



Languages Are Vital to U.S. STEM Competencies

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Summary: Global content is literally exploding. Every minute of every day: 571 websites, 100,000 tweets, 48 hours of video and 204 million emails are created. Content today is multidirectional (B2B, B2C, C2C, etc.), multimodal (desktop, mobile, audio, video, interactive), global (over half of all internet users are now in Asia) and multilingual (less than 30% of the internet is now in English). Foreign Languages (FL) are at the heart of our national STEM sector's ability to communicate, innovate, collaborate and compete in this context. The \$15b U.S. language industry is a highly technologized driver enabling U.S. STEM businesses to reach foreign markets worth \$1.5 trillion. FL has long been an element of the federal STEM research portfolio and should be included in all STEM-related policy and planning.

Language has long been a STEM research subject: For over 50 years, the Federal Government has funded R&D in language fields such as theoretical and applied linguistics, sociolinguistics, the sociology of language, computational linguistics, language acquisition, human language technology, translation and interpreting studies, machine translation, and more. Funding derives from the NSF, DARPA, IARPA, NIH, OSD, and the IC, among others. This funding has resulted in breakthroughs for the commercial sector and public, such as the basic machine translation tools used throughout industry and government.

Language is a highly technologized STEM industry: It is impossible to manage the 21st-century content explosion without robust, constantly evolving technology. Localization now is entirely digital, relying on workflow systems, translation management systems, translation memories, terminology and data mining, complex desktop publishing, content management systems, and machine translation, among other technologies. Human translators and interpreters are no longer mere linguists; they work alongside computer-aided and automated language tools, and the technical nature of their work is high. Language teaching is also increasingly technologized, especially for "long-tail" languages in emerging markets like Africa and Asia. Finally, the language industry drives innovative R&D that cuts across STEM, the social sciences, and the humanities.

America's STEM industries depend on the language enterprise: The work of traditional STEM businesses is now inevitably global; advances hardly occur in one country or market. Multilingual communication is intrinsic to today's scientific collaboration and progress, which means the language industry is fundamental to furthering every aspect of STEM professions and business. STEM companies in numerous sectors depend on the professional language industry to access more than \$1.5 trillion in overseas markets.

Recommendation: As the U.S. supports and promotes STEM, it is vital that the language enterprise be included in policy and planning. Specifically: languages should be included in STEM educational policy; FL technology and linguistics research should be highlighted within the STEM accounts; and STEM-related policies on immigration reform, small businesses, and other areas should include FL.