The Effectiveness of Virtual R&D Teams in SMEs: Experiences of Malaysian SMEs

Nader Ale Ebrahim†
Department of Engineering Design and Manufacture, Faculty of Engineering,
University of Malaya Kuala Lumpur, Malaysia

Salwa Hanim Abdul Rashid
Centre for Product Design and Manufacturing, Faculty of Engineering,
University of Malaya, 50603, Kuala Lumpur, Malaysia

Shamsuddin Ahmed
Department of Engineering Design and Manufacture, Faculty of Engineering,
University of Malaya Kuala Lumpur, Malaysia

Zahari Taha
Faculty of Manufacturing Engineering and Management Technology,
University Malaysia Pahang, 26300 Gambang, Pahang, Malaysia

Received, January 12, 2011; Revised, April 12, 2011; Accepted, April 19, 2011

Abstract. The number of small and medium enterprises (SMEs), especially those involved with research and development (R&D) programs and employed virtual teams to create the greatest competitive advantage from limited labor are increasing. Global and localized virtual R&D teams are believed to have high potential for the growth of SMEs. Due to the fast-growing complexity of new products coupled with new emerging opportunities of virtual teams, a collaborative approach is believed to be the future trend. This research explores the effectiveness of virtuality in SMEs’ virtual R&D teams. Online questionnaires were emailed to Malaysian manufacturing SMEs and 74 usable questionnaires were received, representing a 20.8 percent return rate. In order to avoid biases which may result from pre-suggested answers, a series of open-ended questions were retrieved from the experts. This study was focused on analyzing an open-ended question, whereby four main themes were extracted from the experts’ recommendations regarding the effectiveness of virtual teams for the growth and performance of SMEs. The findings of this study would be useful to product design managers of SMEs in order to realize the key advantages and significance of virtual R&D teams during the new product development (NPD) process. This in turn, leads to increased effectiveness in new product development's procedure.

Keywords: Virtual Teams, New Product Development, Survey Finding, Small and Medium Enterprises.

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are major contributors for industrial economies (Eikebrokk and Olsen, 2007). The significance of SMEs in economic growth has rendered SMEs a central element in much recent policymaking (Hoffman et al., 1998). SMEs appear to be appropriate units as network nodes due to their lean structures, adaptability to market evolution, active involvement of versatile human resources, ability to establish subcontracting relations and good technological level of their products (Mezgar et al., 2000). SMEs possess advantages with regards to flexibility, reaction time and innovation capacity, and therefore SMEs play a major role in the new economy (Raymond and Croteau, 2006). Gassmann and Keupp (2007) found that managers of SMEs should invest less in tangible assets and more in areas which would directly enhance their future competitive advantage such as R&D, which would generate knowledge, as well as in their employees’ creativity to stimulate incremental innovations in existing technologies. A crucial trend for enabling the creation and transfer of new
knowledge in and to SMEs is by the development of virtual collaborative environments and networks to increase their innovation abilities as a single unit and capabilities of the network as a whole (Flores, 2006). Virtuality has been presented as a solution for SMEs aiming to increase their competitiveness (Pihkala et al., 1999). Virtual teams reduce time-to-market for new products (May and Carter, 2001). Lead time or time-to-market has been generally accepted as one of the vital keys for success in manufacturing companies (Sorli et al., 2006).

Ale Ebrahim et al. (2009a, 2010) derived the strengths and weaknesses of virtual teams in SMEs in their recent comprehensive reviews. The effectiveness of virtual teams in Malaysian manufacturing SMEs has not been reported, and therefore, the main objective of this study is to present the primary benefits of virtual teams for the growth of SMEs. The scope of this study is limited to the experiences of Malaysian manufacturing SMEs' expertise, which involve virtual teams. In this paper, the effectiveness is related to the performance and collaboration within virtual teams in order to reduce costs and time of R&D projects. This paper presents a portion of the results obtained from an empirical research carried out during the past two years within manufacturing SMEs in Malaysia. In moving towards virtual R&D teaming, an understanding of existing practices is important. In this paper, a review of recent literature pertaining to virtual R&D teams is presented, whereby the primary definition of virtual R&D teams and its relationship with SMEs are introduced. Following this, the research methodology and data analyses are detailed, and the directions for future research are presented in the final section of this paper.

2. VIRTUAL R&D TEAMS AND SMEs

Gassmann and Von Zedtwitz (2003) defined “virtual team as a group of people and sub-teams, which interact through interdependent tasks guided by common purpose and work across links strengthened by information, communication, and transport technologies.” Another definition suggests that virtual teams are distributed work teams whose members are geographically dispersed and their works are coordinated mainly with electronic information and communication technologies (e-mail, video-conferencing, telephone, etc.) (Hertel et al., 2005). Among the different definitions of virtual teams, the following concept is one of the most widely accepted definitions (Ale Ebrahim et al., 2009c): “Virtual teams are small temporary groups of geographically, organizationally and/or time dispersed knowledge workers who coordinate their work, predominantly with electronic information and communication technologies in order to accomplish one or more organization tasks” (Ale Ebrahim et al., 2009b). Virtual R&D team is a form of a virtual team, which includes the features of virtual teams and concentrates on R&D activities. The members of a virtual R&D team utilize different degrees of communication technology to complete the research without space, time and organizational boundaries.

SMEs are not scaled-down versions of large companies as they possess different characteristics which distinguish them from large corporations. SMEs vary across different countries and cultures, and they are independent, multi-tasked and cash-limited as well as based on personal relationships and informality. Additionally, SMEs are managed actively by the owners, highly personalized, largely localized within their areas of operation and are largely dependent on internal sources for financial growth (Perrini et al., 2007). In order to survive in the global economy, SMEs have to improve their products and processes by exploiting their intellectual capital in a dynamic network of knowledge-intensive relations inside and outside their borders (Corso et al., 2003). Therefore, if small firms intend to create a step change in their technological and innovation base, they may have to rethink their approach to cooperation (Hanna and Walsh, 2002). SMEs need to cooperate with external partners to compensate for other competencies and resources. This is especially the case for R&D, in which SMEs face specific problems compared with large firms (Pullen et al., 2008). Levy et al. (2003) stated that SMEs are knowledge creators; however, they are poor in knowledge retention. They need to be proactive in knowledge sharing arrangements to recognize that knowledge has value, and the value added is derived from knowledge exchange (Egbu et al., 2005). Virtual R&D teams can provide such knowledge sharing. There is a general movement towards virtual R&D teams, as virtual R&D teams facilitate the spreading of risks and sharing or costs among a network of companies (Gassmann and Von Zedtwitz, 1999, Kratzer et al., 2005). Hence, virtual teams are important mechanisms for organizations such as SMEs seeking to leverage scarce resources across geographic and other boundaries (Munkvold and Zigurs, 2007).

3. METHODOLOGY

The data for this research was gathered from desk study and survey. Web-based questionnaires were designed and delivered to Malaysian manufacturing SMEs, which included close-ended and open-ended questions. This study clustered one open-ended question. Clustering involves searching the data for related categories with similar meaning. This analysis is known as Thematic Analysis since the main purpose during the start of the analysis is to look for themes. When a set of themes is formed, more advanced analyses can be employed to look for clusters and patterns among them (Abdul Rashid, 2009). In this analysis, any sentences which provide significant meaning were extracted and organized into different categories.