


# Competence Assessment and Development for Managing Human Capital in the IT Sector

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## ABSTRACT

With ever-increasing demand for software professionals, the time has come for the information technology (IT) industry to unearth competencies required for software professionals. The majority of IT companies have been employing outsourcing software projects to inexpensive hubs in developing nations. Therefore, expectations from highly skilled software professionals are rising. The purpose of the study is to recognize the technical competence levels associated with software professionals in a range of profiles which are found in India's major IT organizations. There are three basic objectives of the present study. The first objective is to conduct a literature survey of description of the software engineers in IT domain. The second objective is to quantify the competency levels of the software engineers in IT sector. Finally, the third objective is to conduct a survey-based empirical study on software engineers. The professional occupation is set up through seven successive profiles.

## KEYWORDS

Competence Assessment, Competence Development, Competence Level, Human Capital, IT Sector, Software Engineers

## 1. INTRODUCTION

Human capital is the most essential asset comprising of the skill, dexterity and knowledge possessed by employees, necessary for achieving the goals of organizations (Guest, 2001; Becker & Gerhart, 1996; Barney, 1991). It is also an area that needs a lot of improvement particularly in IT sector. The human resources are educated people and IT organizations require competent employees for achieving results proficiently, as IT organizations rely on the competence of the workforce for producing a ROI (return on investment) on the usage of technological and physical resources. Thus, human capital is the decisive contributor in determining organizational development nowadays. In addition, IT sector is confronted with the worldwide economic crisis, globalization, technological innovations and other changes. "Workforce characteristics and HR activities supply without a doubt the major source of opportunity for enhancing the productivity" (Boehm et al., 2000). Individual competence is needed to construct core competence of modern firms at organizational level (Bassellier et al., 2001). IT organizations need to systematically pursue competency management (Chouhan and Srivastava, 2013; 2014; 2015).

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The major factor influencing the software development process is competent software engineers with reference to software development teams (Pressman, 2005). Boehm states that “citizen factors have the most impact in shaping the endeavor needed to build up a software creation ” (Boehm, 1981), and “Workforce characteristics and HR activities offer by a long way the biggest foundation of chance for enhancing IT development productivity” (Boehm et al., 2000).

Individual competency is needed in forming the core competency, vital for today’s firms (Bassellier et al., 2001). Numerous studies have been done in IT field (e.g. Sackman et al., 1968) since 1960s. Prolific studies examining the importance of factors involving human capital in IT sector has surfaced after 1990s (Humphrey, 1998), and it is still increasingly growing from the outset of 21<sup>st</sup> century (Tomayko & Hazzan, 2004; Constantine, 2001; van Solingen et al., 2000). Chouhan and Srivastava (2013; 2014; 2015) have recommended for conducting competence assessment and development for managing human capital in IT sector.

For improving the ability of the employees, numerous schemes, e.g., People-CMM (People Capability Maturity Model) (Curtis et al. 2001), elucidate a development plan commencing from improvised, erratically performed HR practices, and cultivate into a established practice infrastructure for constantly uplifting employee ability. According to People-CMM, level 3 means the area labeled as “Career Development”, that executes the occupational career to make certain that employees are given chances to nurture their competencies which allow them to accomplish career goals. For achieving level 3, firms should decide about various occupational careers their workforce can assume, describing the occupational profiles and equivalent competence levels in a precise manner.

In addition, competence levels for occupational profiles are among the primary features regarding the development level of a profession, specifically “Professional Development”. Software Engineering Body of Knowledge (SWEBOK) asserts the levels for all the elements of 10 knowledge fields (Abran et al., 2004). In line with Bloom’s taxonomy, mentioned levels are decided on the basis of apprenticeship levels (Bloom, 1956). Nomenclature has been given for the sole profile having the qualification of Software Engineer having experience of 4 years. For complementing the ability levels set up by SWEBOK, supplementary competence explanation of ability levels for which 3 diverse Software Engineer’s profiles must match up with dissimilar phases of occupational career: on completion of degree, post 4 years of experience, and as a experienced Software Engineer. However, this research might not be comprehensive, since knowledge fields are restricted to four: Quality, Maintenance, Processing, and Management (Bourque et al., 2004).

In addition, a number of attempts had been made to propose the skills and knowledge needed by software engineers in IT industry (Lethbridge, 2000; Turley & Bieman, 1995), the course of software engineering (Kitchenham et al., 2005) and regular teaching of software engineers (Callahan & Perdigo, 2002). Further researches have been done concerning the competence required on behalf of information systems professionals (Wu et al., 2007); as IT project managers (Sukhoo et al., 2005); beginner software engineers (McMurtrey et al., 2008); chief information officers (Bassellier et al., 2001); as analysts (Misisic & Graf, 2004); and generally software engineers (Kovacs et al. 2006) to quote few major exemplar.

Above mentioned programs are hard to be put into practice by HR professionals, since they are restricted—as each sector’s occupational profiles are not covered—or they are broad also, or explicitly precise to several fields of HRM (Acuña & Juristo, 2004); pointing towards a range of knowledge exclusively connected to a software engineer profile. Recognizing competencies and ability for software engineers is an old field.

The current paper presents a research on the role of software professionals in the IT industry, in order to compile a “competency model”. The theme has received increasing attention both from practice and theory (e.g. Gabryk & Naidoo, 2020; Leidig et al., 2020; Topi et al., 2017; Impagliazzo et al., 2016). Taking vital cues from these studies, the current study recognizes an occupational career for SE, characterized with the help of the needed competence levels for all IT occupation for an explicit kind of firms of vital magnitude in the IT occupation, along with a specific geographic

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