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NUMERACY
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Position paper on numeracy skills and advanced manufacturing

The purpose of this position paper is to contribute to policy-making in the European advanced manufacturing sector. The document builds upon the results obtained by the EU-funded NAMA project, an initiative aimed to boost the numeracy skills' level of workers and learners in VET (vocational education and training) linked to the European advanced manufacturing sector. The learning materials, MOOC and mobile applications produced in NAMA were widely praised by its target users. As emerged from the first results of an online survey and a series of short interviews conducted in specific training pilots, over 80% between trainers and learners considered these NAMA outputs to be relevant, useful, and valuable for students as well as current and prospective employees in the manufacturing sector.

Moreover, as a confirmation of the credibility of the NAMA project, the calls of its consortium for devoting greater attention towards numeracy skills in the education and VET context found the support of relevant stakeholders. Indeed, a [Memorandum of Understanding](#) produced by the project consortium was endorsed by a wide range of European and national organisations across Greece, Italy, Poland, Spain. Among them, there are public research institutes on labour and VET, national associations for the engineering industry, VET institutes of public universities, public and private VET providers as well as Europe-wide networks.

In the light of the positive response to the project expressed by both learners and key stakeholders, this position paper aims to draw the attention of decision-makers all over the EU on the relevance of numeracy skills in the European advanced manufacturing sector. It is reasonably structured around the results of the NAMA initiative.

Borne in mind the above considerations, the NAMA consortium intends to emphasize the importance of the following points:

1. Numeracy skills are critical for today's workforce in advanced manufacturing. With industrial practices more and more influenced by widespread digital developments, human capital will increasingly need to be equipped with a sufficiently high level of numeracy skills. Insights from practitioners strongly linked the competitiveness of

the advanced manufacturing sector with the skills possessed by its workforce. A numerically skilled labour force is also tied with lower levels of unemployment.

The NAMA consortium calls on VET regulatory bodies across the EU **to consolidate the inclusion of numeracy skills in manufacturing-oriented VET programmes, and in particular to explore possibilities to improve math learning in the vocational class room, with the aim to better reflect in curricula the advanced manufacturing skills needs reshaped by digitalization.** It also calls on relevant national accreditation agencies across Europe **to give priority focus on numeracy skills in their respective accreditation systems.**

2. Non-formal and informal learning formats, such as Open Educational Resources (OER) and Massive Open Online Courses (MOOCs) are nowadays decent forms of learning in order to improve the employability of labour market entrants and existing advanced manufacturing workers. However, their regulation across EU countries is still currently fragmented, and ranges widely with regards to the degree of acceptance of such learning methods. The NAMA consortium calls on skills accreditation regulators and authorities across the EU **to delineate new avenues for validation of numeracy skills not recognized in existing qualifications, so as to properly incorporate these formats in education and VET systems.** It also invites relevant Member States' regulatory bodies to **consider the feasibility of validating numeracy skills already acquired in another EU country, with a view to foster labour mobility across the Union.**
3. Advanced manufacturing remains essential for achieving Europe 2020 strategy's goal of raising the share of industrial production to 20% of EU GDP by 2020. It also remains critical to meet 21st century societal challenges, such as energy efficiency and healthcare services to an aging population, since the adoption of Key Enabling Technologies (KETs) in the sector opens up, for instance, new opportunities for energy saving and more effective healthcare provision. Given the interconnectedness of the sector with the wider economy and society, as well as its essential position along the manufacturing value chain, we call on governments in the EU **to increase available funding on numeracy teaching at VET level,** including via partnerships with businesses so as to capitalize on the respective strengths and enable the technological uptake of the European advanced manufacturing sector. We furthermore invite relevant Member States' regulatory bodies **to financially support work-based learning initiatives within advanced manufacturing firms,** be them apprenticeships, on-the-job experiences or training programmes, especially as a large amount of players in the sector is constituted by resource-limited SMEs. These supportive actions should be undertaken **through measures such as tax rebates, education vouchers and innovative financing schemes.**
4. Recent insights point to recruitment difficulties by European manufacturers in relation to so-called STEM skills¹, among which it figures math. A looming skills shortage in the advanced manufacturing industry is therefore an increasing risk for

¹ Mapping and Analysing Bottleneck Vacancies in EU Labour Markets: Overview report Final (European Commission, 2014, p.10)

the years to come. Amid these problems, the NAMA consortium calls on governments across the EU to rise the number of STEM-related graduates both at higher education and VET level. We invite authorities to **consider undertaking communication campaigns and work out concerted promotion strategies on STEM by schools, universities and VET providers so as to boost the number of learners of math.**

5. Lifelong learning policies are an important instrument to encourage the up-skilling of adults and equip them with those numeracy competences necessary for 21st century manufacturing-related jobs. We call on Member States' VET regulatory bodies to **step up efforts on lifelong learning, by developing customized and well-targeted training programmes based on the specificities of this group of people, and oriented towards the specific local manufacturing demands.**
6. Training providers remain a key element in the experience of learners, and a crucial variable in the overall outcome of such experience. In order to maintain high quality teaching standards, the NAMA consortium calls on Member States' VET regulatory bodies to **devote heightened attention on continued professional development for training providers.** Examples of effective measures are the sharing of best practices across the EU as well as the diversification of staff to foster teaching specialisation on math. Overall, efforts should be placed on **updating VET trainers' knowledge and experience of industrial practices on the shop floor.**

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