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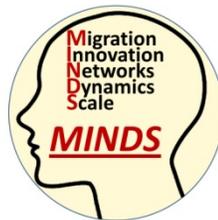
The Wilting STEM: **Talent Shortage in Norway**

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Abstract

The lack of talent in science, technology, engineering, and math (STEM) is a global problem. This talent shortage can deter technological gains and innovation. The shortage has sparked many countries to create initiatives to recruit, retain, or create talent. Norway has an abundance of natural resources, and has a potential to be a center for technology and innovation. However, Norway is struggling to find enough talent to fill the need for STEM professionals. This poster investigates why STEM graduates in Norway do not meet the qualification requirements of companies. It also studies the role of Norway's tertiary system in the national talent shortage. The research shows that while the Norwegian education system excels in some areas, the programs for STEM majors fail to teach the skills that engineering employers need.

We are becoming increasingly dependent on technology and its practical functions: using a cell phone or driving a car. So what happens when the talent pool that creates, designs, and perfects these systems runs dry? This question is asked by companies worldwide that look for young talented engineers to stay productive and innovative, but they cannot find enough workers with the skills that they are looking for. This is also an issue in Norway. Without sufficient talent production and efficiency, Norway will have difficulties to remain competitive internationally.

Now more than ever there is a mismatch in the capability level of engineers and what companies are looking for. “A substantial proportion of employers around the globe identify a lack of available talent,” says the Manpower Group, a company that conducts national surveys on the global job market. “(It is) a continuing drag on business and performance” (Manpower Group 2012). The group notes that approximately one in three companies worldwide, or thirty four percent, are failing to fill the voids that the recovering economy and lack of talent has left on the market. This is a slight increase from 2009 when thirty percent of companies were reporting these difficulties. This lack of talent was felt in all industries, and engineering and information technology have been most affected.

The reported rates of the talent shortage in Norway declined from forty percent in 2008 to eleven percent in 2011 (Manpower). The global average for talent shortage in 2012 is 34 percent; while Norway has a 22 percent reported shortage from companies surveyed (Manpower). This shows that while Norway is experiencing an increased need for talent (from 11 percent in 2010 to 22 percent in 2012), its talent needs are lower than some other countries that are well known for innovation and education like the USA and Japan (49 and 81 percent reported lack of talent) (Manpower 2012).

This dilemma has left many organizations and companies to examine the source of the problem, and how to combat this lack of talent. While there might be seemingly obvious reasons for the markets' shortcomings, they do not apply everywhere. For example, some sectors in India experienced more financially dependent workers who are significantly less likely to "job hop" and to demand higher salaries during the financial crisis (Arrawatia). There is also a theory that the expectations of engineering companies overestimate the skills of undergraduates in engineering (Arrawatia). This presents an important question: How does Norway's educational system affect/influence the current talent shortage of engineers and information technology specialists?

The global talent shortage affects countries in different ways. Norway particularly needs workers in engineering and technology. According to offshore.no, Norway is in need of 7,000 engineers in the petroleum industry alone (Oland 2011). This is surprising when you look at the low employment rate of engineers in Norway: "the pool of unemployed graduates is growing while there is a chronic shortage of science graduates and especially engineers."(Oland 2011) Promoting engineering and technology fields to prospective students would be a way to increase the number of engineers, as well as matching skills with labor demand. However, an increase in student seats in these fields demands a large commitment from the Norwegian government.

The answer to the talent dilemma might lie in the IT sector, 'The gap in the IT industry is huge and it will probably continue to increase,' said Senthil Nayagam, vice-president of key account and Hexawarsity at Hexaware. 'There is only so much a 3-6 month training can do. It cannot replace the 4 years spent in college when they should have ideally picked up these skills' (Tec gig). In Norway, with the exception of the Norwegian University of Science and Technology (Norway's most notable university for engineering programs), most universities

offer courses in general areas of engineering and technology. These general courses do not offer the specialized skills that engineering companies are looking for.

Norway's public colleges offer free tuition, which makes education accessible to Norwegians and international students who meet admission requirements. "Norwegian universities, which have free admission, have the capacity to educate more than half of secondary graduates each year and over 60% of the population enters tertiary-type A programmes during their lifetimes" (OECD 2004). Norway has universities in Oslo, Stavanger, Tromsø, and Trondheim (NTNU).

The Norwegian Institute of Science and Technology (NTNU) graduates roughly 80 percent of all students with advanced engineering degrees in Norway. NTNU enrolls 20,000 students, and approximately 8,000 of these are engineering students. In 2009/2010, Norway graduated 3,113 students in the STEM fields nationwide. The University of Oslo and the University of Tromsø both offer engineering courses. The University of Oslo offers classes that are specifically geared toward technology, while the University of Stavanger offers course in Petroleum Engineering and Structural Engineering. Stavanger is the center of Norway's Oil and gas industry and a leader in technological innovation. The University of Stavanger states on its website, "The Faculty is in some areas within petroleum research among the world's best. The research of increased oil recovery in carbonate fields is a case in point" (University of Stavanger 2012).

An OECD review of Norway's tertiary education in 2005 found the following shortcomings: "delays in graduation; student dropouts; the need for a stronger emphasis upon quality teaching and upon student outcomes; and the need for a better follow-up of students"

(OECD 2004: 12). The report also noted that cultural factors delay graduation in Norway. Young Norwegian students not only start college later comparatively to students in other countries but they also decide to graduate later. More students decide “to travel; to work; to do community service; and, although less commonly now, for males to do military service” (16 OECD). Therefore, only four percent of undergraduate students are under the age of twenty (OECD 2004: 16). Norwegian students are also more likely to attend post graduate institutions instead of shorter technical courses. Therefore, few students take STEM courses and even fewer students graduated with STEM majors.

The OECD reviewers noted that Norway made a noticeable improvement in several areas of its education system. The Norwegian government created a Quality Education Reform Council and the Norwegian Agency for Quality Assurance in Education (NOKUT) to improve the education system. Norway is proud that its education is accessible to a broader range of its citizens; more than many other OECD countries. As far as STEM majors in Norway, OECD concludes that there could be a problem but that they did not look at the quality of education specifically. The OECD also noted a need for a boost in interest in the STEM fields. “Tertiary education in Norway has undoubted strengths. However our main conclusion is clear enough: there is much more to do in universities and university colleges if Norwegian tertiary education is to retain its position of strength in the years ahead and to contribute what is needed to Economic development” (OECD 2004 70)

As mentioned earlier, Norway has institutions that review its education system. The Norwegian Agency for Quality Assurance in Education is one of the programs that reviews the quality of education in Norway. In a 2008 report, NOKUT praises the links of Norway’s engineering education with private enterprises that influence the curriculum. “Know-how

exchange takes place between the institutions and companies. The students are given opportunities for forging early links with their future profession; the degree programs are vocational” (NOKUT 2008:11). However, Norway’s engineering curriculum is widely theory-based and lacks the technical and problem solving skills. “The lack of academia-research links in engineering, means that the students fail to gain sufficient training in critical thought, analysis and use of scientific method and source evaluation” (NOKUT 2008: 5). This possibly explains why engineering companies question the quality of Norway’s engineering education.

Sometimes it is easy to forget the impact of technology on our daily lives. It is extremely important that young talent will be able to keep pace as our technology keeps evolving rapidly. This is also a reality in Norway. The reports on Norway show that while Norway’s education system excels in other areas, it has few STEM majors and they do not receive the type of education that companies demand. While the system currently offers theory-based learning, companies demand a focus on more innovative, technical problem solving skills. Nonetheless, efforts to encourage students in STEM majors would help the engineering shortage. The standards of today’s technology require an ever more rapid development of young minds. The question is: How can Norwegian companies and educational institutions continue to keep up?

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