

## **TECHNOLOGY MANAGEMENT EDUCATION: A GLOBAL PERSPECTIVE**

### **ABSTRACT**

Technology management is a dynamic and evolving profession, driven by changes in technology, globalization, sustainability, and the increasing importance of the service economy. Technology management professionals must be better prepared for the challenges they will face in the future due to rapidly changing technologies and increased globalization. The purpose of this paper is to present findings of an international study on technology management education. The study was designed to identify the optimal curricular elements for effective technology management programs in today's rapidly changing environment. Much of the research on technology management education occurred more than ten years ago and focused on regional or limited populations. The importance of this study is its relevance to today's academic concerns and its global perspective. An online quantitative survey was used to solicit feedback from technology professionals to identify the knowledge, skills, abilities and behaviours necessary for technology managers. Management of technological change, project management, and management of information, quality management, innovation and product development as well as strategic management of technology competencies were addressed. Over 1,500 technology management professionals and technology management graduates were surveyed. Upon completion of the survey respondents were asked to forward a survey link to other technology professionals using a snowball sampling method to garner input from a larger population. Over 350 surveys were completed by respondents from 30 different countries. Almost 86% of the respondents indicated that they were employed full-time in a variety of industry sectors; including aerospace, chemicals, computers and information technology, education, energy, manufacturing, and research and development. (Additional Study Results). The results of this study will help to close the loop on curriculum design and inform faculty members on curricular changes and developments necessary for effective programs in the discipline of technology management.

**Key words:** Management of Technology; Innovation Management; Technology Management Education; Management of Technological Change

### **INTRODUCTION**

Universities throughout the country have become part of a competitive environment with diverse stakeholders and partners. Increasing demands are placed on higher education institutions for relevant curriculums focused not only on the education of its students, but also on the requirements of today's industries (Bellamy, Becker, & Kuwik, 2003). Effective education programs must identify and support the connection between the needs of students to help them develop the competencies necessary to prepare them for the workplace and the demands of global businesses (Rainsbury et al. 2002). Relevant and comprehensive studies must explore the key elements needed by employers in technology sectors when developing or revising existing curriculums. These rigorous technology management programs will ultimately support the program graduates and meet the demands of their future employers (Klingenberg & Lauria 2007; Nambisan & Wilemon, 2004).

## **LITERATURE REVIEW**

This literature review addresses the definition of technology management and shows the relationship between earlier studies that highlighted the importance of technology management skills and the more recent studies that tie together the needs of technology intensive industries with academia. The expansion of curriculum beyond traditional conceptual topics will be discussed. Additionally the need for universities to respond to changes occurring in the competitive and global business environment will occur.

Thamhain (2005) defines the management of technology as the art and science of creating value from integrating technology applications within businesses. Early studies initially focused on the importance of technology management education and various approaches to employ in curriculum development (Badawy, 1998; Becker, 2007; Herink et al., 1987; Khalil & Yanez, 2006; and Kocaoglu et al., 2003). Later studies continued to support the importance of technology management education; however, they began to increasingly explore the symbiotic relationship between educational programs and the needs of businesses and technology industries (Cetindamar, Phaal, & Probert, 2016; Doggett et al., 2013; Horwitch & Stohr, 2016; and von Konsky, Miller, & Jones, 2016). These more recent studies argued that while technology managers should possess a high level of knowledge in certain conceptual areas, they also need to possess some technical knowledge, skills, and abilities to manage systems, applications, and processes. Knowing or understanding theoretical concepts is no longer sufficient or considered desirable by organizations, particularly those in a competitive and global marketplace.

Nambisan and Wilemon (2004) found that the inclusion of industry needs is vitally important when designing the curriculum for technology management programs. Because technology management programs are career-focused, graduates need skills, knowledge, and competencies in areas that are identified as important by employers. As technology management programs continue to increase, efforts to identify a consistent and relevant body of knowledge for these programs is warranted (Alvear et al., 2006; Khalil & Yanez, 2006; van Wyk, 2004).

One of the challenges facing universities today is the speed and globalization of knowledge that takes place within different technology intensive industries. Company executives expect graduates from technology management programs to be knowledgeable, proficient, and able to quickly adapt to these changes. For universities, it is difficult to quickly identify these changes and adapt curriculums to the needs of both the students and businesses. Additionally, academicians and businesses have yet to develop agreed upon educational elements or requirements that fit the needs for both groups (Frankel, 2011; Goksoy et al., 2012). This lack of collaboration is ultimately harmful to students, university programs, and businesses (Ikinci, 2014; Tudor, 2014).

## **METHODOLOGY**

The population for this study consisted of technology management professionals and technology management graduates and was delimited by its focus on technology management education. The data used for the study was obtained from an online survey that focused on the knowledge, skills, abilities, and behaviours necessary for technology managers. Specific topics included management of technological change, project management, management of information, quality management,

innovation and product development, as well as strategic management of technology competencies. Purposive expert sampling of over 1,500 technology management professionals and technology management graduates occurred. Upon completion of the survey respondents were asked to forward a survey link to other technology professionals using a snowball sampling method to garner input from a larger population. Using the data gathered from the returned surveys, the study explored the optimal curricular elements for effective technology management programs. The survey was available for six months, July through December. The data from the study was collected, assessed, and analyzed using Qualtrics.

### **FINDINGS AND DISCUSSION (*INITIAL FINDINGS ONLY*)**

Over 350 surveys were completed by respondents from 30 different countries. Approximately 19% of the respondents were female. Almost 86% of the respondents indicated that they were employed full-time in a variety of industry sectors including aerospace, chemicals, computers and information technology, education, energy, manufacturing, and research and development.

**PLEASE NOTE THAT THIS IS A DRAFT AND THAT ELEMENTS OF THE FINAL PAPER WILL BE EXPANDED UPON IN ADDITION TO THE FINDINGS AND DISCUSSION SECTION.**

## CONCLUSION

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