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The Impact of User Innovation on New Product Development Project Success in Japanese Firms, Comparative Study between B2B and B2C Projects

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Abstract:
This study aims to investigate the impacts of user innovation practice on NPD project success of B2B and B2C projects in Japanese manufacturing firms before Lehman Shock. Specifically, a conceptual model at firm level analysis was proposed, consisting of four phases in which a linear process (1) degree of new product newness to the firm (marketing newness and technical newness); (2) research and development strategy;(3) user innovation (user expertise, user innovation implementation); (4) NPD project success (effectiveness and efficiency). Our model was suggested and tested with structural equation modeling, using the empirical data which was collected from 77 B2B and 112 B2C NPD projects of Japanese manufacturing firms in 2008. Considering the implementation of user innovation, differences between B2B and B2C projects were noticed in terms of the NPD project success. Regarding B2B projects, increasing the level of user expertise, efficient R&D strategy and the degree of product newness make projects stable and efficient, consequently, the success is achieved. As for B2C projects, a high-level of user expertise and frequently user innovation activities are necessary for terms of generating financial and personnel resources, and changes in R&D strategy should be treated carefully according to the degree of product newness conversion.

Keywords: *User innovation, Japanese firms, new product development (NPD) project success, structural equation modeling (SEM), B2B and B2C*

1. Introduction

Since the concept of user innovation was theoretical documented in “the Sources of Innovation”(von Hippel, 1988). Prior literature emphasized the importance of user innovation (Chatterji &Fabrizio, 2007; Shah&Tripsas, 2007), and as a source of novel technologies and products innovation (Finkelstein & von Hippel 1979; von Hippel, 1988).

As a form of innovation, user innovation has been documented in large-scale, multi-industry of firms developing process innovations (de Jong &von Hippel, 2009; Gault & von Hippel, 2009), and surveys was conducted for measuring (Bogers, 2009; de Jong & von Hippel, 2009; Lhuillery & Bogers, 2006). Moreover, positive impact on users as innovators on NPD project success has been established in research and practice (Enkelet al., 2005; Ogawa& Piller 2006; von Hippel, 2005). This means in a wide variety of product domains, that users are a critical and frequent source of NPD project.

Additionally, (Baker et al., 1986; Voss,1985) have suggested that innovative ideas or creating prototypes of innovative products from users, and collaborations (Littler et al., 1998;Mikkolaet al., 2004) with users can be utilized in NPD processes and develop new business models.

However, these empirical studies are based primarily on western firms and focus on industries level. Relatively little works have indicated the relationship between user innovation and NPD project success of Japanese firms. In addition, considering different project types such as B2B (Business to Business) and B2C (Business to Consumer), quantitative research has not been conducted. That means it is not clear, though, whether the factors identified by previous researches can be applied to the industries in Japan.

In this vein, the purpose of this paper is to reveal the similarities and differences between different types of NPD projects regarding the impacts of user innovation on NPD success with quantitative analysis. In particular, we articulate the factors of the degree of product market, technological newness, R&D strategy, user expertise, implementation of user innovation and NPD project success in our model. In the data considered, we collected the empirical data from Japanese manufacturing firms in particular unique period, which is before the economic recession in 2008. Then, we analyze the conceptual model of 77 B2Band 112 B2C NPD projects with partial least squares-structural equation modeling (PLS-SEM)(Hair et al., 2014; Hulland, 1999).

The paper contains four sections. We first introduce the background of research in section 1. In section 2, we develop the hypotheses and conceptual model which are based on the results of literature review. Section 3 describes research method. In section 4, we present the model testing results and SEM analysis results. Discussion and conclusions are made in section 5.

2. Hypotheses Development

2.1. User Expertise

From the user 's perspective, as key collaborative partners (Howells& Tether, 2004). Mullins and Sutherland (1998) identified that potential customers cannot easily articulate needs to a new product concept. Whereas, Fuchs and Schreier (2011) revealed that firms empowering their customers during NPD enhance competitive advantage in the market place.

Specifically, customers are so-called ‘lead users’-at the leading edge and early phases of innovation projects, sufficiently well innovative and motivated to make significant contributions to the NPD or services have become important (Barabba& Zaltman, 1991; Herstatt & von Hippel, 1992; Lilien et al., 2002; von Hippel, 1988; Zaltman, 2003).Moreover, von Hippel (1986) argued that lead users contributed to the design and development of products. At new product idea generation phase, several published studies have reported that lead user-centered approach played a critical role (Franke & von Hippel, 2003; Herstatt & von Hippel, 1992; Lilien et al. 2002; Morrison et al., 2000; Urban & von Hippel, 1988. Lilien et al. 2002) also found that lead user approach significantly positive impact on the newness of innovation, the expected turnover, the market share, and the strategic importance of 3M Company.

From the firm's perspective, recent studies have identified that lead users with high level of innovativeness characteristics such as, being ahead of a target market trend, high expected benefits, user expertise and motivation, extreme user needs as well as opinion leadership should be integrated into the firm’s NPD process (Bilgram et al., 2008; Marchi et al., 2011).Not only lead users, ordinary users can also provide valuable ideas for NPD (Kristensson et al., 2004). Futhermore, Poetz and Schreierr (2012) further explicitly studied the value of user versus professional ideas emerging in a crowd sourced NPD process, showed that, while ideas developed by professionals in the firm tend to be more feasible, user ideas exhibited a higher degree of novelty and promise clearer customer benefits.

2.2. User Expertise and User Innovation Implementation

The literature on user innovation generally defines users as economic actors— which can be both firms and consumers—that expect to benefit from using a certain technology, in contrast to selling it (von Hippel, 2005). Based on previous research (Franke & Shah 2003; Lüthje et al. 2002; Morrison et al., 2000; Morrison, et al., 2004), a strong correlation between lead users and user innovation was found. Zu’bi (2016) measured lead users collaboration in NPD by multiple regression analysis, showed that lead users’ collaboration in NPD significantly affected innovation behavior. Moreover, there is a significant support for the link between the amount of experience and knowledgeable users and user innovation implementation (Franke&Shah, 2002; von Hippel, 1988; Lu¨thje et al., 2002). The reason is that expert users in a given product field have correspondingly lower innovation-related costs and are more likely to innovate (Lüthje, 2004). Furthermore, von Hippel (2005) summarized that user innovations in general, as well as commercially attractive ones in particular, tend to be developed by lead users.

Therefore, we hypothesize that,

- Hypothesis 1The user innovation implementation is positively affected by high level of user expertise.

2.3. NPD Project Success

According to Verworn et al.(2008), there are two key factors as the measurement of success, efficiency and effectiveness. The NPD project efficiency is a function of the degree to which the NPD project can economically transform inputs into outputs, respondents assessed the degree of agreement between financial and personnel resources (Dvir &Lechler, 2004). Effectiveness is related to a corporate image, target market share, and customer satisfaction, and emphasizes a long-term outcome (Chen and Lin, 2011).

In this study, efficiency refers to cost-efficiency of technologies; required technological support; quality of applied technologies; lead time efficiency, while effectiveness refers to meet profit targets, sales volume targets, market share targets and customer’s satisfaction.

2.3.1. NPD Project Efficiency and Project Effectiveness

The key factors influencing NPD effectiveness such as NPD team’s creativity (Amabile,1997; Im &Workman Jr., 2004; Martins &Terblanche, 2003; McAdam and McClelland, 2002); structural capital (Edvinsson & Sullivan, 1996; new product vision (Cox et al.,2003; Lynn & Akgün, 2001); new product competitive advantages (Chen & Lin, 2011; Swink & Song, 2007; Zhan et al, 2009). Among other factors, interpersonal trust has been a major factor for both efficiency and effectiveness of NPD (Bstieler, 2006; De Dreu, 2006; Iacono& Weisband, 1997).

Several empirical researches showed a strong correlation between success factors, the effectiveness of the NPD projects is positively affected by the efficiency of NPD projects (Dvir &Lechler, 2004; Verworn et al., 2008; Verworn, 2009). Thus, here comes hypothesis 2,

- Hypothesis 2 The effectiveness of NPD project is positively affected by NPD efficiency.

2.4. User Innovation and NPD Project Success

Not only the users with high level of capability and motivation are prompted to become the initial developers of NPD (Zu’bi, 2016), users who have previous knowledge and stored experience in creative problem solving are also concerned (Marsh et al., 1999; Perkins,

1988; von Hippel,1986).Empirical researches have illustrated that experienced users and user's needs (Hars & Ou, 2002; Lakhani & Wolf, 2005)in industrial markets often played a dominant role in NPD. Meanwhile, studies of the origins of successful innovation have indicated that users, have been shown to play an important, and sometimes dominant, role in the innovation process across a wide range of industrial sectors (Gardiner & Rothwell, 1985; Spital& Francis,1979; Shaw& Brian, 1985).
Then, Füller (2006) implied that user innovation was one of the motivations for consumers engage in NPD because they can benefit from using their innovation. Accordingly, Veryzer and Mozota (2005) based on their conceptual framework (see in Figure 1), and examined the user-oriented design (UOD) contribute positively to NPD.

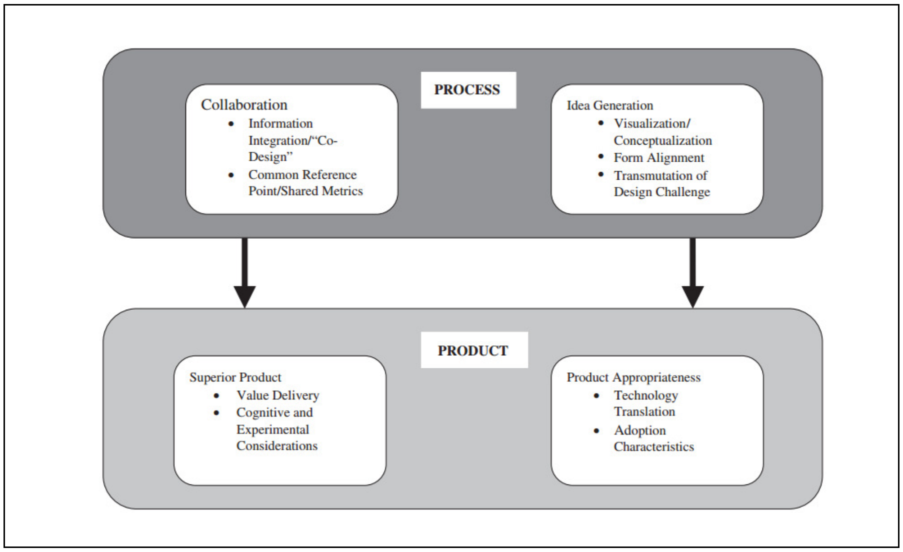

Figure 1: User-Oriented Design Impact on NPD in Veryzer and Mozota (2005)

As user integration has been emphasized in a study of essential activities in NPD. There might be the strong causal relationship between the user innovation and the NPD project success. However, little was known about the relationship between user expertise and efficiency or effectiveness of NPD. Hypotheses 3 and 4 are as follows,

- Hypothesis 3 The efficiency of NPD project is positively affected by highlevel of user expertise.
- Hypothesis 4a User innovation implementation is positively related to the efficiency of NPD project.
- Hypothesis 4b User innovation implementation is positively related to the effectiveness of NPD project.

2.5. Degree of Product Market, Technological Newness

Several studies clarify that the difficulty of a project could change according to the product newness or innovativeness (Verworn et al., 2008; Verworn, 2009; Mammetseyidov &Nagahira, 2015). The degree of newness is consist of 11 items (Booz, Allen Hamilton,1982). Regularly, highly innovative products are signified as having a high degree of newness (Kleinschmidt & Cooper's,1991), notably as market and technological to the perspective of the firm (Garcia & Calantone, 2002). Similarily, according to (Meyer &Roberts, 1984; 1986), the product newness is consists of technology newness and market, based on the conditions existent at the time of each product's development. Moreover, technological and marketing resources were found as newness elements of new products innovation (Verma, 2010).
In this study, we adopt 'degree of market newness' (difference in a target market, distribution channels, and advertisement of the new product), 'degree of technical newness' (difference in technical components, product lines, processes and knowledge required) to analyze.

2.5.1. Degree of Product Market, Technological Newness and User Innovation

The degree of newness of a product determines how much information must be gathered by a firm to develop a new product. Ziamou (1999) suggested that technology-driven innovations necessitate a novel user input to provide an existing functionality that consumers are already familiar with. The specific user needs to be required customize a high degree of technological and market newness (Meyer & Roberts, 1984). Asusers can be functionally fixed to their current use context and therefore unable to develop radically new ideas (von Hippel,1986). On the other hand, it is difficult for users to validly evaluate concepts and prototypes of the high degree of technological newness (Urban et al., 1996; Veryzer,1998).
Thus, based on previous research, the degree of a product newness and user innovation activities are might strongly correlated. We hypothesize that,

- Hypothesis 5aThe high-level user expertise is positively affected by the high degree of product market, technological newness.
- Hypothesis 5bThe user innovation implementation is negatively affected by the high degree of product market, technological newness.

2.5.2. Degree of Product Market, Technological Newness and NPD Project Success

The degree of newness or degree of innovativeness of an NPD project was identified as a key contextual factor (Griffin & Page, 1996; Khurana &Rosenthal, 1998; Moenaert et al., 1995; Verworn et al., 2008; Verworn, 2009; Nagahira et al., 2015).Several studies provided the negative link between the degree of product market, technological newness and the NPD project success (Salomo et al., 2007; Verworn, 2009; Mammetseyidov & Nagahira, 2015). Researchers state that the higher the degree of newness more uncertainty exists in the NPD process. Consequently, the difficulty of execution results in higher degree of failure.

Therefore, we hypothesize that,

- Hypothesis 6aThe efficiency of NPD project is negatively affected by the high degree of product market, technological newness.
- Hypothesis 6bThe effectiveness of NPD project is negatively affected by the high degree of product market, technological newness.

2.6. R&D Strategy

Several empirical studies (Gupta et al.,1986; Lu & Chang, 2002;Song & Thieme, 2006)have defined that R&D strategy is an essential ingredient for achieving superior R&D performance of NPD.

2.6.1. Degree of Product Market, Technological Newness and R&D Strategy

(Kohli& Jaworski,1990; Bacon et al.,1994; Brockhoff, 2003; Callahan & Lasry, 2004) suggested that a higher degree of product newness reduced innovation risks and more precision in resource spending. Loch and Christoph (2000) demonstrated that a new market or new technology can be attacked by a task force led by R&D. Furthermore, technological newness was related to a content of R&D in the products (Steenhuis & de Bruijn,2006).

Therefore, we hypothesize that,

- Hypothesis 7Degree of the product market and technological newness are positively related to R&D strategy.

2.6.2. R&D Strategy and User Innovation

Steinhoff and Breuer (2009) introduced a systematic open R&D and innovation approach called user-driven innovation. Gambardella et al. (2015)designed a model of R&D strategy with user innovation activities, revealed that producers' optimal R&D strategies yield a suboptimal division of innovative labor between users and producers at the societal level.

Therefore, we hypothesize that,

- Hypothesis 8R&D strategy is positively related to user innovation implementation.

2.6.3. R&D Strategy and NPD Project Success

A relatively high rate of NPD Project success is originated from marketing and customers as compared to ideas originating from R&D, suppliers, and management (Souder, 1987). Cooper and Kleinschmidt (1995) demonstrated the three cornerstones of NPD success; Process, Strategy, and Resources. A successful NPD process meets market demands and needs with an appropriate R&D Strategy (Lu & Chang, 2002;Song & Thieme, 2006). Fain et al. (2011) based on the model developed by Guptaet al. (1986), conducted a Partial Least Squares (PLS) analysis on Slovenian companies with different NPD characteristics and confirmed that NPD success is influenced by the level of R&D. Similarly, Ashok et al.(2014) tested at firm level with SEM demonstrated that the internal resources such as R&D management mediate the impact of the end-user collaboration and breadth of external collaboration on NPD.

Therefore, we hypothesize that,

- Hypothesis 9a The efficiency of NPD project is positively affected by R&D strategy.
- Hypothesis 9bThe effectiveness of NPD project is positively affected by R&D strategy.

The hypotheses are summarized in in Figure 2. In particular, we contributed to illuminating the importance of factors such as R&D and the degree of new product's newness, which has an effect on the user innovation. The factor user innovation in this model refers to user expertise and the implementation of user innovation. Two factors for NPD success at the project level are considered, efficiency and effectiveness (Pinto & Slevin, 1988; Hauschildt, 1991; Ernst, 2001; Verworn, 2009).

In addition, the model proposes three key front end factors that determine NPD projects' effectiveness and efficiency, the degree of newness, R&D strategy, and the user innovation. Based on research framework, same hypotheses are employed for both B2B and B2C projects in order to revise the similarities and differences as follows.

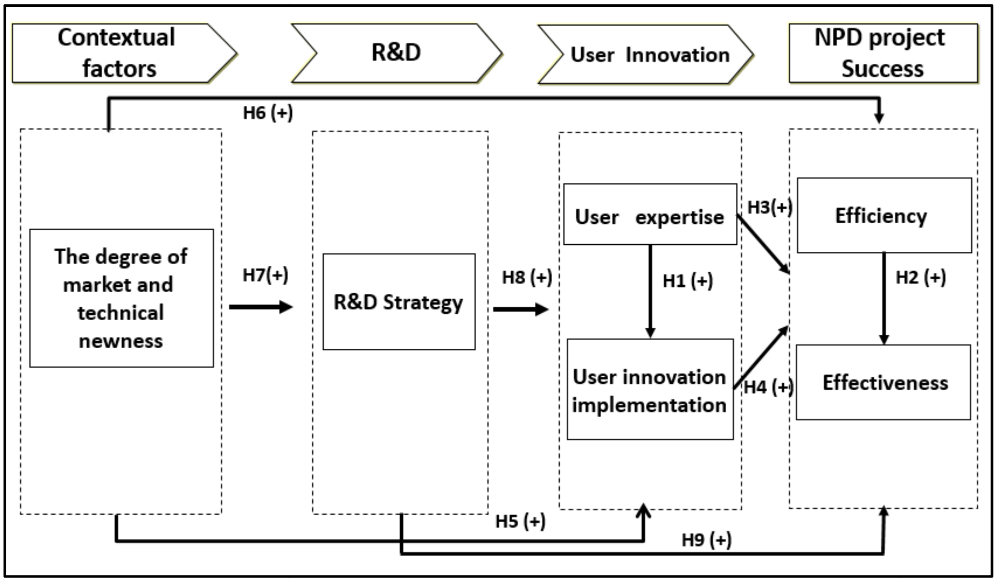

Figure 2: Research framework

3. Research Methodology

3.1. Sample and Data Collection

The hypotheses were tested by analyzing a sample of data, collected from Japanese manufacturing firms in 2008 (189 usable samples out of 351 respondents with a response rate of 53.8%). From the usable samples, there were 77 B2B projects and 112 B2C projects. For the survey items, respondents were given the survey to answer the indicator questions on a 7- point Likert-type scale of 1 ("strongly disagree") to 7 ("strongly agree").

3.2. Firm and Project Characteristics

In this section, descriptive statistics about B2B and B2C NPD projects were reported. The B2B firms participating in our study had between ranging from 1,061 to 3,544,900 million yen (Figure 3) and annual sales ranging from158 to 34,090 employees (Fig.5)
As for B2C firms, they had annual sales ranging from 2,380 to 20,000,000 million yen (Figure 4) and between 70 to 32,8645 employees (Figure 6).

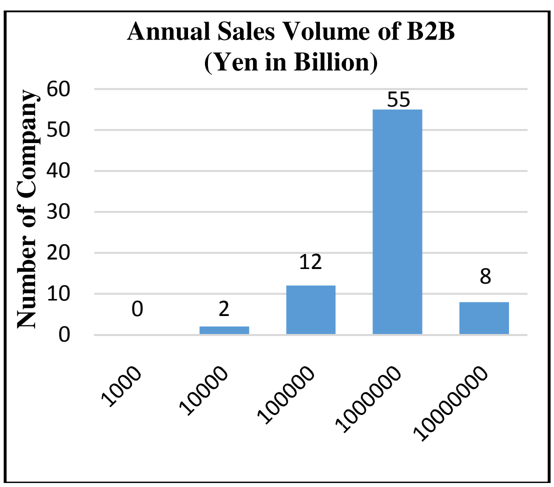

Figure 3: Annual Sales Volume of B2B

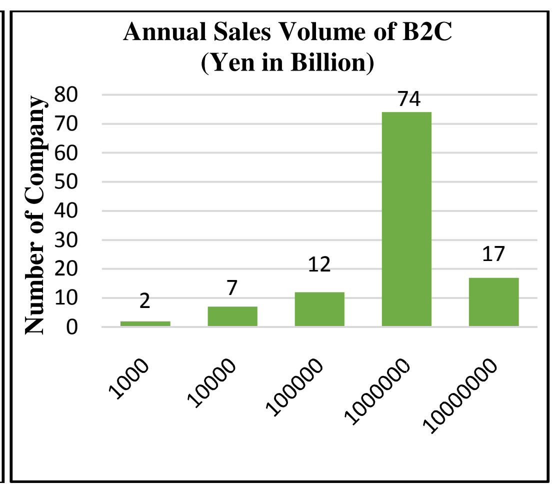

Figure 4: Annual Sales Volume of B2C

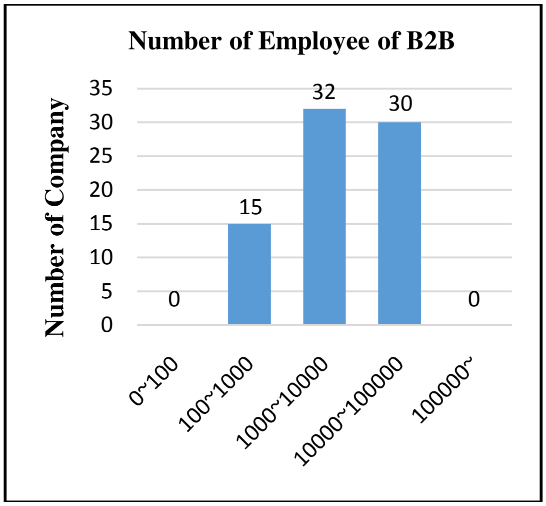

Figure 5: Number of employees of B2B

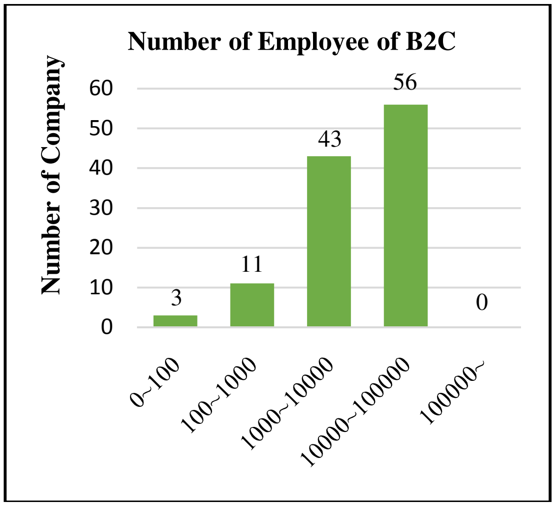

Figure 6: Number of employees of B2C

3.3. Research Method

We inferred that Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM approach (Smart PLS 2.0 statistical software package), as against Covariance-based (CB)–SEM in our study for the following reasons. Firstly, PLS trades in optimality for consistency in the statistical inference (Hair et al.,2013a; 2013b). Secondly, PLS is distribution free and allows for the estimation of the relationship between latent variables for small sample size (Chin &Newsted, 1999; Henseler et al., 2009). Recommendations of PLS for the minimum number of observations range from 30 to 100 cases is distribution-free, and achieves higher statistical power with smaller samples. Moreover, PLS supports a complex model design and is more appropriate for the exploratory nature of our study (Lee et al., 2006; Ringle et al., 2012)

4. Model Testing ans Results

4.1. Measurement Assessment

Assessment of our measurement models includes Cronbach's alpha, composite reliability to evaluate internal consistency (Chin, 1998), individual indicator reliability, and average variance extracted (AVE) greater than 0.5 is preferable to evaluate convergent validity (Henseler et al., 2009). The results of these calculations are shown in Table 1 and Table 2. The common quality requirements were met by almost each of the constructs. Thus, it is can concluded that the measurements are reliable for data of Japanese firms.

Construct	**Measurement item**				
	AVE>0.5	Composite Reliability>0.7	R²	Cronbachs Alpha>0.6	Communality >0.5
Newness	0.656	0.851	0	0.739	0.656
R&D strategy	0.815	0.898	0.137	0.776	0.815
User expertise	0.663	0.922	0.719	0.897	0.663
User innovation implementation	0.572	0.941	0.648	0.931	0.572
Efficiency	0.688	0.946	0.648	0.934	0.688
Effectivess	0.674	0.799	0.313	0.6	0.674

Table 1: Measurement Assessment B2B (Calculation with Smart PLS 2.0)

Construct	**Measurement item**				
	AVE>0.5	Composite Reliability>0.7	R²	Cronbachs Alpha>0.6	Communality >0.5
Newness	0.583	0.848	0	0.771	0.583
R&D strategy	0.610	0.824	0.224	0.704	0.610
User expertise	0.549	0.878	0.003	0.832	0.589
User innovation implementation	0.577	0.904	0.661	0.873	0.577
Efficiency	0.564	0.911	0.404	0.888	0.564
Effectivess	0.674	0.840	0.190	0.662	0.727

Table 2: Measurement Assessment B2C (Calculation with Smart PLS 2.0)

4.2. Result of Direct and Total Effects

Bootstrapping analysis was undertaken to ascertain cross loadings to get *t*-values (Davison& Hinkley, 1997; Efron & Tibshirani, 1993; Henseler et al., 2009), using 5000 sub-samples as prescribed by Hair et al. (2013a). With the analysis of the measurement model being satisfactory, it was then proceeded to analyze the structural model, the analysis results of total effects are displayed in Table 3 and 4, which summarizes the results by showing *t* values and shows the estimated path coefficients, the corresponding significance levels (indicated with asterisks) for correlation coefficients, * p<0.05; ** p<0.01; *** p<0.001. These results provide empirical support for 6 of 13hypotheses.

Hypotheses	**Direct effects**				**Total effects**			
	Path Coeff.	Standard Error	*t* Value	Sig. Level	Total effects	Standard Error	*t* Value	Sig. Level
H1 User expertise->UI	0.858	0.035	24.196	***	0.858	0.035	24.196	***
H2 Efficiency->Effectiveness	0.115	0.156	0.794		0.115	0.156	0.794	
H3 User expertise->Efficiency	0.362	0.149			0.7444	0.053	13.999	***
H4a UI-> Efficiency	0.448	0.160	2.887	**	0.448	0.160	2.887	**
H4b UI->Effectiveness	0.056	0.147	0.339		0.106	0.118	0.907	
H5a Newness-> User expertise	0.150	0.117	1.241		0.150	0.117	1.241	
H5b Newness->UI	-0.099	0.064			0.036	0.125	0.225	
H6a Newness-> Efficiency	0.087	0.075	1.090		0.192	0.117	1.556	
H6b Newness ->Effectiveness	0.368	0.111	3.248	**	0.488	0.080	5.941	***
H7 Newness -> R&D strategy	0.376	0.118	3.128	*	0.376	0.118	3.128	**
H8 R&D strategy->UI	0.017	0.055	0.34		0.054	0.050	1.072	
H9a R&D strategy-> Efficiency	0.103	0.072	1.414		0.019	0.070	0.279	
H9b R&D strategy-> Effectiveness	0.247	0.100	2.407	*	0.259	0.100	2.545	*

Table 3: Measurement assessment B2B (Calculation with Smart PLS 2.0)

Hypotheses	**Direct effects**				**Total effects**			
	Path Coeff.	Standard Error	*t* Value	Sig. Level	Total effects	Standard Error	*t* Value	Sig. Level
H1 User expertise->UI	0.812	0.035	22.956	***	0.812	0.035	22.956	***
H2 Efficiency->Effectiveness	0.430	0.117	3.633	***	0.430	0.117	3.633	***
H3 User expertise->Efficiency	0.284	0.134	2.099	**	0.584	0.070	8.242	***
H4a UI-> Efficiency	0.369	0.133	2.779	**	0.369	0.133	2.779	**
H4b UI->Effectiveness	-0.208	0.107	1.900		-0.049	0.120	0.392	
H5a Newness-> User expertise	0.051	0.115	0.485		0.051	0.115	0.485	
H5b Newness->UI	0.007	0.073	0.130		0.015	0.125	0.151	
H6a Newness-> Efficiency	0.128	0.087	1.457		0.111	0.128	0.936	
H6b Newness ->Effectiveness	-0.249	0.122	2.139	*	-0.259	0.120	2.126	*
H7 Newness -> R&D strategy	-0.487	0.090	5.245	***	-0.487	0.090	5.245	***
H8 R&D strategy->UI	0.070	0.073	1.044		0.070	0.073	1.044	
H9a R&D strategy-> Efficiency	0.073	0.095	0.649		0.097	0.0977	0.920	
H9b R&D strategy-> Effectiveness	0.099	0.121	0.733		0.128	0.130	0.852	

Table 4: Measurement assessment B2C (Calculation with Smart PLS 2.0)

5. Discussion

Considering the results, it can be seen that five hypotheses (Hypothesis 1, 3, 4a, 6b and 7) were supported for both B2B and B2C projects. For both projects, the direct and total effect of user expertise has a strong positive impact on the implementation of user innovation (Hypothesis 1). As a result, the efficiency was positively affected by the implementation of user innovation and user expertise respectively (Hypothesis 3 and 4a).

The efficiency has a direct and total positive effect on the effectiveness statistically significant in the B2C project (Hypothesis 2). In contrast to, the result was not supported by theB2B project. A possible explanation could be the culture of Japanese firms. Most Japanese firms evaluate the projects with efficiency (reaching planned milestone, the absence of additional resource allocation and so on) rather than effectiveness. In the B2C project, the nature of a seller-customer relationship focuses on making a profit by selling products and services to them (Dowling, 2002). Whereas B2B project prefers to use longer-term efficiency for evaluating effectiveness of their marketing activities (Karliceket al., 2014)

Expected positive direct and total effect of the degree of product market, technological newness and effectiveness can be noticed (Hypothesis 6b). It was supported by two stars (**) for B2B projects, while the B2C project was supported by the negative relationship with one star (*) for. Meanwhile, the effectiveness of NPD project is positively affected by R&D strategy only in the B2B project. A possible explanation could be highly product newness leads to organizational change. Substantial changes tothe organization increase the communication costs. Consequently, the project difficulty is heightened. Thus, B2C projects might not challenge to new domains.

Moreover, the positive relationship between the degree of product market, technological newness and R&D strategy was confirmed for the B2B project (Hypothesis 7). Contrary to expectation, for the B2C project, this relationship was negative significantly. Thus, organizational changes are conducted according to the market and technology.

On the other hand, six hypotheses (Hypothesis 4b, 5aand b, 6a,8, 9a) were rejected for both projects.

The result of hypothesis 4b revealed that the user innovation implementation did not lead to the effectiveness of both projects. It was against with the economic benefit of a customized solution in the B2B project is apparent than the B2C project (Franke & Piller 2004). At the same time, in both projects, the effect of the degree of product market, technological newness and R&D strategy were not proved to be significantly affecting the user innovation and efficiency (Hypothesis 5a and b, 6a, 8 and 9a).

6. Conclusion

In this study, a comparative study was carried out to investigate the direct and indirect impacts of user innovation implementation and level of user expertise on NPD projects success of B2B and B2C projects in Japanese manufacturing firms. Thus, firstly, based on the systematic literature reviews, we proposed the theoretical framework consist of (1) degree of product market, technological newness, (2) R&D strategy, (3) user expertise, user innovation implementation and (4) NPD project success as efficiency and effectiveness.

Secondly, from the results of the SEM analysis, we find the high-level of user expertise have a significant positive effect onuser innovation implementation and efficiency respectively for both projects. However, as for the relationship between efficiency and effectiveness, we found a significant difference between B2B and B2C projects. A positive impact of efficiency on effectiveness could be noticed but this is not the case for B2B.

Thirdly, empirical results provide information that the positive correlation of degree of newness of NPD projects with R&D strategy. However, it resulted in negative effects in the B2C project.

Overall, results described the user innovation of B2B and B2C projects in Japanese manufacturing firms had a different impact on NPD project success. Regarding B2B projects, increasing the level of user expertise, R&D strategy and the degree of product newness make projects stable and efficient, consequently, the success is achieved. With regard to B2C projects, the high-level user expertise and frequently user innovation activities are necessary for terms of generating financial and personnel resources, and changes in R&D strategy should be treated carefully according to the degree of product newness conversion.

These results contribute to understanding the relationship between the user innovation and NPD project management according to characteristics of the products of Japanese firms.

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