspxin>

⁵⁸ www.pratiques-de-la-formation.fr/Les-observatoires-prospectifs-des,8.html

⁵⁹ www.frequenz.net/

⁶⁰ <http://www.sscalliance.org/>

⁶¹ For a broader coverage of forecasting and anticipation of skills in Europe, please refer to Annex 3 of this study, the Inventory of European Practices on Anticipation of Skills, written for this study by Pat Irving, GHK.

⁶² <http://www.destree.be/esco/report.pdf>. Towards a common language for employment and education and training-report from stakeholders conference 2010.

knowledge, skills and competences, in the context of the European Qualification Framework (EQF) will enable coherence in the development of ESCO. According to the European Commission, the challenge will be to ensure the development of a common language on skills and competences within ESCO that is also understood by non-education specialists, be they employers, public employment services, or citizens. In this context the EU-US partnership on education can provide a fruitful framework for sharing methodologies and practices to link employment information systems with the world of a skills taxonomy - which is the basic functionality of the O*NET system which is described in the following section.

6.2 Forecasting and anticipation of skills needs in the USA

In the United States it is not perceived as a government responsibility to undertake forecasting and anticipation of skills needs with a view to informing the content and the dimensioning of programmes at a post- secondary level offered by community colleges or universities. In the K-12 system as described in the introduction, the Department of Education has in recent years engaged in a public private partnership to improve the relevance of the K-12 education including teachers' education in the context of emerging 21st century skills. From the interviews it emerges that the debates on 21st century skills also have had an impact on post-secondary education, especially on workforce development initiatives. The Department of Labor plays a pivotal role in projecting skills demands in the labour force, which has a considerable impact on workforce development initiatives at the state level. The *Employment Projections Program (EPP)*⁶³ develops information about the labour market for the nation as a whole for 10 years in the future. Detailed data sets are available online on occupational projections, labour force productivity, outcomes of workforce development, composition of the labour force, international labour force comparisons, etc.⁶⁴ Labour force data are produced for regions and divisions, states, counties, metropolitan areas, and many cities, by place of residence. Data sources can be accessed to the regional level and all information is disseminated targeted to different users such as employers, job seekers, researchers, and policy makers.

6.2.1 The US Labour market information system- O*NET

The O*NET program is the primary source of occupational information in the USA. Central to the project is the O*NET database, containing information on hundreds of standardised and occupation-specific descriptors. The database, which is available to the public at no cost, is continually updated by surveying a broad range of workers from each occupation. Information from this database forms the heart of O*NET OnLine, an interactive application for exploring and searching occupations. The database also provides the basis for Career Exploration Tools, a set of valuable assessment instruments for workers and students looking to find or change careers.

The Occupational Information Network (O*NET) is being developed under the sponsorship of the US Department of Labor and Training Administration (USDOL/ETA) through a grant to the North Carolina Employment Security Commission.

6.2.2 Content Model - Anatomy of an occupation

Every occupation requires a different mix of knowledge, skills, and abilities comprising a variety of activities and tasks. These distinguishing characteristics of an occupation are described by the O*NET Content Model⁶⁵, which defines the key features of an occupation as a standardised, measurable set of variables called "descriptors". This hierarchical model starts with six domains, describing the day-to-day aspects of the job and the qualifications and interests of the typical worker. The model expands to 277 descriptors collected by the O*NET program, with more

⁶³ <http://www.bls.gov/emp/>

⁶⁴ <http://www.bls.gov/emp/home.htm#outlook>

⁶⁵ <http://www.onetcenter.org/content>.

collected by other federal agencies such as the Bureau of Labor Statistics⁶⁶. Across industries it is also possible to access online relatively detailed information about occupations within an industry. An illustrative example is “careers in wind energy”.⁶⁷

O*NET-SOC Taxonomy - a spectrum of occupations

While the Content Model defines the information structure for a single occupation, the O*NET-SOC taxonomy⁶⁸ defines the set of occupations across the world of work. Based on the Standard Occupational Classification⁶⁹, the O*NET-SOC taxonomy⁷⁰ currently includes 974 occupations⁷¹ which currently have, or are scheduled to have, data collected from job incumbents or occupation experts. To keep up with the changing occupational landscape, the taxonomy is periodically revised; the last revision was in 2010.

In the context of the O*NET an occupation is defined as by the U.S. Department of Labor as follows:

Group of jobs, found at more than one establishment, in which a common set of tasks are performed or are related in terms of similar objectives, methodologies, materials, products, worker actions, or worker characteristics.

The Core of the O*Net system- The Content Model

The Content Model was developed using research on job and organizational analysis. It embodies a view that reflects the character of occupations (via job-oriented descriptors) and people (via worker-oriented descriptors). The Content Model also allows occupational information to be applied across jobs, sectors, or industries (cross-occupational descriptors) and within occupations (occupational-specific descriptors).

O*NET Descriptor Domains

⁶⁶ <http://www.bls.gov/>

⁶⁷ http://www.bls.gov/green/wind_energy/#occupations

⁶⁸ <http://www.onetcenter.org/taxonomy.html>

⁶⁹ <http://www.bls.gov/soc/>

⁷⁰ For those readers who wish to acquire more in-depth knowledge about the O*NET methodology and underlying concepts, the O*NET Resource Center has published a wealth of information on the system and its functionalities as well as research projects that have been implemented as part of the development and updating of O*NET:
<http://www.onetcenter.org>

⁷¹ http://www.onetcenter.org/taxonomy/2010/data_coll.html

Worker Characteristics - characteristics that may influence both work performance and the capacity to acquire knowledge and skills required for effective work performance.

- **Abilities**
- **Occupational Interests**
- **Work Values**
- **Work Styles**

Worker Requirements - descriptors referring to work-related attributes acquired and/or developed through experience and education.

- **Basic Skills**
- **Cross-Functional**
- **Knowledge**
- **Education**

Experience Requirements - requirements related to previous work activities and explicitly linked to certain types of work activities.

- **Experience and Training**
- **Basic Skills - Entry Requirement**
- **Cross-Functional Skills - Entry Licensing**

Occupation-Specific Information - variables or other Content Model elements of selected or specific occupations.

- **Tasks**
- **Tools and Technology**

Workforce Characteristics - variables that define and describe the general characteristics of occupations that may influence occupational requirements.

- **Labor Market Information**
- **Occupational Outlook**

Occupational Requirements - a comprehensive set of variables or detailed elements that describe what various occupations require.

- **Generalized Work Activities**
- **Detailed Work Activities**
- **Organizational Context**
- **Work Context**

The O*NET database was initially populated by data collected from occupation analysts; this information is updated by ongoing surveys of each occupation's worker population and occupation experts. The data are incorporated into new versions of the database on an annual schedule to provide up-to-date information on occupations as they evolve over time. The overall philosophy of the O*NET is that it has to be able to capture labour market dynamics at the occupational level in order to be of value for the target user groups.

Both in the EU and in the USA, the changing pattern of globalisation and its impacts on the labour market, on skills, and on occupations are monitored closely - in the USA especially due to the increasing policy debate on the perceived growing threat from outsourcing of manufacturing jobs.

Under President George W. Bush the High Growth Job Initiative⁷² was initiated as a strategic effort to prepare workers to take advantage of new and increasing job opportunities in high-growth, high-demand, and economically vital sectors of the American economy. In fields such as health care, information technology, and advanced manufacturing, the assessment was that potentially a lot of jobs remained unfilled due to a lack of people qualified to fill them. The High Growth Job Training Initiative targeted worker training and career development resources toward helping workers gain the skills they need to build successful careers. The identified growth sectors were:

- Geospatial Technology
- Automotive
- Health Care
- Biotechnology
- Hospitality
- Construction
- Information Technology
- Energy
- Retail Trade
- Financial Services
- Transportation

The in-demand industries identified by this initiative served as the primary focus for a development initiative relating to O*NET with focus on new and emerging occupations. The aim was through research to identify new occupations to be included in the O*NET system (US Department of Labour 2006).

The two main criteria for selection of potential occupations to include in the O*NET database were:

- that the occupations were projected to add substantial numbers of new jobs to the economy or affect the growth of other industries; or
- that existing or emerging businesses were transformed by technology and innovation requiring new skills sets for workers.

A methodology was developed with an additional set of criteria as the basis for identifying and selecting which new occupations were to be included in the O*NET, and secondly to delineate identified new occupations from existing occupations.

6.2.3 Greening of the Economy

In the context of the greening of the economy a research study has been undertaken within the context of the O*NET (Dept of Employment 2009) initiative aimed to identify occupational impacts of the green economy. To inform the design of the occupational analysis and based on new workforce development initiatives, considerable efforts were made to define *green* from an

⁷² <http://www.doleta.gov/business/PDF/1%20-%20HGJTI%20overview.pdf>

occupational taxonomy perspective. The main rationale was to minimize the risk of overlooking the fact that how much and in which ways the green economy impact occupational requirements vary substantially. Through the initial work the green economy was defined as follows:

Definition Green Economy:

The green economy encompasses the economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy.

It was also important to establish conceptual and definitional boundaries for “green employment” or work in so-called “green jobs, and to specify the appropriate level of analysis for the research at the occupational level and in terms of groupings of work roles. The methodological approach taken in the background study focused on the “greening” of occupations, which were defined as follows:

Definition Greening of Occupations:

The “greening” of occupations refers to the extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work and worker requirements.

This definition lent itself to three general occupational categories, each describing the differential consequences of green economy activities and technologies on occupational performance.

- **Green Increased Demand Occupations.** Defined as a growth in employment demand for an existing occupation with a work context that might be changing, but the work tasks themselves were projected to remain the same.
- **Green Enhanced Skills Occupations.** Defined as leading to significant changes in activities and technologies resulting thus in major changes in the work and worker requirements within an existing O*NET-SOC occupation. This impact might or might not result in an increase in employment demand for the occupation. The essential purposes of the occupation were defined as remaining the same, but tasks, skills, knowledge, and external elements, such as credentials were changing significantly.
- **Green New and Emerging (N&E) Occupations.** Defined as a level of impact creating the need for totally new requirements resulting in the generation of a new occupation relative to the O*NET taxonomy. This new occupation could be entirely novel or “born” from an existing occupation.

With definitions of green economy, occupation, and the greening of occupations established, the next step was a finer-grained examination of the broader green economy. After reviewing existing lists of major green economy sectors, 12 sectors were chosen based on those areas typically discussed in the extant literature.

- Renewable Energy Generation
- Transportation
- Energy Efficiency
- Green Construction
- Energy Trading
- Energy and Carbon Capture
- Research, Design, and Consulting
- Services
- Environment Protection
- Agriculture and Forestry
- Manufacturing
- Recycling and Waste Reduction
- Governmental and Regulatory Administration

For each of these 12 green sectors, research was conducted to ascertain general sector activities, recent trends, and workforce implications. More specifically, emphasis was placed upon

determining the levels of occupational greening within these sectors. The background study built on the assumption that the increased growth in renewable sources of energy along with significant investments in renewable energy could result in the creation of more than 650,000 jobs in 10 years and more than 1.4 million jobs by 2025.

6.3 Use of anticipation studies in the USA

At the state level, skills anticipation and forecasting studies are typically an integrated component in economic development initiatives often initiated as part of restructuring initiatives. The Michigan case study is such an example. In the USA, skills forecasting studies are most often conducted at the state or the local level. At the institutional level, surveys conducted among alumni and close collaboration and linkages with industry provide the institutional framework for a more incremental and ongoing adaptation of programmes as well as the basis for new programme initiatives such as the case study on energy from MIT. There is no evidence that skills forecasting and anticipation studies in any way are used as point of departure for the development of joint curriculum in the transatlantic programmes. Judged from the relatively modest number of interviews, anticipation and forecasting studies are rarely used by faculty and departments, and interviews suggest that among practitioners the agenda on *New Skills for New Jobs* and what it means to the studies they teach are not well known. It leaves some questions, in particular in a European context where forecasting and anticipation studies play a much more prominent role in education policies, on how studies can be better disseminated so that they are perceived useful and used also among education practitioners.

“Foresight studies are valuable, but it is by nature impossible to say what is going to happen in the future. You see predictions in many different directions sometimes.”

– project manager at European university

Experts and project managers from both sides of the Atlantic have some words of warning about how and to what extent skills forecasting studies are used when planning curriculum content. The main argument is that by nature it is impossible to predict the future and that past studies have more than once contained forecasts that turned out to be wrong. Another point raised by project managers and some experts as well is that the nature of many anticipation and forecasting studies tends to contain information at a highly aggregate level with little information specific to subsectors, occupations, and geographical locations.

“I think the New Skills for New Jobs Agenda probably overestimates the feasibility and power of forecasting. Dialogue between industry and institutions always wins.”

– European employer’s association representative

7 Adjusting to current and emerging demands

This chapter discusses processes and practices to adjust to current and emerging demands in the labour market at the institutional level in the USA and in Europe. Institutions in the USA and in Europe recognise that key skills / 21st century skills such as communication, teamwork, ICT and languages are indispensable across programmes and levels of education pursued. However, it is an evolving topic of how and to what extent the institutional arena of teaching and learning processes can be adapted to accommodate for these competences. With *The Education Gospel* (Grubb and Lazerson 2007), the promises of education in terms of fulfilling the economic expectations of individuals has become more dominant. Institutional practitioners recognise that it has increased the demand on institutions to concurrently adapt to and be attuned to labour market demands. Some practitioners see these developments as leading students to having a more instrumental view of education, with subsequent loss of the broader personal and civic value of education. It is important to remind the reader that reflections expressed in this chapter build on a relatively moderate evidence base, but nevertheless have been included, as there is no doubt that the capability of undertaking and sustaining change in value creating activities is an increasing demand to education institutions – and it is an important agenda in institutional practices and strategies.

7.1 Ad-hoc adaptability or systemic innovation capacity - new institutional challenges?

According to the interviewees, the overall adaptability of education systems is based on several factors such as:

- the ability to adjust institutional setups and partnerships,
- the ability to adjust curriculum including opportunities to exploit interdisciplinary curriculum involving inter-department collaboration in response to change,
- the actual opportunities to adjust teaching and learning processes to meet emerging demands.

The above points illustrate that management of change has a legislative component - how prescriptive is the legislative base, and how easy is it to implement incremental innovations in education without changing the legislative base?

Management of change also has a human factor component having to do with leadership and the institutional culture- which may promote best- practice-based innovation driven by the community of teachers – or the opposite.

7.2 Innovation cultures – critical factors

The interviews and case studies show that institutional governance mechanisms play a very central role in terms of implementing an overall institutional culture and leadership practices conducive to key skills and 21st century skills, some of which are conducive to systemic innovation capacity (Shapiro & Helms 2011). One of the critical factors to institutional innovation performance is autonomy and how it is translated into leadership practices. Autonomy does seem to impact how and to which extent external relations become enablers of innovative teaching and learning environments – such as for example the Aalto University and MIT in the USA. There is evidence from an OECD/CERI study (OECD/CERI 2009) that institutional autonomy correlates with institutional cultures in terms of exploiting change in the form of systemic innovation capacity with focus on value creation. Some experts and institutional respondents believe that European Institutions are negatively impacted captured between the political influence on institutions and a very control oriented accountability culture and on the other hand a growing need to test entirely new approaches to meet more diverse and increasing demands from institutional users, whether

these be industry or the student population. There might therefore be a tendency for innovations to occur in institutional pockets in Europe driven by a highly dedicated and competent group of professors or VET teachers – and transatlantic projects are in that sense an potential enabler of practice-driven innovations.

Independent governing bodies enable US institutions to test hypotheses of change and quickly adapt programmes of studies to challenges of constantly changing social and economic reality. However, the involvement of strong boards can also be a platform for capturing emerging demands particularly in engineering and science programmes, drawing on what goes on in industry research labs.

There is also some evidence that innovation of curriculum and teaching and learning processes in European institutions becomes more ad-hoc and dependent on external project funding, whereas the top US education institutions are perceived to be the most efficient in this regard, because they have an institutionally strong systemic innovation capacity

“... they (US partner institution) are constantly changing the content. Sometimes they change the curriculum completely from year to year.”

– project manager at European university

There are nevertheless major differences between the responsiveness of US institutions depending upon the type of financial and non-financial resources they have available. Many education institutions have lost major part of their endowments under the financial crisis. Impacts of these developments have yet to materialise.

“Money is a barrier to adjustment. It costs money to set up new courses and to change our curricula. We can’t meet all growing demands, so we pick the most important ones.”

– project manager at European university

One expert did find the financial problems to be more of an excuse than an actual cause of many institutions’ inabilities to adjust in a timely manner to new skills demands. His argument was that curriculum change is not that costly as long as it does not require investments in new technology and equipment. Putting more emphasis on, for instance, communication and teamwork at the expense of some professional topics is more a matter of rethinking teaching and learning processes in the planning, and thus associated with very few expenses and simply a part of good professional practice.

Particularly on the European side, one explanation for the inflexibility of many education institutions is the lack of financial incentives. Several stakeholders notice that whereas USA Institutions strongly depend upon industry actors as the primary source of funding, and the external stakeholders therefore have a strong voice in defining and assessing the relevance and quality in performance. Funding principles in Europe are in that aspect perceived as much less market and performance focused, *fachhochschulen* and vocational education providers of apprentice programmes being an exception. One of the ongoing debates in Europe regarding market responsiveness is the balance between the ordinary education provision and shorter further education programmes and modules to respond to immediate needs.

“There is an ongoing discussion on whether shorter courses might be the solution [...] We are looking at it, but not much is being done yet...”

– project manager at European university

Another explanation of differences regarding demand orientation is the perceived rigidity in accreditation systems and the processes through which new programmes and courses are approved. Some European and USA interviewees suggest that government authorities or committees who set up to approve new courses or programmes often have little or no specialised knowledge of the specific content which is proposed for a new course or programme. This, according to some respondents, has led to a “play-it-safe” mentality on the part of the approving authorities and the institutions seeking approval, which has substantial negative impact on innovation in content and methods:

“The best way to get a programme approved is to do it exactly the way it was done last time. I have been through new programme approval processes where, step-by-step, innovations were crossed off because they were “risky”... because they might prevent the programme from getting approved”.

– American guest-professor in the EU⁷³

7.3 Adjustments in teaching and learning processes

Key competences and 21st century skills have a strong focus on personal abilities and behaviours. Experts and institutional representatives agree that traditional instruction and lecturing modes of delivering education and training are of little relevance in the context of emerging 21st century competences and key competences. This is because the acquisition of transferable key competences tends to be highly situated, meaning that students best acquire these competences by working with authentic tasks in realistic real life situations. Respondents primarily note four transformational drivers which could impact future teaching and learning environments. These four features are 1) problem based learning, 2) experiential learning including multidisciplinary learning, 3) individually adapted learning, and 4) technology-based learning.

Respondents are quite aware that traditional teaching and learning processes, whether or not they are described in learning outcomes, are not suitable to further the type of key competences associated with creativity and innovation in the broadest sense. It is also clear that the notion of experiential learning spans a range of theories on the nature of learning.

In Europe and in the USA there are many innovative newer examples of design and implementation of learning environments conducive to key competences/21st century skills. The example below is just one promising approach to innovation in teaching and learning processes.

Georgia Tech USA

Janet Kolodner (Georgia Institute of Technology) has developed a conceptual framework conducive to developing 21st century skills within the context of science education. Learning by Design (LBD) is a project-based inquiry approach to learning science and scientific reasoning in the context of design challenges. Students work in small groups on design challenges that require targeted science competences as well as scientific reasoning, collaboration, communication, and planning. The design challenge is one that can be achieved in the physical or virtual world, for example, designing and building a vehicle that can navigate a certain terrain (to learn about motion and forces) or designing and modeling an erosion control system (to learn about the earth’s ground processes).

⁷³ Conference speech, “Global Innovation & Competition” at LeaderLab Network Meeting, March 31, 2011. Available at <http://vimeo.com/22072142>

(Source: National Research Council 2010)

VET institutions including *fachhochschulen* in Europe are not surprisingly perceived to be better than HE institutions at designing teaching and learning processes that build on experiential learning and authentic problems. However, interviews conducted with transatlantic project partners do not suggest that innovations in teaching and learning processes actively promote key competences and that 21st century skills are a prominent feature in the partnerships. There is recognition that ICT-enabled learning holds potentials to sustain teaching and learning processes that take their point of departure in students' different learning styles and levels of competence, what one respondent called, "*what lights a fire in the individual student*", and several mention that they believe the USA in that respect has an advantage because institutions in the USA to a larger extent have managed to mainstream ICT-supported teaching and learning environments.

Nevertheless, there is little evidence that partnerships are used to explore how ICT technologies can be used to build radically new forms of learning environments that are not just the emulation of project based work in traditional classrooms.

Respondents do not point to any substantial transatlantic differences in terms of utilising more innovative learning methods or those based on the deployment of ICT. They do however believe that the American system is better geared to ICT-enabled innovations in teaching and learning processes. An American guest professor believes what he calls "the highly regulated education system" to be a substantial barrier to team-based and innovation-oriented learning in Europe. In Denmark, where he is currently employed as a guest-professor, he finds a lot of barriers to innovations in an institutional setting.

"In Denmark I cannot ask as much of students, so they don't work as hard. They don't have to, and they don't do it... As a lecturer, you cannot require students to participate, you can appeal... You cannot require them to hold a presentation, you can appeal... You cannot take the classroom activities in a new direction if that direction is not prescribed in the "learning objectives" of the course. So you don't follow new paths and that does not exactly promote innovation."

– American guest professor in the EU

8 Current and emerging skills demands

When asking experts and representatives of multinational companies which skills are likely to be in high demand in the future, a clear and to some a familiar picture emerged. As a foundation for employability they mention in particular:

- adaptability;
- professional skills;
- international skills (multicultural and language skills);
- basic skills (reading, writing, math);
- innovation and entrepreneurship skills;
- organisational skills (ICT, communication/presentation and teamwork); and as a sum of these competences and abilities, employability.

This section analyses the different views expressed on the strengths and weaknesses of education institutions in the USA and in the EU in terms of responding to new types of skills and competences perceived by industry and experts to be of growing importance for employability and civic engagement. When asked about terms such as *key competences*, *21st century skills*, and *new skills for new jobs*, relatively few of the interviewees in Europe and in the USA have a precise understanding of what these skills and competences are, and there is also some confusion between the notion of key competences and basic skills. This probably mirrors the fact that the emerging skills needs and the nature of those needs is an evolving topic, and it is also mentioned by some that it could reflect a persisting gap between policy visions and the daily life of practitioners. However, all interviewees recognise that the type of skills, knowledge and personal competences, which increasingly are perceived as a precondition for employability are changing. Personal competences and abilities are increasing in value for employers in almost all job functions, regardless of the qualification level. A couple of the European institutional representatives and experts also comment that the notion of *new skills for new jobs* does not really capture the tendency that demands for skills are changing in most occupations and also in mature industries such construction, textile, and manual services.

8.1 Adaptability

Before discussing how – and how well – emerging skills and competences are being promoted by institutions in the EU and US, one particular skill which stands above the rest needs to be addressed first: the ability to adapt to constantly changing skills demands. Both experts and multinationals representatives presented the view that education systems should increasingly focus on designing teaching and learning processes that promote students' development of the ability to adjust and continuously learn, instead of focusing primarily on teaching specific professional skills, which might become obsolete in the near future. Experts and industry representatives agree that neither European nor the American institutions in general currently are particularly effective in fostering this competence, seemingly because this would require a fundamental change in how learning processes are organised and possibly also require expanded options for work placements or other ways so that students can work with real life problems. In that respect, the MIT case study from the USA and the case study from Aalto University in Finland are examples of such forefront education practices.

“You can't tell what your job description is going to be 10 or 30 years from now. You should therefore be able to reinvent yourself constantly. It's like in hockey: don't skate towards where the puck is now, skate for where it is going”.

– expert

On both sides of the Atlantic there is currently awareness of the importance of promoting adaptability. At the policy-level there is great awareness of “life-long learning” and “learning to

learn”, and also at the institutional level, adaptability seems to be more in focus. Nevertheless, as one expert mentioned: adaptability is difficult to teach in a classroom.

“When they graduate from their education there are certain demands that are no longer the same as they were when they started. We should not give them tools for specific jobs, but for Life Long Learning and the ability to adapt. I am not sure the education system is currently designed for that”.

– American expert

Most experts and project managers agree that the transatlantic exchange programmes are a rich source for promoting adaptability and the capacity to thrive in ongoing change. Due to significant differences in teaching styles and studying cultures on the two continents, students learn to work in different ways and to apply skills other than the ones they usually use in their everyday studies. European students coming to the USA typically have to adjust to, for instance, studying more hours and focusing more on presentation and communication skills, whereas Americans coming to Europe often become more exposed to open-ended assignments and a more independent learning culture compared to what they are used to. In addition, institutions also typically value different professional skills, which the students going abroad are required to strengthen. It was often stated in the interviews that being exposed to different skills demands and having to adjust accordingly is the best preparation for entering the rapidly changing labour market of the future.

8.2 Professional skills and competences

Even though much focus is being put on core skills, which are relevant in all sectors and jobs, high-level professional skills continue to be the ones primarily demanded by employers on the labour market. As one representative of a multinational company stated:

“Our employees are hired because of their professional skills. Period.”

– representative of multinational company

Experts generally agreed that promoting state-of-the-art professional skills are essential in the knowledge economy. Without these, the importance of the horizontal skills disappears. What good are entrepreneurship skills if you don't have the proper occupational knowledge skills and competences to develop a solid and marketable product? All of the interviewed experts and global enterprise representatives unanimously stated that recruiting graduates with solid professional skills is generally not a problem on either side of the Atlantic. There are reports about quantitative gaps, not least regarding graduate scientists and engineers. There is some evidence that particularly large multinational companies both with origins in Europe and in the USA increasingly tend to select graduates for core professions from Ivy League Universities across the globe rather than looking to universities in the particular country of location. The combination of digitalisation of a range of knowledge-intensive services and the rapid growth of the higher education sector in particular in Southeast Asia has led to a rapid increase in the number of graduates. University graduates can therefore no longer expect to be rewarded financially for their level of education unless they are graduates from Tier I Universities around the globe. The book *“The Global Auction: The Broken Promises of Education, Jobs, and Incomes”* (Brown P. et al 2011) has created quite a debate in both academic and policy circles due to the controversial message that graduates are becoming a “commodity” in the global knowledge economy auctioned off according to their academic standing.

8.3 International skills

The increasingly global labour market has led to a growing need for graduates with the ability to work and thrive in a multicultural setting and with the language skills necessary to engage in a

global environment. This was the general view expressed in the interviews by companies, education institutions, and labour market experts.

“The world is globalising and there will not be unicultural companies in the sphere of ICT and management in the future”

– project manager at European university

Even though the globalisation of the labour market is definitely upon us, experts and companies warned that the phenomenon should not be exaggerated. Many years from now, an overwhelming majority of companies will likely also recruit locally or nationally. Global recruitment on a larger scale is currently only seen in certain highly knowledge-intensive sectors such as ICT, biopharma, and digital communication. This does not reduce the growing importance of multicultural and language skills on either side of the Atlantic. American and particularly European societies and workplaces are becoming increasingly multicultural, companies increasingly sell their products on the global market, and the digital age has transformed patterns of co-operation and communication. Multicultural and language skills will therefore undoubtedly be in growing demand in societies and among employers in both the EU and the USA in the future.

8.4 Multicultural skills and competences

The answer to the question of how efficiently multicultural skills are promoted at institutions in the EU and the USA largely depends on how the term “multicultural” is understood. Through the interviews, two different understandings emerge:

- *Multicultural* understood as “ethnically diverse”;
- *Multicultural* understood as something more comprehensive including different organisational cultures, value systems, languages, etc.

For those using the first definition, US institutions are seen as being far better at promoting multiculturalism than European institutions due to the heterogeneous nature of American society and thus also on-campus environments. American society is, according to the first definition, multicultural in itself in that it consists of people with different ethnical backgrounds. But if the second definition of “multicultural” is applied, Americans, whether Caucasian, Hispanic or African-American, still share something common called the “American culture” with a set of value and norms, according to American and European respondents. Some Europeans however see European multi-culture as something more defined and specific than US multi-cultural identity. As a result, if “multicultural skills” is understood as something more comprehensive than “ethnically diverse”, respondents believe that EU education providers then have an advantage in terms of promoting multicultural skills.

“...It depends on how you define multiculturalism. There is a lot of emphasis here in the US on diversity – that’s for sure. But if it is broader than diversity, if it means across country markets, I don’t think we have done a lot to advance that.”

– expert

According to the interviews, the primary explanation relates to geographical and historical factors rather than to how education systems and institutions operate. The EU is composed of 27 countries. Historically they have developed in various configurations of independent countries with their own education systems and business cultures. The relatively small size of most countries in the EU has necessitated co-operation in trade and in other ways as a sheer necessity in order to avoid national isolation and conflicts. Therefore, according to respondents, education systems in Europe have been more outward-oriented than the American systems.

“US universities tend to have more ethnically and culturally diverse student bodies. They come from more places, but they are not really different. The surroundings in the US do not give our students too much exposure to foreign relations, so to speak...”

– American guest-professor in the EU

“The American society is multicultural by definition. In Ireland we are just adjusting to multiculturalism. But I generally think EU students are much more willing to travel and to engage in foreign environments than students from the US. At least, that is my experience...”

– project manager at European university

There seemed to be a broad consensus that multi-cultural skills cannot be taught in a classroom context but are developed through experience in being exposed to working with different cultures. As one expert put it:

“The only way you can really advance multicultural skills is experientially”

– expert

A number of interviewees mention that intercontinental exchange plays a strong role in promoting multicultural skills and competences. Experts and project managers of transatlantic collaboration projects all agree that it is the best way to prepare students to live and work in a multicultural environment once they graduate. But studying abroad is often expensive, particularly for US students, who often have to pay their tuition on top of their expenses abroad. Other and less costly ways of developing students' ability to operate in a multicultural environment mentioned by some respondents are as international guest-lecturers and the presence of international students on campus. Others mention the promotion of systems to connect classrooms as being vital in providing students unable to go abroad with multicultural exposure.

Project managers of transatlantic collaboration projects almost unanimously agree that students on both sides generally have solid prerequisites for working in another culture and learning environment. Exchange students from both the USA and EU are generally open-minded, curious and socially oriented, which are fundamental abilities when it comes to working in and with other cultures.

8.5 Language skills and competences

USA and EU graduates have different advantages when it comes to language skills. By companies operating internationally, proficiency in English language is by far in highest demand. Here, American and European students from UK and Ireland have a major advantage:

“In our company everything is done in English. In all of our locations around the World, except Japan, we speak and write English internally”

– representative of multinational company

“When it comes to recruitment of labour among our multinational companies, English-speaking countries or countries where English is spoken at a high level are particularly attractive”

– European employer's association representative

When it comes to being able to speak multiple languages or languages other than English, European students are believed to have an advantage. This is due to the same geographical and historical factors described above, in that teaching other languages has historically been a simple necessity for most European countries.

“In this school (business school in Denmark) you see people sometimes looking confused because they don't know which language they should communicate in. In the US that never happens. Well, sometimes between Spanish and English, but very rarely”

– American guest-professor in the EU

There are, however, major internal differences in the EU when it comes to language skills. Representatives of multinational companies pointed to particularly smaller Western-European countries such as Denmark, Sweden and the Netherlands as generally being sound in promoting English-speaking capabilities. Larger Western and Southern European countries such as Germany, Spain, Italy and France as well as Eastern European countries were, on the other hand, pointed to as being not as attractive recruitment markets for multinational companies using English as their working language.

“In the EU there are major internal differences. We have problems hiring French professionals, but when it comes to the UK and the Netherlands there are no problems. But if we want people for positions who speak multiple languages, UK is actually a much smaller recruitment market than other European countries.”

– representative of multinational company

In the USA there have historically been fewer incentives to learn languages other than English, since this language is shared by all states. However, there is increasing awareness of the importance of teaching other languages, and a number of European project managers point to solid Spanish skills among a large number of American students.

8.6 Organisational skills and competences

ICT

Coming from being the “talk of the town just 5-10 years ago”, as one expert said, promoting basic ICT skills is no longer at the top of the HE and VET institutions’ agendas. This is not because they are regarded as unimportant, but rather because students on both sides today are perceived to have a sufficient level of digital literacy when they enter the education institution as well as when they graduate from it.

“That (lack of ICT skills) is never a problem. All of our applicants can use ICT actively”

– representative of multinational company

Some university representatives report that insufficient skills in reading, writing, and math are often a much bigger problem than insufficient ICT skills. Students might be capable of using digital devices such as PDA’s and Smartphones, but still they lack sufficient literacy or math skills.

Some respondents stressed that US education institutions might generally be somewhat ahead when it comes to integrating ICT and digital technologies in teaching and learning, but it is recognised that there are huge institutional differences due to costs of ICT infrastructures. According to several informants, European HE and VET institutions tend to use ICT for information search and in relation to project-based work. ICT holds immense opportunities to support complex problem solving and experiential learning through virtual environments - an opportunity which could be further explored in the transatlantic co-operation.

Teamwork

Experts as well as representatives from education institutions and companies unanimously stated that teamwork (or collaborative) skills are in increasing demand on the labour market. In a time of increased specialisation, collaboration amongst employees, offices, and companies is of growing importance. As one respondent put it:

“Teamwork is becoming increasingly important [...] Our people work in projects, where scientists, marketing people and production staff work together in teams”

– representative of multinational company

“That (teamwork skills) is something we are definitely looking for, and I think that has increased in importance in recent years. The work done by our engineers is increasingly team based.”

– representative of multinational company

It is a general stance that group- and project-based studies are conducive to the development of teamwork competences, but also that work placements, apprenticeships, or internships are generally even more effective in this regard. Interviewed experts and managers of transatlantic collaboration projects believe that European education institutions overall make more extensive use of group-based learning. On the other hand, many informants believe that American education institutions are more successful in providing students with authentic real-life experiences in teamwork and as part of their studies. The interviewed representatives of multinational companies generally considered students on both sides of the Atlantic as being fully able to work effectively as part of a team and do not note any general differences between the two continents.

Communication and presentation

Exchange programme coordinators generally share the view that American HE and VET institutions tend to focus more on skills in communication and presentation than institutions in Europe.

“There is clearly a larger focus on this (communication and presentation) in the US.”

– project manager at European university

Informants believe that US students generally have better presentation and communication abilities than their European counterparts. A number of interviewees point to a cultural-historical explanation for this. The proposed explanation is that American culture to a larger degree than the European is based on having to create one's own fortune, making the ability to sell one's own services and abilities increasingly important. As a result, it has been a historical necessity for the individual American to be able to present an idea or a product and to make a good first-hand impression, and this is therefore now deeply embedded in the education institutions. However, according to some of the students interviewed, the key reason is that American institutions prioritise that students learn to write short and concise papers on a particular topic, which they then often present and discuss with peer learners.

I really acquired some written and oral presentation skills from my study in the USA, which I now use as a professional. On the other hand I was quite surprised to find myself on the top list of performance without having studied that hard. I think that the research skills I had with me based on all the independent project work, which was part of high school really made the difference. In that sense I have had a bit of the best from each system.

-a European student

8.7 Employability

Employability is closely entwined with the notion of being able to learn throughout life so as to be able to proactively cope with changes in working life. Employability is understood as the capability of an individual to move self-sufficiently within the labour market to realise potential through sustainable employment. For the individual, employability is not just a matter of having the right combination of skills in the transition to work. Equally important is the ability to learn on an ongoing basis and to have transferable competences that are of broad value in the labour market. In this regard, the interviewees noted some general variations between the two continents' education systems.

“In the US, working life is at the centre of their studies. Case studies are very important and they are about real companies. It is always about preparing them for a job [...] When talking about universities in Europe in general, I think they are focused a lot more on academic content and theory. In the US, they focus more on application and becoming ready for the world of work”
– project manager at European university

One important component in promoting employability among students at HE and VET institutions is a practically oriented or case-based approach to learning. There is a widespread understanding that particularly case-based learning in this context has received increased attention in European HE institutions in recent years.

Job placement schemes, internships, and apprenticeships are critical to promoting employability. Students, employers, and teachers believe that job placement schemes, apprenticeships and internships lay the foundation for establishing personal networks in the industry before graduating. In vocational education, experts generally notice little variation between the two continents' education systems. Both are perceived to be efficient in integrating real-life training schemes in their curricula, though the formal apprenticeship system is primarily a European phenomenon. As for HE institutions, European universities are generally perceived to focus less on exposing their students to real-life environments than their American counterparts. Although there are substantial variations between sectors and institutions, the general perception seems to be that European universities have not traditionally utilised a practice based experiential approach to learning, though a change in that direction is seen in some institutions – Aalto University being just one case example. Education providers in the USA and in the EU see key competences and 21st century skills as critical to employability, and they also mention it is a core focus in discussions with employers:

“Employability is the thing right now in European education. It has grown tremendously in importance – particularly within the last 12 months.”
– project manager at European university

Employability does thus have to do with labour market mobility through a career trajectory, but it is also a matter of institutional performance - whether students get a job or not upon graduation.

“(In Europe) I now see new many measures being taken to promote employability. They [institutions] will start to keep track of how many students of each course actually get a job once they graduate. Who delivers employable graduates? There will be a focus on giving students more than a diploma, to also provide them with valuable industry links, solid CVs and practical experience. They will be labour market ready when coming out. That is really the new thing.”
– project manager at European university

In the US, the majority of education institutions have used such measures for years.

The transatlantic differences in the approach to employability are explained as being based on fundamental cultural differences. American education institutions have traditionally always been more oriented towards producing graduates able to contribute to a growing market economy. European institutions, on the other hand, have historically put more emphasis on research and creating new knowledge in more isolated academic environments:

“...they (American graduates) work in a different culture, and I think that is a major reason why. From early childhood it is about jobs and employment. They are teaching it very different from us in their elementary schools, but the parents teach their kids about it. You create your own luck and failure is punished”.
– European employer's association representative

Differences in incentive structures impact institutional behaviours. According to stakeholders, US institutions are to a larger extent than in Europe held accountable for producing graduates

immediately ready to enter the labour-market, and are also rewarded accordingly, for example in terms of endowments and elite students' choice of institutions. Due to US institutions' dependency on funding from private businesses, it is substantially important for them to be able to showcase their ability to provide labour-market-ready graduates. Another important source of funding comes from student tuitions, which are typically paid by the students' parents. Being able to demonstrate track- records leading to high-value employment is therefore equally important. Scores and rankings of US institutions are common, and an essential parameter in deciding their ranking is their proportion of students who end up in well-paid or high positions. In Europe, government funding for the education institutions to a larger degree rests on the graduation rate of students.

8.8 Basic skills

Providing students with proficient skills in reading, writing and math is an equally large problem and a substantial political priority on both sides of the Atlantic. Although the problem primarily lies at the secondary school level, VET and HE institutions clearly feel the impacts. One administrator at an engineering school for instance states that some of the students, although extremely well-skilled in math, generally write so poorly that written dissemination of their research results is a substantial problem.

"It is a major problem on both sides, particularly in relation to math and literacy"
– expert

In Europe, Finland, Belgium, and the Netherlands are frequently mentioned as top countries in terms of providing students with the basic skills necessary for progressing in education. In the US, the variation is primarily from school district to school district and is, as a couple of experts stated, closely tied to socio-economic conditions. Private and well-funded public schools are generally more efficient in teaching basic skills compared to more poorly-funded public schools.

"We talk about the poor reading, writing and math skills a lot on both sides, and we try to do a lot about it, I think. In the USA the problem is closely linked to socio-economic conditions."
– expert

Some education institutions state that only little can be achieved to improve skills in reading, writing and math once students have entered the VET or HE system. Others have taken different measures to promote such skills by providing voluntary writing and math courses for their students.

8.9 Innovation and entrepreneurship

The promotion of entrepreneurship and the development of an entrepreneurial culture in the EU have been strategic objectives for the European Commission and the Member States for many years, framed by the Lisbon Agenda. The European Charter for Small Enterprises⁷⁴ (adopted in 2002), set within the context of the Lisbon Strategy, committed Member States to 'nurture entrepreneurial spirit and new skills from an earlier age'. Most recently the 2020 Strategy for Smart, Sustainable and Inclusive Growth⁷⁵ in the EU provides the medium term strategic orientation in the EU to be realised through entrepreneurial and innovative capabilities in all parts of society.

In this context, education and more broadly lifelong learning is a critical policy lever to stimulate entrepreneurial mindsets in all education sub-sectors. However, entrepreneurship education is not limited to promoting the skills to start-up a business. In the EU, entrepreneurship refers to something broader such as an individual's ability to turn ideas into action. Entrepreneurship is therefore a **key competence for all**. In fact, the *Recommendation on Key Competences for Lifelong Learning*, which was adopted on 18 December 2006 by the European Parliament and

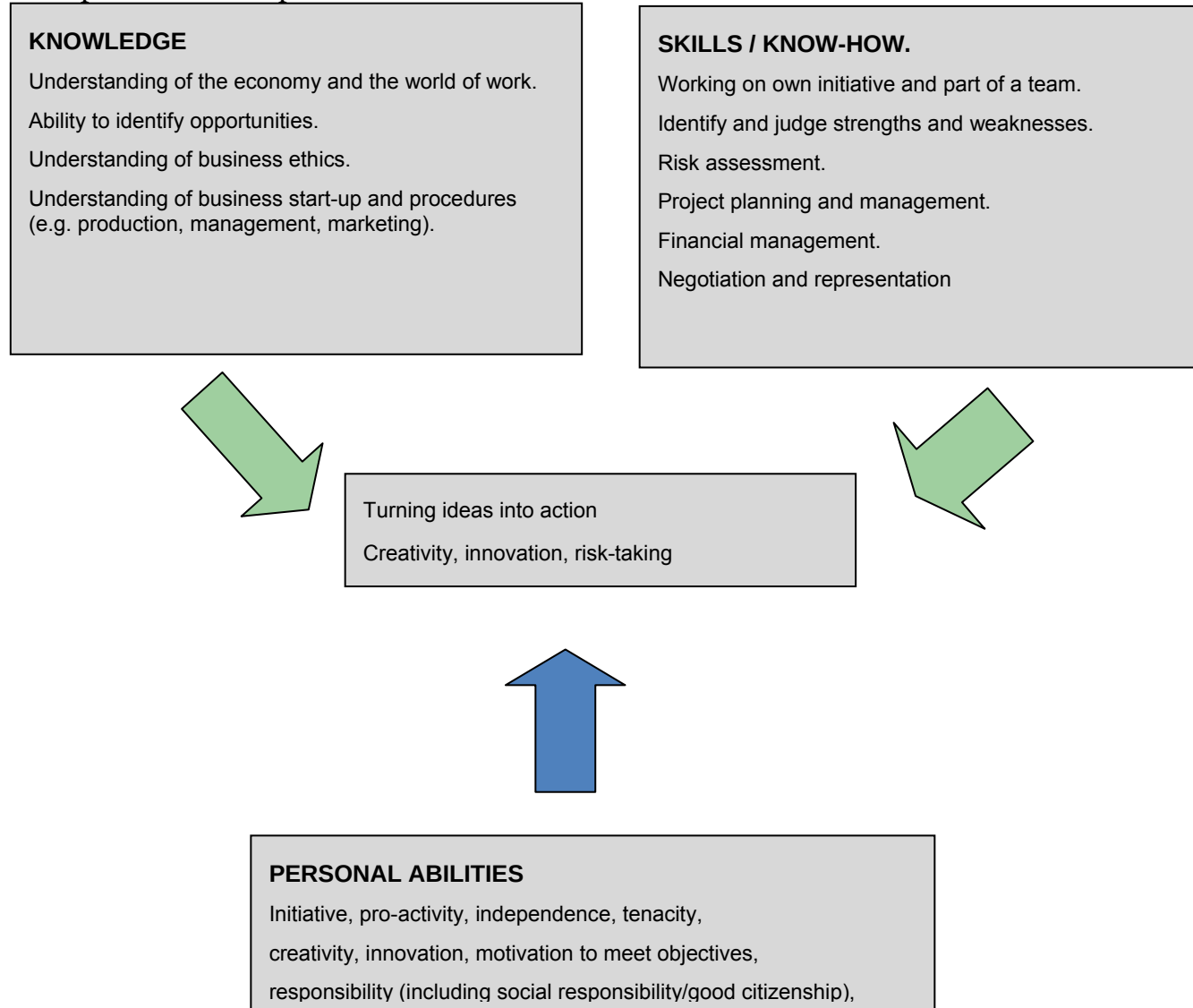
⁷⁴ European Charter for Small Enterprises. <http://ec.europa.eu/enterprise/policies/sme/best-practices/charter/>

⁷⁵ http://ec.europa.eu/europe2020/index_en.htm

Council, included entrepreneurship. The key competences policy framework has as such provided a strong impetus for Member States to address entrepreneurship in an integrated manner within the framework of lifelong learning.⁷⁶

In that sense, entrepreneurship in Europe is increasingly seen not just as a matter of starting an enterprise, but also as a competence closely associated with adaptability and personal initiative as illustrated in the figure below:

Entrepreneurial Competences



(Source: EC 2010b)

Innovation skills and competences

"We invent most of our own products. So innovation is the key in what we do [...] we want the future Nobel Prize winners"

– representative of multinational company

⁷⁶ http://ec.europa.eu/education/policies/2010/objectives_en.html#basic

The European Commission has in partnership with Member States and a range of stakeholders actively promoted entrepreneurship for many years, and numerous studies have been published to actively promote entrepreneurship in all parts of the education system (NIRAS Consultants et al, 2008).

The European Year of Creativity and Innovation in 2009 was an integrated policy approach to promoting entrepreneurship across policy domains such as education and culture, enterprise, media, research, and social and regional policy. The activities of the year focused on creating an environment favourable to creativity and innovation and became as such a strong impetus for a long-term integrated policy setting. New pressures on the European economy, including an ageing population, shrinking labour force, as well as increasing competition from emerging economies, are also perceived as potential drivers of entrepreneurship in the EU. Through the Structural Funds, for example, initiatives have aimed at facilitating entrepreneurship opening up employment for disadvantaged groups and in particular enabling the entrepreneurial potential of women. In this way entrepreneurship has more of a dual policy focus in the EU than in the USA, aiming to contribute equally to growth and social cohesion through its contribution to employment and self-employment.

The interviewed experts agree that fostering innovation and entrepreneurship is essential in securing future competitiveness of the European and American economies and some also mention entrepreneurial and innovation skills critical to societal cohesion. In an increasingly global market where primarily lower value-chain activities are being outsourced to non-western countries, Europe as well as the United States will depend increasingly on new and innovative products and business models. Developing new innovative solutions is one thing; commercialising these on the market is another. According to the interviewed experts, education systems play an important role in providing the skills necessary to foster such developments in innovation and entrepreneurship. On both sides of the Atlantic, education providers are increasingly aware that entrepreneurship skills are something much broader than the foundation for starting a business, and that the education systems at all levels should promote an entrepreneurial mindset. New approaches to the design of teaching and learning processes supportive of creative and innovative competences and skills are increasingly emerging – though rarely as a systemic feature. In that aspect both the MIT case and the Aalto case are examples of how leadership and a strong and experimental and open institutional culture may foster systemic change, for example leading to innovative cross-curricular activities integrating engineering, social sciences, business studies and humanities. Nevertheless, a more coherent and systematic approach to the teaching and learning of entrepreneurship is still not an embedded feature and mainstreamed in upper secondary and tertiary education in Europe to the same extent as in the USA despite multiple policy actions enabled by the European Commission in co-operation with the Member States (EC 2010b).⁷⁷

Entrepreneurship education in the EU is characterised by a highly uneven and varied landscape of practices with variations across countries, within countries, and even within institutions. One reason for this is that entrepreneurship education to a large extent has developed bottom-up and has to a large extent therefore not been mainstreamed within institutions or countries, according to a study published by DG Enterprise in 2010 (DG Enterprise 2010b). These variations in attitudes towards entrepreneurship between Member States are according to the study also impacted by different cultural contexts. In Sweden, for example, a strategy for entrepreneurship education has been developed within a cultural context where there traditionally has been little interest amongst citizens in starting their own businesses and within an economic context characterised by a predominance of large firms and a large public sector.

Nevertheless the Year of Creativity, Entrepreneurship and Innovation in 2009 illustrated that across the Member States practices have evolved, which can provide a fertile ground for mainstreaming entrepreneurial education policies taking into account economic and cultural differences in the EU.

Both in the USA and in the EU there is a growing tendency for entrepreneurial competences to be defined as something broader than the start-up of an enterprise. One aspect is the nature of skills pertaining to different forms of innovation such as user driven innovation and employee driven

⁷⁷ <http://ec.europa.eu/enterprise/policies/sme/documents/education-training-entrepreneurship/> provides an overview of EU reference documents pertaining to the SME entrepreneurship agenda

innovation in contrast to R&D and technology driven innovation. Another aspect is the system capacity to undertake innovation behaviour as an ongoing feature⁷⁸. The research conducted as part of the preparation of the year of Creativity, Entrepreneurship and Innovation (Shapiro & Haahr 2007) suggests that innovative competences and capabilities should not be taught as generic topics, but must be embedded in the specific curriculum and occupational context, a factor also raised in the most recent publication on entrepreneurship from the EU (DG Enterprise 2010) as well as in publications on innovation and skills from the OECD (OECD 2010, 2011). In addition, the organisation of teaching and learning processes to enable innovation needs to be supportive of constructivist learning processes and preferably build on genuine problems for which there is not one definite answer (OECD CERI 2009).

The general picture emerging from the interviews is that American and European education systems are generally both capable of promoting innovation skills, but that American institutions have an advantage due to the historic entrepreneurial orientation in higher education in the USA. Another explanation lies in the deeply rooted integration of private sector actors in American education institutions. The close collaboration with enterprises enables students in post- secondary and tertiary education to have better opportunities for learning based on real life problems. The Mid-term review of Digital Literacy in Europe (2009) suggests that in the context of informal learning, innovative models enabled by the range of NGOs found in the USA and building on principles of social innovation are quite successful at integrating marginalised youth and adults and creating new opportunities for micro enterprising (Shapiro & Hilding Hamann 2009).

In the EU and in the USA there is a growing focus on entrepreneurial education targeting at-risk groups, and more broadly also the role of social innovation in learning contexts.⁷⁹ In the USA, social entrepreneurship education has gained much attention in recent years. Many K-12 schools and post- secondary schools have started to develop innovative and integrated curricula to address the needs of preparing future entrepreneurs. New paradigms have been developed to explore the non-traditional value-added goods and services provided by farms and the prosperity of the Community.

The Mid-term Review of Digital Literacy in Europe⁸⁰ showed that successful approaches to developing digital literacy among potentially excluded groups to a large extent take their point of departure in the socio-economic context of the individual and with emphasis on developing digital skills to strengthen the individual's potential resources in the community where he/she lives (Shapiro 2009). But new forms of entrepreneurship are also gaining a foothold in business schools. In Europe, one of the leading business schools INSEAD offers an executive programme in social entrepreneurship.⁸¹ Also Stanford University in the USA offers an executive programme in social entrepreneurship⁸², and it furthermore has a centre of social innovation⁸³.

Foundations and NGOs in the USA have traditionally played a strong role in promoting entrepreneurship within a wider equity cause, as is the case of the Network for Teaching Entrepreneurship (NFTE)⁸⁴.

⁷⁸ See for example source list: OECD/CERI 2009

⁷⁹ http://www.wikipreneurship.eu/index.php5?title=Social_innovation_in_EU_policy

⁸⁰ http://ec.europa.eu/information_society/eeurope/i2010/key_documents/index_en.htm

⁸¹ http://www.insead.edu/facultyresearch/centres/social_entrepreneurship/education/documents/ISEPFlyerv2400311.pdf

⁸² <http://www.gsb.stanford.edu/exed/epse/>

⁸³ <http://csi.gsb.stanford.edu/>

⁸⁴ <http://www.nfte.com/>

NFTE founder Steve Mariotti, a former business executive and entrepreneur, started the organisation officially in 1987, after five years as a public school teacher in New York City school system, as a drop-out prevention programme in the South Bronx. Mariotti found that his students responded to math and reading when they were embedded in the “real-life” scenarios of business. He quickly discovered that when low-income youth were given the opportunity to learn about entrepreneurship, their innate “street smarts” could easily develop into business and academic smarts. NFTE has worked with over 220,000 young people from low-income communities over the last 20 years, in programmes across the U.S. in 31 states and in 13 other countries. The organisation has trained more than 4,700 Certified Entrepreneurship Teachers (who deliver NFTE’s specialised curriculum), and is continually improving its innovative programme models. One of the leading organisations engaged in a comprehensive, scalable, proven, and cost-effective entrepreneurship education model is the National Foundation for Teaching Entrepreneurship (NFTE), which is principally engaged in educating young people from low-income communities.
<http://www.nfte.com/>

(Source: ASPEN Institute 2008)

In the EU the Young Foundation⁸⁵ in the UK has played and plays a catalytic role in promoting new forms of entrepreneurship.

UpRising works with talented young people aged 19-25, equipping them with the skills, knowledge and confidence to transform their communities for the better.

The programme is driven by learning through experience. UpRisers participate in regular training sessions and see how the levers of power work behind the scenes in Parliament, government departments and the media. They also test their skills by running their own local campaigns and receive one-to-one support from mentors - other young leaders who can offer support, advice and guidance.

Three years on UpRising participants have launched anti BNP campaigns, become school governors, sat on grant committees and successfully pushed for changes in legislation.

(source: http://www.youngfoundation.org/our-ventures?current_venture=1925)

In Europe, the boundaries and overlaps between skills for entrepreneurship, innovation and creativity are often not that clear for policy makers and institutions, and the debate on how to design education and training supportive of innovation is much less developed than is the case for entrepreneurship. The *Fachhochschulen*⁸⁶ (polytechnics) in Germany and Austria are implementing innovative solutions based on an application oriented approaches to learning, but promising models are also evolving in the Nordic further education systems – especially in labour market training programmes. One of the great challenges however is that most initiatives aimed to spur innovation competences through education occur through pilot funding, scaling and mainstreaming innovative practices remains a challenge.

According to the interviews, innovation in Europe mostly takes place outside the education system, though most of the respondents recognise that education systems can play a clear role in driving innovation. According to some informants, competence and outcome based frameworks offer in that sense better opportunities to develop education and training activities that build on authentic problems. Innovation as a topic is often discussed theoretically in classes and auditoriums.

⁸⁵ <http://www.youngfoundation.org/>

⁸⁶ Polytechnics - many of the *fachhochschulen* play a strong role in the regional innovation system, similar to the role that many community colleges in the USA play as actors in competence based regional innovation strategies.

In many of the vocational education and training systems in Europe there is a strong tradition for employment of social partners in curriculum development, be it at the upper secondary level or in the tertiary polytechnics. In many Member States, engineering associations have also had an increasing role in the development and quality assurance of curriculum (SEC 2009, 158 final). Generally, the EU cases show that there is a growing mutual interest in collaboration. Furthermore, there is some evidence that the growing demand for key competences functions as an enabler of such partnerships also within the wider context of regional innovation systems, as shown in the cases from the automotive sector and the biotech sector in the UK.

In the USA there are many interesting examples of how community colleges partner-up with clusters of companies and become agents in regional innovation systems.⁸⁷ The Michigan and Milwaukee cases from the USA are both such examples.

Interviewed experts, companies, and managers of transatlantic programmes perceive innovation as being able to develop marketable new products, services, and processes of relevance in the commercial market or to the benefit of the wider society. Some experts and institutional representatives refer to changing patterns of innovation in terms of an individual's ability to contribute to value-adding change in a company on the basis of their skills and often tacit knowledge about the customer. Applying this definition, innovation and adjustability skills become closely interlinked, and this poses challenges to the design of the teaching and learning environment. One of the experts, who used this definition, expressed the following view:

"Innovation skills are instrumental in your ability to reinvent yourself, which is perhaps the most important asset on the modern labour market. We have to teach our students that you learn when you fail. On both sides of the Atlantic we teach them the opposite – in schools and on the labour market, and that is really an innovation killer. We have a whole generation of workers who are too afraid to reinvent themselves. We can't make that mistake with the next generation."

– expert

In spite the quite critical view of the role of the education system as an enabler of innovation expressed by experts in US and in the EU, it is interesting to note that primarily in the EU there is a growing recognition that particularly workforce development begins to have a more recognised and visible role as an enabler of innovation from the shop floor. One of the reasons for these differences may be the prominent role of lifelong learning not only in education policies but also as part of wider economic policies in the EU compared to the USA.

When asking the interviewees about entrepreneurship skills, definitions vary. Some refer to the term as being the ability to start up one's own business- particularly institutional representatives. Some experts from the USA and Europe see entrepreneurship as something broader - "a mind-set" which can be used in all organisations and in life in general. Regardless whether the narrow or the broad definition is applied, and despite the developments in entrepreneurship education in the EU, there is a strong belief that US institutions in general have a better understanding of what it takes to produce graduates with solid entrepreneurial skills.

"From what I have learned in my research, there is really no common definition of entrepreneurialism. We need more research on what actually constitutes the entrepreneurial skills mix. Everyone talks about it, but they talk about different things."

– project manager at European university

⁸⁷ For more information see Regional Technology Strategies, North Carolina, which has published a range of interesting studies on best practice models for driving regional innovation through competence-based cluster strategies. <http://rtsinc.org/publications/index.html>

As with innovation skills, most experts and university representatives agree that entrepreneurial skills are difficult to teach in an auditorium. Theoretical disciplines and concepts underpinning entrepreneurship can effectively be taught in a traditional teaching environment with subjects such as macro-economics, commercialisation, and organisation. Key competences pertaining to entrepreneurial dynamics can only be acquired by working with authentic tasks in a real-life environment and by receiving the proper support and coaching, according to several of the respondents. This can either be promoted in real-life settings or in simulated environments. The crucial part is for students to be given hands-on entrepreneurial experience. One example of an intra-institutional scheme promoting entrepreneurship is the “Formula Student” engineering competition.

Formula Student

Formula Student is an international engineering competition where universities from across the globe are challenged to design and build a racing car and to set up a supporting business model. Students are asked to imagine that they have been approached by a car manufacturer to produce a prototype car for evaluation. Apart from constructing the actual car, students also have to structure their team effort, promote their concept, and raise sponsorships.

The project is coordinated by the Institution of Mechanical Engineers in London and is backed by the companies in the automobile industry and large engineering companies. Every year, students from around the globe gather at the infamous Silverstone Racing Circuit to race against each other, to exchange knowledge and ideas, and to meet with possible future employers from the industry.

The project illustrates an innovative way of promoting a wide array of both professional and core skills while at the same time creating a platform for interaction between education institutions and private sector actors. In addition to providing technical skills, students also acquire innovation and entrepreneurship skills as well as skills in management, marketing and teamwork – all in a real-life environment.

(Source: <http://www.formulastudent.com>)

Some respondents underline the point that successful entrepreneurship only partially relates to actual skills, the other part being factors such as motivation, commitment, awareness of own strengths and weaknesses, networking abilities, and knowledge of market actors and dynamics.

“I always tell policy-makers: Please do not approach this from a theoretical or academic point of view, but do it practically. Place students in real-life situations or simulated training environments. You cannot teach innovation and entrepreneurship in a classroom. A practical approach is absolutely essential”

– expert

Experts and project managers on both sides of the Atlantic generally believe that education systems are efficient in providing a solid theoretical foundation for entrepreneurship. When asked about the ability to provide students with hands-on experience and support schemes, US education institutions are perceived to be ahead of their European counterparts. Due to the American institutions’ close interaction with industry actors, students typically get a better inside view of the industry before they graduate. Collaborative projects with industry partners are also catalytic to entrepreneurial education. However, as the cases from the EU illustrate, wider collaborative projects with industry will likely increasingly and positively impact the overall quality of the learning environment. In Europe there are also positive developments regarding on-campus incubator environments for entrepreneurs and infrastructure and mentor support such as is seen in the USA. Getting in contact with angel investors and venture capitalists outside campus is specifically mentioned as something occurring more easily in the USA than in the EU.

“The institutions in the USA are good at helping graduates setting up own businesses. They also have good start-up programmes for immigrants and they are very good at establishing support schemes for commercialisation of activities. We could learn from that in the EU...”
– expert

A majority of the interviewees points to differences in mind-sets and cultures. As one expert puts it:

“The American narrative is basically a story on entrepreneurship. The entrepreneur is in many ways the focal point of American history and society”
– expert

Across the USA there are multiple examples of community colleges and universities being part of a local ecosystem of start-ups. This mentality, respondents argued, shines through in the upbringing of children and in the education system all the way from elementary school to PhD-level. As a

result, graduates from American community colleges and HE institutions are perceived to be more market-oriented and better at thinking in new business opportunities and commercialisation. Two European experts suggest that European graduates learn too little about handling risks, failures, and financial ups- and- downs and maybe too much about the start-up of a micro business.

Nevertheless, some of the American experts as well as experts from Europe mention that entrepreneurship is by no means a systemic feature across the education system in the USA. When comparing entrepreneurship education in the USA to the situation in the EU it is worthwhile noting that the growth of entrepreneurship education in the USA is a relatively new phenomenon. During the past two decades there has been a tremendous growth has occurred in the number of entrepreneurship courses offered by colleges and universities. In 1985, studies indicate there were about 250 entrepreneurship courses offered across all college campuses in the United States. Today, more than 5,000 entrepreneurship courses are now offered in two-year and four-year institutions (Kaufmann Foundation 2008).⁸⁸ It could be interesting within the transatlantic co-operation and of benefit to both US and European institutions to explore the success of scaling entrepreneurship education in the US, which in no way can be characterised as having expanded by from being mainstreamed, which has been suggested as one model of growth for entrepreneurship education in the EU (Dg Enterprise 2010).

Entrepreneurship and youth

There are a range of innovative examples emerging both in the USA and in Europe aimed to stimulate entrepreneurship capacity, many of the initiatives occurring outside the institutional context. Both environments make extensive use of social media to enable their activities.

Rural Youth Forum

Rural Youth Europe (RYEurope) is a European Non-Governmental Organisation for rural youth. Established in 1957, it is an umbrella for youth organisations working to promote and activate young people in countryside. It provides international training possibilities and works as an intermediary between national organisations and youth organisations and public institutions at the European level. Rural Youth Europe is a member-led organisation: democratically constituted, the organisation is led by young people for young people and it plays an important role in promoting youth entrepreneurship as an opportunity for youth in rural areas

(Source: <http://www.ruralyouth europe.com/>)

⁸⁸ For more in-depth coverage of the development of entrepreneurship education in the USA. See Charles R.B. Stowe. <http://www.wspiz.pl/~unesco/articles/book3/tekst8.pdf>.

The Young Entrepreneurship Academy (YEA!)

Created at the University of Rochester in 2004, the YEA! programme was developed and launched in New York State at the University of Rochester with the support of a grant from the Kauffman Foundation, and it has since launched additional sites at the State University of New York at Geneseo (with support from the Finger Lakes WIRED initiative), at Niagara University, the Greece Central School District (NY) and Lake Zurich High School (IL). In September 2009, YEA! launched 11 new high school sites and a pilot site and model for a national expansion at the Boys & Girls Club of America in Rochester.

YEA! was initially developed as a pre-college, after-school, academic programme hosted by colleges and universities. The original university model provides an opportunity for students to become familiar with the campus that their YEA! class is located on. Over the last four years, 42% of eligible YEA! students became matriculated undergraduates at the college where their YEA! class was held. YEA! has since designed and launched an additional, in-school model that allows high school students to take YEA! as an elective course, built into their school day schedule. The high school model allows YEA! to impact a greater number of students and eliminates potential barriers for students to participate, such as tuition costs, after school commitments and transportation to their local college or university campuses

(Source: http://www.yeausa.org/About_Us.html)

9 The role of transatlantic collaboration

This section gives an overview of main perceived benefits and barriers in the transatlantic co-operation- pertaining to the theme of this study.

9.1 Benefits

Experts, managers of transatlantic collaboration projects, former exchange students as well as representatives of multinational companies pointed to a number of either potential or already harvested benefits of collaboration across the Atlantic. The mentioned benefits were primarily seen to have an impact at three levels: 1) macro level, 2) institutional level and 3) student level.

Macro level

The impacts of transatlantic collaboration at macro level primarily include effects on education policies and the respective economies, but effects on cultural relations between the two continents were also mentioned to be important positive effects by a number of respondents.

All respondents unanimously stated that transatlantic co-operation in the field of education has the potential to lead to better and more responsive education systems on both sides of the Atlantic. Some experts, project managers and company representatives underline the importance of knowledge-sharing on emerging global skills demands as a key issue, in particular the range of methods to thoroughly identify emerging skills needs and subsequently also how to integrate emerging skills needs for example to avoid curriculum over-crowding. Other aspects concern the design and implementation of teaching and learning processes conducive to the development of personal competences.

“Emerging needs and adjustment to these is a big part of what we discuss with our US partners”.

– project manager at European university

Because methodologies deployed in Europe and in the USA are very different, there is a shared view that the co-operation really brings value to the agenda on emerging skills and jobs.

“I think it (transatlantic collaboration) fosters better education policies. It is that simple...!”

– representative of multinational company

Development of a better and more globally oriented workforce is one of the effects most often mentioned by respondents and is primarily linked to staff and student exchange schemes. International environments and exposure to new cultures and traditions promotes a unique mix of competences, according to informants, which is difficult to achieve in other ways. Both students and staff experience new professional approaches within their field and are forced to reflect on their own practices, which promotes a more open, innovative and flexible. Being inserted into a new environment and learning to manoeuvre there creates a self-confidence and independence which is of value in labour markets and in civic life.

Other positive effects and potentials are mentioned. Two of the most frequently mentioned are increased mobility and improved recognition of qualifications and competences. A number of experts, company representatives and project managers see a substantial potential for developing common recognitions of qualifications. Lack of common recognition or at least a common qualification and competence terminology is mentioned to be among the largest barriers to transatlantic collaboration for example when it comes to the development of joint degrees. In this context it is noticeable that most American experts, education providers and enterprise

representatives use the terminology *skills* and *qualifications* referring to the formal outcomes of education, whereas European experts and institutional representatives tend to talk about competences and outcomes as a framework which to some extent can ease collaboration in spite of programme differences.

“Right now we don’t have the tools to compare and measure skills and competences across the Atlantic. We need information on this. Now, all we do is assume. We need comparative instruments”.

– expert

Institution/faculty/students

“What we didn’t expect ended up becoming the most valuable... To work with people from other cultures and experience other ways of doing things has become maybe the most valuable outcome of this collaboration to our institution... There was a clear agenda which was about strengthening networks and our international profile, but it was all the other things that we ended up learning the most from.”

– project manager at European university

Students learn to work in other organisational cultures, which promote values typically quite different from the ones promoted at their home institution. European students often believe there is a greater focus on presentation, communication, ethics and hard work at American institutions compared to what they are used to at their home institutions. American students on the other hand find a much greater focus on independence and problem solving in Europe compared to that found at their home institutions. By exposing students to different working environments, student exchange promotes the students’ abilities to navigate in changing environments, which, by experts, is perceived an invaluable asset on the labour market.

“The American students come in with a different attitude than our students. They are taught to work hard – really hard. Our students have what we call the “6-mindset” - the perception, that if you score 6 out of 10 you don’t have to work to improve anymore. They are definitely learning something about hard work. But where our students can learn about working hard, American students can learn how to work smart and independently“

– project manager at European university

Apart from promoting key competences respondents also frequently find that a stay abroad strengthens a number of social competences such as self-confidence, self-consciousness, the ability to work independently and the ability to take care of oneself in life. Some simply referred to it as maturity.

“They become more attractive on the labour market because they have a proven ability to adjust to new environments [...] It improves their CV and it seems to me, that the students who participate in the exchange programme make it pretty far. [...] They gain international experience, language training, ability to adapt to new environments, a multicultural perspective, increased self-consciousness...”

– project manager at European university

9.2 Barriers

There are indications that some institutions do not have implementation mechanisms to fully benefit from participation. In particular, staff exchange schemes seem to rarely lead to actual adjustments of institutional practices. In most instances, the exchange activities bring many personal benefits,

which impact the individuals' practice but more or less disconnects them from institutional processes at large. This study builds on relatively few interviews; nevertheless, it should be noted that only at one of the interviewed education institutions was feedback from students and staff on their exchange experiences used systematically to make institutional adjustments.

10 Conclusions and recommendations

There are several themes that emerge from interviews and case studies conducted in Europe and in the USA. The study points to a number of themes, which could enrich the existing transatlantic co-operation, either implemented through the programme measures, through studies, or through ongoing strategic policy dialogue.

On the one hand, convergence can be noted in a range of areas pertaining to the debate about changing skills and jobs within the broader context of globalisation; on the other hand, there are fundamental differences in institutional practices and in policies. The EU-US partnership in education could therefore be an ideal teaching and learning innovation platform for further exploring institutional processes and practices for promoting key competences/21st century skills in post-secondary education. The partnership could also be a platform for collecting more evidence and for testing innovative approaches related to the agenda of changing skills and competences.

In this sense the US- EU co-operation provide further impetus to a dynamic development of the knowledge triangle- critical to innovation performance in a knowledge society.⁸⁹ This could be done through a strong connection between pilot projects, commissioned studies linked to the pilots - and as a third element policy dialogues also involving external stakeholders.

10.1 21st Century skills in a globally more connected world- emerging trends!

The growing policy focus on key competences and 21st century skills is situated in a context where education institutions and industry alike have begun to focus more on the outcomes of education – that is, the accrued benefits of education with more of a dual focus in the EU on employability and as a means to improve equity. Key competences are also strongly embedded in policy discourse on lifelong learning with focus on the rights to employability and active civic participation throughout life for everyone in the EU. In the USA, the changing nature of skills demands is situated in debates about a growing job polarisation, and it is primarily the community college system that has the broader mission of providing post-secondary education as a second chance opportunity. In this context it is noticeable that many US community colleges not only provide vocational education and training, but also broad foundation courses concerned with civic engagement and the local community. The aftermaths of the financial crisis and the fact that the BRIC economies have invested heavily in the development of their higher education systems have also led to policy makers revisiting previous assumptions about the nature of global specialisation. In that context key competences are a critical factor because they are by nature highly situated and thus harder to copy.

Key competences and 21st century skills are to a large extent driven by a growing awareness of the impact of globalisation in terms of the overall job turn-over and reconfiguration over labour markets. But – globalisation has evolved over time:

In the first phase of globalisation, outsourcing strategies were primarily cost-driven. In the second phase of outsourcing, firms aimed to take advantage of costs in combination with proximity to emerging and growing markets - not just for the purpose of reducing transportation costs, but also to better tailor products and services to local markets. The third wave of outsourcing is still driven by a cost advantage and proximity to new mass markets. But, the strategic outsourcing advantage for multinationals in particular builds on massive investments in technology based research and production of graduates, PhDs and post-docs in those fields leading to outsourcing also of research activities (Shapiro et. al. 2008). The new market of science and engineering graduates has led to

⁸⁹ http://en.wikipedia.org/wiki/Knowledge_triangle

and will in the coming years lead to a massive increase in a highly skilled and readily mobile labour force- and likely with lower expectations to salary levels (National Research Council 2005). These developments occur in a context with increased enrolment of foreign students in graduate science and engineering in the USA in particular from Southeast Asia. In Europe, there have been concerns about the brain drain with reference to science and engineering graduates emigrating to the USA and despite measures to attract more students to science and engineering programmes, some countries have voiced policy concern about high school graduates' choice of education and career trajectories.

This study as well as a recent empirically based research publication (Brown et al 2011) suggests that the third wave of globalisation medium term may have substantial impact on the labour markets of higher education graduates. Interviews suggest that some multinational companies are beginning to transform their HRM strategies concerning their specialist workforce. As the quality of human capital increasingly becomes a key parameter to competitiveness and as higher education has become more of a global mass market, a master's degree or a PhD in science and engineering is not necessarily a pathway to a well- paid career trajectory. As some industry informants suggest, the graduate market has grown so much that university credentials are no longer a sufficient selection criterion. Industry therefore looks to what they perceive as Tier 1 universities across the globe. With stronger linkages and interactions with universities, the Ivy League of global universities becomes easier to identify as partners in research alliances and as a gateway to recruitment of new graduates. According to the same industry representatives, these developments are enabled by graduates being geographically and culturally mobile - and also because more graduates possess the types of skills and competences that support mobility and because of legislative measures at the national level opening up for influx of high skilled graduates.

It is still a trend - and thus it cannot to be said what level of impact it will have in the years to come. Nevertheless, this trend should be monitored closely. Until now the quality of the available skills base has been a critical parameter in the choice of location for knowledge-intensive multinationals. If that pattern begins to be replaced by more global recruitment practices regardless of country of location, it may substantially challenge institutional and national educational strategies and current assumptions about excellence and competitive advantage.

10.2 Multidisciplinary learning

Another difference observed in the study is that multi-disciplinary curriculum seems to be more dominant in the educational philosophies of US higher education than in Europe, though there seems to be a tendency in Europe for universities to increasingly begin to offer multi-disciplinary programmes, Aalto University in Finland being such an example.

It is still more common for universities in the USA to encourage students to take courses and engage in projects with students from other disciplines than the core of the programme, and students may also, depending upon collaboration agreements between providers, be able to put together quite a unique study programme drawing upon expertise from more than one university.

As a student coming from Europe it was amazing how I got opportunities to put together a programme from Stern School of Business and NYU. I could therefore get a solid foundation in the music industry- whilst also learning about broader aspects of business. I also worked on case studies related to the business of music industry- and I even started up a company brokering rights of music and text from independent musicians creating a stream of revenue by selling bits and pieces of music and text for example to advertisement companies. The professors really encouraged me to explore opportunities within the management side of music business- or as a professional musician who needs to know about business- I even also got support to train with a really strong musician who was part time teacher at a community college, and I got it recognised as part of my curriculum. I could never have had that opportunity in Europe – and it has helped me tremendously as a professional musician.

European student who completed study in the US

Proposal for joint action

Graduates from vocational education institutions and from universities can increasingly expect to deploy a broad set of competences in all professional areas, and many will sometime in their life work in an international company as part of their career trajectory. The institutional focus on core skills and on 21st century skills is an important step in that direction, as is international mobility, but only few students are likely to have such an experience through their study.

Therefore it could be of value to jointly explore what the foundations for an international mindset is in educational terms, and how students can best be prepared for a growing global integration and potentially an international career?

Themes to further explore could be:

- What could be the components in curriculum that strengthen the international dimension, be this in health, humanities, arts, business, or science studies?
- Can projects aimed at developing joint degrees to a larger extent integrate components conducive to developing an international mind-set and abilities in models that are also transferable and scalable? As some experts have suggested, ICT remains highly underexplored for that purpose, not only in terms of international on-line guest lecturers, but also in terms of curriculum and problem and project based assignments.
- A high-level transatlantic policy seminar could be used to elaborate ideas and scenarios that could guide further development possibly with the involvement of other international stakeholders such as UNESCO, OECD, the World Economic Forum, as well as some of the bigger educational foundations.

10.3 International orientation

Some US experts and institutional representatives believe that US students are much less internationally oriented than their European counterparts. Figures on mobility do not however support this. The myth may be grounded in the fact that there is major variation in the level of internationalisation across institutions in the US, whereas in the EU the mobility programmes in combination with other European programme measures over time have driven an institutional internationalisation process with a growing impact across the EU.

“They are too nationally oriented and not even having a passport”. Maybe it is because Europe is perceived as “too socialist and students may not be sufficiently protected in Europe as on a home campus.”

- a USA expert

Some informants believe that participation in exchange programmes may improve employability, but the majority focus on the personal development aspects as the key added value. Seen from a broader educational perspective, there is no doubt that the capacity of institutions to manage international mobility has grown tremendously in recent years thanks to the different mobility instruments. While there is some indication that students may be accredited for the study period abroad, there is less evidence that the outcomes of the study period are fully exploited upon return to their home university. In this sense, the exchange period may not fully contribute to the student's learning in a more transformative manner, because it remains disconnected to a large extent to the remaining part of a student's study period.

Among the European informants, ETCS points are seen as an important enabler, as is the Bologna Process more broadly since university programmes now more or less have a similar structure in the EU compared to other countries such as the USA. In the USA the federal influence is mainly limited to the federal student aid programme. Individual states with state systems of higher

education often do have a great deal of influence on institutions that are part of the state system, but rarely do states become involved in academic planning issues. The implication is that institutions are truly autonomous and that standards, the use of credit systems, and the evaluation of transfer credit are institutional decisions not federally (nationally) or state mandated.

Proposal for joint action

It is proposed to develop a best practice guide for transatlantic mobility addressing institutions and students. The guide should include practical case descriptions as well as guidelines with focus on preparatory aspects of an exchange (students and staff), but it should in particular give examples of how institutions and students can integrate in practice the outcomes of the exchange period in the student's education pathway upon return.

10.4 Key competences – 21st century skills- of growing importance across the Atlantic

The study shows that key competences⁹⁰ and in the United States 21st century skills⁹¹ are perceived by companies, institutions, students and staff to be of growing importance for employability, and that exchange programmes in that respect provide important contributions because students are brought in situations that are unfamiliar in many dimensions. It should be recognised that both in the USA and in the EU, key competences are also perceived as critical to civic engagement. These aspects of key competences have been less covered within the framework of this study. Nevertheless, among the institutional representatives interviewed, there is not a lot of evidence that the notion of key skills/ 21st century skills has been an explicit focus in existing transatlantic collaboration. For example, a US student, now a professional nurse, reports:

"I have become much more conscious about differences in rights to good health services, and in that sense how important preventive health promotion really is regarding where you get to work as a professional nurse."

- US former exchange student

Another European student explains:

"As much as I wanted to study in the USA, as much I was about to run away because graduate students in many respects are treated like children as part of the whole campus culture. After the first semester I convinced my parents that I had to move away from the dorm - sharing one room with two other girls were driving me crazy – the whole time male students came by- there was never a moment where you could sleep or study – and the room was a bloody mess. Now I can see I learned a lot about how to cope in intense situations."

- a European student

As the two statements show, the exchange period becomes a genuine "learning about yourself" experience - about values and cross cultural differences in a way that could never be achieved in an ordinary educational setting. With the interviews and case studies conducted there is on one hand evidence of the perceived importance ascribed to key competences or 21st century skills as they are called in the USA. The desk research undertaken indicates that the debate about competence education has been more critical in the USA, raising important and fundamental questions about evidence and justification of value added of such approaches, about necessary teacher qualifications- and rethinking of assessments and exams. Both in European and US institutions, there is a belief that students acquire key competences in the type of assignments they get and through class discussions, etc. The institutional representatives from the EU all mention

⁹⁰ http://ec.europa.eu/dgs/education_culture/publ/pdf/ll-learning/keycomp_en.pdf

⁹¹ <http://www.p21.org/>

the growing importance of key competences. The MIT case, the UK Biotech study, and the Aalto case study are examples of how key competences in practice can be embedded in teaching and learning processes. Nevertheless, the interviews and review of literature strongly indicate that institutional representatives and experts are still in an early phase in terms of translating the underlying philosophy of key competences and 21st century skills into new teaching and learning processes. There is a general agreement among US and EU institutional representatives that closer industry partnerships can offer unique opportunities for students to acquire key competences such as complex problem solving, communication skills, and the ability to work in a multi-cultural environment. Much of the literature suggests that constructivist and experiential approaches to the design of learning processes with the use of genuine “fuzzy” problem complexes are conducive to the development of key competences. At the University of Aalto, training of teachers to the new learning context in the learning factories is seen as critical to successful implementation of new learning spaces, but in general, teachers’ skills have not been raised by respondents as a key issue to implementing key competences and 21st century learning environments in post-secondary education.

Proposal for joint action

From some of the interviews and a couple of the case studies - in particular the MIT and the Aalto case studies - new teaching and learning environments are emerging which could lead to deep transformations in institutional cultures and practices medium-term. The transatlantic partnership between the US Department of Education and the European Commission, DG Education and Culture, could provide a strategic framework for testing and further elaborating models of teaching and learning processes conducive to innovation.

Some of the characteristics of such learning environments are:

- Research-informed teaching utilises real life research galvanising the breadth of university expertise in multi-disciplinary learning processes to help solve the complex, comprehensive, and interconnected problems;
- Learning beyond the campus walls and in new partnership models;
- Discovering that which may be of use beyond the borders of the classroom, and service and solutions that directly benefit the public;
- Students work on projects with real clients, applying their specialist subject skills, and receiving course credits for their work. The community becomes part of the teaching process and benefits from the students work;
- final exams that mirror the growing focus on key competences/21st century skills. New boundary crossing organisations and structures are being developed as part of the learning environment;
- ICT is an integrated feature in teaching and learning processes.

Within the action line of joint development of curriculum, funding could be prioritised in a first phase feasibility study to explore opportunities for developing transatlantic curriculum that builds on teaching and learning in multidisciplinary problem-based settings. Changed environments for teaching and learning demand new teacher qualifications and assessment models, which should therefore also be part of such a joint activity. In that context the Thematic Working Group on the Assessment of Key Competences⁹² is developing and sharing policies and experiences that can promote the effective use of a variety of approaches to pupil/student assessment with focus on the learner. It would be important for the fruits of this work to be taken on board in any further transatlantic activities.

It is also proposed to initiate studies and pilot activities with focus on innovative methods of teacher training to be able to design teaching and learning processes based on a key competences/21st century skills approaches, and to analyse and collect best practice examples of tests and

⁹² <http://www.ksll.net/MutualLearning2020/clusterDetails.cfm?id=18>

A third proposal is to conduct a joint study to thoroughly assess benefits and barriers to competence based higher education and vocational education from the perspective of teachers, students, researchers, and industry, with a view to expand the evidence base to competence based education and its added value. One of the key themes to be addressed is the feasibility of mainstreaming and scaling competence based education and assessment approaches within the existing institutional regimes.

An action of this nature could be enhanced with policy oriented studies to document and further analyse national, regional/state, and institutional strategies and practices to develop and sustain innovation capacity.

10.5 Accountability and performance

It is interesting to note that several informants in both Europe and the USA see American students as much harder working and disciplined about their studies. An American visiting professor is discouraged with what he perceives as a lack of performance culture, judged from his experiences as a visiting professor in a Nordic business school.

“It is hard to ensure progress and student excellence, because students are left far too much to decide for themselves and against their own good for example if they wish to show up to a class or not, or how much work they put into an assignment- and you are not supposed to pace the students to make them excel, and there is a lack of a professional culture even when it comes down to whether standard technical equipment works or not.”

- American visiting professor

There are several factors that could be at play, according to some sources, for example differences in financing.⁹³ European education policies differ in many respects from American policies in the provision of higher education studies: higher education institutions in Europe are predominantly publicly funded, somewhat similar to how compulsory K-12 education is funded in the United States. It is suggested (Young Kim 2009) that a sense of public entitlement and taxpayers' rights to accountability therefore permeates in Europe and the accountability culture in European higher education, at times leading to micro-management according to some respondents. In the USA, private and state higher education institutions, which includes community colleges, tend to be run much more independently of federal and state authorities, and the institutional accountability culture is primarily focused on the different sponsors - the students and their parents, former alumni, foundations, etc. Some respondents therefore suggest that American higher education institutions by definition focus on strong relations with external partners. A European institutional representative states that the nature of external relations is at times “as a marriage enacted by government” and mandated by legal statutes.

Some informants believe that different funding regimes of higher education are the key reasons to different approaches to performance orientation in the USA and in Europe.

The differences are perceived as having a major impact:

“Here in Denmark - they do nothing but check, check, check – the government decides on everything, there is so little autonomy compared to in the USA, so I really think it kills innovation and excellence - even impacting the professionalism of the support infrastructure in a negative way.”

- American visiting professor

⁹³ For further discussion see for example source list, Young 2009.

European funding diversification has increased the past years as higher education and continuing education and training have increased in volume and as businesses have looked to the education sector for support to commercially focused R&D and innovation. Institutional leaders are now attempting to raise their university endowments, contract out research with private industry, and deal with the ongoing policy debate and pressures to introduce tuition fees to accommodate for the overall costs with an increased access to tertiary education. But to a large extent it is a market in the making which requires development and commitment and investments from both sides, as the American case studies show. The primarily market based funding model in the USA has also shown its limitations during the financial crisis.

Stronger collaboration between education providers and the private sector is high on the policy agenda in the EU and in Member States to ensure a responsive education system, but also to diversify funding streams. For now, different approaches and strategies are deployed by European higher education and vocational education and training providers, at times struggling to get the equation right, and for some this takes its toll on resources and long term strategic planning.

“We spend more and more time to raise funding for new activities to respond to employers’ requests, but responsiveness cannot be a one-way relationship. If an employer states they need this or this course, collaboration between institutions here in the region has been a high strategic priority in order to be able to provide comprehensive services. However, if we commit to developing a new further education course, which is claimed to be highly needed - and the local industry then only are able to send a handful of participants, then the equation is not right. Furthermore, ad-hoc project based funding- does not enable long term visionary and strategic planning”.

- a UK professor

Due to a strong institutional accountability culture in many of the US universities and community colleges, students are invited to assess their professors to an extent not yet seen in Europe.

Students in the USA tend to get much more ongoing feedback through short assignments than those in Europe, and it is much more common to track career pathways of former graduates in the USA than in Europe. This again feeds into how universities and community colleges are ranked. Students in the USA are perceived as “customers” to a greater extent than in Europe. As one professor states it:

“ Our customers are young, and most often the parents pay, we therefore have to ensure that students “get value for money” – even if it comes at the expense that students do not to the same extent as in Europe learn to take responsibility for own actions”

-a US professor who has been a guest professor in Europe several times

Institutional representatives from Europe believe that students *develop their ability to set targets for themselves and pace themselves as part of learning to learn* in upper secondary and higher education. The same institutional representatives believe that these are the most essential life skills and a precondition to be able to navigate in change. They also claim that self-paced learning enables students to become lifelong learners valuing the process of learning. This is set in contrast to education processes that are so structured that students end up taking limited responsibility for their own progress and become *instrumental in their approach to learning*. However, some of the European informants recognise that as higher education increasingly becomes a mass market with new student profiles enrolled, universities will have to balance education as central to personal growth and development with demands from external stakeholders concerning the delivery of skills that have a market value. The same respondents, who have taught USA exchange students, believe:

“Students in the USA risk losing out on the most important competence at all – the ability to navigate in change, because the whole educational process is much more structured and leaves little room for independent thinking. “

-a European professor

Proposal for joint action

Both in Europe and in the USA, new students with new profiles are entering universities, community colleges, and vocational education programmes. These students can be part time, working, can have families, or may be immigrants, factors which all influence study behaviours.

In the USA, competence based assessment models tend to be situated in an accountability culture where on the one hand assessments are used to inform quality improvements in teaching and learning approaches and on the other are used as a means to improve access for non-traditional students. It is proposed to jointly develop and test assessment models that can feed into quality development of competence and outcome based curriculum and into guidance models for non-traditional student cohorts. As previously mentioned, the Thematic Working Group on the Assessment of Key Competences could provide valuable impetus to such joint work.⁹⁴

Secondly, it could be of value to set up a virtual knowledge sharing platform on the range of topics and tools linked to emerging skills and competence based education. The purpose would be to link education providers to the range of tools and methods that have been developed such as competence based assessments or personal competence portfolios. Secondly, it should target researchers and policy analysts with interest in these fields – particularly with a view to ensuring that emerging evidence on different approaches is widely available and known in communities of practice.

10.6 Entrepreneurship in education

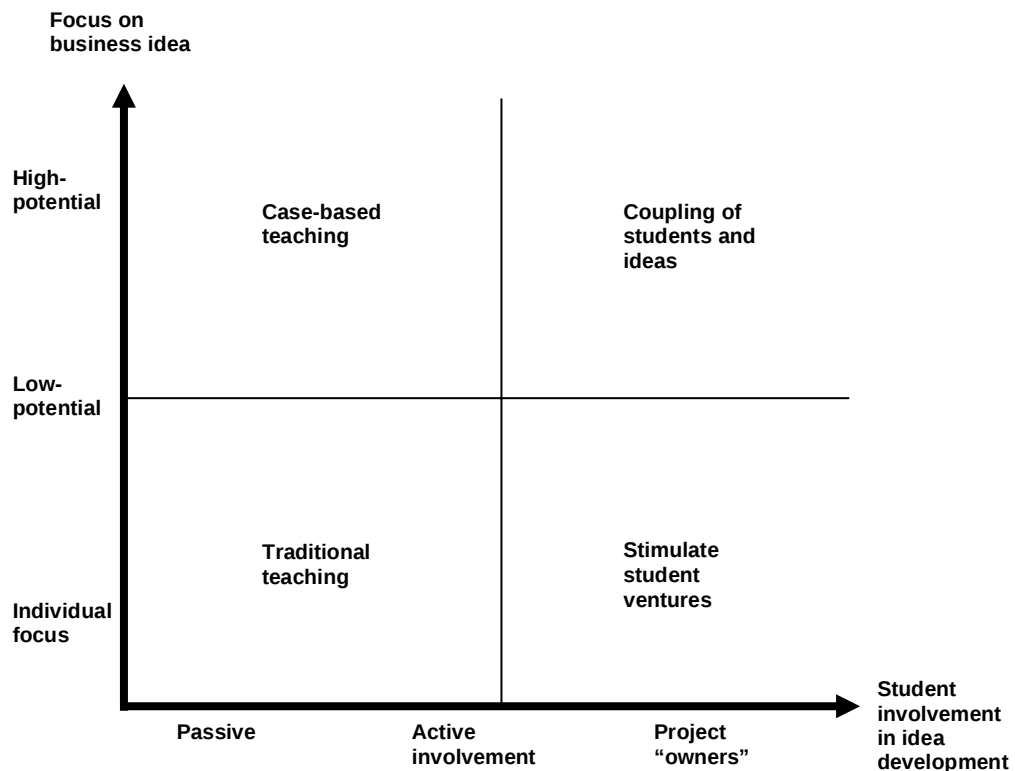
According to the different informant interviews, professors and teachers at community colleges in the USA have personal entrepreneurial experiences more often than in the EU. They may be entrepreneurs themselves, they may mentor start-ups, or they may be involved in incubator environments at the campus. This allows for opportunities to integrate entrepreneurship in a structured real-life environment, also due to the strong external network many professors in the USA have developed with investors or entrepreneurs. Interviews and cases suggest that entrepreneurship and skills for entrepreneurship increasingly are perceived as something broader, also with a view to social enterprising. Entrepreneurship education is increasingly changing from being taught as a subject where students acquire knowledge about entrepreneurship to a situation where entrepreneurship education is more project and case-based. Yet according to a more recent review of entrepreneurship education policies and practices, the landscape is quite diverse in Europe and by no way part of mainstream practices in all Member States. Lack of adequate teacher skills and resources is a further issue.

There are changes occurring in vocational education institutions and in universities all over Europe, with entrepreneurship gradually becoming an integrated feature in programmes rather than being taught as a separate subject. There is however little evidence aside from specific projects under the Atlantic initiative that entrepreneurship is a focus in joint projects as a mind-set relevant to all.

The case of the University of Aalto in Finland is just one example of such developments. However, as several studies have shown, most start-ups in Europe are not growth-oriented at all, and the question is what role the design of curriculum and the underlying philosophies play in developing and nurturing a sustainable and growth-oriented entrepreneurial culture to the benefit of both the private sector and the wider society?

⁹⁴ <http://www.ksll.net/MutualLearning2020/clusterDetails.cfm?id=18>

Institutional strategies for entrepreneurship education



(Source: Rasmussen and Sørheim 2005)

Interviews and case studies from Europe suggest that many institutions are still struggling to find new learning paradigms that do not build on the notion of the successful and creative single person with the brilliant breakthrough idea, a theme which is perceived as predominantly relevant in business studies. The quote below illustrates that the notion of entrepreneurship is still evolving for example when it comes to its applicability in the public sector:

Well in our partnership we do not focus on entrepreneurship - and it has not been a topic at all - since our focus is health systems.

- co-ordinator of a joint project within health

Both in the USA and in Europe, enormous changes in the health systems will need to occur in the coming years, for example to cater to an increasingly greater number of elderly people in Europe and in the USA – and to reap the benefits of technology deployment. The transatlantic co-operation on education could provide an innovative framework for developing and testing entrepreneurship and innovation in the context of public services. Within the ATLANTIS programmes there have been projects specifically focused on entrepreneurship education⁹⁵. One of the findings of one of the previous projects is that in the USA there will often over time evolve an eco-system of serial entrepreneurs and venture capitalists with close formal and informal connections to the university environments- nourishing a localised entrepreneurial climate of major benefit also to the quality and dynamism of entrepreneurial education. Such environments begin to emerge in Europe, KISTA outside Stockholm being just one such example. It could therefore be of benefit to further explore if these types of eco-systems that have developed over time in the USA from Silicon Valley to North

⁹⁵ http://www.bentley.edu/atlantiss/documents/Presentation_TESEVERO.pdf

Carolina Research Triangle can function as environments of excellence for the development of entrepreneurship education (Larsen et. al. 2011).

Proposal for joint action

The transatlantic co-operation could be a unique framework for jointly developing generic models and multi-disciplinary curriculum integrating entrepreneurship in natural sciences, creative arts, health services, and teacher education and training programmes, as these study areas in Europe tend to have been less of a priority than business and engineering studies. It could also be of value for institutions in the USA and in Europe collaborating on entrepreneurship education to jointly develop a network of former graduates who have become successful entrepreneurs in different fields and are ready to function as mentors within the EU-US co-operation.

The emerging policy focus on social innovation and the known benefits of entrepreneurship education also for groups which are traditionally defined as disadvantaged could call for a joint action on social enterprising and learning focusing on the role of NGOs and on how wider aspects of social enterprising can be embedded in education more widely.

At a more policy oriented level it is proposed to identify, in collaboration with the Kaufmann Foundation, newer successful *best practice examples* on entrepreneurship education embedded in different programmes and disciplines. Both in the USA and in Europe there is a growing focus on how social innovation can contribute to solving some of the biggest contemporary social challenges. The transatlantic co-operation could provide an ideal framework for also addressing these emerging concepts of entrepreneurship as the basis for the joint development of curriculum. Broad dissemination of guidelines and good practices through different channels could stimulate the development of entrepreneurial components in the preparation and development of new joint programme initiatives.

10.7 Anticipation of skills

Measures to anticipate skills are seen both in the United States and in Europe. The Department of Labor in the USA is the key actor in the projection of long term labour market forecasts. Very elaborate and searchable data are available on occupational projections, issues linked to labour force productivity, outcomes of workforce development, composition of the labour force, international labour force comparisons, etc.⁹⁶ Sector-based anticipation studies such as those commissioned by the European Commission are generally not found in the United States. However, both within the context of the greening of the economy as well as in relation to emerging new occupations anticipation studies have been commissioned to feed into O*NET development efforts, aimed to link labour market data with workforce development offers in particular, although O*NET data are also used for other purposes for example within the K-12 system. According to several experts, the institutional culture is such that it is not the role of public policy to intervene in the planning of the educational offer from post-secondary institutions. However, it should be noticed that President Obama in the 2020 initiative for education has put increased emphasis on repositioning US as a global leader in education with measures aimed at improving framework conditions linked to issues on innovation, access, and quality. Still, the view that market mechanisms are the best regulators to maintain a responsive and dynamic education and training system is still deeply embedded in the post-secondary education culture in the USA, as interviews have shown in this study. At the state or the regional level there are several examples of how anticipation of skills is embedded in broader economic development initiatives. The *Michigan Works*⁹⁷ Association and the *Michigan Skills Alliances*⁹⁸ are just two examples of how public policy

⁹⁶ <http://www.bls.gov/emp/home.htm#outlook>

⁹⁷ <http://michiganworks.org/>

⁹⁸ <http://www.michigan.gov/rsa>

makers, employers, educators, and other types of organisations at the state level, join forces to ensure the availability of a qualified workforce matching emerging demands. The European CLEPA Case study provides examples of a European-wide initiative that captures changes in the automotive industry within the context of restructuring, and also uses a regional approach. In the review of literature, several foundations that commissioned multi-disciplinary research studies on the nature of change in workplaces and in jobs were identified in the EU as well as in the USA. It remains a question however, if the knowledge triangle - understood as the linkage between research, policy, and practice - functions in an optimal manner in terms of the actual uptake of such studies in institutional strategies. Interviews conducted with both US and European institutional representatives indicate that methodologies to anticipate skills and studies on anticipation are used to a limited extent in USA and European institutions – one major exception being regional anticipation studies undertaken in the context of restructuring and workforce development in the USA.

Proposal for joint action

It is proposed to organise a joint event with particular focus on how regional policy makers and education providers can use anticipation methods and existing studies as the basis for workforce development, and more broadly as input to formulation of demand-driven institutional strategies.

Study findings indicate that the international and multicultural dimensions of exchange visits are primarily perceived as developing personal abilities, whereas other dimensions to internationalisation and multiculturalism, apart from language skills, seem to be less explicit for students and professors alike - except in business studies.

It is therefore proposed to jointly explore the nature of international and multicultural dimensions in curriculum in different programme streams (science, business studies, humanities, arts, engineering, and social sciences). Secondly, it is proposed to identify and test teaching and learning processes that are conducive to developing key competences /21st century skills relating to internationalisation and multiculturalism. The purpose would be to identify and develop some best practice examples that would strengthen the value of transatlantic exchange initiatives, for example also exploiting the use of ICT.

A high-level transatlantic policy seminar possibly with the involvement of other international stakeholders such as UNESCO, OECD, the World Economic Forum, and some of the bigger educational foundations, could be used to elaborate ideas and scenarios that would guide further development.

Secondly, at a policy level it is proposed to set in motion a high level initiative to share knowledge about the use of different research methods to identify emerging new occupations and shifts in occupations within the framework of respectively O*NET and the EU ESCO initiative. It will be of value to share promising practices on tools and strategies used to identify growth opportunities and project occupational growth as the economy recovers in the EU and in the USA, and to avoid skills mismatches and skills gaps driven by restructuring in the economy. *The EU-US Working Group on Employment and Labour Related Issues*⁹⁹ co-operates on similar topics, but from a labour market perspective, so synergy and impact would likely increase by sharing resources, expertise and findings. In the same context it would be of value to identify enablers and barriers to a wider deployment of skills anticipation studies in institutional strategies.

Finally, a number of foundations in the EU and in the USA fund research and initiate projects and studies of a transnational character on topics related to the theme of New Skills for New Jobs. Since the funding available for initiatives of a policy-oriented nature and to improve institutional practices is limited, it is proposed to jointly explore opportunities to engage foundations in activities

⁹⁹ <http://www.dol.gov/ilab/programs/oir/EU.htm>

in support of the EU-US co-operation on education. Such an involvement could also impact dissemination efforts.

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Annex 2 - Case Studies

Aalto University Finland

Aalto University in Finland provides an interesting European institutional example of how universities institutions find new avenues to improve the strategic orientation and competitiveness on a global scale, with a view better prepare graduates as entrepreneurs or innovation agents in industry.

Background /rationale

The last 10 years have seen intensifying debates about higher education in Finland. Criticism has come from within the university sector itself as well as from industry and the state:

- The universities raised concerns that they could not compete with top universities around the world within a governance structure where the Ministry of Education and Culture had a strong decision making power: One example of the constraints inherent in the centralised governance is that the universities could not develop individual HR strategies.
- Private industry voiced similar concerns given developments in top universities in other parts of the world.
- Prior to the reform, the Finnish tertiary sector was somewhat fragmented with a relatively large number of universities and polytechnics spread across the country. From the point of view of the government, this could constitute a barrier to efficiency and to achieving world class excellence in research and in teaching.

As part of the preparations for a university reform, a working group proposed the merger of three Helsinki universities as a basis for a new world class university in the greater Helsinki area. Established in 2010, Aalto University is strongly future-oriented. It builds on the combined 300-year-history of the Helsinki School of Economics, Helsinki University of Technology, and the University of Art and Design Helsinki. After the merger, Aalto University became a foundation with capital stemming from the Finnish government as well as donations from industry. This step is perceived by stakeholders as providing Aalto University with better preconditions to pursue long term strategic targets.

Enablers of demand-orientation

The Aalto University model is an example of how a university deploys new models of open innovation in partnering up with local industry. In such a model research, teaching, and innovation are tightly intertwined.

As previously mentioned, Aalto University is a private foundation with an external board – a management model similar to that of American Universities. The university has created an organisation which includes departments for the different types of services such as HR, communication, policy and foresight.

The mission for the university is as follows:

“Aalto University strives to change the world through top-quality interdisciplinary research, pioneering education, surpassing traditional boundaries, and renewal. The Aalto University educates responsible, broadminded experts with a comprehensive understanding of complex subjects to act as society's visionaries.”

Sustainability as an innovation factor in teaching and learning

Sustainable development is linked both to the University's own actions and the contents of research and teaching. In that aspect there are many similarities to the MIT energy initiative.

The enforcement plan of sustainable development is thus divided into 2 parts.

The plan creates guidelines for a sustainable campus, in the short and long run. Measures are promoted as everyday actions within all service units. The emphasis is on ecological sustainable development, but also social, cultural, and economic viewpoints will be taken into account.

Another entity relates to the objectives and contents of the University's research and teaching. The objective is to contribute to the themes of sustainable development in the focus areas set out by the University's strategy (sustainable use of energy and natural resources, human-centred living environment) in the contexts of both research and teaching, and to bring those themes together.

The goal of Aalto University is to be in the global university top tier in the fields of technology, business, and design within the next 10 years.

The purpose of the merger has also been to create a multi-disciplinary environment that in many ways emulates how innovation processes occur in industry, and thus to enable students to develop skills and personal abilities, such as problem solving, team work, communication, creativity, and the integrated use of ICT, that are critical to participating in innovation or becoming an entrepreneur. Basically, learning is perceived as learning through design, and to this end the university has developed what is known as 'learning factories', which aim on one hand to create a better linkage and inter-change between knowledge production and knowledge utilisation, and on the other hand to create a multidisciplinary learning environment conducive to developing innovation skills and abilities. The model emulates open innovation with the involvement also of industry. The way the learning environment is designed is in many ways similar to some of the high performance institutions in the USA. One of the advantages could be that innovations in teaching and learning processes become more incremental and an ongoing process of reconfiguration of teaching and learning processes.

Learning factories as a model

Learning factories are workshops designed to facilitate new forms of multidisciplinary collaboration focusing on teaching and learning. The factories are described as:

"...platforms that combine the expertise of the different Aalto University schools in the field of product development, media and services. The factories are designed to facilitate new forms of collaboration in an environment where academic teams, researchers and students work together with companies and communities".

(Design Factory: Annual Report, 2009-2010).

The Design Factory, the Media Factory, and the Service Factory are platforms combining the expertise of the different Aalto University schools in the fields of product development, media, and services; these are fields on which the three schools have already co-operated actively. The Factories are designed to facilitate new forms of collaboration in an environment where academic teams, researchers and students work together with companies and communities with the purpose of enabling a better interchange between research and teaching as well as learning processes.

The Design Factory gradually emerged in the preparation of the Aalto University model. It is a new open environment for the research and education on product development. The Design Factory architecture and models of operation build on the notion of open innovation. In the Factory, theory meets practice: the shared prototype workshops, exhibition rooms, library, and lounge area form a multifunctional meeting point for its users. The group work facilities and rooms of the Factory have been designed to allow flexible use 24/7.

As regards fields of technology, the Design Factory is connected, among other things, to electrical engineering and electronics, automation, architecture, mechanical engineering, materials science and engineering, computer science, and industrial engineering and management. The School of Art and Design is represented by the fields of textile art and clothing design, industrial design, and environmental art. The School of Economics is linked to the Factory through marketing, international business, and innovations.

The Media Factory covers the entire materials and communication chain from raw material to message production, formation, and reception. Its focus areas are, for instance, the media behaviour of the future, the

media industry, and the role of media in society. Teaching and learning models build on the same principles across the three factories. The two first Media Factory projects implemented were *Enactive Social Media* and *Gaming*, focused on electronic media and the gaming culture, and *Doing Cross-Media: Technology Production and Consumption*, a project examining media production and consumption.

The Service Factory brings together the service-related expertise of the Aalto University schools. It is an open collaborative network and a platform for multidisciplinary co-operation. The Service Factory is also engaged in research projects that span all three factories.

The key themes of the Service Factory are: 1) service innovation and management, 2) service design and experiences, 3) service systems and infrastructure, and 4) service design and metrics.

The Service Factory spans several industries across the service sector such as trade and tourism, digital services, knowledge services, and public well-being and administrative services.

Development of career system

The reform has made it possible for Aalto University to develop a career system for professors called the “tenure track”, inspired by similar systems in the United States. The system replaces the old academic career path with a new path where teaching is an integral part of the work of scholars up to the highest level. Job titles have also been changed with inspiration from the US system, so that all categories of teaching staff are now called “professor” with a prefix indicating their academic experience (assistant professor, associate professor, professor and distinguished professor).

Aalto University has introduced a programme of continuous professional education of the academic teaching staff and professors, mainly in the field of pedagogy to enable the staff to be able to deploy the new pedagogical principles in practice. So far, the programme is not compulsory. However, there are ongoing discussions on the advantage of making some modules compulsory.

The initiative in the educational landscape

The Finnish Ministry of Education and Culture perceives Aalto University as the flagship initiative of the Finnish university reform. The expectations to Aalto University are therefore high. Other universities in Finland have also merged and created new universities.

The innovative aspects of Aalto University are enabled in different ways:

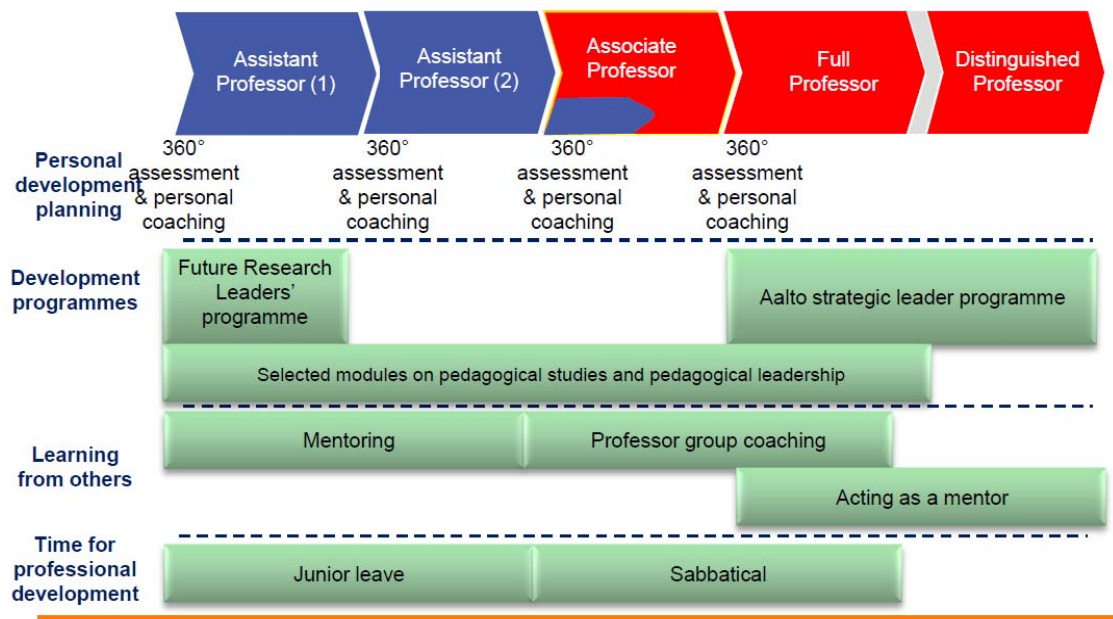
- The multi-disciplinary collaborative learning involving students and companies as learners and co-producers of new knowledge which is shaped into new artefacts and services;
- a new understanding of what constitutes academic excellence;
- changing the roles of university teachers from lecturers to active participants in open collaborative and multidisciplinary learning processes.

The pedagogical philosophy is based on Aalto University’s notion that universities need to educate what they call “T-shaped” people, i.e. high-level experts in their own specific fields who possess partial knowledge, skills and competences from other disciplines and are able to co-operate with experts from these disciplines.

Moreover, the creation of the recruitment system and the tenure track for professors with focusing on both research and teaching is opening up for the new perception of the role of university teachers. The competence development support within the tenure track is illustrated in Figure 1 below.

Figure 1: Career path and continuing development at Aalto University

Competence development support for tenure track



Source: Aalto University

The change of titles from lecturer to professor is not merely symbolic; it signals a change in the roles of university teachers from lecturers to active participants in collaborative multidisciplinary learning processes. Lecturing is still a valid tool in teaching according to the Vice President of Aalto. However, it is important to rethink this method and develop complementary ways of teaching such as the Design Factory methods.

Specific competences which are not embedded in specific academic disciplines or fields are needed to participate in multidisciplinary work. The staff at the Design Factory has identified competence needs in the area of "problem-based teaching", and has developed two programmes for the continuous professional development of professors and associate professors:

- *Forum* - designed for teachers that already have some pedagogical training. This course consists of a monthly network activity meeting to discuss a specific topic in the area of learning.
- *Opekumppani* – Pedagogical support for Aalto teachers. The programme offers the teachers at Aalto University theoretical and practical support to encourage continuous development of teaching practices. The programme includes:
 - The pedagogical knowledge base of a Master of Education
 - Additional work force and support in planning, executing and evaluating a teaching and learning session
 - Introduction to the Design Factory as an experimental platform of co-creation and of its teaching philosophy

The aim is for these teachers to become change agents as the programme provides them with better tools to kick-start change in their own environment and influence the learning approach within their specific field.

Lessons learned

Since Aalto University was created, more Finnish tertiary education Institutions have been merged, but Aalto University remains a flagship of Finnish university reform. One of the challenges to the underlying model of Aalto University is an increasing number of Finnish students that opt to work whilst studying, a barrier to

excellence in teaching according to a USA guest professor at a Danish Higher Education Institution. Currently the University aims to engage enterprises in a more profound manner as actual partners – somewhat building on the model of MIT. How that will evolve is yet to be seen.

Aalto University is an example of a profound institutional change primarily aimed to develop strategic capacity to engage with the external world benchmarked against the best universities globally. The creation of the university has had a profound impact upon the education offered in the sense that it builds on sustaining incremental innovation capacity as a key to responsiveness. Professors and students are engaged in projects with industry, and through these projects the relevance of the education and the overall approaches to teaching and learning are constantly being tested.

Denmark- *Prognose Puljen*

Background and context- Anticipation in the VET system

In April 2006 the Danish Government launched an ambitious strategy to gear Denmark for the future. The strategy contained 350 specific initiatives, which together entailed extensive reforms of education and training programmes which could stimulate the national innovation system more broadly. The strategy materialised through a process which was quite unique in its incorporation of broad groups in society.

The process started in April 2005, where the Government set up a *Globalisation Council*¹⁰⁰ comprising representatives of all sections of society with the task of advising the Government on a strategy for Denmark in the global economy. The Council's fourteen meetings – chaired by the Prime Minister or in some cases the Minister of Education – comprised representatives from many parts of Danish society including the Government, employers, trade unions, and academic and research institutions. In addition, external, national and international experts were invited to contribute to some of the Council's meetings relevant to their area of expertise.

Through a series of meetings all parts of the education system were discussed with a view to identifying areas of improvement, building on a substantial number of reports and other forms of evidence that were developed for each meeting.

During the meeting focusing on the upper secondary vocational system, it was discussed and recognised that the tri-partite system is unique in terms of ensuring that the vocational education system is responsive to the needs of the labour market, due to the governance of the system with the social partners playing a central role. On the other hand, in emerging occupational areas and in fields where technological changes have an impact across many trades - for example relating to the agenda on greening of the economy - the governance system might not be sufficiently geared to address these changes, partially because the governance structure mirrors the existing labour market¹⁰¹. The Globalisation Council's recommendations were since followed by a thorough process in which all the proposals were addressed one by one.

The upper secondary Vocational Education system - ways forward?

It was broadly recognised by the Council that the upper secondary vocational education system in general works well in terms of being responsive to the demands of the labour market, though the problems of drop-outs from the system was recognised. Due to the major structural changes in the Danish labour market, a process which started already in the 70s, it was decided to form a committee to analyse the structure, governance, and curriculum in the upper secondary vocational education system. The aim was to identify areas where changes were needed to ensure realisation of the government's target that 95% of a youth cohort complete an upper secondary qualification and to ensure that the system be aligned to changing and increasing skills demands driven by globalisation and technological change.

One of the proposals from the Committee was to establish an analysis and forecasting unit, recognising that research relating to the upper secondary vocational education system was limited compared to research in other fields. It was furthermore the intent that the initiative be complementary to the roles that the social partners play in monitoring the match between demand and supply of skills, and further strengthen the link between labour market policies and the vocational education and training supply.

It was proposed that the initiative would provide the framework for forward looking studies on industry changes including studies on emerging new sectors, which could impact the supply and demand of persons with an upper secondary vocational qualification. This also comprised cross cutting changes, which could impact supply and demand for skills across a range of existing occupations.

¹⁰⁰ <http://www.globalisering.dk/page.dsp?page=294>

¹⁰¹ http://www.globalisering.dk/multimedia/Faktabilag_EUD_Brancheforskydninger.pdf

The aim was also that international studies relevant to the Danish system would be disseminated in such a form so as to be relevant to the work of the trade committees and the Ministry of Education¹⁰².

The governance structure proposed and implemented for the new anticipation measure was from the outset more embedded in the national forecasting and anticipation measures for VET compared to the German initiative *FrequenzNet*, which is a more loosely coupled network composed primarily of universities set up by the German Federal Ministry of Education and Research.

Implementation

In 2007 the Danish Ministry launched a call for support to the implementation of the Anticipation Unit. The call was specified with two separate activities:

- 1) One core activity consisted of providing support to the Ministry of Education in relation to the annual calls for projects. This included preparation of the background material and themes and preparation of application forms and monitoring arrangements. This part of the contract was won by the Danish Pedagogical University in partnership with a Danish consultancy - KUBIX.
- 2) Another core activity was the identification, analysis, and dissemination of anticipation studies from other countries, including the management of a website to ease access to and use of international studies by the trade committees and in the vocational education and training institutions. This part of the anticipation unit is managed by Danish Technological Institute, Centre for Policy Analysis.

Focus of Anticipation Studies

Since 2008 there have been annual calls launched by the Danish Ministry of Education corresponding to an annual funding level of between DKK 3 and 8 million.

For the period 2008-2009, 18 projects were funded under the following three themes:

1. General studies related to supply and demand issues. One study looked at the future skills needs in the tele- and media sectors, another on recruitment of the VET teacher profession.
2. Anticipation of changing skills needs in particular industries, sectors- and/ or induced by new technologies. This comprised 10 studies such as the impact of nanotechnologies on industry qualifications; future skills needs in the energy sector; the tourism sector; the impact on clean tech; new work organisation practices in building and construction and their impact on skills demands; enterprise capacity in commerce and trade to enter apprentice agreements and factors influencing this; and new skills demands in administrative job functions relating to an increased use of ICT.
3. Analyses of students' needs, interests and abilities. One study looked at the factors that influence the choice of a vocational education, and another study the factors related to students' well-being while undertaking a vocational qualification.

Some proposals were submitted by the social partners in partnerships with an external partner, either consultancy companies with expertise in these types of studies or research institutes. In the first call the majority of contractors were however consultancies, some of which had relatively weak linkages to the social partners and the vocational education system.

For the second call for 2009 – 2010, DKK 5 million was set aside for proposals under the following two themes:

Theme 1: Cross cutting studies on change in sectors and industries with relevance to vocational education. This theme included a study on the need for new qualifications relating to sports, and a study on clusters with a high number of skilled workers. There was a study on new skills in the health and care sector linked to employee driven innovation, as well as two studies that addressed occupational mobility. Two of these studies were submitted by the social partners in partnerships with an external consultancy.

Theme 2: Challenges for the vocational education and training system. This line of projects looked at issues relating to the creation of apprentice places - including experiences from other apprentice-

¹⁰² <http://pub.uvm.dk/2006/fremtidssikring/>

like systems. Another study looked at the organisation of school-based and company-based training with a view to improving the overall quality and perceived relevance both from the point of view of the apprenticeship enterprise as well as the student. In two of the projects, social partners were actively involved, according to members from the trade committees. In the second call for proposals the trade committees were very active in the preparatory phase, establishing partnerships with institutions and private consultancies to ensure better synergy between the committees' internal activities relating to anticipation of skills and the themes covered by the call for proposals.

For 2011, DKK 3 million has been set aside for proposals with the overall theme of "challenges for vocational education and training", which is divided in two sub- themes:

1. Demand for skilled workforce in areas characterised by economic growth.
2. An integrated and differentiated vocational education and training system with access to tertiary education.

Currently (August 2011), proposals have not yet been selected for this third round, but based on dialogues and contacts initiated by members from the trade committees it is quite evident that there is focus on how the initiative can feed into planning and innovation of the VET system, particularly in the context of policy priorities such as the creation of apprentice places in new occupational fields and excellence in VET.

Use of the Knowledge base: Dissemination of project results and international studies.

Danish Technological Institute disseminates on an ongoing basis briefs of international anticipation studies. To ease access for the social partners and other stakeholders, studies are disseminated according to the 12 different entry ways for vocational education and training in Denmark¹⁰³. This is complemented by an electronic news magazine.

Lessons learned

According to some trade committee members, the international studies provide a value added, for example in relation to the annual development plan that each trade committee prepares as basis for dimensioning of the particular VET programme and as input to ongoing revisions of specific vocational qualifications. Even if several of the trade committees have professional secretariats, they mention that it can be difficult to get an overview of studies on anticipation of skills needs. It is obvious, however, that trade committees which represent globalised sectors often will be more interested in broader globalised trend studies than trade committees that are oriented more towards the national labour market.

¹⁰³ http://www.fagligeudvalg.dk/index.php?option=com_content&view=article&id=119&Itemid=92

Biopharma industry-university co-operation – South East England

Background and context¹⁰⁴

The biopharma sector is a vital part of the UK economy. The UK is a world leader in pharmaceuticals, medical biotechnology and medical technology. The pharmaceutical sector's investment in 2007 of £4.5bn in R&D makes it the leading UK sector on that measure and represents over a quarter of all UK business R&D. The UK medical biotechnology sectors leads Europe in the number of drugs at all stages of clinical development.

The South East England region is home to almost 1000 health technology companies, generating revenues of £58bn annually; 14 of the world's top 20 pharmaceutical companies (by revenue) are located in the region, with 300 pharmaceutical companies in total. The sector employs over 200,000 people including associated services, and 30% of the UK's life science research and development occurs in the region.

The crisis has led to some new industry characteristics, following the disaggregation and reorganisation of its structures and operations according to the analysis from the biopharma group of universities.

These include:

- New sorts of work and working practices and vastly increased complexity, including extensive outsourcing within and beyond the UK;
- concomitant increases in skills and knowledge demands on recruits and existing staff;
- financial constraints arising from a declining drugs pipeline, patent expiration, and other sector-wide factors;
- quick shifts of focus and concomitant fluctuations in demand regarding numbers of graduate and postgraduate recruits and particular areas of expertise

Skills demands in the sector

The biopharma industry is increasingly relocating to India, China and elsewhere. The Skills Council *Semta* conducted a labour market survey in 2009¹⁰⁵. It reported a shortage in this sector at levels roughly five times higher than for all UK firms. Skill shortages reported were mainly introduced by new product developments, new technologies, and new work organisation practices. The industry's movement out of the UK has forced the Government, through its Regional Development Agencies and other bodies, to look for action among universities to provide a better match between higher education outputs and business requirements in the biopharma sector.

In 2008–09, the South East Universities in the UK formed the Biopharma Consortium was formed with participation of the following universities:

- University of Reading
- University of Brighton
- University of Kent
- University of South Hampton
- University of Surrey

Sponsored by the South East England Development Agency (SEEDA), the Universities undertook a study to investigate how universities in the south east could better address the skills demands of the biopharma

¹⁰⁴ For case study sources see source list: Semta, 2008; CBI, 2009; and *South East Universities Biopharma Skills Consortium Project*.

¹⁰⁵ Sector skills council that covers biopharma:

http://www.semta.org.uk/pdf/SEMTA%20COGENT%20report_2009%20final%20V2%20.pdf

companies operating in the region. Secondly, the study intended to analyse the desirability and feasibility of the universities working together as a consortium. The investigation was prompted by industry reports on the 'skills pipeline', principally those published by the Association of the British Pharmaceutical Industry (ABPI) in 2005 and 2008. These successive reports indicated not a new but a greater and more urgent problem, which persisted despite existing co-operation between universities and the biopharma sector. They also presented a clear call to the universities to respond to the sector's skills needs as expressed in reports on the 'skills pipeline'.

In response to the industry reports published by the British Pharmaceutical Industry, the five universities that founded the Biopharma Consortium undertook a study to identify the challenges and to provide concrete solutions to the skills needs identified by industry. The strategy to form a consortium was based on the underlying assumptions that this would result in a stronger basis for meeting the diversity of skills need in the Biopharma Industry, and that it would also allow for sufficient scale in the response to the industry's needs. In that sense the case represents an interesting approach to how education providers can achieve scale and a sufficient level of specialisation to meet the needs of a highly dynamic sector such as biopharma. The consortium of biopharma universities undertook initially a literature review to get a full overview of other studies undertaken by the biopharma industry. One of the industry studies they identified was the *Life sciences blueprint* (OLS, July 2009). That report focused on the overall framework conditions and critical demand factors to further develop and sustain a highly competitive industry in the UK. Informed by the literature review of industry studies, the consortium of universities designed its study with the specific aim to get a deeper understanding of supply factors influencing the overall ability to meet industry needs. In that sense the biopharma study undertaken by the group of British universities was very different from many other studies on emerging skills needs undertaken in the EU. By taking a supply perspective on the skills issue in the biopharma industry, the aim was to identify barriers to meeting the needs, and secondly to identify how these barriers could be overcome. The University of Reading led the investigative project, working with the Open University and the universities of Brighton, Kent, Southampton and Surrey.

Implementation

In order to identify areas for action and improvement, the project sought to explore and articulate current practices and recent experiences among university staff pertaining to the needs of the biopharma industry as discussed in various industry reports.

The group of academics which undertook the biopharma study on behalf of the university consortium believes that it is important to strategically begin to discuss supply side factors in the debate on emerging skills needs. Though there is a growing political focus on how the responsiveness of the tertiary sector can be improved in all of Europe, the pre-conditions to strong and mutually beneficial public-private partnerships have been addressed to a lesser degree. The other side of the coin – how industries engage with universities and their capacity to do so - is often overlooked; and in particular because the further education market in the EU is still a market in the making, this issue is a critical factor to successful public-private partnerships.

In the study undertaken by the university consortium, over 40 members of academic and related staff were interviewed in the six institutions. Further meetings were held with industry representatives, but the investigation's main purpose was to capture and convey the experiences and ambitions of university staff - including assumptions about industry and as a supplement to the industry reports. Some interviewees regretted that HE had not been given the chance to feed fully into, for example, the ABPI reports. The interviews were intended, in part, to take into account a perceived frustration among university staff that the universities' voice is not always heard in discussion about supply and demand and thus the universities' experience and expertise may remain untapped.

The project therefore took a novel and holistic, provider-based, 'supply side' in order to better understand how universities translate the needs of a particular industrial sector in terms of services offered. One of the challenges has been that whereas the universities typically have offered courses within particular disciplines, the industry has often expressed their needs in terms of demands that cut across all disciplines which feed into biopharma.

Study Findings from the Biopharma Consortium analysis

One of the findings of the consortium of universities is that industry at times has over-expectations to graduates in terms of their *labour market readiness*; that is the students' level of maturity, their general work- and life experience, and breadth and depth of knowledge and particularly 'specialist' knowledge. Universities cannot deliver ready-made graduates, as this would lead to curriculum overcrowding at the expense of a stronger more transferrable methodological and theoretical foundation of knowledge, skills, and abilities critical to employability and *learning-to-learn* skills. The perception among the interviewed university staff is that with a rapidly growing and more complex knowledge base, such as is characteristic of the field of pharmaceuticals, it becomes increasingly critical that universities and industry come to a better understanding of the respective roles of universities and industry to ensure a smoother transition of university graduates to the labour market, and to ensure that the progression of a career trajectory is aligned to the further development of the professionals skills base to the specific needs of the employer.

The biopharma sector is not a homogenous or consistent market for the universities, making it hard for them to plan in terms of scale, timing, or type of provision. Furthermore, the industry's needs are not generally articulated in a way that universities can use as the basis for developing new programmes or courses.

The universities need to be sure that any significant developments they invest in are likely to have the desired impact on the industry. As noted above, there is no value in providing courses and options that meet the industry's requirements unless students choose to take them. One of the barriers is that students may not choose targeted courses in response to what the industry says it needs, and therefore student numbers are too small to be financially viable.

Many analyses tacitly assume a coincidence of students' and employers' interests, but this is not necessarily the case. One of the challenges with using anticipation studies for a sector such as the biopharma sector is an inconsistent and sometimes inscrutable market for the universities. The biopharma sector does not work, think, train, or act as a homogeneous sector, and that impacts supply because the demand from industry may be so specific so it can be quite costly to develop a suitable training offer. The key issue is that while industry sector anticipation studies provide skills statements on the sector's behalf, the universities cannot use these studies as an effective guide for developing and delivering solutions to the sector as such, because demand may in fact be quite diversified to the level of the needs of a specific sub-sector or even a single company. The University Consortium suggests that closer inter-sector collaboration in the sector could lead to a better framework for forecasting skills across the varied needs in the sector with reference to the Knowledge and Skills Framework developed and implemented for the health sector.

One of the points raised through the analysis is the question of market orientation - and who covers the costs of developing a further education and training offer in markets that are highly dynamic and diversified. This is not only an unsolved question in terms of shorter courses, but it is also an issue when it comes to the more specialised MA studies responding to a well-defined need but within a limited segment of the industry and thus with a low return on investment for the universities. To develop a robust further education market within pharmaceuticals, members of the consortium of universities believe it is necessary to look at funding streams from public and industrial sources, as they currently tend to be ad hoc, resulting in the further education offer for the industry being developed in a fragmented manner because the further education market for the biopharma industry at the regional level is still not fully mature.

Skills needs reported

The focus of the analysis for biopharma points to a two way alley regarding supply and demand of skills. With greater demand for employability skills, the contribution and involvement of industry in curriculum development becomes more critical.

The analysis point to gaps regarding:

- Generic 'employability' skills;
- Technical and mathematical skills;

- Broad and in-depth knowledge within disciplines such as chemistry, pharmacology, and genetics;
- Lab skills;
- In Vivo skills
- Mathematical and statistical skills pertinent to the contemporary drug development process, such as statistical and quantitative analytical techniques.

Ways forward?

Accreditation of degree programmes by professional bodies has helped firm up some existing curricula, and these bodies may be a route for the industry to voice its needs regarding the requirements for discipline specific skills.¹⁰⁶

In other fields, industrial partners have designed modules for inclusion as final-year options with the intention of priming students for an industry they have expressed an interest in joining. Similarly, some university courses have a common core in the initial years followed by a final-year specialisation linked to a distinct career route or industry application. This approach minimises ‘interference’ with the main body of the programme and also brings the advantages of direct industry engagement in learning and teaching issues.

An alternative to highly tailored industry-specific curriculum is to build on the graduate internship model, which has also been piloted as part of the Consortium effort to develop the relationship with the biopharma industry.

In this model, the new recruit pursues training on the job and through an industry-defined university short course(s). In dynamic industries such as biopharma, the findings of the consortium also point to the challenges of being “responsive” because requirements are constantly changing. The study therefore suggests that the universities need to build the capacity for flexibility in delivery and content, which is enabled by inter-university collaboration such as the biopharma consortium. Collaboration might include sharing Master’s modules across the institutions and developing joint programmes between them, not only at the regional level, but potentially also as European Master’s programmes. A major step in this respect would require universities to:

- review existing course content;
- identify, develop, and potentially share core components and specialist modules;
- Address issues of copyright;
- explore and exploit the potential for distance-learning, online delivery, and industry-developed modules;
- create structures for the joint operation and ongoing review of master’s level programmes, including credit transfer and franchised delivery.

Both within the European programme SOCRATES and within the framework programmes on telematics-supported education programmes, such models have been developed and tested, and some have also since been scaled across several countries.

The study undertaken by the consortium of universities for the pharmaceutical industry concludes that given the quick changes of focus characteristic of biopharma and industries with similar characteristics, it is necessary to critically examine service and delivery models for further education. However, the universities face some challenges, according to consortium representatives:

- broadly speaking, employers are more used to thinking about universities in the context of educating entrants to their organisations rather than their existing workforce, where industry tends to look to in-house solutions or to the private training providers;

¹⁰⁶ One of seven key actions in the recent *Life sciences blueprint* relates to the accreditation of undergraduate bioscience degrees by the Society of Biology. However, the BBSRC’s Bioscience Skills and Careers (BSC) panel has questioned whether the current funding model gives the universities sufficient capacity to run courses to meet accredited standards.

- some companies view universities as expensive, outmoded, and inflexible providers of further education;
- the further education market requires constant strategic focus, yet the market is not reliable and it requires substantial investments with a low level of return on investment;
- keeping up with the industry's requirements is resource-intensive, and courses of all types need to be kept under constant review;
- Further education as a commercial activity for universities is still a market *in the making*. According to the team, this also implies that industry also needs to understand "*the business of a university*" in order to develop a mutually valuable partnership. This means that industry across individual enterprises in a cluster like biopharma has to improve not only its ability to identify its needs for new skills in specialised areas, but also has to be able to quantify needs.

The universities are under increasing pressure from many quarters to help students develop a broader range of skills within and beyond the curriculum, mostly in the general context of 'graduate employability'. Within the universities interviewed there is concern that too much of a strict focus on employability can result in skills profiles that are too narrow, thereby limiting career choices and options for new graduates.

In that sense, core skills or generic skills are critical skills in the application of scientific and mathematical knowledge. This includes thinking across and drawing together different segments of learning, applying learning to real-life problem solving, and anticipating outcomes prior to processes which are also on the other hand best acquired in the work context. From the university perspective one of the key issues to enable students to develop broader key competences is to reverse the decline in the number of industry placements available, because industry placements provide an ideal learning environment in which students get opportunities to learn through real-life problem solving.

Impact

The universities have explored the idea of a formalised regional consortium as a way of addressing some of the issues faced by themselves and the biopharma industry. At the time of this case study the idea was still on the drawing board, but it nevertheless illustrates the university partners' commitment to developing a sustainable model building upon the combination of scale and specialised services by pooling resources.

Lessons learned

Industry and academia would benefit in multiple ways from the synergy provided by a formal HE consortium, in which the universities shared effort, resources, expertise, and risks. With appropriate resourcing, such a consortium could effect greater change and offer better visibility and responsiveness to industry than institutions acting independently.

The prevailing financial and institutional constraints in both HE and the biopharma industry have exacerbated the gap between what universities are providing and what the industry wants from its employees. Despite this, there is existing co-operation and joint activity between universities and the industry at multiple levels.

The biopharma industry is not a homogenous or consistent market for any type or level of higher education, making it difficult for universities to plan in terms of scale, mode, or type of provision.

For long-term benefits, the industry needs to make a consistent commitment to partnering with universities in order to develop key work-related skills in students, notably through placements. In turn, the universities should facilitate industry involvement in curriculum design and delivery and the industry could develop its own potential to deliver validated work-based learning with the support of the universities.

Skills needs in the Automotive Value Chain in Europe

Background and context

CLEPA (*Comité de liaison européen des fabricants d'équipements et de pièces automobiles*) was created in 1959 by national associations representing automotive suppliers. Originally the aim was for the association, with a representation in Brussels, to address technical regulations that the newly born European Economic Community was starting to define.

In 1997 the association was redesigned and changed its statutes to gain independence from other similar industry associations. CLEPA then became the European Association of Automotive Suppliers and extended dramatically its range of activities and its membership, including corporate members.

The automotive sector in the EU has traditionally played an important part in the European economy. In the past years, and similarly to the entire auto-supply value chain, the automotive sector has undergone major transformations as a result of market trends. This has included international competition, changed dynamics in the global value chain, technological innovation, and regulatory changes. The European *Partnership for Anticipation of Change* was launched in October 2007 on the occasion of the Automotive Restructuring Forum organised by the European Commission. Its aim was to bring the car manufacturers and automotive suppliers to work together with the trade unions with a view to better anticipate the changes taking place in the industry, thus contributing to the sustainability of the European automobile industry.

This initiative was a starting point to gather all relevant stakeholders to review the evolution of the automotive sector, to open a dialogue between the different actors, and to help them to adapt to the changes.

The underlying agreement committed the partners to a series of actions over a 2-year period (2008-2009) aimed at monitoring the developments in the industry and exchanging know-how and best practices on managing disruptive change in a socially responsible way.

Anticipation- drivers of change

Anticipation of change is a precondition to effective workforce development and to ensure that the development of new qualifications better meets emerging needs medium term. In the EU as well as among social partners there has been a growing policy focus on which type of methodologies may best support anticipation of change, taking into account that changes in the socio-economic environment may be affected by a range of similar drivers, but may nevertheless play out quite differently across the Member States due to different framework conditions. To qualify the monitoring of developments in the sector, a 12-month European project “**Anticipation of Change in the Automotive Industry**” was initiated.

The study explored the main drivers behind change in the automotive sector and the mechanisms that should be implemented in order to anticipate and manage it in a socially responsible way. The main objective of this work, jointly carried out by CLEPA and the European Metal Confederation, was to analyse skills implications in accordance with long term trends for the automotive sector 2020, which already were identified. Key focus areas were:

- Good practices in anticipating and managing change within companies and regions
- Good practices in increasing skills levels and employability within companies, regions, and sectors
- Analysis of regions where the automotive supply chain traditionally had a strong position.

About the automotive sector in the EU

According to information from the sector, the European automotive sector is globally one of the largest producers of motor vehicles, producing annually in a volume corresponding to about of 1/3 of the market for passenger cars. In addition, it is a major employer of a skilled workforce, directly employing over 6 million people (1.2 million employed by car manufacturers and 4.8 million by suppliers) and indirectly responsible for approximately 12 million jobs in large companies and SMEs. The sector is Europe's largest private R&D investor, investing nearly €20 billion, and is a key driver of innovation. It accounts for about 3% of the EU's GDP and about 7% of its total manufacturing output. It provides 8% of the EU's total general government revenues and handles 5% of total EU exports.

Europe is one of the major automotive manufacturing regions in the world. It is the second largest manufacturer of motor vehicles after Asia-Pacific in terms of passenger vehicles and light and heavy trucks, and at the time of the CLEPA study it was the largest producer of passenger cars.

From 2000 to 2009, global competition in the automotive sector intensified, especially from the BRIC group of rapidly emerging economies (Brazil, Russia, India and China), with estimates that it will increase its share of global vehicle assembly from 16% in 2006 to 23% in 2014.

In 2007, China was one of the world's fastest growing automotive producers, with an increase of 23% in production from 2006. Furthermore, the Indian component industry has grown by around 17% over the last few years to reach \$10 billion USD in 2005-2006.

The potential of further growth in India is apparent with automotive penetration at 7 cars per 1000 persons.

For the former Eastern Europe countries, their proximity to the Western European markets opened up new opportunities which led to the establishment of new assembly plants which has been followed by the establishment of new suppliers' plants.

Growing globalisation and growing digitalisation within the global value chain have intensified the competition for the European automotive industry and forced the sector to address cost-cutting pressures and shrinking margins. Increasingly, the industry in Europe, and the West in general, is battling to compete against its lower factor cost rivals, most of whom are also developing significant design, engineering, and R&D capabilities. Innovation capacity through the whole value chain as well as the quality of skills is thus critical to exploit technological innovations- whilst also improving efficiency in all parts of the value chain.

While global demand for automotive products has been growing for several years, large segments of the supply industry have been facing severe competitive pressure. The pressure on the industry has increased with high fluctuation in the price of raw materials in general and oil in particular.

As vehicle manufacturers strive to reduce their costs, they have tended to source from fewer larger component suppliers, and they have either switched to lower cost sources or pressured component producers to achieve lower cost targets. The rapid investments in new production facilities in the emerging markets coupled with the rise in material prices and reduction in demand has led to problems of over - capacity. In an effort also to comply with the legislative pressure to reduce carbon emissions, firms have begun to experiment with various competing technologies such as bio fuels, hybrids, electrics, and hydrogen-based fuels.

In this context, CLEPA (the European Association of Automotive Suppliers) took initiative to undertake a thorough study on practices of anticipation and management of change within companies and regions in Europe where the auto industry plays a central role in the regional economy. The study was supported by the European Commission, and has been the key background source for this case study.

Study design - anticipation in the automotive sector.

The CLEPA study had four interrelated objectives:

- To analyse the type of actors and initiatives taken which are the preconditions for a successful transformation of the automotive industry;

- To identify the factors that are critical for forward-looking industrial policy and the subsequent actions to be undertaken, especially in relation to the skills and competences of the workforce;
- To gather information on good practices developed by companies and regions to anticipate and manage change and restructuring, giving special attention to innovative practice;
- To create a list of existing major National Networks/Initiatives in order to link the main stakeholders and create an informal observatory for anticipation of change.

A comprehensive literature review was conducted to identify major drivers of change in the value chain. Fifteen key drivers of change in Europe's automotive industry were identified:

Key Drivers

Consumer Demand	Oil Policies/Energy	Consumer Attitudes
Market Segmentation	R&D	Personal Identity
Legislation & Regulation	Manufacturing Technologies	Globalisation
Shifting Lifestyles	Urbanisation	Environment
Economy	Socio-demographics	Emerging Markets

At a national level, the automotive industry has some mechanisms designated for anticipation of change, e.g. *observatories*. These observatories are found in some countries because framework conditions vary across the EU member States. In countries where they operate they monitor trends in the automotive industry pertaining to human resources, labour relations, technology, marketing, environmental regulation, developments in foreign direct investments, and supply chain.

The study also included company case studies regarding anticipation and management of change in five large organisations plus an additional five enterprises to cover the SME segment.

As in other studies¹⁰⁷ on industrial change, the study found a strong correlation between the size of the organisation and the level of sophistication of the anticipatory methodologies deployed to capture dynamics in the external environment. Often firms will also have too short a time perspective. In that sense the CLEPA initiative and similar European sector initiatives play an enabling role in terms of building internal capacity among firms – notably SMEs to undertake anticipatory activities as part of their strategic. More specifically, the analysis undertaken by CLEPA found:

- In the firms studied the scope of anticipation analysis was quite introspective; most of the anticipation and management of change processes concentrated on issues internal to the industry, with only a few organisations focusing on external factors driving change;
- Preventive measures had been taken before the financial crisis - yet nobody expected the scope and impact of the crisis. Consequently, the primary focus was to act urgently to protect employment at national level and avoid collective redundancies while retaining competences.
- Information is shared and observation results are discussed with the workers' representation. In Germany, for example, works councils' structure and representation on policy boards enables them to participate actively and sustainably in company planning processes. In France, employees' representatives have prerogative in the context of information and consultation proceedings. Parallel to work councils at the firm level in the Member States, European works councils can also play a role in the anticipating and managing of change.

¹⁰⁷ For other studies on industrial change see. <http://www.eurofound.europa.eu/emcc/>

- The demand for training and qualifications is identified over the short and medium term and is typically a component in individual annual employee dialogues. In only a few cases is this demand assessed within a formalised competence management system which attempts to deduce demand for future products and markets prior to the development of further training plans.
- Regional actors are only involved in company affairs in cases of restructuring where support is required concerning layoffs and even plant closure.

Scenario modelling as a strategic tool

Scenario planning has emerged as one of the more comprehensive and solid mechanisms in anticipating change, being used across a range of anticipation studies commissioned by the EU, national governments, and social partners - depending upon the quality of the methods deployed and the experience of those facilitating a scenario process. The scenario process typically includes a process of scenarios built on the notion of plausible distinct futures which can be elaborated based on observable drivers of change in the external environment:

Researchers were commissioned by CLEPA in order to jointly work on the different phases of the study. Based on the literature review, drivers of change were mapped and indexed in order to be used to elaborate scenarios. This was followed by a scenario workshop organised as part of a consortium meeting during the project period with the point of departure in the extensive horizon scanning.

Five in depth case studies were carried out at company level covering Germany, France, UK and Spain. The purpose of the case studies was to identify the processes and routines used by the major companies of the sector when anticipating changes in their external environment.

Skills needs identified - how are they met?

The case study design regarding future skills needs and how they are met was based on the following three questions:

- What kind of vocational and further training measures are offered by the company?
- How much in advance are employees further trained with respect to future skills requirements?
- What is the basis for identifying future qualification demands?

In the countries covered by the study, vocational training plays a central role in developing skills and competences, especially in Germany given the strong involvement of employers and employee representatives. Slovenia has structures of vocational training similar to Germany. The study found that most companies were not able to offer any quantitative data about this field because budgets for further training are not centrally recorded. In most cases further training programmes have been geared at demands that are recognisable only on a short horizon (one to two years). These programmes are usually internally developed and financed and take place on the job. External resources for further training are only used as an exception. There are specific further training programmes for different occupational groups such as engineers and technicians, assembly workers and skilled labour (*Facharbeiter*) within the companies that were interviewed, similar to what is seen across countries and sectors in Europe.

In some cases qualification needs were derived from either technological aspects or aspects of the corporate strategy. There were some indications that systematic approaches to capture future skills requirements would have a substantially longer time perspective – and would also need to capture more long term trends – not only regarding the deployment of emerging technology application – but also nanotechnology in the context of new materials or the deployment in ICT in components as well as in the whole supply chain of services.

in a second phase and based on the study on anticipation approaches, an additional 14 company case studies were conducted.

Based on the in-depth case studies, the second report found that further training was offered in a broad range of areas – most of them being internal and with focus on the development of existing competences and skills of the workforce. Most of the companies involved in the study would use a competence management system or related instruments to identify the skills needs of their workforce. Only in three instances did the company's approach have a longer term perspective.

A third study followed to analyse the practical experiences by regional and local actors and instruments implemented to anticipate changes and to address negative impacts of restructuring for the workforce.

Lessons learned

Compared to some of the other case studies - additionally assessed for the purposes of this study on practices on anticipation of skills approaches in the EU and in the USA, the unique strength of the CLEPA initiative is that it is strongly embedded in the ongoing social dialogue between employers and unions in Europe on restructuring in the entire auto-motive value chain. The case study is thus embedded in types of institutional structures which are not found in the United States. In contrast, in a European context these structures are a powerful motor for ensuring that studies of this nature become usable and are used not only by policy makers, but also by practitioners. In that sense, CLEPA's extensive European coverage and its institutional linkages to national observatories and social partners has provided a strong platform for disseminating the conclusions of the study and other CLEPA activities related to human resources so that these can have a multi-level impact.

One of the challenges regarding the uptake and impact of anticipation studies is the perceived level of ownership to the study among key stakeholders and the appropriate choice of dissemination channels. In all Member States and also at the EU level, there are examples of studies of very high quality, but which nevertheless have minimal impact because these factors have not been taken into account. Given that many US initiatives on skills forecasts in the context of restructuring occur at the state level, US readers especially may be interested in obtaining a deeper insight in the cluster mapping initiatives undertaken by CLEPA. The individual reports may be found with a link at CLEPA's website, <http://www.clepa.eu>.

Michigan Regional Skills Alliances¹⁰⁸

Introduction

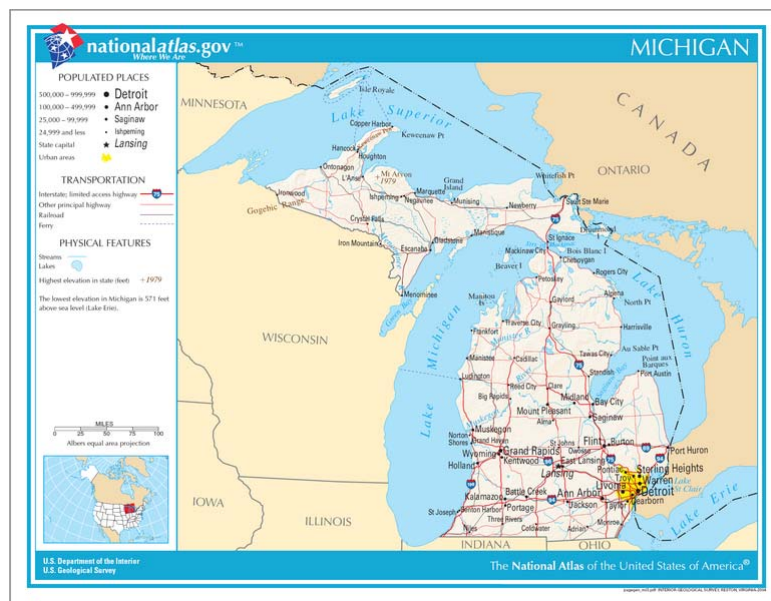
The Michigan Regional Skills Alliances (MiRSAs) initiative was launched in 2004 “to help employers and workers in Michigan improve their competitiveness and economic security.”¹⁰⁹ The programme offered a total of \$1 million for one-year startup grants for the initial development of up to 12 MiRSAs in Michigan.

MiRSA objectives are to attract and retain talent, upgrade the skills of low-qualified workers, and integrate the disadvantaged into the labour market. These skills alliances are formed as partnerships that are business driven and business focused, addressing current and future regional and industry sector workforce needs. The success of this initiative depends on the collaboration of key stakeholders to form effective partnerships.

The information presented below is mostly drawn from studies of the first two years of MiRSA activities.

Michigan’s economy

Michigan is the eleventh largest state by land area, touching four of the five Great Lakes. It is divided into two distinct regions. The **Upper Peninsula** is forested and rich in minerals, and its economy is primarily based on forest products and mineral extraction. The **Lower Peninsula** is also forested in the north, but also contains agricultural land in the south, producing apples, cherries, and other crops and dairy products. Over 40% of Michigan’s land area is covered by lakes.



(Source: Wikipedia Commons, http://en.wikipedia.org/wiki/File:Map_of_Michigan_NA.png)

Michigan is a major manufacturing state and its economy still depends on the production of goods, especially by the auto industry, although this latter is declining in importance. Manufacturing accounts for 18% of

¹⁰⁸ Information from Eberts, R. and Hollenbeck, K., *Michigan Regional Skills Alliances: A Statewide Initiative to Address Local Workforce Needs*. In OECD 2009. “Designing Local Skills Strategies.” Eds. Francesca Froy, Sylvain Giguère and Andrea Hofer. OECD Publishing, 2, rue André-Pascal, Paris. ISBN 978-92-64-06662-5. Further footnote citations are taken from this publication.

¹⁰⁹ Department of Labor And Economic Growth, press release, 13 May 2004.

Michigan's output and 14.5% of its employment, both figures well above the national averages of respectively 12.1% and 10.3%.

Michigan has been negatively affected by global competition. At the time of the introduction of the MiRSA initiative, Michigan had one of the worst levels of economic performance in the USA. In the last half of the 1990s Michigan has had one of the lowest unemployment rates in the country; the 2001-2002 recession raised this rate to 7.1%, 2 percentage points higher than the national average.

Michigan's economic problems were very severe in the transportation sector, since Michigan was highly dependent on the "Big Three" automobile companies - General Motors, Ford, and Chrysler-Daimler – which lost market shares throughout first decade of the 2000s. The situation was exacerbated by the recession that started in the end of 2007, and by June 2009 the state unemployment rate was 15.2%, the highest in the country.

Michigan is similar to many older industrial economies in that it is facing the challenges of increasing global competition, an aging workforce, an increasingly diverse population, and a workforce whose qualifications do not match business needs for a highly educated workforce. This is not to say that the Michigan education system is not able to prepare its workforce for participation in the global economy; rather, fewer students apply to college and fewer complete degree programmes. In addition, there is a "brain drain" in that more students enrol in out-of-state universities than students from out of state enrolling in Michigan education institutions.¹¹⁰ Enrolment decline then leads to cuts in university grants, and the poor state economic performance has resulted in a budget deficit which has led to even greater cuts in education funding.

Development of the Michigan Regional Skills Alliance initiative

The goal of the initiative was to increase regional workforce skills levels and subsequent worker labour market success, and to provide a tool whereby local employers could access a more skilled workforce. Benefits for workers are increased skills levels, employability, job retention, and higher wages. Benefits for employers are lower employee turnover, greater profits and productivity, and fewer unfilled job vacancies. A unique feature of the MiRSA initiative is its construction as a partnership between the state government and a charitable foundation. While this construction is not unusual at local levels, it is uncommon for state governments to work with charitable institutions in both the design and the funding of initiatives.

Purpose

MiRSAs are specified as locally initiated and managed partnerships to address workforce issues in sector-specific industries in distinct geographical areas. The partnerships are to address issues such as labour and skills shortages, training mismatches, and employee recruitment and retention. Activities to address these issues include analysing, designing and implementing human resource practices such as recruitment, the development of career ladders, training, and mentoring. In addition, MiRSAs can focus on revising and coordinating training programmes, transportation and other support services, and the improvement of supplier relationships.

¹¹⁰ National Center for Public Policy and Higher Education (2006). "Measuring Up, a National Report Card on High Education."

MiRSA activities by objectives

Attraction and retention of skilled workers

- School career fairs.
- Summer camps for youth.
- Career information for students, including online video clips.
- Marketing campaigns to bring “retired” nurses back into the workforce.
- Internet-based clinical calendar that reduces wait time for clinical job opportunities.
- Electronic transactions among member businesses.

Skill upgrading

- Collaboration among community colleges to coordinate training curricula.
- Promoting training for workers.
- Computer and Internet training seminars.
- Modularisation and standardisation of curricula among various educational institutions.
- Invest existing WIA incumbent worker funds into long-term care facilities, and other businesses.

Integrating the hard-to-serve into the workforce

- Develop career ladder programmes for entry-level nursing-related occupations.
- Work to change the attitude of the construction industry toward minority workers.
- Training to prepare for high school Graduation Equivalence Degree (GED).
- Remedial literacy and numeracy training.

Source: see first footnote in this case section

The initiative does not include much funding for job training or job search assistance; these services are to be funded by existing workforce programmes.

MiRSA partnerships must include enterprises within the targeted industry, local education institutions, and workforce development and economic development agencies. Other possible partners are industry and trade associations, labour organisations, chambers of commerce, and community based organisations.

Application process

The Michigan Department of Labor and Economic Growth (DLEG) received 26 MiRSA applications. A review committee recommended 13 applications for funding¹¹¹. The DLEG provided technical assistance to prospective bidders and then to the selected grantees. However, it did not intervene in the decisions of local partnerships; these were free to identify targeted industries and occupations and propose solutions.

Overview of the 13 selected MiRSAs

Two MiRSAs came from the Upper Peninsula and two from the upper half of the Lower Peninsula; the remaining 9 were from the southern third of the Lower Peninsula. The majority of the MiRSAs targeted the healthcare industry. One focused on manufacturing alone, and one on manufacturing and health care, while the rest addressed issues related to construction, nanotechnology, and public utilities. The funded MiRSA initiatives tended to include multi-county instead of narrowly defined geographical areas such as single local labour markets. Six of the healthcare initiatives covered large, multi-county areas. While many of the MiRSAs dealt with training issues, only one or two involved training efforts; most dealt with curricula and the introduction of students to the respective industries.

¹¹¹ The original intent was to fund 12 MiRSAs; a 13th initiative was designated as a MiRSA but not funded by MiRSA funds.

Two examples of MiRSAs

The **Healthcare Regional Skills Alliance of Northwest Michigan** charted healthcare sector shortages of trained entry-level workers, Certified Nurse Aides, and Registered Nurses. In addition, the alliance found that there was a lack of people choosing health care career, and too few and too expensive training opportunities for upskilling in healthcare trades.

The alliance and its partners in Northwest Michigan implemented among other things summer camps to attract new potential healthcare workers. These activities included a week-long boarding camp for high school students, where participants could explore medical careers in a hands-on environment and through interactive lessons and tours of local hospitals. In addition to activities targeting students, the alliance initiated programmes targeting job access and retention.

The **Capital Area Manufacturing Council**, located in Lansing, the state capital, focuses on manufacturing production employees. Although Lansing area unemployment figures are better than those of the state and the country as a whole, there has been a considerable decline in its core industry, transportation equipment production. This MiRSA provides a platform where member manufacturing employers can report trends that can affect local area manufacturing and can receive support in dealing with common development issues.

Governance Issues:

1. Collaboration and partnership

Many of the MiRSAs were formally structured into committees to deal with those tasks that had been identified as central to workforce challenges facing employers in their region. A few MiRSAs worked more informally, relying on staff borrowed from other organisations or using part of their funding to hire staff. But even among MiRSAs using hired staff, the structured approach was most prevalent.

Many of the alliances represented the first instance of education/employer/workforce agency collaboration. Stakeholders emphasised the importance of employer participation in decision making, since the central goal of such alliances is to address the enterprise workforce needs. However, employers were the least satisfied with their roles, and many MiRSAs had difficulty in attracting a broad base of employer representation within targeted sectors.

2. Communication

Clear and timely communication is crucial to MiRSA success. MiRSAs must enhance awareness in the employer community and enlist its support, and communicate meeting times, agendas, and background material to staff and decision makers. Communication also involves reporting plans and results to the public, to state administrators, and to other stakeholders.

Formal meetings were often the primary means of communication. One issue affecting satisfaction and attendance levels in the rural MiRSAs was the distance that partners had to travel in order to attend; for while e-mail and website communication was available and used widely, in-person contact was considered essential for successful partnership interaction.

3. Resources

Initial funding is primarily designed to catalyse the formation of partnerships; this funding must be supplemented in order to provide those services necessary to improve workforce quality. Employer partners had to make a financial commitment as part of the MiRSA application process. Overall, however, employer satisfaction with MiRSA services did not always lead to sustained contributions. One MiRSA, which was organised as an association to produce programmes and services for interested manufacturers, collected dues from participants, covering 85% of year-two activities. One difficulty in obtaining employer support is the reluctance of business to spend money on basic training – literacy and numeracy – for entry-level workers. Employers see little return on such investments, and fear that many workers will merely switch to another job shortly after receiving training.

4. Outcomes and value added

Most activities were implemented by the second year of each MiRSA programme. Since many activities had long-term or systemic change goals, their net impact on regional employees and employers cannot be assessed independently. In addition, activities with shorter term goals (such as workforce training) were funded by other programmes and therefore results cannot be attributed uniquely to MiRSA activities. The same applies to activities regarding curricula changes, which are linked to general benefits of education programme enhancement.

Interviewees were generally satisfied with the activities specific to the needs of targeted industries, but employers often first and foremost mentioned the value added of collaboration and networking; this was seen as important for information sharing and interaction with a wider group of stakeholders, and important for the economic viability of the individual enterprises. The healthcare MiRSAs, especially those in rural areas, saw a direct link between their organisations' and their region's economic future; this is because the decline of manufacturing had promoted the healthcare industry to the region's primary employer. Without access to a sufficient supply of qualified employees, the healthcare industry faces higher costs, unfilled job positions, and the inability to create sufficient revenue for economic viability.

Overall employer satisfaction with the MiRSA initiative is tempered by the identification of programme issues such as the short funding cycle, difficulties with employer support and sustainability, and the use of traditional workforce outcome measures which can be at odds with expected systemic outcomes.

Conclusions

During their first years of operation, MiRSAs were able to identify employment issues and key industries facing labour shortages, and to design and implement skills strategies. The ensuing networking and collaboration was an unqualified benefit of the MiRSA programme. Almost all employer partners were committed to continued participation in their MiRSAs, even though their level of continued financial commitment was not so high.

Observations and recommendations

- Key stakeholder and partner commitment is crucial, and it is especially important that CEOs in the employer partners be actively involved.
- MiRSAs should be funded within the scope of a single, well defined labour market of manageable size. This permits partners to better focus on specific initiatives so that regular meetings can be held without excessive travel.
- The first stage of formation is crucial, especially the development of a strategic plan. The plan must reflect the various needs of the participating organisations, and demands broad consensus.
- Alliances must establish and track performance measures, using outcomes to engage partners and maintain their focus on mission and goals.

MiRSAs have generally successfully identified and directed funding to activities important to local area businesses; examples are programmes to acquaint youth with regional career opportunities, the development of career ladder models, and the development of collaboration between training providers, workforce development agencies, and employers. But as mentioned, funding for traditional direct activities such as worker training or job matching services came from external programmes, and many MiRSAs were reluctant to use such funding because of restrictions attached to its use. The lack of funding to address this type of locally identified problem was not helped by the lack of significant employer co-funding of workforce development public funds, and may have narrowed the scope of MiRSA solutions.

As mentioned by employers, MiRSA success is more dependent on the establishment of an infrastructure that supports partnerships, networking, and local decision making, and less on the provision of services to employers or employees. MiRSA funding is low compared to that available through workforce programmes, but it is nevertheless useful for supporting the administrative services necessary for collaboration. Without

continued state funding, and in combination with the lack of employer funding, it is doubtful that many MiRSA partnerships can continue to sustain themselves.

It is not clear if the MiRSA activities addressed Michigan's overarching needs, since only one MiRSA addressed manufacturing, the state's primary source of employment, and most MiRSAs focused on local traditional sectors rather than on robust emerging export industries such as life sciences and biotech.

Milwaukee Creative industries

Context

There is a growing body of studies in Europe carried out at a regional, national or European level to anticipate future skill demands within a particular sector, value chain, or the application of a technology such as ICT. Those types of studies are very rare in the USA - as confirmed by USA informants.

At the US state level and at the federal level there are numerous projections of developments of supply and demand based on econometric models, undertaken by the Department of Labor and state level employment authorities.

Studies which address skills supply and demand using a mix of methods are typically founded in cluster initiatives at the state or local level. Community colleges often play a strong outreach and broker role in the initiation and implementation of workforce development initiatives similar to the strategic position that some polytechnics have succeeded in achieving within the regional innovation system. Forecasting studies are primarily undertaken to provide the foundation for and prioritisation of local economic development strategies at the state level¹¹², and factors pertaining to the supply and demand of skills become a component in integrated competence based regional economic development and/or restructuring initiatives. The US case studies from the city Milwaukee and from Michigan build on a model that OECD/LEED has recently identified to be a key to efficient and coherent strategies for human capital based economic development strategies, and they can therefore be a source of inspiration for regions or cities which strive to develop integrated approaches to regional development which aim to create optimal synergy between workforce development, labour market, and economic and innovation policies.

Creativity Works - Milwaukee Region

The *Creativity Works* initiative from the Milwaukee region is one of several regional examples of how the debate about the value of the creative economy, first proposed by Richard Florida, has impacted regional development models. The underlying assumptions are that creative cities and regions are the most successful in terms of attracting creative talent and inward localisation of high value service companies.

Studies similar to the Wisconsin case study have been undertaken in other states in the USA such as New England, New York, Arkansas, and Kentucky. More or less the same analytical model has been applied as to the Milwaukee region - and with the purpose of identifying the whole range of state specific enablers and barriers critical to the creative industries as a driver of sustainable growth in the particular State.

The initiative was kick-started by the Cultural Alliance of Great Milwaukee, supported by an analysis undertaken by Mt. Auburn Associated and Regional Technology Strategies, both recognised for their role in skills and knowledge based regional economic policies.

¹¹² A recent study from the OECD/LEED (*Breaking Out of Policy Silos- Doing More with Less* (2010) suggests that one of the enabling factors could be industry-led Workforce Investment Boards. There are approximately 600 Workforce Investment Boards, and they are the principal private-sector policy advisor for the governors across the US States on building a strong workforce development system aligned with a state's economic development goals and the characteristics of the particular state markets. Its members are appointed by the governor in the state and represent a cross-section of business executives, labor officials, education leaders, economic development practitioners and local elected officials.

Methodological Approach

Creative industries and occupations were defined by reviewing how the creative sector and creative occupations are defined in a range of international sources. Data concerning labour market characteristics and the occupational profiles in the industry were acquired by combining the US Department of Labor's Quarterly census on employment and wages with data from the Bureau of Economic Analysis combined with county business statistics. The definition was further defined and validated through qualitative analysis.

For the purpose of the study the creative industries were defined as:

"Those enterprises and people involved in the design, production and distributions of goods and services in which the aesthetic, intellectual and emotional engagement of the consumer gives value to the product/service."

In the Milwaukee region this led to the identification of the following sub-sectors:

- Design , building design, environment, communications, and products)
- Performing Arts
- Visual Arts and Crafts
- Media and Film
- Culture and Heritage

Milwaukee Region

The creative industries in Milwaukee are built on a legacy that started more than 100 years ago founded in southeast Wisconsin known as the nation's industrial heartland, the root of which was firmly planted in craft and design. The region's arts and cultural activities grew from a diverse population that migrated to the region. A strategy was developed entitled "Creativity Works". Its aim was to connect and leverage the region's creative industry assets into a competence and talent based cluster strategy.

A comprehensive assessment of the creative industries was made taking into account:

- All the jobs in commercial and non-profit enterprises in the defined creative industry segments;
- Jobs in creative industries that were not traditionally defined as part of the creative segments;
- Jobs associated with freelance work and self-employment.

For each of the identified industry segments an analysis was carried out of the current education and training supply. This included workforce development measures offered by the region's public universities and community colleges as well as by private and not-for profit providers, in order to create a comprehensive overview of the current offer – what is in demand by whom and what is the scope of the current offer - including a view to capture programmes or courses in demand which the industry was not aware of.

Similarly, a mapping for each of the segments was carried out regarding support structures - which is worthwhile noticing, because in reality there are often blurring boundaries between informal and formal learning arrangements when it comes to support to workforce development or to entrepreneur support.

Two data sets were combined to identify the workforce of the creative industries: all of the workers within creative enterprises and those workers with a creative occupation outside the creative industries.

Findings

The researchers found:

- More than 66,700 people are employed in the creative industries in southeast Wisconsin, whether they are creative workers in creative enterprises, creative workers in other enterprises (such as a musician in a church), or a business or support worker in a creative enterprise (such as an accountant for an arts group), or a free-lancer;

- More than 49,000 people were employed in the region's creative enterprises, which exceeds the number of people employed in education (36,451), water businesses (20,000) or food and beverage manufacturing (14,700);
- The Milwaukee region employs more creative employees as a percentage of total employment—4.2%—than Wisconsin as a whole (3.6%) or the national average (3.7%);
- With almost 23,000 people working in the design field, designers make up about half (46%) of those who are employed in the local creative sector, and earn 59% of its wages;
- In 2009, about \$2 billion in wages were earned by the region's creative workers.

The use of O*NET to map skills to occupations

A mapping of occupations and job functions with the cluster was carried out against the O*NET occupational profiles.

Table 10.5 Creative Occupation Segmentation

Artists	Craftspeople, fine artists, multi media artists, actors, producers, directors, dancers, writers, choreographers, musicians, composers, animators
Cultural	Archivists, librarians, library technicians, curators, conservators, audio visual collection specialists
Designers	Architects, landscape architects, industrial designers, landscape designers, interior designer, fashion designers, graphic designers, floral designers, set and exhibit designers
Media	Audio-sound and broadcaster technicians, camera operators, film and video editors, media and communication workers, photographers, announcers, agents, sound engineers, news analysts, broadcast technicians, technical writers

TOTAL EMPLOYMENT:
66,707

33,319

**Other workers in
Creative Enterprises**
*e.g. receptionist in
architecture firm;
accountant in orchestra*

15,827

**Creative Workers in
Creative Enterprises**
*e.g. graphic designer
in ad agency;
actor in theatre company*

17,561

**Creative Workers in
Other Enterprises**
*e.g. product designer
in a manufacturer;
musician in church*

49,146

CREATIVE ENTERPRISE SEGMENTS

CULTURE & HERITAGE

Museums, Libraries, Historic Sites

DESIGN

Built Environment: Architectural Services,
Interior Design, Landscape Design, Architectural
Woodwork and Ornamental Work
Product: Industrial Design Services, Fashion
and Special Product Design
Communications: Printing, Graphic Design,
Advertising

MEDIA & FILM

Newspaper and Periodical Publishing, TV
and Radio Broadcasting, Software Publishing,
Motion Picture and Video Production and
Distribution, Music Publishing, Sound Recording
Studios, Bookstores

PERFORMING ARTS

Theater Companies, Musical Groups
and Artists, Promoters and Agents, Dance
Companies, Musical Instrument Manufacturing,
Musical Instrument and Supply Stores

VISUAL ARTS & CRAFTS

Visual and Crafts Artists, Art Dealers,
Photography Studios, Fine Art Schools,
Photographic and Art Supply Stores

33,388

CREATIVE OCCUPATIONS

ARTISTS

Craft Artists, Fine Artists, Multi-media
Artists, Actors, Producers, Directors,
Dancers, Choreographers, Writers,
Musicians, Composers, Animators

CULTURAL

Archivists, Librarians, Library Technicians,
Curators, Conservators, Audio-visual
Collection Specialists

DESIGNERS

Architects, Landscape Architects, Industrial
Designers, Interior Designers, Fashion Designers,
Graphic Designers, Floral Designers, Set and
Exhibit Designers

MEDIA

Audio, Sound and Broadcast Technicians,
Camera Operators, Film and Video Editors,
Median and Communication Workers,
Photographers, Announcers, Agents, Sound
Engineering Technicians, News Analysts,
Broadcast Technicians, Technical Writers

These listings
are representative
and not meant to
be all-inclusive.

As mentioned in the introductory chapter, factors relating to supply and demand of skills in post-compulsory education are generally perceived as a matter to be handled by the market. In the larger Milwaukee area there are examples of how the close and ongoing, but often not very formalised forms of interaction between the creative industries and the education sector quickly are translated into new courses or programmes.

As an example, the Milwaukee Area Technical College was quick to launch an Associated Applied science degree in computer simulation and gaming programme when the first free-lancers and entrepreneurs started creating apps and games. The education institutions have also showed success in terms of addressing niche markets such as documentaries and advertisements. This has subsequently led to micro-enterprises with growth ambitions settled in the region, because they can get access to highly specialised skills on a freelance or employment basis. In this way the skills-based clustering strategy linking economic development and innovation to the local labour market and human resources pool contains both pull and push effects that we do not see to the same extent in Europe.

Identifying skills needs at the sub-sector level

An overview of each creative industries segment, including identification of key assets, historical context, and current profile was developed, including identified skills/ workforce issues.

Interviews conducted within the status pointed to the need across the industry segments to ensure the creative pipeline. This was done by involving education and training providers at different levels including the K-12 system and providers of extracurricular activities for youth. According to informants the creative pipeline might have been somewhat damaged in recent years, because public schools have been under pressure to concentrate resources on raising math, science and English scores at the expense of the arts. Within a European context it is worth noticing that although the study has provided contributions specifically focusing on education, training, and support structures, the creative industry's assets, challenges and opportunities are more broad-based and systemic in nature than outcomes of similar studies in the EU. Based on interviews with involved stakeholders some of the following recommendations emerged:

DESIGN factors:

- Some of the region's post secondary institutions had developed innovative approaches to teaching design.
- The outreach to relevant companies could be improved through regional intermediaries and within a broader innovation context.
- A need to improve the matching of young graduates with the industry to address skills-mismatch issues identified.
- Integration of entrepreneurial components in the curriculum targeting the industry segment as many graduates end up being self-employed.

FILM AND MEDIA:

- Education and training in web based media mobile apps and gaming in combination with industry placements - as much of the recruiting to the sector occurs through high level connections.
- One of the more interesting proposals coming out of the study was also to make of the informal learning and networking opportunities offered through local film festivals such as the Milwaukee Underground Festival - and using the film festivals to expose students to the environment, as is the case of a student-run film festival. The education institutions obtain exposure to the industry as well as opportunities for industry placements, for the industry is a source for recruiting new talent on a project base or in regular employment.

PERFORMING ARTS:

- Peer learning through network based activities proposed to strengthen market visibility and to develop niche markets and products.

VISUAL ARTS AND CRAFTS:

- Need of professional marketing and branding skills, including e-business skills to reach new market segments.

CULTURE AND HERITAGE:

- Training in digital technologies as a means to create new experiences before, during and after making use of museums and cultural heritage sites.

Lessons Learned

The Milwaukee Region takes an integrated approach to anticipation of skills. This has been done by making an assessment of the existing offer of education targeting the creative industries, and then situating this offer in the characteristics of the creative industry labour market in Milwaukee. In this way the approach has a model character which could be relevant both in a regional cluster initiative in Europe and as a resource in the implementation of sector-based projects with support of the structural funds. It is worth noting that the study also identified a number of promising practices regarding education and training and support structures with a view to sharing them in the series of dissemination events that were held as part of the initiative.

Meeting global challenges through education- the case of MIT- Energy Initiative- MITEI

The MIT Energy Initiative (MITEI) at Massachusetts Institute of Technology was established in September 2006. It is an Institute-wide initiative designed to tackle global energy and climate challenges by transforming the global energy system to the needs of the future. From the outset the initiative was multi-disciplinary, involving all the departments and schools at MIT which span engineering, management, architecture & planning, and humanities & social science. At the time the initiative started, numerous reports had already been published globally, showing the realities of the climate and energy crisis.

The MIT president subsequently established an Energy Research Council (ERC) of 16 faculty members from all five schools. They were charged with formulating a vision for how MIT could best deploy its combined resources and knowledge to tackle the world's energy crisis. MIT faculty, students, staff, and alumni as well as key industrial leaders provided contributions and ideas which formed the basis for a report that the Energy Research Council submitted to the MIT president in May 2006¹¹³.

The report noted that many students at MIT as well as students from other universities in the greater Boston area already had expressed strong interest in energy topics, as evidenced by the formation of energy-related clubs and cross registration in a broad range of energy related subjects, and likely also driven by a broader public and political attention to energy and climate topics.

As stated in the report, many energy-related course offers already existed at MIT. It was nevertheless the view of the Energy Research Council that a much more coherent and comprehensive offer could be developed. It was strongly recommended by the Council that an MIT-wide group should be established to guide the development of multi-disciplinary energy education that would span traditional departmental and school boundaries. This group would be important for identifying and addressing opportunities for energy education in the first year for developing educational programmes that would build on the offerings of several different departmental programmes, and for providing service and guidance to students.

Leading by example

Moreover, the council proposed that the campus environment should reflect MIT's commitment to sustainable energy practices as part of their brand. The basic idea was that the MIT campus should function as a sort of living lab, learning and teaching and research environment which students and faculty could affect and improve by designing a Sustainable Campus Energy Initiative that would entail the following three actions:

- increasing MIT campus energy efficiency through feasible approaches that would reduce environmental impacts and energy costs,
- taking a leadership role in shaping energy practices for energy-intensive research institutions, and
- fostering student creativity and activism, inspired by the energy-conscious campus environment, and allow them to develop new ideas for energy sustainable living that are applied on the evolving MIT campus.

These proposed new action lines were set in a context in which the significant recent development of the MIT campus had led to substantially increased energy use and cost, increased emissions, and higher per capita energy use. The goal was to embrace a sustainable campus energy initiative rooted in technology, and to demonstrate that it would be feasible to develop and implement an integrated and cost effective conservation, research, and education programme, while not compromising institutional growth.

A tangible metric of progress of such an initiative was proposed to be campus greenhouse gas (GHG) emissions. Using this metric would on the one hand be aligned to the goals of the initiative, and on the other an easily articulated metric which could be communicated to the wider public and contribute to the branding of MIT.

¹¹³ <http://web.mit.edu/mitei/about/erc-report-final.pdf>

Whilst it was not proposed to house all energy research and education at MIT in one central unit, it was proposed to provide unique, central facilities of value to a broad cross-section of energy research on campus as well as to provide a location for demonstration/pilot projects to give the initiative a unique character.

The management of the initiative proposed that a strong MIT steering committee was to work with the Director on key decisions. In addition, the management proposed that an external advisory committee be formed to provide strategic direction to research and other activities within the initiative. It was proposed that a focal point for interdisciplinary discussion/communication both internally and externally should be established with the purpose of managing an energy web site/portal, convening workshops with industry, sponsoring a colloquium and seminar series, facilitating discussions across schools and department on hiring needs and opportunities in the energy area, and organising educational programmes in energy that involve multiple academic units.

Today, the MITEI programme includes research, education, campus energy management, and outreach activities that cover all areas of energy supply and demand, security, and environmental impact.

MITEI's educational approach

The underlying philosophy of the education provision is highly entrepreneurial and supportive of the development of core competences – or what is called in the USA 21st century skills - in so far that it merges "real-world" experience, creative approaches, and problem solving and communication skills in trying to find new solutions to real world problems. This is done through MITEI's interdisciplinary teams of scientists, engineers, economists, architects and planners, management and innovation experts, and social scientists as teaching resources.

The aim of the MITEI is to function as a centre of learning offering an environment in which students work on technologically, socially, and politically challenging problems closely linked to MIT's energy research on *Walk the Talk*. To that end, students are offered possibilities to assist with energy research and learning opportunities beyond the classroom. Among the activities have been energy system upgrades, student-run projects to reduce energy use and emissions, on-campus testing of specific innovative measures, a major study to look at all options, and web postings of resulting guidelines for use by other universities and institutions.

Many student groups on campus offer creative activities related to energy, including lectures and discussions, community service, extracurricular design projects, energy advocacy, and academic work. Clubs include graduate and undergraduate students. Examples of groups are:

Biodiesel@MIT, a student-led group working to establish a campus biodiesel system, incorporates the collection of used vegetable oil (UVO) from dining locations, the processing of the UVO into certifiable biodiesel, and the usage of the biodiesel product in campus transportation. Biodiesel@MIT is also developing educational materials and seeks to be an information resource on biofuels.

Another example is the **MIT China Energy and Environment Research Group**, a student club founded in order to create a communication platform for students, scholars and professionals at MIT and other Boston-area Universities who are interested in topics related to China's energy and environment. It organises speeches by inviting officials from the Chinese and US governments, industrial leaders and scholars, hosts seminars and round-table discussions on China energy and environmental studies, and builds up connections with China's energy organisations.

Social entrepreneurship is another facet of the initiative. Students have been offered the opportunity to design a classroom in rural Cambodia with natural lighting, no air conditioning, natural ventilation, no glass, and low noise level between classrooms. During the fall semester, students worked on analysing a building and designing a campus. During their January break, students travelled to Cambodia for 15 days to see how well their building plans would work on location and how a structure can be built from scratch. During the project, the 15 students in the class and their three instructors collaborated with a Cambodian architecture firm along with people from the local school. Because the school had to function in a very different climate from Boston and with the use of other materials, students were forced to think outside the box. The professors believe that the project offered cross-boundary learning as students also had to incorporate new kinds of design objectives.

MITEI also offers a range of shorter courses for professionals mirroring the multi-disciplinary approach adopted as well as hard core technology courses.^{114 115}

Lessons learned

The MIT MITEI Initiative is a strong example of how key competences/ 21st century skills can be integrated in curriculum and in teaching and learning processes that maintain rigorous academic standards while also offering a unique learning environment conducive to 21st century skills. The design of the learning environment builds on multi-disciplinary as well as problem- and project-based learning. Similarly to the University of Aalto case, it can be argued that the way to anticipation of emerging skills builds on an incremental innovation model in which both students and faculty are constantly exposed to external changes in demand.

¹¹⁴ <http://web.mit.edu/mitei/education/professional.html>

¹¹⁵ For more information on the MIEI Initiative, please see <http://web.mit.edu/mitei/index.html> , which also offers links to resource persons.

Annex 3 - Inventory of European Practices on Anticipation of Skills

Approach adopted

The approach adopted to prepare the inventory was to examine 'known practice', based on the team's knowledge and expertise concerning EU labour markets and associated education and training responses. The analysis presented builds on previous research, which included updating the analysis presented in the NSNJ Commission Staff Working Document as well as other studies conducted for DG EAC (O98 and O119).

The inventory is split into two sections as follows:

- The first section concerns the labour market and skills context and forecasting, foresight and other research that focuses on understanding the needs of the labour market;
- The second section concerns the education and skills context and explores skills and competence development.

Labour market context

The 2008 Commission Communication (COM) on New Skills for New Jobs (NSNJ)¹¹⁶ and the associated Staff Working Document – highlighted the importance of skills upgrading for Europe's recovery from the crisis and longer term economic growth and social cohesion. Highlighting themes that emerged in the subsequent 2020 strategy, the COM acknowledged the potential of the low carbon economy and the knowledge economy as drivers for economic growth and sustainable employment, while recognising that globalisation, an ageing population, increasing urbanisation and rapidly evolving social structures have accelerated the pace of labour market change. The focus of the COM and the subsequent work on New Skills for New Jobs provided an impetus for the examining the mechanisms in place at both the Member State and European levels for monitoring, assessing, anticipating skills needs and matching labour supply and demand.

The NSNJ COM stated that matching needed to be improved as the mismatch between labour supply and demand had been growing. A key driver for anticipating, monitoring and matching is to ensure that education, training and employment policies and measures were responsive to the needs of the labour market and resources allocated to these activities were allocated on an equitable basis and were spent efficiently. Of course, a further issue for education and training providers was the need to generate new skills in response to new jobs and equip individuals with the necessary basic skills and competences to adapt to an evolving world of work.

The Commission Staff Working Document that accompanied the Communication identified skills anticipation, monitoring and matching practices across Member States and at the European Union levels. The SWD highlighted a growing body of evidence at the EU level and a range of different practices at the Member State level.

At the time of the COM some European studies were underway, though outputs had not been delivered (e.g. the sectoral studies that used the common foresight methodology) while Cedefop's initial work on developing a medium term skills forecast had been completed. Since the COM, Cedefop has updated its Medium term skills forecast, which was published in 2010 along with the report of the expert group on New Skills for New

¹¹⁶ Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions: New Skills for New Jobs – Anticipating and matching labour market and skills needs, COM(2008)868 final, {SEC(2008) 3058}

Jobs¹¹⁷. Both reports advocated a need to build bridges between the worlds of work and education and training.

Findings from the DG EMPL sector studies highlight an increasing polarisation in the demand for skills and competences. The accompanying transversal analysis¹¹⁸ highlighted a decline in skilled jobs (typically in manufacturing), moderate increases in the very low skilled elementary occupations and a high increase in high skilled jobs (e.g. professionals and managers). Services are expected to grow in importance over the next 10-15 years while in manufacturing, specialisation is expected to drive the need for highly skilled labour. Irrespective of industrial change, upskilling is anticipated across all sectors, increasing the education level among workers. Increasingly the boundaries for traditional sectors and job profiles will blur, resulting in employers' requiring new combinations of skills and competences.

To illustrate the practical application of the results from the DG EMPL sectoral studies, one of the proposed cases studies concerns the automotive sector where CLEPA, the European Association of Automotive Suppliers, ACEA, the European Automotive Manufacturers Association and EMF, the European Metal Workers Federation proposed a 'European Partnership for the Anticipation of Change in the Automotive Sector' that aims to strengthen and maintain European competitive advantage, create quality jobs and reinforce employability.¹¹⁹

Consistent with findings from the sectoral studies, Cedefop's 2010 forecasts of skills supply and demand indicate a shift towards a more highly qualified workforce with an increasing proportion of workers with medium and high level qualifications and an increasing requirement for workers to be adaptable in how they use their skills and competences in the world of work. Workers qualified at the medium level are expected to make up half of the workforce by 2020, with the massification of education showing as increasing numbers of highly qualified young people enter the labour market, while low skilled older workers exit the labour market.

Following the Communication, DG EMPL launched a new project in 2010 'monitoring labour market developments in Europe'.¹²⁰ The rationale for the project, which comprises two dimensions: the European Vacancy Monitor and the European Job Mobility Bulletin, is to collect up-to-date data on job vacancies providing 'early warning information' concerning bottlenecks and mismatches and an analysis of the vacancies posted on the EURES job portal.

As specified in the NSNJ Staff Working Document, at the Member State level, practices from countries with long standing experience of skills anticipation activities have been transferred to those with less or limited experience. However few Member States adopt holistic approaches, where the various anticipation and monitoring activities clearly linked to education, training and labour market planning.

In preparing this inventory the analysis of the mechanisms in place for skills anticipation, monitoring and matching, presented in the NSNJ SWD has been updated.

Country specific approaches to understanding labour demand, forecasting / foresight work, supported by institutional examples using outputs

Across the EU Member States conduct different research activities to understand skills mismatch and to anticipate labour supply and demand. These are summarised in the table at the end of this annex.

¹¹⁷ European Commission (February 2010) New Skills for New Jobs: Action Now – A report by the Expert Group on New Skills for New Jobs prepared for the European Commission

¹¹⁸ Oxford Research for DG EMPL (January 2010) Transversal Analysis on the Evolution of Skills Needs in 19 Economic Sectors. Further information available from <http://ec.europa.eu/social/main.jsp?langId=en&catId=782&newsId=731&furtherNews=yes> – checked 24.03.11

¹¹⁹ See European Partnership for the anticipation of change in the automotive sector, found at: http://www.anticipationofchange.eu/fileadmin/anticipation/Logos/EU_partnership_en.pdf - checked 24.03.11

¹²⁰ See the following link for further information <http://ec.europa.eu/social/main.jsp?catId=955&langId=en> – checked 28.03.11

Understanding skills mismatch

While the recent DG EMPL project 'monitoring labour market developments in Europe' introduces a pan-European mechanism for tracking vacancies, the NSNJ Staff Working Document highlighted that data problems can act as a barrier to research of this type. Vacancy data held by the Public Employment Services typically miss higher level vacancies, frequently advertised by private employment agencies. However, Belgium is one Member State where the Public Employment Services conduct research of this type.

Employer surveys are often used to provide a short term picture of skill shortages and mismatch. Such surveys, which are typically orientated towards understanding labour demand, can take place at the national and / or regional level and can be sector-oriented. Regional and sectoral studies also can include qualitative research.

At the national level such surveys are commissioned by labour ministries and / or the public employment services, though can be conducted by national statistical offices or research institutes. Countries conducting regular national employers' surveys include Cyprus, Finland, Germany, Hungary, Italy, Latvia, Luxembourg, Malta, the Netherlands, Norway, Slovenia, Sweden, Turkey and the UK. Recent skillsnet data for Bulgaria indicate that the public employment service, though its regional offices, conducts annual assessments of employers' needs.

Sectoral, regional and qualitative labour market research takes place in a number of countries (AT, BE, CZ, DK, EE, ES, FI, FR, HU, IE, IT, LT, LV, LU, MT, PT, SK). Sectoral studies are typically commissioned on an ad hoc basis and are used to ascertain new trends in skill and competence requirements and changes in occupations. In Italy, in 2010 following the economic crisis, the Ministry of Labour, the regions, autonomous provinces and social partners have conducted a survey of short term skills needs aimed at providing interested labour market actors with information on employers' skill and competence needs.

Forecasting and foresight

The NSNJ SWD identified that forecasts, of various types - and at various stages of development - existed in 19 countries (AT, CY, CZ, DK, EE, FI, FR, DE, IE, IT, LT, LV, NL, NO, PL, RO, SI, SE, UK). Institutions in Member States with a long tradition of forecasting have worked closely with institutions in EU 12 to share practices and contribute to the development of forecasts. Skillsnet data show that development work to inform the preparation of forecasts has taken place in Bulgaria. Also in Hungary, data suggest that forecasts occur, though not systematically (see box below).

Development of forecasting systems – Bulgaria and Hungary

Bulgaria: An interagency working group for the development of a national research and forecasting system was formed in 2008. The working group included representatives from the Ministry of Labour and Social Policy, the Ministry of Education, Youth and Science, the National Agency for Vocational Education and Training, Social Partners' national organizations, the Institute of Economics and the Institute for Study of Society and Knowledge of the Bulgarian Academy of Sciences.

- The concept for and the structure of the research and forecasting system has been considered. It is expected to be a national system, with a regional dimension that focuses on recognized professions, occupations and economic activities.
- As a part of the system, a pilot model for short-term forecasting, "barometer" type will be developed and tested, using the experience gathered so far.

Hungary: Mid-term (3-5 years) and long-term (5-10 years) labour market forecasts have been prepared on an ad hoc basis. Most recently research was conducted using Structural Funds monies, on workforce structure (e.g. Borbély and Fülöp, 2008) within the framework of the 'Development of Public Employment Service' programme of the Human Resources Development Operational Programme (*Humán Erőforrás Operatív Program*, HEFOP).

Applying the results from forecasting, foresight and other research activities

This sub-section identifies practices across the European Union concerning the use of forecasting, foresight and other research in informing education planning. The following examples are illustrative of the types of practices in place across Europe:

- Cyprus
- Denmark
- Finland
- Germany
- Ireland
- Netherlands
- UK.

A common link in the examples identified is the use of forecasts and other labour market research in informing decisions about the delivery of vocational education and training and ensuring that such provision is relevant to the needs of the labour market.

Cyprus

The Cypriot approach to anticipation, operated by the Human Resource Development Authority, comprises:

- Employment forecasts in economic sectors (46 sectors) and occupations (around 200 occupations) cover expansion and replacement demand, conducted every 2-3 years, covering a ten year period.
- Annual research on skills needs, which informs training delivery (Multi-company Initial Training Programmes), developed in conjunction with the social partners.
- Recent research on green skills needs.

The outputs from the various research activities are used to plan student numbers enrolled at the branch level and inform curricula design. For example, research studies are being used to inform the development of the Standards of Vocational Qualifications, co-financed by ESF. During phase one (2006 – 2008) five standards were developed while during phase two (2007-2013) a further 72 new standards are being developed.

Denmark

In Denmark labour market research and skills forecasts are extensively used to direct individuals to education and training and inform various aspects of education and training delivery. A holistic approach is adopted underpinned by continuous improvement in VET programmes linked to labour market needs. Trade committees submit their recommendations to improve VET curricula, though practices vary between the different trade committees and across regions.

Key elements include:

- Trade committees and the national Councils for Initial Vocational Education and Training (*Rådet for Erhvervsfaglige Uddannelser – REU*) and for Adult Vocational Education and Training (*Rådet for Erhvervsfaglige Voksen og Efteruddannelse - REVE*) are responsible for updating VET programmes and ensuring that they reflect the skill and competence needs of the labour market at the national level.
- At the regional/local level local training committees, comprising representatives from vocational colleges, social partners and local employers are able to influence VET programmes so that they are specifically adapted to meet the skills needs of local business.

As part of the VET modernization agenda, the Ministry of Education has put forward the proposal for centralising VET analysis and forecasting to ensure that a form of 'early warning' is built into the system concerning new skills demands, changing labour market conditions and new occupational profiles. Since 2008, VET analysis and forecasting has been the responsibility of 'central analysis and prognosis unit' (*central analyse- og prognosevirksomhed*) in the Ministry of Education.

The Danish approach is one of the proposed case studies.

Finland

Since joining the EU, Finland has had a longstanding tradition of labour market research and forecasting that has continued to develop over time. The results from the various projects are used to inform curricula development, qualifications and qualification frameworks.

National education and training committees established in 2007 tasked with evaluating, anticipating and analyzing the development of labour market skills needs and make recommendations concerning curricula and qualification design.

The Finnish methods have been shared at the European Level through the Mutual Learning Programme at events in 2006 on Finland's long term forecasting model¹²¹ and 2010 on the ageing population and educational choices, which focused on the VATTAGE model, a general equilibrium model which is being used to inform education planning at the national and regional levels.¹²²

Finland's population is ageing more rapidly than many of its EU counterparts. In the absence of significant immigration, dependency ratios are set to increase significantly and demand for health and social care services is set to rise, even when taking into account the higher number of years of healthy life expectancy. The first projection from the VATTAGE model carried out in spring 2010 indicated that Finland is moving further towards a service sector economy and predicts an additional requirement of 120,000 workers in the health and social care sector by 2025.

¹²¹ http://www.mutual-learning-employment.net/index.php?mact=PeerReviews,cntnt01,detail,0&cntnt01options=10&cntnt01orderby=start_date%20DESC&cntnt01returnid=59&cntnt01item_id=16&cntnt01returnid=59 – checked 28.03.11

¹²² http://www.mutual-learning-employment.net/index.php?mact=PeerReviews,cntnt01,detail,0&cntnt01options=10&cntnt01orderby=start_date%20DESC&cntnt01returnid=59&cntnt01item_id=82&cntnt01returnid=59 – checked 28.03.11

Germany

A number of different research activities contribute to skills anticipation in Germany since the systematic recording and research of the development of future skills needs in Germany was initiated in 1999 through the resolutions passed by the Alliance for Jobs, Training and Competitiveness (*Bündnis für Arbeit, Ausbildung und Wettbewerbsfähigkeit*), and implemented through the initiative for the early identification of skills needs launched by the Federal Ministry of Education and Research (*BMBF*).

A network for the Early Identification of Skills Needs (*FreQueNz*, www.frequenz.net/) was established by BMBF, comprising research institutions, and education organisations, the Federal Institute for Vocational Education and Training (*BIBB*), the German Confederation of Trade Unions (*DGB*) and the German Employers' Organisation for Vocational Training (*KWB*).

The research focus is qualification development. It focuses on changes in existing fields of work and the emergence of new fields, and the implications for changing or new qualification requirements.

In monitoring new skills, BIBB conducts the following activities:

- **Occupational and qualifications projects** – BIBB and the Institute of Employment Research collaborate to produce labour market projections.
- **Employer surveys** - to build up a comprehensive picture of technological and organisational developments and the associated skills requirements. Regular panel survey – the Reference Company System (Referenz-Betriebs-System, RBS).
- **Job advertisement analyses** – provides information on the demand for skilled workers in the job market and the qualification profiles desired by companies.
- **Surveys of advertisers** are conducted to find out whether the advertised vacancies were filled or if not, why not.
- **Surveys of guidance staff** to generate expertise on in-company strategies for change and skills development.
- **Representative surveys of people in employment** to understand their perceptions of expertise requirements, job profiles, working conditions and continuing education and training needs.
- **Regular surveys of continuing education providers** to collect data on the implementation, reception and any modifications of courses offered, as well as experiences and assessments of trends among training institutions.
- The Prize for Innovation in Continuing Education and Training (WIP) – an initiative to seek out innovative approaches to continuing education and to set the tone for new developments and a contemporary style of VET.
- **Structural and longitudinal studies of the continuing vocational education and training courses listed** which provides information on changes and trends in CVET provision.

Cooperation between the social partners and the government is a core element of the German VET system, hence their involvement in FreQueNz provides a bridge to research to inform qualifications development. Typically the initiative for updating the occupational profiles of a training occupation or for developing an entirely new occupations come from trade associations, employers' associations, trade unions or BIBB.

Ireland

A number of different studies have been prepared in Ireland that anticipate future skills needs. In 2007 a longer term forecast (to 2020) that included expansion and replacement demand was prepared by the Economic and Social Research Institute (ESRI) for the Expert Group on Future Skills Needs (EGFSN) to inform the development of a national skills strategy. EGFSN brings together representatives from government, the private sector and education and training providers, including careers guidance.

Since the longer term forecast, EGFSN has prepared a number of different types of research reports examining sectoral skills requirements and research on labour supply, including the following¹²³:

- The Future Skills and Research Needs of the International Financial Services Industry (December 2007)
- A review of the employment and skills needs of the construction industry in Ireland (2008)
- Monitoring Ireland's Skills Supply: Trends in Education / Training Outputs (2008, 2009, 2010)
- Future requirements for high-level ICT skills in the ICT sector (2008)
- Future skills needs of the Irish Medical Devices sector (2008)
- Future Skills requirements in the food and beverages sector (2009)
- Skills in Creativity, design and innovation (2009)
- Future Skills Needs of enterprises in the Green Economy in Ireland (2010)
- Future Skills Requirements of the Biopharma-Pharmaceutical Sector (2010)
- Future Skills Needs of the Wholesale and Retail Sector (2010).

In 2010 FÁS, the Irish Training and Employment Authority and ESRI (the Economic and Social Research Institute) launched occupational employment forecasts to 2015.¹²⁴ This report is the thirteenth report in the Irish occupational forecasting series, established in 1991.

Netherlands

The Research Centre for Education and the Labour Market (ROA), a research institute at the University of Maastricht specialises in labour market forecasting and skills anticipation. The forecasts aim to increase transparency between the match between education and the labour market. The most recent forecast available, conducted in 2009 is for 2014. The forecast is complemented by a series of other research reports examining different aspects of education performance and labour market needs.¹²⁵

The association of Knowledge Centres for VET and Trade and Industry (*Colo*) active in upper secondary VET – works with ROA to make better use of the available data. The 17 branch-specific Knowledge Centres publish their sector's education and labour market research results, making use of ROA information and other resources. The research outputs contain information on the labour market by sector or branch including demand for qualified personnel and the expected availability of places in companies for practical training, as well as qualitative developments related to changing and new employment. Educational institutions are subsequently responsible for attuning their provision of education at regional level. The regional training centres sometimes carry out their own market research to gain insight into expected needs for qualified employees at regional level.

UK

Much was written about the UK in the 2008 NSNJ Staff Working Document. The UK system for skills anticipation and forecasting is a well developed and long established that is currently coordinated by the UK Commission for Employment and Skills (UKCES). UKCES works across the four nations.

The main labour market analysis projects UKCES coordinates include the following:

- Ambition 2020: World Class Skills and Jobs – which provides an assessment of progress concerning skills development
- National Employer Skills Survey (most recent 2009)
- Employer Perspectives Survey (most recent 2010, with the 2011 survey underway)
- Working Futures 2010 – 2020, the latest projection, which is currently underway, with reporting expected in July 2011.

¹²³ Publications can be accessed through the following link: <http://www.skillsireland.ie/publications/> - checked 28.03.11

¹²⁴ <http://www.fas.ie/NR/rdonlyres/FDBB3580-C466-4002-8EE7-C289E9E8BAB2/999/OccupationalEmploymentForecastsMarch2010.pdf> - checked 28.03.11

¹²⁵ Various research reports available from <http://www.roa.unimaas.nl/> - checked 28.03.11 (please note the link provided opens onto the ROA homepage, click on ROA reports to access different publications)

Twenty three Sector Skills Councils exist covering over 90 per cent of the economy. Sector skills councils conduct research on identifying current and future skills needs, developing skills and training solutions, setting occupational standards and shaping the future development of qualifications.

Approaches to anticipating skills needs across European countries

Country	Approaches adopted
AT	The system is well-developed and incorporates several elements: qualification barometer for the comprehensive and continuing monitoring of skill demand with an on-line information system, macro-level medium-term forecasts, accreditation system for universities of applied sciences, networking of researchers in public employment services, and employer skills surveys.
BE	The Public Employment Service (VDAB — Be NL) and FOREM (Be FR) conducts an annual analysis of hard-to-fill vacancies. Research conducted by social partners to identify occupational profiles started in 1997, though it is unclear whether this process continues or has been completed. Research on vulnerable groups on the labour market since 2008. Professional and qualification profiles developed.
BG	Inter-agency working group established for the development of a national research and forecasting system. System expected to provide national and regional forecasts. HRD operational programme funding being used to establish a labour market information system.
CY	Long-established system of macro-economic medium- to long-term forecasts by sector and occupation, complemented by short-term forecasts and annual surveys of skill needs among employers in collaboration with social partners. 2010 project providing employment forecasts for green skills 2010-2013.
CZ	The Czech Republic has started actively developing a system for the anticipation of skill needs during the last decade. It is based on medium-term, macro-level quantitative forecasting which incorporates some qualitative elements of sectoral projections. In parallel, qualitative sectoral surveys covering several selected sectors are now planned to be linked to a more permanent system of sector councils. Although there is no developed system as yet, a number of efforts at national, regional and sector levels aim for a more systematic approach. Research also completed on the situation of graduates in the labour market.
DE	Well-developed system based on mutual sharing of research activities and experiences by networking (FreQueNz). The system includes surveys (employers, advertisers, guidance staff, employees, education and training providers) qualitative research into sectors, branches, occupations, econometric forecasting and qualification standards research.
DK	The system is based on the involvement of social partners in funding and in direct research collaboration, mostly at trade and local levels. Employment and education forecasts conducted by the Economic Council of the Labour Movement and the Danish Institute of Governmental Research are feeding into the policy debate on future imbalances between the supply and demand for labour. As part of the modernising VET agenda VET analysis and forecasting has been centralised by the Ministry of Education to ensure that new skills demands, changing labour market conditions and new occupational profiles are detected early. Thirteen newly established adult and continuing education and training centres have the identification and integration of skills needs as one of their five core functions.

EE	The country has started actively developing a system for the anticipation of skill needs during the last decade. It is based on medium-term, macro-level quantitative forecasting which incorporates some qualitative elements of sectoral projections and expansion and replacement demand. In parallel, qualitative sectoral surveys cover several selected sectors. Although there is no developed system yet, a number of efforts are aiming for a more systematic approach.
ES	Anticipation of skill needs through work on the development and updating of vocational qualifications, sector studies, permanent observatory of occupations, and the network of observatories of the labour market
FI	The system is well-developed. Quantitative forecasting is a major building block of the system, although some qualitative elements are built into the forecasts, and qualitative surveys and focus groups are conducted in parallel. Current forecast concerns skills needs in 2025. The new VATTAGE model (a general equilibrium model) is being used to explore sectoral skills needs. Also regular surveys by the Confederation of Finnish Industries on labour force skills needs. Partnership and cooperation are important elements of the system. One product is an electronic information bank.
FR	A long-established system for the anticipation of skill needs based on macro-level medium-term forecasts, sectoral studies, regional surveys and employer skills surveys. Active involvement of social partners and regional actors.
GR	The system has started developing only recently. It is based on local partnerships, alumni surveys and other transition-to-work research. Some econometric forecasting and other quantitative and qualitative surveys are under development.
HR	New forecasting models are being introduced through the guidelines for human resource development and the Education Sector Development Plan 2005-2010.
HU	Regular short-term labour market projections by the PES, based on employer surveys. Mid and long term forecasts also prepared. 2008 research on workforce structure and systematic collection of data on job search among school leavers. No systematic anticipation of skill needs yet, but a number of efforts to incorporate continuous monitoring of skill needs into the VET system.
IE	Well-established system based on a combination of sector studies, general labour market and employment trends analysis, and medium- to long-term employment demand forecasting by occupational categories. Twenty year forecast issued in 2007, which has been used by the Expert Group on Future Skills Needs as a basis for various sectoral studies and trends in education and training outputs. Thirteenth medium term forecast issued in 2010.
IS	Occupational Councils are responsible for providing advice on skill needs, and work with the Ministry of Education, Science and Culture to identify and develop the proposed education and training response. Skills demands based on interviews with employers and employees, scenarios used to frame trends and different perspectives.

IT	The system is based on sector and regional studies, hiring surveys and short- and medium-term econometric forecasting by sector and occupation. Since establishment in 2007 the Single National Board for implementing a system of minimum professional standard for professions (<i>Tavolo Unico nazionale</i>) has commissioned a number of sectoral studies including ones concerning engineering, tourism, textile-clothing, chemical and food industry. These studies have been used to inform occupational standards. 2010 study on short term skills needs conducted by the Ministry of Labour in conjunction with the Regions, Autonomous Provinces and social partners. The survey examines skills needs territorially and by sector.
LT	Anticipation of skill needs through sector studies and development of qualification standards and forecasts based on available statistical indicators and employer surveys. No developed system of skill needs anticipation yet, though work has recently been carried out on the development and application of medium-term (5-year) forecasting methodology for skills/qualifications demand on the labour market, with reporting scheduled during 2008.
LV	Responsibility for medium and long term forecasts rests with the Ministry of Economics and the State Employment Agency. In 2009 the Ministry of Economics prepared a report on the medium term labour demand while the State Employment Agency produces twice yearly short term labour market forecasts, complemented by employer surveys to clarify the results. Further research with sectoral organisations in 2010 to ascertain skills needs.
LU	A Permanent Committee of Labour and Employment has been established by the Ministry of Labour and met for the first time in June 2008. The Committee is to examine employment, unemployment, working conditions and the security / health of workers. Regular employer surveys conducted in the banking sector to anticipate short-term skills requirements. .
MT	Short-term labour demand forecasting based on an employer survey was conducted by the Public Employment Service, but this survey has been discontinued. A scoping study on the demand and supply of IT skills was conducted in 2007, while the Central Bank of Malta conducts a regular business perception survey.
NL	Very well-developed and long-established system with multi-source funding and strong involvement of social partners, quantitative and qualitative information, very detailed results to support decision-making as well as to provide guidance for individuals.
NO	Statistics Norway produces macroeconomic labour supply and demand projections (current projections to 2025), while the Norwegian Labour and Welfare Organisation conducts a short-term (annual) analysis of labour market needs. For the health sector Statistics Norway uses a tool for forecasting employment needs (HELSEMOD) – the most recent forecasts were conducted in 2009, concerning labour demand to 2030.
PL	The country has scaled down the interdepartmental efforts of the last decade to develop a system of labour-market skills demand forecasting. Planning to develop a new system is in place as well as efforts to establish a more holistic approach to achieve more robust and reliable results. Poland has applied an interesting method for the observation of trends and changes in skills demand in old Member States.

PT	Sectoral analyses linked to the development of professional profiles and qualification standards
RO	In 2008, the National Reform Programme presented measures to anticipate skills needs, which included the development of tools and methodologies for analysing and anticipating changes in the labour market; anticipating/forecasting the need for vocational education and training and skills in seven out of the eight Development Regions of Romania; and forecasting the demand for skills and national level. As well development work underway to elaborate occupational profiles for 150 occupations.
SK	No developed system of skill needs anticipation yet. There is awareness of the need for such system as well as planning to develop it, but there are indications of a lack of available expertise. Promising development at sectoral and regional levels.
SI	No developed system of skill needs anticipation yet, though SYSDM data mention an annual medium-term forecast prepared by the Institute of Macroeconomic Analysis and Development. Skill needs analysis is performed for the development of occupational standards, including a few sectoral analyses. The systematic development of the anticipation of skill needs in the Podravje region is promising, with suggestions and attempts to disseminate the good practice to other territories.
SE	Wealth of high quality data (and a long-established system of forecasting) with several complementary long-, medium- and short-term forecasts, a system of sectoral studies, regular questionnaire-based skills surveys among employers, and regular regional surveys on employment (past and planned).
TR	The Turkish Statistical Office conducts a monthly labour force survey to ascertain short-term skill needs. The public employment service (PES) collects and collates redundancy data. The PES has plans to analyse these data in the near future. A joint project between the University of Ankara and the PES is developing a jobs inventory to examine employers' skill needs: results are anticipated in the near future.
UK	Very well-developed and long-established system (although still under further development and change) based on several pillars and currently coordinated through 'Ambition 2020: World Class Skills and Jobs': - Well-coordinated sectoral and regional research into skill needs identification through the UK Commission for Employment and Skills and a network of 23 Sector Skills Councils; - Medium- to long-term sophisticated forecasting to provide the necessary level of detail at sectoral and regional level as well as implications for qualifications; - Regular employer skills surveys at national and regional level (most recent surveys include the National Employers Skills Survey and the 2010 employer perception survey). UKCES works across the four nations.

Source: NSNJ Staff Working Document, updated using skillsnet research, EEO outputs, and other national sources.