# A Model Curriculum for Undergraduate Program in IT SSME

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## ABSTRACT

*The service sector is the uppermost growth segment of the developed economies, and becoming more knowledge intensive as automation and outsourcing reduce demand for labor in agriculture and manufacturing. The reliance of this sector on information technology (IT) deserves revision of IT curricula. As the field of computing continues to grow and diversify, and new computing-related disciplines emerge, existing curriculum programs must be updated regularly and new computing disciplines will be drafted to prepare students with the knowledge and skill sets applicable to current and projected future service sector. Service Science, Management, and Engineering (SSME) is a new market-relevant multidisciplinary academic program designed in response to the service sector's growing dominance. The main aims of this paper are firstly, to identify and develop the body of knowledge areas and skills needed by IT professionals. Secondly, to develop SSME undergraduate curriculum and courses that embody the topics in the SSME body of knowledge. The study was based on surveying and analyzing the current and projected future demand for IT Professionals with enhanced IT SSME skills. With the support of IBM, Jordan University of Science and Technology will begin offering an undergraduate program in SSME in fall 2013.*

*Keywords:     Curriculum, Job Market, Service Science, Service Science Management and Engineering (SSME), Undergraduate Program*

## INTRODUCTION

In today's knowledge-intensive economy, the service sector and service innovation for business and society represent the fastest growing portion of the world economy. This comes out from both the annual income reports of innovative companies that report on growing service revenues, as well as the gross domestic product (GDP) statistics of nations. Governments and businesses need to make service innovation a priority, because it contributes more than

50% of World GDP economy (Soubbotina & Sheram, 2000) and revenue and profit growth also increasingly depend on service innovation.

In the US economy, the service sector accounts for more than 75% of the economy (Wei, Chen, & Zhu, 2010). According to the US Bureau of Labor Statistics, in 2010, 112 million (78.8%) people were employed in a service sector industry, compared to 30 million in the other sectors. By 2020, this number is expected to increase, with 79.9% of total work force in the service sector. Employment of IT professionals and business services is expected to jump to 14.2%, growing by over 3.9 million jobs (BLS, 2013). The same scenario for the European Union, in 2009, workforce employed in services accounts for more than 65% of total employment (EU, 2013). Table 1 shows the top industrialized economies that are shifting from the goods-producing sector toward the service-providing sector in recent decades (Data were compiled from U.S. Bureau of Labor Statistics (Spohrer & Maglio, 2008) and Table 2 shows the lead of service sector jobs over agriculture and industry jobs in most world regions during the period between 2000 and 2011 (Data were compiled from International Labor Organization (ILO, 2012)).

Many top companies (e.g., IBM, Google, HP, Cisco, American Express, …) are aware of the growing importance of service innovation and expanding value co-creation opportunities with customers (Hocová & Staníček, 2010). IBM has established the Services Science, Management, and Engineering (SSME) initiative (Maglio et al., 2006). IBM, HP, and Cisco have recently launched a new umbrella non-profit professional association known as the International Society of Service Innovation Professionals (ISSIP.org, pronounced I-ZIP) to promote service innovation for an interconnected world, and to focus on objectives such as professional development, education, research, practice, and policy associated with service innovation.

The share of service value added in GDP in middle-income countries generally accounts for more than 50%. Even in the low-income countries, these patterns of increasing importance of services are observed (more than 47% of GDP) (WTO, 2010). As for example, in Jordan, the service sector is the mainstay of the economy of where it became the main driver of economic growth across a variety of industries, including health care sector, finance and logistics. It occupies the largest percentage of GDP. Service sector jobs are considered among the highest in the region. In 1980, services contributed 64% of GDP, and in 2003 the figure was 72%. These figures compared to the entire Middle East and North Africa (MENA) are 39% and 47%, respectively (see Table 3 - data were compiled from Jordan Ministry of Industry and Trade (UNCTAD, 2006)).

*Table 1. Employment shares by sector, selected countries (%)*

| Year | 1980 | | | 2011 | | |
|---|---|---|---|---|---|---|
| Country | Services | Industry | Agriculture | Services | Industry | Agriculture |
| USA | 67.3 | 29.3 | 3.4 | 81.1 | 17.3 | 1.6 |
| United Kingdom | 61.2 | 36.2 | 2.6 | 81.1 | 17.7 | 1.2 |
| Canada | 67.8 | 27.3 | 4.9 | 78.8 | 19.1 | 2.1 |
| France | 53.2 | 36.1 | 10.7 | 76.1 | 20.9 | 3.0 |
| Germany | 51.9 | 42.9 | 5.2 | 71.4 | 27.0 | 1.6 |
| Japan | 54.8 | 35.1 | 10.1 | 71.3 | 24.9 | 3.8 |
| Republic of Korea | 37.3 | 28.7 | 69.4 | 69.4 | 24.2 | 6.4 |

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