Abstract

Today's manufacturing industry faces hard competition. To minimize the fluctuations in demand or economic downturns and to reduce labor cost, companies resort to low-cost outsourcing or hiring contract operators. Manufacturing shop floors are always knowledge-intensive environment where highly skilled workforce is led by meisters (experienced and masterful operators or line leaders) with their strong tacit knowledge. Outsourcing provides the benefit of gain in business profitability with trade-off of skill transfer and knowledge inheritance due to high turn-over rate. With the emergence of Industry 4.0 and smart factory concept, externalizing this tacit knowledge and automating tasks using IT systems is a promising solution. Requirements engineering is an essential part of software development. Explicit requirements are usually clearly described and well aware-of by target users. Tacit requirements are hidden or embedded which cover the skills and experience of shop floors' meisters. To complete project in time, on budget, it is essential to fully capture and implement these tacit requirements. This thesis constructs a framework design which integrated ethnography, knowledge externalization process with the tacit requirements elicitation to achieve this goal. A case study of a semiconductor factory is used to illustrate and evaluate this approach.

Keywords: knowledge conversion, Requirements Engineering, ethnography, project management; tacit knowledge