


# Engineering to Management Transition: Challenges and How Education Might Assist

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## EXECUTIVE SUMMARY

*This chapter identifies the main challenges in the transition from engineering to management and discusses how management education may assist in this transition. Mixed methods were used to achieve the above. Initially, two focus groups were conducted, and at a later stage, 126 engineers reported through a questionnaire the most common challenges in the transition from engineering to management and then a few were also interviewed. Results demonstrate that skills such as delegation, communication, convincing, coaching, and guiding others pose important challenges. In relation to the second inquiry, it is proposed that, other than management theory, offering examples, opportunity to practice with feedback, and case-based learning can help minimise the challenges. Also, leadership skills, such as delegation, developing personality, cross-cultural understanding, and managing diversity, can be strategically used to facilitate learning in the field of engineering and better prepare engineers in their transition to management.*

## **INTRODUCTION**

The transition to a management position is a common characteristic of an engineering career (Lloyd, 1991). Engineers who demonstrate competence in carrying out their job often take up extra responsibilities and guide and direct others in performing their jobs. Gradually, they are identified as possible managers and, occasionally, they eventually get promoted. Indicatively, according to a study by executive search firm Spencer Stuart, 33% of S&P 500 CEOs held engineering degrees (Lutchen, 2016).

The transition from a position that involves purely engineering tasks to management is not easy however (Roberts & Biddle, n.d.). Several scholars have identified the challenges of this changeover, which are attributed to the kind of tasks managers and engineers have to tackle, as well as their different training and mindset. As (Hsu, 2017) pointed out, ‘the emphasis on objectivity and facts during engineering education results in problems in dealing with the more vaguely defined problems of management’ to conclude that ‘the problems [in management] are people problems, communication problems, all the things [engineers have] generally learned to devalue as engineers’.

Lack of education in management is one factor that contributes to engineers lacking ‘soft’ skills, which are vital for successful management (Seethamraju & Agrawal, 1999). These gaps are usually identified several years after they attain their formal engineering qualifications, in the middle-to-late career phases (Yeh, 2008). To advance further, engineers express a strong interest for management training, whereas many of them seek post-graduate qualifications through a master’s degree in management or business administration (Batley, 1998). These observations, reemphasise the need to proactively include management education in engineering studies so that engineers are equipped with the right skills prior to facing transition obstacles.

Moreover, the transition challenges are also attributed to personal and contextual factors. Studies in the UK, USA, Germany, New Zealand, France, Japan and Australia, reveal that engineers, their expressed interests, personalities, priorities, professional satisfaction, attitude towards career advancement, status within society, occupational identity, local industrial relations, cultural factors and organisational policies pose different challenges on this transition (Buchanan, 1989; Florman, 1994; Glover & Kelly, 1987; Hill, 1993; Martínez-León et al., 2018; Rynes, 1987; Sakakibara & Westney, 1995; Williams, 1988). These observations call for localised studies, aiming at exploring the challenges of advancing engineers in their own national, cultural and workplace context.

While previous literature has provided valuable insights regarding the possible management-related challenges of engineers, as well as the role of education in this changeover, two important questions seem to persist: ‘what challenges are encountered

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