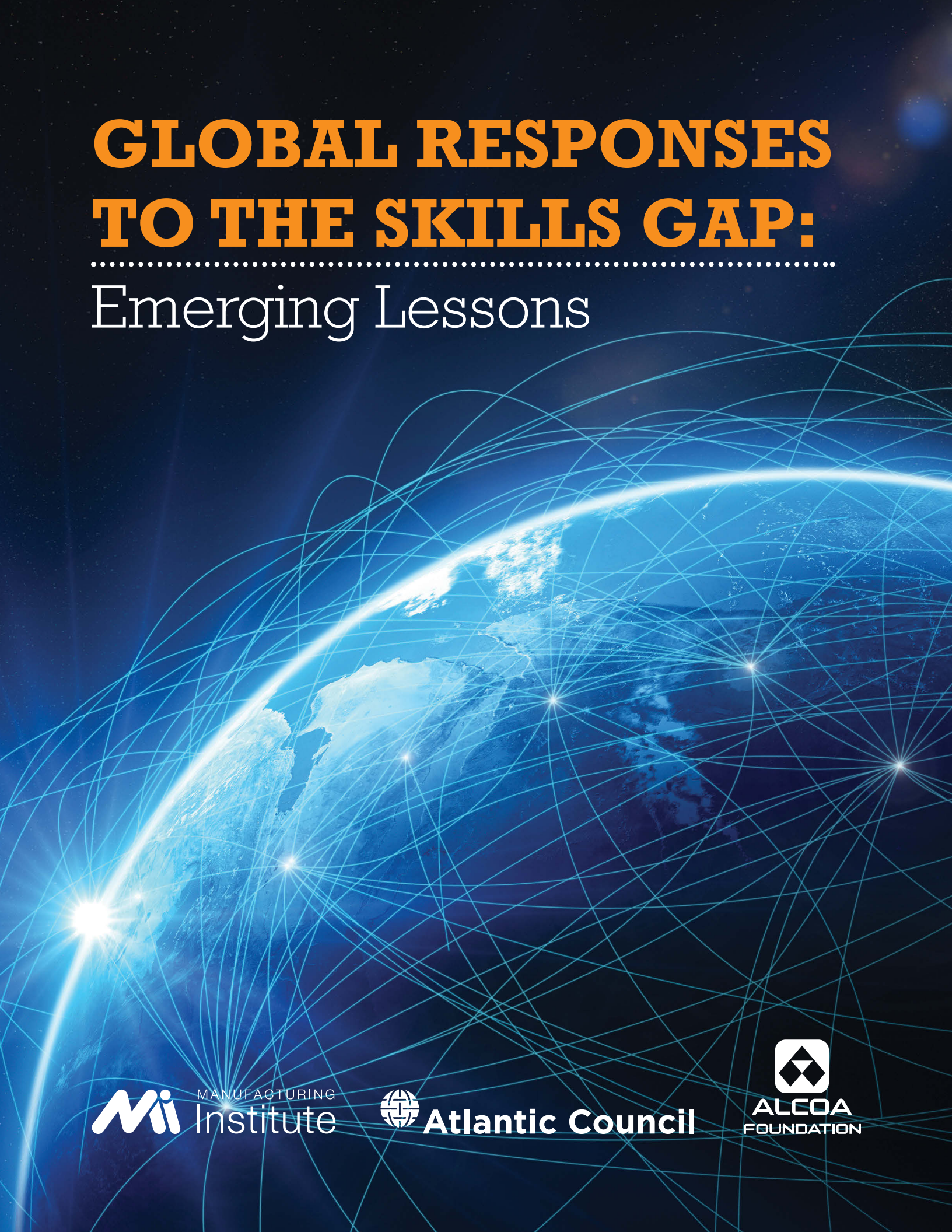
GLOBAL RESPONSES TO THE SKILLS GAP:

Emerging Lessons



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This report was written with support from Alexei Monsarrat, Nonresident Senior Fellow, Global Business & Economics Program at the Atlantic Council. The Atlantic Council is a nonpartisan organization that promotes constructive US leadership and engagement in international affairs based on the central role of the Atlantic community in meeting today's global challenges.

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In November 2012 the Manufacturing Institute, Alcoa Foundation, and Deloitte hosted *Talent-Driven Innovation: A Global Symposium on Best Practices for Growth,* This global symposium brought together top thinkers and practitioners from around the world to gather best practices in manufacturing skills training. The day-long session focused in particular on how the private sector can work together with governments, and schools to help build a world-class manufacturing workforce.

A critical outcome of the *Global Symposium* was the call to collect best practices to inform business leaders, policymakers, and educators about what has been tried and what works. This paper is an initial effort to gather those lessons, focusing on what has been done in Europe, as well as in South Korea and Mexico. It looks primarily at the evolution of government programs over the last several years, with special focus on the trends in how businesses and government are increasingly working together.

The challenge of comparison

The first thing to acknowledge when trying to draw cross-national lessons, is that it is difficult to make direct comparisons across countries: each country has unique social, political, and economic dynamics that come together to form its particular skills development system. Finland, for example, is highly successful, but is also a small, homogenous country with an open economy and a history of strong social safety nets.

There is also a serious lack of data on whether programs have been successful, which is true worldwide. There are a number of efforts underway to address this issue[1] but there is still a long way to go before policymakers and even businesses have verified information on the success of their programs. As a recent report by the Atlantic Council notes, "There is a major gap in what we know about who is engaged in training, how much and what type is underway, and how much is being spent." The report recommends the formation of a national commission to address this issue.[2]

Still, there are some common emerging elements across a number of countries, some of which are catching on in systems that are quite different from each other. We group these under the challenges put forward by the *Global Symposium*.

1. For example, the European Commission established the European Centre for the Development of Vocational Training (CEDEFOP) in 1975 to help gather, analyze, and disseminate training information to Member States.
2. http://www.atlanticcouncil.org/publications/reports/training-our-future-skilled-workers-and-the-revival-of-american-manufacturing.

Baseline performance

It is important to note that a crucial part of the relationship between government and business lies in basic education. It has historically been the role of government to provide students with the basic tools they need to become effective employees – reading, writing, basic math, communication skills, and some basic familiarity with the world of work. Companies then take on the role of training these educated workers for their specific jobs.

A recent OECD study, however, draws some troubling conclusions about whether this is happening. The Survey of Adult Skills[3] evaluated adult skills adults in literacy, numeracy, and problem solving in a technology rich environment from 24 countries.[4] Several findings are of particular note for this discussion:

- **Some schools are not preparing students for the workforce:** In Italy and Spain, 5 percent of adults tested at the highest literacy level, and nearly 30 percent perform at or below the lowest level in literacy and numeracy. Moreover, US, Italian, and Spanish recent college graduates perform well below high school graduates in Japan and the Netherlands.[5]

- **The talent stock is declining in several major economies:** England and Northern Ireland are about average in literacy when comparing 55-65 year-olds, but when looking at 16-24 year-olds they are almost at the bottom in literacy among all 24 participating countries. This trend is also true of the United States in the numeracy category. By contrast, in Korea, adults 55-65 are some of lowest skilled in the survey, but the country's 16-24 year-olds are second only to Japan's (across literacy, numeracy, and problem solving). This problem will only worsen as manufacturing jobs require ever more skills.

- **Access to lifelong learning for adults is essential:** Providing a system of lifelong learning – in the formal education system and on the job – is critical to maintaining a skilled workforce. This means businesses should continue to train their own workers, and government policy should make sure high quality training is available and affordable.

- **Destabilizing income gaps rise as skill levels fall:** Compared to the low skilled, people with high skills are almost three times more likely to have high wages. A better living means that high skilled people participate far more in civic duties like volunteer work and the political process, and are twice as likely to be in good health.[6]

3. Also called the Programme for the Assessment of Adult Competencies (PIAAC): http://www.oecd.org/site/piaac/.
4. Australia, Austria, Canada, Cyprus, the Czech Republic, Denmark, England, Estonia, Finland, Flanders, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, Norway, Northern Ireland, Poland, the Russian Federation, the Slovak Republic, Spain, Sweden and the United States.
5. PIAAC p33.
6. PIAAC p27.

All these factors then have serious implications for countries' future competitiveness. It is in no way surprising that the study confirms "per capita incomes are higher in countries with larger proportions of adults who reach the highest levels of literacy or numeracy proficiency." This means the United States has work to do if it wants to maintain competitiveness in manufacturing.

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The good news is that countries can take action to deal with these issues. As the study makes clear, "the information-processing skills measured by the Survey of Adult Skills are "learnable." That is, countries can shape the level and distribution of these skills in their populations through the quality and equity of learning opportunities both in formal educational institutions and in the workplace."

The challenges are in knowing what action to take, how to structure a training system so that it responds quickly to industry needs, and who pays for it. Experts at the *Global Symposium* identified a number of key takeaways that can help answer these questions. We augment these with successful examples from Europe and Asia, where we see three common trends in skills training.

EU decision-making

There are four components to Europe's basic decision-making structure.

1. **European Council:** Comprising leaders from of all 28 EU Member States, the president of the European Council (currently Herman von Rumpoy, appointed by Council members), and the president of the European Commission (currently Jose Manuel Barroso, nominated by Member States and elected by the European Parliament). This group sets very broad policy goals, such as deeper economic and political integration, and the free movement of people.

2. **The Council:** Comprising one minister from each Member State (membership shifts according to the topic of the meeting) who is granted authority to make commitments on behalf of his government. This group adopts legislation, signs treaties on behalf of the EU, manages the EU's common foreign policy, coordinated Member State implementation of EU policies, and approves the EU budget.

3. **European Commission:** Akin to the executive branch of a national government, the Commission implements policies and programs, develops legislative proposals, and handles the day-to-day running the EU. There are 27 Commissions (so that each member state can lead one commission), though not all are of equal importance.

4. **European Parliament:** The European Parliament is a 766-member body made up of representatives elected by Member States (allocated based on population). It shares legislative power with the Council, has oversight authority over the Commission, and shares EU budget authority.

The decision-making and policy formulation process between these countries is complex, and can vary from issue to issue. In general, all the bodies except the Parliament prefer to operate by consensus. This means that staffs hash out issues at length before they come up for a decision.

Overall, the EU and its institutions have real authority over a relatively small but slowly expanding range of issues. Their principal competence is to coordinate trade policy for Europe's single market, and as of 2009, they also coordinate a common foreign policy (though Member States retain their own individual policies as well). The EU does play an important role in helping coordinate policies across Europe, even if it lacks binding authority to enforce them.

The Workings of Europe

The European system can confuse even long-time experts, so Appendix 1 provides an overview of the EU-level training programs, which, as in the United States, are scattered across a number of institutions. While this is not a complete picture of the system, it will provide a working understanding of its major features.

There are also a few commonalities across Europe that have direct bearing on US challenges. These include:

- **Standards-based systems:** With a few exceptions – mostly in Eastern Europe – all EU countries have qualifications frameworks and standards that are better coordinated and clearer than the United States. According to the European Center for the Development of Vocational Training (CEDEFOP), the majority of EU countries already have national qualification frameworks already in place. This is not to confuse the presence of a framework with its effectiveness, but overall Europe excels in this area.

- **Institutionalized employer engagement:** Companies and/or their associations are usually a formal part of developing standards, qualifications, and curricula, alongside government policymakers and unions. This is especially true in "dual system" apprenticeships, where companies are an integral part of the actual training. As noted below, countries that do less well on this are working to improve.

- **A policy of industrialization:** The European Commission has set a goal that industry's share of value added to the economy will increase from 16 percent to 20 percent by 2020. While this may not be achievable, it clearly sets a political agenda favorable to manufacturing over the next seven years.

These trends are not as evident in developing countries like Mexico and India, or in emerging economies like Korea. Instead, these governments are focused on more basic issues of how to turn heavily government-controlled and social welfare-focused systems and modernize them for skills delivery. In that sense they are much more like the United States.

Alcoa Foundation announced a **$1.25 million internship program for 500 students** in eight countries over the next two years.

The goal of the program is to provide unemployed youth with the experience to start a career in manufacturing.

The program is a grassroots initiative involving manufacturing companies and will be managed by the Institute of International Education.

CHALLENGE 1: MANAGING DEMOGRAPHICS

The *Global Symposium* began with a discussion of the forces driving change in today's workforce. Primary among these is demographics. In Europe, the United States, and some Asian countries, workforces are quickly aging. According to the US Department of Labor, the share of 45-59 year-olds in the workforce will rise 6.2 percent from 1995 to 2030 across all OECD countries.[7] Europe is especially vulnerable to an aging workforce. In 2010, more workers exited the labor force than entered for the first time, and its labor gap – the difference between those entering and leaving work – will rise to 8.3 million people by 2030.[8] The global economic crisis could increase this number as older people continue to work longer in order to replace lost savings.

It is therefore critical to keep the adult working population skilled and engaged in ongoing training. The PIAAC study makes this a central recommendation, calling for countries to "provide high-quality initial education and lifelong learning opportunities" and to "make lifelong learning opportunities accessible to all."[9] Finland stands out for its work in this area, in particular for its adult VET system. It has a high participation rate in adult education[10] and scored at the top of the PIAAC rankings in adult skills. Its success reflects its national policy to extend the careers of its senior workers,[11] and lies in five attributes:

1. **Available to everyone:** The system is designed to accommodate anyone who wants to use it, regardless of employment status, education level, or income.

2. **Clear qualifications, linked to the world of work:** Finland's qualifications system is efficient and well administered. The Finnish National Board of Education (NBE) is solely responsible for setting qualification standards in primary, secondary, and adult education (including VET), which are based on legislation developed by the Ministry of Education and Culture. The NBE develops the qualification requirements in co-operation with employers, employees, and the educational sector, meaning that qualifications are consistent and in demand.[12]

3. **Lowering the participation threshold:** The government of Finland (GOF) has taken a number of steps over the last 20 years to make it easier for adults to use the adult education system, including:

    a. Improving skill recognition: adults can take competency tests to either immediately acquire a credential, or gain credit toward one, shortening study time and lowering costs (in time and tuition fees);

7. http://www.dol.gov/oasam/programs/history/herman/reports/futurework/conference/trends/trendsi.htm.
8. http://www.ey.com/GL/en/Issues/Business-environment/Six-global-trends-shaping-the-business-world---Demographic-shifts-transform-the-global-workforce.
9. PIAAC p 32.
10. Finland ranks at the top in the EU for its adult participation rate: 23 percent of Finns aged 25-64 have utilized the adult education system: https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Finland:Adult_Education_and_Training.
11. Country Report on the Action Plan on Adult Learning: Finland. p3.
12. Finland – VET in Europe Country Report, p 27.

b. Making coursework flexible and plentiful: All schools (e.g., high schools, universities, and polytechnics) offer adult education, all of which teach the same qualifications. At the upper secondary level in VET training, for example, courses are modular, and follow an individual study plan that allows for customization.[13]

c. Giving providers wider latitude: There are over 800 adult education providers in Finland,[14] 173 of which are VET providers.[15] Finland is shifting to an outcomes-based system of credentials, rather than requiring certain inputs (e.g., courses or methods). This decentralizes control over instruction, which allows courses to be tailored for local conditions/employers even as they maintain a consistent standard.

4. **Quality assurance:** Adult students in Finland know they are getting a good education. This is borne out by their PIAAC performance, and by the steps the GOF has taken over the last 10 years to improve quality assurance. This includes a range of new mandates for VET providers to ensure quality, which are monitored by groups that comprise government, business, and students.[16]

5. **Innovative leave policies matched with funding:** The GOF offers a period of unpaid "study leave" to adults who are on the job and want to upgrade their skills. While there are limits (e.g., leave cannot exceed two years and employees must have worked at the same job for at least one year), the government pays for the majority of the training costs and the employer must maintain the employee's job. To provide for living expenses, the government offers an "adult training allowance" to employees on the job for eight years (equal to an unemployment check) and merit-based scholarships.

In some ways Finland is lucky. Lacking major natural resources, its main competitive advantage has always been its people. Its society therefore places high value on education, and lifelong learning is an important part of many peoples' lives. While other countries cannot replicate these qualities, the policy efforts and principals embedded in Finland's approach are adaptable.

13. Finland – VET in Europe Country Report, p18.
14. http://www.minedu.fi/OPM/Koulutus/aikuiskoulutus_ja_vapaa_sivistystyoe/?lang=en.
15. As of 2011: Finland – VET in Europe Country Report, p20.
16. Country Report on the Action Plan on Adult Learning – Finland, p13.

As Thomas Friedman noted earlier this year, we live "at a time when there is increasingly no such thing as a high-wage, middle-skilled job…Now there is only a high-wage, high-skilled job.

CHALLENGE 2: BUILDING FLEXIBLE SKILLS

The nature of work is changing along with the global economy, and the *Global Symposium* drew attention to the need for a workforce with "cross market/cross-technology" skills to compete in this evolving environment. As Thomas Friedman noted earlier this year, we live "at a time when there is increasingly no such thing as a high-wage, middle-skilled job…Now there is only a high-wage, high-skilled job."[17] This means that even as workers need new skills to stay competitive, they also need flexibility and versatility in how they apply them.

Even as late as the 1990s this notion might not have applied as much to manufacturing, but those days are gone. Manufacturing is now deeply integrated process with jobs that require understanding of product innovation, design, and fabrication, as well as how to operate any given machine. Ralf Atzor, vice president of engineering and manufacturing for Blum USA, estimates that employees need four years on the job with training to know their job well enough and have the experience to be both skilled *and* flexible.

The UK government has taken this message to heart. In 2012 the UK asked Doug Richard, a California entrepreneur who, among other things, created the TV show *Dragon's Den*, to review the UK's apprenticeship system. The resultant report (dubbed *The Richard Review*) starts by noting, "In a dynamic and changing economy, people need to be ready and able to apply their skills in new jobs and sectors. So while we must ensure that apprenticeships are training people for real and specific skilled occupations, we must also ensure that an apprenticeship is broad enough to equip someone with genuinely transferable skills: skills which they will need and use in any job, and skills which enable them to be competent and confident beyond the confines of their current job..."[18]

17. http://www.nytimes.com/2013/03/31/opinion/sunday/friedman-need-a-job-invent-it.html
18. The Richard Review p4

The British government will implement all of the report's recommendations, many of which are designed to create a competent and flexible workforce, including:

- Creating new industry standards that define what every apprentice must know by the end of their apprenticeship.

- Inviting business to compete in the design of apprenticeship qualifications that should ensure apprentices can do specific tasks, but also that they are "qualified to do the job well in a range of situations and across different companies within the sector."

- Designing tests that will prove that apprentices can apply what they know to real work situations i.e., that they are problem solvers as well as functionally capable.

Private companies are also looking for creative ways to develop more flexible employees as they work to grow their operations. Hoerbiger is an Austria-based, global compression, automotive, and driver technology company with operations in over 50 countries. In the United States, it has designed a new management training program in partnership with Caltech that will offer 40 hours of advanced training over two years to develop higher level operations managers.

Hoerbiger's goal is to build its next generation of managers and senior leadership. It is seeking to fill these positions by building the skills of existing workers, in part because it cannot find the people it needs on the market. The company also identified three other factors driving it to design a tailored program, all of which point to the importance of flexible skill sets:

- Fewer people with comprehensive operations and supply chain talent are available and are in greater demand;

- Need people with aligned global perspectives who have breadth and depth; and

- Need people in operations and supply chain roles who possess unparalleled critical thinking skills.[19]

Hoerbiger will send 17 of its top engineers between the ages of 25-35 into the training course, with the goal of building its top managerial talent for the next 10 years. The program mixes in-class lectures with web-based instruction that leads to a Comprehensive Manufacturing Operations Management Certificate. It also builds in web-based "office hours" with instructors so that students can ask questions and receive extra help.

19. Hoerbiger presentation to CalTech, slide 10.

CHALLENGE 3: EXPANDING WORK-BASED LEARNING

There has been strong renewed interest from policymakers and companies in better using apprenticeships and other on-the-job training to meet immediate skills needs, as well as better prepare youth for future careers. Apprenticeships, in particular, are increasingly popular. This is driven partly by companies based in countries that heavily use them seeking to replicate their home models in new markets, and partly by government policymakers looking for new ways to build skills. The *Global Symposium* agreed this is a positive trend, though was skeptical whether the model can be adapted to the United States.

It is useful, then, to look at the experiences of firms and governments to see what they have learned. Apprenticeships are uniquely challenging to replicate, since they generally require preconditions, including:

- An education system that feeds into apprenticeships by preparing students academically and by promoting the idea that apprenticeships lead to good careers.
- A clear set of qualifications that will lead to a defined occupation.
- Demand from businesses, in the form of open jobs, co-financing of instruction, and engagement with the education system to ensure schools are teaching applicable skills.
- A geographic sectoral cluster can be important to provide scale, especially for industries that lack a single, dominant company.

Every country that uses apprenticeships struggles with one or all of these elements listed above. Even European countries that have much longer experience with the model concede that too many students still see apprenticeships (and the VET system generally) as a second-best option. The United States is far behind even these countries, where students view a career in manufacturing as an outright failure to have achieved anything better.

Germany, Austria, and Switzerland are the prime examples of how to build a strong apprenticeship system. Notably, all of these countries operate on a “dual system” in which apprentices divide their time between the classroom and the shop floor (the split varies by apprenticeship but is generally at least 50 percent classroom time). Apprentices receive a reduced wage for their time at work. The government generally pays for the in-class portion, either through direct support to schools, tuition support to students, or both. Companies pay the in firm portion, including materials, staff time, and apprentice compensation.

At the end of this process apprentices receive a qualification, and can either try to continue to higher levels in the VET system (generally through exams) or go straight into a job (which in many cases will be with the firm for which they apprenticed, though this depends on performance and the contractual arrangement between the student and the company). General education (also known as compulsory) secondary schools are designed to feed into this system.

This system has been very successful for the core countries that have used it – some of them for centuries – and there is increasing interest in finding ways to adapt the dual model to other countries (see below for a full discussion). At the same time, however, even as countries without apprenticeship systems look for ways to expand their use, those with them are making changes in two key areas: first, companies are demanding ever higher skills and tightening apprentice wages. This is in response to the same forces that are driving overall changes to the nature of work.

Second, partly in response to falling apprenticeship wages and due to the falling reputation of manufacturing overall, students want more options to transition out of apprenticeships and into the higher education system. Austria, for example, has developed a pilot program that can qualify apprentices as skilled workers, giving them a "general entry ticket" into the higher education system at the same time. This is designed to ease the financial and time constraints on moving from apprenticeship to university, and to make apprenticeship more attractive. Participation is modest, but more than tripled between the pilot launch in 2008 and 2010, and has since then risen again by 30 percent.[20]

Making sure that apprenticeships respond to employer and apprentice needs, and are run efficiently is difficult. As UK apprenticeship expert Hilary Steedman noted of the British system in 2011, "Government agencies and private providers have been used to design apprenticeship programmes and procure places, and a substantial proportion of government funding for apprenticeship training is swallowed up by the processes required to account for it. This model deters employers and stifles the growth of apprenticeships."

The UK will address this problem by handing over substantial control of the process to the private sector. Beginning with standards setting, the government has brought together a group of "Trailblazers," firms that will receive financing to help develop new apprenticeship standards and qualifications that apply directly to the business community.[21] The revisions will vastly simplify standards that the government produces, leaving much more discretion for companies to choose how they meet the qualifications. This will help smaller companies, which might be overwhelmed by a 75 page standard with detailed proscriptions for meeting an apprenticeship qualification, to feel more confident in taking on an apprentice.

SKILLS CERTIFICATION SYSTEM

In 2013, The Manufacturing Institute launched the Skills Certification System Toolkit.

Designed with small, medium, and large manufacturers,

the Skills Certification System is built off of 10 years of experience

and best practices.

The system of credentials is designed by industry, for industry, and represents skill certifications that manufacturers can trust.

20. CEDEFOP: WORKING PAPER No 16 Trends in VET policy in Europe 2010-12 Progress towards the Bruges Communiqué.
21. Initial manufacturing sectors for redesigned qualifications include Aerospace, Automotive, Energy and Utilities, and Food and Drink Manufacturing.

CHALLENGE 4: PARTNERING TO ACHIEVE SCALE

All those involved in the *Global Symposium*, and wider skills debate want to create a holistic skills delivery system that produces top flight employees for the most lucrative industries. The goal is to employ the maximum number of people in the highest value-added sectors. Assuming this is possible, it is by now accepted wisdom that partnerships between government, business, and the private sector are the best way to develop effective training systems.

How to do this, however, is stubbornly challenging. Despite the influence of globalization on industries and the way it has changed the nature of work, job markets, like politics, are still mostly local. Most importantly, it is no one's job to serve as an intermediary between the local, national, and international forces that affect the job market, nor between the public and private sectors. Closing this "intermediary gap" is fundamental to solving the skills challenge. Whether the outcome is a national skills delivery system, or one comprised of local efforts that form a national network, there are a few clear roles that governments and firms should play.

In the most basic analysis, it is the role of government to provide a workforce with a strong skills base.

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That being said, in the United States that kind of engagement has been uneven and company-specific, and the manufacturing sector as a whole has not kept its potential future workforce informed of the major changes taking place; changes that would draw more people to the sector and that also mean the required skills are very different today than even 10 years ago. This means that it is to time reimagine how companies and governments work together, alongside schools, to help put more people to work in the good, open jobs that manufacturing has to offer.

GOVERNMENT AS CATALYST

Governments have three main roles.[22] First, they should provide the motive force behind the overall skills effort, injecting political momentum and attention to the issue. In Europe this is happening in part at the EU level (as previously noted), but Germany is also taking on an important lead role. In mid-2013 the Federal Institute for Vocational Education and Training (BIBB) stood up the Office for International Vocational Education and Training Cooperation. The office is tasked with coordinating Germany's VET system internally,[23] as well as its substantial international programs on skills. Traditionally Germany has targeted its assistance at developing countries, helping build skills systems in countries

22. These are roles for government within the context of VET and other skills training. Acknowledging their important role in government policy and in skills training, we do not consider here broader public roles e.g., reducing unemployment, and social welfare programs that include training elements.
23. The Central Office runs interagency roundtables that coordinate German federal state (Lander) policy as well as national-level policy. This is a new task and the roundtables are still evolving as a coordination tool.

where German companies maintain a significant presence. The Central Office recently signed new MOUs with China, India, Russia, South Africa, and Turkey. It also supports skills development in a large number of other countries, including Brazil, Chile, China, Costa Rica, El Salvador, India, Lebanon, Mexico, Nicaragua, Poland, the Republic of Korea, Singapore, Slovenia, the United States, and the UAE. [24]

Germany's work with Mexico offers insight into how countries and companies can work together across borders, and how to adapt systems from one country context to another. In 2009 Germany and Mexico signed a cooperation agreement that would provide German technical assistance in revitalizing Mexico's dual system. The two countries had previously cooperated on dual system apprenticeships in the 1990s through a program run by Mercedes-Benz. The new partnership is managed by a German-Mexican company named the "German-Mexican Alliance for Technology Transfer" (ALTRATEC), and overseen by Mexico's education ministry (called CONALEP).

Germany supports ALTRATEC financially, as well as through support in developing national legislation, working with companies, and designing curricula across a range of sectors, including manufacturing. A small program, ALTRATEC handles only about 800 students, though the government hopes to increase this to 1200 by this year. Mexico also made some alterations to the German model to better fit its local needs:

- **Placement:** rather than each student finding her placement independently and signing a contract with the employer, CONALEP and ALTRATEC centrally assign apprentices to positions. This pre-screening helps ensure a positive experience for the companies and attract more employers to the program.

- **Exams and certificates:** In addition to a certificate from Mexico (which allows students to go on to higher education), completion of the ALTRATEC program entitles students to take an international exam that provides an internationally recognized certificate.

- **Employer engagement:** Mexico does not engage the private sector directly in designing regulations and qualifications, which stands in stark contrast to most European companies and overall global trends. Mexican authorities believe this better suits their national context.

- **Financing:** More positively, and unlike Germany, the Mexican government provides some funding to companies to defray the cost of training.

Mexico faces the same stigma against apprenticeships and VET training that most developed countries do. It will be a challenge to build momentum for the system, but the adaptations it has made to the dual system are meant to increase apprentice quality and entice more companies to participate. Hopefully this will come along with a larger role for the private sector in setting qualifications and standards, as well as helping make sure teaching aligns with company needs and practice.

24. Much of this cooperation takes place through iMove, a government-run initiative created to "promote international collaboration and the initiation of cooperation and business relationships in vocational training and continuing education." http://www.imove-germany.de/cps/rde/xchg/imove_projekt_international/hs.xsl/about_imove.htm.

The Austrian company Blum also demonstrates the way a European dual system model can be adapted to another national context. In 1995 Blum launched the "Apprenticeship 2000" program in order to develop the specialized skills it needed in the United States. The result is an 8000 hour program that has built a team of 40 senior engineers that comprise that heart of Blum's US operations, and a coalition of 8 companies, the Central Piedmont Community College, high schools in 6 counties, and the state labor relations board that works together to recruit and build talent.

The remarkable success of the program rests on the adaptations Blum made to the Austrian system to fit an American context. The key lessons are:

- **Take the time to build interest:** Company representatives engaged in a long process of working with high schools, community colleges, parents, teachers, and students across the state to spark interest apprenticeships, and explain the value of working in manufacturing.

- **Bring in allies:** Blum now works with 7 other companies that jointly pitch parents, teachers, and students on the program, and work together to support program costs. The governance is loose, with no central secretariat and a 10-point guideline document that defines the relationship. The coordinating group meets quarterly to work through strategy and work plans.

- **But not too many:** This arrangement works precisely because it is kept small, focused, and informal.

- **Screen well:** The high schools pre-screen students who show interest and aptitude for an apprenticeship. This provides the companies with a pool of motivated candidates who are likely to succeed.

- **Forget poaching fears:** The cost to train each apprentice is about $160,000. To make that investment worthwhile, apprentices need to stay at the company for two to three years. Blum seems very little attrition due to the company loyalty the apprentices gain in their service, which is backed by the knowledge that a job at Blum is a rewarding career with good pay.

While this is a small program when compared to European systems, it is essential to Blum's US operations. As Ralf Atzor put it, "we couldn't run the company without the talent we recruit here [in North Carolina]." That means all 350 jobs at Blum's North Carolina plant jobs hinge on Apprenticeship 2000's success.

In the last several years the Central Office has also begun receiving requests from European countries, and is in the process of signing formal agreements with Greece, Italy, Latvia, Portugal, Slovakia, and Spain.[25] On December 4-5 it hosted a major conference on workplace learning in Europe in order to explore whether and how other European countries can adapt the dual system to their own countries.

Second, governments should fund research on skills. This should include cataloguing existing programs (run by governments, the private sector, and combinations thereof), and leading the development of evaluation methods so that we know what works. The European Center for the Development of Vocational Training (CEDEFOP), based in Greece, performs some of these functions. Its core research areas include labor market forecasting to identify skills needs, advancing the EU's goals on qualifications frameworks (EQF), quality assurance (EQAVET), conducting country level policy analysis,[26] and supporting Member State efforts on adult education.

Third, governments are best placed to lead efforts to coordinate broad frameworks on issues like qualifications standards. Labor mobility between Member States is one the overarching priorities for Europe writ large.[27] In order to facilitate this, employers across (and in some cases within) countries have to be able to understand the qualifications from other Member States. The EQF and EQUAVET programs described in Appendix 1 are the EU's main tools to help accomplish this, which help push Member States to develop their own national qualifications frameworks. This is a vital leadership and coordination function that no other actor could do, and so is exactly the way government can be helpful.

25. The German embassy in the United States recently launched the "Skills Initiative, a major new effort with US states, which to date has visited California, Georgia, Indiana, New Jersey, North Carolina, Ohio, South Carolina, Virginia, and Washington, DC.
26. CEDEFOP has catalogued 24 of 28 Member States' VET systems, providing standardized country profiles and policy analysis, as well as a periodic Europe-wide assessment on overall VET policy.
27. As detailed in several major policy initiatives, including the Lisbon Agenda, Europe 2020, and the Bologna process.

PRIVATE SECTOR AS IMPLEMENTER

As the end user and demand side for skills, the private sector has the clearest idea of the kinds of skills it needs and what the public sector should produce.

As the end user and demand side for skills, the private sector has the clearest idea of the kinds of skills it needs and what the public sector should produce. Many companies have an established history of working with high schools and colleges, including in specialized VET training. Policymakers in Europe and the United States have prioritized in the last decade putting companies at the forefront of setting standards, developing curricula, and even managing public training funds.

The challenge for policymakers and schools is engaging all types of companies, not just large, well-established firms. As one European official noted, large companies have the resources and usually the know-how to work with schools and local policymakers to design training systems that will meet their skills needs. Partly because of this, they can be difficult to engage in skills programs organized by others.

Even more challenging is bringing together small and medium-sized enterprises (SMEs), which often lack the capacity – in time and money – to focus on their skills needs. They also lack the hiring volume on their own to build a bespoke program. For example, many community and technical colleges need a minimum student number to offer a certificate program, and a single local company will not have enough open jobs to meet that number. While some SMEs fall within a larger company's supply chain and can utilize their patron company's skills pipeline, many do not.

In the UK, the Commission for Employment and Skills (UKCES) has launched "Employee Ownership Skills (EOS) Pilots" in 2011, which has found innovative ways to solve this challenge. The program provides matching government funds for business-led projects that will "raise skills, create jobs, and drive enterprise and economic growth."[28] In the first round of approved projects, the government will invest 90 million GBP alongside 115 million GBP from the private sector into 34 projects.

Companies that will execute the projects range from the global (GE, Siemens, BAE Systems) to local SMEs. In this latter category, for example, a small engineering firm will bring together 40 local, small employers with the goal to develop 90 new employees (30 in apprenticeships, 60 full time, and 35 with supervisory and leadership qualifications). Employers will together contribute 3 million GBP and the government 85 thousand GBP. The companies will also work in partnership with a range of local and federal job programs. This kind of intra-private sector partnership, combined with government support, represents the newest and best thinking in connecting SMEs to the larger training infrastructure.[29]

28. http://www.ukces.org.uk/employerownership.
29. AJ Woods Engineering paper.

BAE Systems is also helping SMEs build capacity through the EOS program. For its 2013-14 apprenticeship class the company will train 36 apprentices over and above its intake needs who will then be sent out to small companies. These SMEs are either directly in BAE's supply chain or in the wider geographic area around BAE's plant. BAE works with Semta (a private apprenticeship placement service) and its own suppliers to find placements for apprentices. It also sends its own apprenticeship trainers to the SME on a periodic basis to help with skills evaluations, manage general apprenticeship issues, and the like.

SMEs in Korea employ 12 million people – nearly 90 percent of the workforce. To increase training capacity for these companies, the Korean government in 2001 began offering subsidies of up to 80 percent of training costs to large companies to train firms in the supply chains. SK Telecom was an early leader, providing access to its eLearning library and offering more traditional trainings that have so far reached 210,000 people. While the quality of the training and overall impact remains to be seen, it is an innovative attempt to give SMEs more options to advance their training.[30]

The challenge for small companies is somewhat mitigated in Europe due to the more institutionalized training framework. Companies are already integrated into the training structure, particularly in dual system countries. Even in those without dual tracks, however, companies are often legally required to either provide a certain amount of training, or to pay into a central training fund. In France, for example, all companies have a legal obligation to pay a certain percentage of their wage bill to "CVET" (continuing vocational education and training, which refers to people no longer in school, and who may be employed) training.[31] Companies pay for about 40 percent of total CVET spending (31.3 billion Euros in 2009), as well as into the initial VET system through apprenticeship salaries.[32] Other countries with similar requirements include Denmark, Korea, Malaysia, Singapore, and Sweden.

The trend toward deeper integration between government (especially the secondary education system) and private is sweeping a host of other countries. For the most part this involves methods to better engage companies in standards development and in targeting education to company needs. For example:

- The Government of Hungary in 2004 substantially devolved responsibility over significant portions of its VET training system to the Hungarian Chamber of Economy and Commerce (MKIK), a private sector industry group. This was designed to bring teaching more in line with industry needs, with MKIK now responsible for developing qualification exams and standards criteria for 125 vocations. The MKIK exams and system will replace the current, publicly run vocational schools with a three year program that students can enter after completing secondary school (about age 16). The Chamber expects to complete the restructuring of the system this year.[33]

30. McKinsey on Society, Education to Employment: Designing a System that Works.
31. This is set at 1.6% of the wage bill for companies employing 20 people or more; 1.05% with 10 to 19 people; and 0.55% with fewer than 10 people. France - VET in Europe Country Report, p14.
32. France - VET in Europe Country Report, p14.
33. CEDEFOP background document.

- Korea has taken a more direct approach. In addition to reforms to better align vocational teaching with the current skills needs (see appendix 2) the government in 2010 launched 21 "meister schools." These are high schools with "industry-customized curriculums,"[34] designed to place students in high-skilled manufacturing jobs. As of 2012 there were 28 meister schools operating with 11,500 students involving 1,611 companies. McKinsey reports that 85 percent of meister students have job offers, even before they graduate.[35]

- In September 2012 Poland launched a new core curriculum for vocational education (CCVE) designed specifically to improve links between VET schools and employers. While there was already a requirement that schools coordinate with regional and local labor groups (generally through the designated associations). The government consulted widely with over 600 individuals to develop the CCVE, including 271 employers, educators, and members of the scientific community. Significantly, the 2012 reforms also provide ways for adults to receive credit for non-formal training, and gain better access to adult VET qualifications.[36]

- Slovakia began a series of reforms in 2009 that created similar "National VET Councils" comprising employers and government policymakers who jointly set regional and national VET strategies that would ultimately dictate what skills schools should produce and direct financing only to those institutions. Unfortunately, firms have struggled to develop strong data that clearly show the skills they need, and so companies and governments are working to develop better forecasting and labor market data.[37]

- In Sweden, the government in 2008 created national and local "program councils" to coordinate between schools and companies on issues including coursework and curriculum design, and to increase the number of locations for work-based learning at the secondary school level.[38] At the tertiary level, companies provide direct training in schools and help guide content provision. Any institution that wants to launch a new program is required by law to show that there is employer demand for the skills the program would teach.[39]

34. Ministry of Education, Science, and Technology, Major Policies and Plans for 2011, p8.
35. http://mckinseyonsociety.com/e2e_casestudy/meister-high-schools-south-korea/.
36. Poland – VET in Europe Country Report, p35.
37. http://www.cedefop.europa.eu/EN/articles/17595.aspx.
38. CEDEFOP background document.
39. A Skills Beyond School Commentary on Sweden, OECD; and Swedish National Agency for Higher Vocational Education.

- In the UK the government has launched the Growth and Innovation Fund (GIF) and the Employer Investment Fund (EIF). Housed in the UKCES, these programs provide matching grants to companies that submit proposals for innovative training programs (the above-mentioned Employer Ownership of Skills program is funded with GIF money). The smaller EIF targets support to Sector Skills Councils.[40] Together these funds have provided 111 million GBP to 36 different groups since their launch in 2011.[41] The manufacturing sector has received almost a third of this funding (over 32 million GBP).

The degree of success varies greatly across these different examples, but it is notable that they all trend in the same direction. The good news is that almost everyone believes more private sector engagement is good – even that companies need to lead the process. The bad news is that relatively few countries have worked out how to do this well.

40. Sector Skills Councils are private-sector-led groups that design standards and define skills needs. They work with employers and the government to help build skills, with particular emphasis on apprenticeships.
41. http://www.ukces.org.uk/ourwork/investment/portfolio.

Toward closing the gap

The global groundswell of interest in better training manufacturing workers is driving substantial cross-border collaboration. Even as consulting companies warn about the impending (or already raging) "war for talent," there is an unprecedented level of cooperation and cross-border learning happening through international groups like the OCED and CEDEFOP, and on the part of countries like Germany and Austria. Even more remarkably, this open discussion is happening within the private sector.

Yet in addition to a skills gap, there remains an important "intermediary gap" in moving beyond discussing the challenges. Everyone has largely agreed that collaboration is a good thing, but it is still no one's job to take action on any of the ideas that require partnership. This is especially true when looking at supporting SMEs with knowledge, and on program assessment. It is striking how much activity is underway that no one has ever checked to see if it works.

In order to generate serious momentum and capacity for cataloguing what is happening, rigorously measuring what works, and spreading that knowledge, an Atlantic Council report recently called recently called for the formation of a cross-national training methods institute. This organization would provide political energy by engaging ministers and CEOs, build a storehouse of best practices, develop major analytical capacity, and provide an advisory service for companies and governments on program design. Funding would come from governments and the private sector.[42]

This kind of appointment of intermediaries will be increasingly important as countries and companies try to meet their skills needs. It will be essential to moving to the next step in closing the skills gap, a topic we look forward to engaging with you in 2014.

42. http://www.atlanticcouncil.org/publications/reports/training-our-future-skilled-workers-and-the-revival-of-american-manufacturing.

Appendix 1: EU and Education Policy

At the Commission level, vocational education and training policy is led by the Education, Culture, Multilingualism and Youth Commission, with input from the Commission on Employment, Social Affairs and Inclusion. Decisions at the Council level fall within the Council on Employment, Social Policy, Health and Consumer Affairs; the Council on Competitiveness; and the Council on Education, Youth, Culture and Sport.

There are two major high level policy initiatives that affect education and economic policy, writ large, and training as a subset of these efforts. There are also a host of other policy tools the EU has developed[43] over time that address skills issues.

1. ***The Copenhagen Process and the Bruges Communique:***[44] In 2002, EU education ministers met in Copenhagen and agreed to work together on VET policy. After a series of meetings they agreed in 2010 to the Bruges Communique, which sets out a vision for the VET systems Europe means to create:

    - VET is on equal footing with "traditional" education: people see VET as high quality and leading edge, not as the only alternative after all else has failed;
    - People can easily access the system from any point in their education or life: there are clear routes into the VET system from secondary school and from the workplace;
    - Clear and transferable qualifications: employers and students understand what they are getting through the VET system;
    - Mobility and social inclusion: workers can move easily throughout Europe, and disadvantaged workers and immigrants can improve their standing through the VET system.

    The following are the major policy efforts to make this vision a reality, and under which most of the EU's work takes place:

    - **Common standards:** The European Qualifications Framework (EQF) provides a common qualifications framework so that companies in all countries can understand each other's qualifications.
    - **Common credentials:** The Europass framework provides a common set of documents that allows people to clearly present their competences, skills, and qualifications in a unified format.

43. One might argue many of these have "accumulated" rather than "been developed," and a serious realignment of efforts is overdue.
44. http://ec.europa.eu/education/vocational-education/copenhagen_en.htm and http://europa.eu/rapid/press-release_IP-10-1673_en.htm.

- **Mutual recognition:** The European Credit system for Vocational Education and Training (ECVET) allows students to earn credits across countries so that they can study and learn abroad.

- **Reliable quality:** The European quality assurance in vocational education and training (EQAVET), provides a consistent approach to how countries monitor and improve training quality, giving employers confidence that a degree earned abroad is as good as degree earned at home.

The EU has set 2020 as the timeline to make these changes (see below on *Europe 2020*). The implementers of the work plan are the European Center for the Development of Vocational Training (CEDEFOP) and the European Training Foundation (ETF), with funding from the European Social Fund.

2. ***Europe 2020:***[45] In 2010 the European Council launched *Europe 2020* as the economic growth strategy for the decade. The stated goals that relate to VET and jobs are:[46]

    - **Employment:** 75 percent of the 20-64 year-olds to be employed

    - **Education**: Reducing the rates of early school leaving below 10 percent; at least 40 percent of 30-34–year-olds completing third level education

    - **Fighting poverty and social exclusion**: at least 20 million fewer people in or at risk of poverty and social exclusion

3. ***Other programs:*** There are a number of other programs and initiatives that contribute to the Bruges Communique framework. These include:

    - *Agenda for new skills and jobs*:[47] This is a set of policy initiatives run by the Commission for Employment, Social Affairs, and Inclusion, notionally created to implement the Europe 2020 and Bruges Communique goals. It includes the *New for Skills New Jobs* initiative, which is largely a recapitulation of the work managed by the Commission for Education.

    - *Erasmus for All*: This is the Education Commission's main educational platform, under which it runs several VET programs that students and organizations can apply to for VET training. These include the "Leonardo da Vinci," which supports training abroad and collaboration between countries on training programs, and the "Grundtvig" program that supports adult education.

45. http://ec.europa.eu/europe2020/index_en.htm.
46. The others are: R&D: 3 percent of the EU's GDP to be invested in R&D; Climate change and energy sustainability: greenhouse gas emissions 20 percent lower than 1990; 20 percent of energy from renewables; 20 percent increase in energy efficiency.
47. http://ec.europa.eu/social/main.jsp?langId=en&catId=958.

- *European Alliance for Apprenticeships*: Set up by a Council declaration in 2012, this group comprises policymakers, businesses, VET providers, students, and schools to increase the quality and use of apprenticeships across the EU. It does this by advancing common policy goals, researching the state of apprenticeship in Member States, improving the reputation of apprenticeships by disseminating success stories, and targets EU funding to achieve these ends.

- *Education and Training 2020 (ET 2020)*: Under the Education Commission's lifelong learning policy, ET 2020 sets a target of 15 percent participation in adult learning by 2020.[48] It will primarily focus on providing data, policy analysis support, and sharing best practices among Member States.

- *The European Employment Strategy*: Member States can use "peer pressure" to push common policies in some areas, including on the economy. The European Employment Strategy is a process for doing this by reviewing at the Commission national level employment policies. As part of this the Commission launched in April 2012 the "Employment Package," which tries to improve labor market forecasting, identify the EU's biggest job potential areas, and the most effective ways for EU countries to create more jobs. This includes improving skills through better data collection (using the "EU Skills Panorama" portal, which provides data on skills) and working to support national level traineeship (as distinct from apprenticeship).

4. ***The Bologna Process:*** The Bologna Declaration was signed by EU education ministers in 1999, and sets out the broad for making academic degrees comparable and promoting mobility. It aims to create a "European Higher Education Area" within which degrees – including VET credentials – are fully transferrable.

48. The current rate is 8.9 percent as of 2011: http://ec.europa.eu/education/lifelong-learning-policy/adult_en.htm.

Appendix 2: Modernizing skills delivery in Korea

Korea has a long – even ancient – tradition with skills training. Picking a modern starting point of the 1960s, the system was designed for economic development and social welfare. As a result, it was entirely directed by the government, which also directed business investment and industrial policy. This arguably worked quite well, with real GDP growth averaging 10 percent annually between 1962 and 1994. Its income per capita rose from $67 in the 1950s to $22,670 in 2012.[49]

Ironically, Korea's manufacturing sector is a victim of its own success. With higher income levels, most students want white-collar jobs that require a university degree, and participation in the VET system has declined. The number of students attending vocational high schools, for example, fell about 14 percent from 1995 – 2001.

Between 1970 and 2001 the percentage of students coming out vocational high schools that have gone on to higher education increased almost 45 percent.[50] At the same time McKinsey estimates that 46 percent of Korean university graduates are overeducated for available manufacturing jobs, and less than 50 percent of college graduates were employed full time in 2011.[51]

Now that Korea has "arrived" as a global economic power, it is subject to the same global economic dynamics that are driving changes in developed country VET systems. As the World Bank notes, in the early 2000s "The level of skills needed in labor market began rising, and the life spans of specific technologies were cut in half."[52] As in Europe, it is beginning to respond with major reforms. These have been slowly brought in over the last 10 to 15 years, and feature many of the same themes as European efforts:

- **Better aligning school with work:** Similar to the United States, the utility of Korea's technical high schools and junior colleges has drifted over the years. Instead of providing high quality instruction that leads to jobs, they now serve mostly as stepping-stones to higher education for those who were initially unable to get there.

  To fix this, Korea has revitalized its technical high schools and invested much more in its junior and polytechnic schools. The 2009 "Higher Education Capacity Building Act" provided substantial new funds to support junior colleges based on performance requirements linked to graduate job placement.[53]

- **Supporting creative SMEs:** To improve skills at SMEs, to offer SMEs systematic vocational training equivalent to that of large companies, an SME (or an employers' organization) and/or a university can receive funding to organize a training

49. http://www.worldbank.org/en/country/korea/overview.
50. Vocational Education System in Korea, p15.
51. http://mckinseyonsociety.com/e2e_casestudy/meister-high-schools-south-korea/.
52. The Korean Case Study, Past Experience and New Trends in Training Policy.
53. Formula Funding for the Capacity-building of Universities and Junior Colleges, Korean Ministry of Employment and Labor.

consortium with other companies. Funds will support facilities use and equipment, training personnel, and the training itself. The government of Korea spent $116 million, which trained 252,000 workers at 119,000 SMEs.

- **Supporting private sector options:** "Corporate universities" in Korea provide a key form of on the job training. Samsung Electronics Technical University was founded in 2001 to train experienced employees and new hires to their own high standards. Korea is encouraging the establishment of more such schools, and is developing ways for corporate university credits to transfer to the formal education system.

- **Improving qualifications:** Koreas qualification system is a decentralized hodgepodge of government sponsored programs (with 512 occupations managed by 18 different ministries) and private sector credentials (with over 3,200 occupations overseen by 12 different government ministries). In 2012 the government set goals to streamline the qualifications system and make exams more accurate and relevant.

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Institute

733 10th Street, NW Suite 700
Washington, DC 20001
Phone: (202) 637-3426
Fax: (202) 637-3182
www.themanufacturinginstitute.org