5
Product Development and Collaborative ICT Tools

5.1 Development process context and temporal changes

This chapter offers two new views and implications regarding collaborative ICT tools usage forms in product development processes, through analyses of case studies in the IT, communications, electronics, automotive (including component), machinery, semiconductor, chemical, medical and distribution fields. The first of these views illustrates how collaborative ICT tools are used in the two development processes of developing new and novel products, and upgrading existing products—in other words, ICT tools’ usage is dependent on the product development context. The second of these views describes how ICT tools’ usage differs in each of the phases (or steps) of the new product development process, by focusing on the temporal changes in business processes to see how ICT tools’ usage changes.

Existing Information Systems (IS) research does not describe a lot of experimental study or case analysis from these two points of view. Much of it only consists of empirical studies of usage form snapshots or fixed business details, while research into the relationship of ICT tools to the temporal changes in product development and the contextual details therein remains scant and undeveloped.

This chapter clarifies how diverse project organizations consisting of multifunctional teams spanning different specializations and business functions proactively use collaborative ICT tools to spur the creative and efficient development of new products. It also identifies a pronounced increase in collaborative ICT tools’ usage between various organizations as the pace of change and new product development risk increases.

Furthermore, the chapter describes how companies engage in “ambidextrous R&D management” involving simultaneous “uncertainty
management (exploration)” for new product development, and “management of existing business (exploitation)” for upgrading existing products, and in so doing use different types of collaborative ICT tools to respond to temporal and circumstantial changes that occurred during the development process.

5.2 Organizational and ICT tools’ usage forms in product development

Of course, exploratory activities aimed at new product development present challenges for a company in maintaining its competitiveness. Many high-tech corporations in high-risk industries are directly faced with the challenges of executing imaginative and efficient management to develop new products and services where markets, technologies and the competitive landscape are rapidly changing (uncertainty of success, development costs etc.).

One solution that many high-tech companies have used to promote their exploratory activities is to flatten company hierarchies and form cross-functional teams (CFTs) and project-based organizations with a high degree of integration, into which resources for product development are invested. Although market conditions and the state of technology is contingent to successful new product development with project-based organizations or CFTs, it has been reported that a high level of organizational integration is an effective method of product development when attempting to develop new products in risky or uncertain circumstances (e.g. Gemser and Leenders, 2011).

Multinational corporations (MNCs) (e.g. Bartlett and Ghoshal, 2000; Forsgren, 1997; Nohria and Ghoshal, 1997) create project-based organizations as horizontally integrated structures that are more flexible and flatter than the hierarchies in conventional organizations (e.g. Child and McGrath, 2001; Child and Rodrigues, 2003), because in highly volatile markets and fluctuating technological circumstances, these flexible and autonomous project-based organizations are a suitable system for integrating knowledge both inside and outside the company to bring about new products, services and business models (e.g. Lundin and Midler, 1998; Hobday, 2000; DeFillippi, 2002; Lindkvist, 2004). In these systems, project team members work toward common objectives by collaborating under a fixed timetable (e.g. Henrie and Sousa-Poza, 2005).

As an organizational form, the project team has been applied in a wide range of industries to date. Classic examples include the construction