INVOLVING EXTERNAL USERS AND THIRD PARTIES IN THE NEW PRODUCT DEVELOPMENT PROCESS

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New product development (NPD) is increasingly being viewed as a dynamic interplay between two or more actors. The basic tenet of this relationship is that linkages with other actors help firms create value by combining resources, sharing knowledge, increasing speed to market, reducing risk and in general creating a competitive advantage that is likely to be sustainable. Despite the increasing importance attributed to the involvement of external actors such as users and suppliers in NPD, little is known about current practice in the Irish context. Based on empirical evidence collected from 572 Irish manufacturers, external cooperation remains latent and relatively unused as a mechanism for Irish firms to develop new products. Implications of these findings for managers and researchers are discussed.

Introduction

In aggregate terms, Ireland lags considerably behind other EU and OECD countries in terms of new product development (NPD) activity. For example, Irish levels of expenditure on research and development (0.97%) are still well below the 2003 EU average of 1.13 per cent of GDP and the OECD average of 1.45 per cent, placing Ireland in 15th place out of the 30 EU/OECD countries (Forfás, 2005a). Ireland's low level of research and product development activity becomes even more evident when compared to the leaders in Europe and the OECD: Sweden (3.30), Finland (2.40), France (1.36), United States (1.79), UK (1.26). There is current widespread agreement at government and industry level that Irish manufacturers need to become more innovative (Forfás, 2005a). Indeed, it is only through the creation of new products that most Irish firms can hope to sustain growth and profitability in the long term (Forfás, 2004a). However, NPD appears to be a difficult task for Irish companies which is illustrated by the fact that although Irish firms spend approximately two-thirds of research and development expenditure on new products and process development (Forfás, 2005a), the output in terms of success, that is patents registered, is regarded by most as being unacceptably low (Forfás, 2004b, 2005b). Indeed, the complexity of product development is exacerbated by the ever-increasing costs of research and development, the shortening product lifecycles, declining markets, and the increasingly sophisticated demands made by customers on suppliers (Thomas, 1993; Crawford, 1997; Bessant, 2003). Faced with what is clearly a risky and uncertain process, many practitioners and academics are no longer viewing NPD as being the sole preserve of a single company, but rather from a relationship marketing perspective whereby innovation is viewed as an interplay of external relationships with strategic partners such as users (both consumer and industrial), suppliers, research institutes and even competitors.

Due to the relatively small size of Irish firms when compared to our international competitors, the importance of collaborating with external parties to achieve a competitive advantage is made even more critical. Indeed, many government initiatives aim specifically to involve external partners in new product development, for example, Science Foundation Ireland supports the creation of CSET (Centres for Science, Engineering and Technology: Campus–Industry Partnerships) designed to support biotechnology and ICT university–industry innovation and research partnerships. The National Linkage Programme (NLP) sought to develop linkages between multinational companies based in Ireland and indigenous sub-suppliers. Enterprise Ireland's Research Technology and Innovation (RTI) grant schemes fund collaborations between companies and between companies and third level institutions or research bodies. However, as noted by Forfás (2004d), there is a lack of data on the extent to which Irish manufacturers involve external parties in their NPD process. Existing evidence is mainly anecdotal in nature such as the number of RTI funding applications that have been taken up (Forfás, 2004d). One notable exception is Ledwith

(2000) who found low external involvement in NPD using a methodology comparable to this study. However, the focus of that study was on one particular industry, electronic hardware and the sample size was small (n = 36), making generalisations across industries difficult.

The purpose of this study is to report on the practice of involving external parties in the NPD process of Irish manufacturers. This is the first comprehensive study with a sole focus on external involvement in NPD processes in Ireland. It answers key questions such as whether Irish manufacturers are adopting a collaborative model, the type and number of collaborating partners that are involved, the reasons for their involvement and the stages of involvement. Without a clear understanding by policy makers of the current practice being adopted by manufacturers, the translation of worthwhile policies into practice is severely restricted.

The rest of the paper is organised as follows. First, a discussion on the most salient aspects of the literature that led to this investigation is presented. Thereafter, the methodology employed in this research is discussed and subsequently, the results of that analysis are presented. In the concluding section, managerial and further research implications are explored. Limitations and future directions for research are also discussed.

User and Third Party Involvement

Over the years, NPD has been studied from a number of different perspectives. Historically researchers perceived product development as the sole province of the manufacturing firm (Tidd et al., 2001). The manufacturer was viewed as the dominant source of innovation, the party that both initiated and controlled the product development process. However, in the late 1970s a new research impetus occurred in the new product development literature with the publication of Eric von Hippel's two seminal investigations (1976, 1977) in which he advocated the involvement of users in the idea generation stage of the new product development process. Von Hippel's conceptualisation of a customer active paradigm (CAP) (1978) gave focus to a new generation of researchers and to an emerging field of study into the involvement of users not only in the creation of ideas but in the whole new product development process (Foxhall and Tierney, 1984; Shaw, 1985; Voss, 1985; Parkinson, 1982; Biemans, 1991; Håkansson, 1987; Gruner and Homburg, 2000). In addition, a group of international researchers, the International Marketing and Purchasing Group (IMP) argued that characterising the product development process as being a dichotomy between manufacturer and customer active paradigms is too narrow a focus (Håkansson, 1982; 1987). Instead they argued that a combination of these two views should cover the whole spectrum of product development and proposed that the development of new products should be seen as an interplay between a number of actors and so taking place within networks.

The basic tenet of NPD from a relationship marketing viewpoint is that linkages with other actors help firms create value by combining resources, sharing knowledge, increasing speed to market, reducing risk and in general creating a competitive advantage that is likely to be sustainable (Håkansson, 1987; Dwyer et al., 1987; Anderson and Narus, 1990; Buttle, 1996; Ford, 1997; Dyer and Singh, 1998; Barringer and Harrison, 2000). In the words of Ford, 'relationships produce something that neither of the two can produce in isolation and something that cannot be easily duplicated' (1997; 152). From an NPD perspective, the potential rewards associated with adopting a relationship marketing concept have been well documented. Empirical analysis from numerous research studies supports the involvement of external parties in the NPD process (see, for examples, Håkansson, 1987; Gemunden et al., 1992, 1996; Bonaccorsi and Lipparini (1994); Campbell and Cooper, 1999; Lilien et al., 2002). In one of the classic studies on network involvement, Biemans (1992) studied the Dutch medical industry and found collaborative relationships with partners such as governments and research institutes stimulated innovation. He also found that through interaction with a major customer or third party, a company can develop products and services that fit the needs and wants of the market better, share development costs, gain access to new technologies, enjoy increased development efficiency which in turn results in reduced time to market. Similarly, Imai and colleagues (1985) provided evidence from five case studies of Japanese firms that supplier involvement in the product development process resulted in increased development effi-

Table 1 **Respondent Sample Details**

CHARACTERISTICS	RESPONDENTS (%)	CHARACTERISTICS	RESPONDENTS (%)
Nature of business		*Turnover (2003)*	
Pharmaceutical/chemical	18.4	Under €5 million	65.4
Electrical and electronic engineering	14.5	€5 million–€9.99 million	17.7
Industrial machinery	28.8	€10 million–€19.99 million	9.3
Food, tobacco & beverages	11.7	€20 million–€49.99 million	5.1
Metal manufacture	11.4	€50 million–€99.99 million	.8
Timber, furniture & paper	8.9	€100 million plus	1.7
Telecommunications	4		
Others	2.3	Companies engaged in continuous NPD	71.3
Number of Employees		Companies engaged in occasional NPD	28.7
1–50	66.1	Companies with formal NPD departments	37.6
51–100	15.7		
101–200	10	*New Product Development Activity*	
201–500	5.8	Developing new product	64.2
501–999	1.5	Improving existing products	66.4
1000 plus	.9	Developing line extensions	12.2
		Developing products for retargeted use	4.9
Ownership			
Irish owned	80		
Foreign owned	20		

(n=572)

ciency, reduced time to market and faster response to competitor moves. Buchel et al. (1998) advocated that the involvement of competitors in the NPD process diversified and spread the risk, while also reducing innovation and development cycles. Research conducted by the IMP has also provided supporting evidence that successful product development is significantly correlated to relationships with other parties (Håkansson, 1987). Indeed, much of the literature on the involvement of external parties in the development process has been positive and generally implies that contact with users and third parties early on in the development process results in a higher probability of commercial success.

The Study

The research presented in this article is based on a structured telephone survey used to determine how widespread is the practice of involving external parties in the NPD process. Companies included in this research were selected from a Kompass Ireland database, which consisted of 2842 manufacturing companies dispersed across eight industries. Managing directors and NPD managers were selected as key informants for this study because of their high level of knowledge about the company and its NPD activities (Rindfleisch and Moorman, 2001). The survey was conducted over a three-month period in 2003, and to ensure high contactability of respondents call-backs were made at different times and on different days. After five failed attempts at contact, the company was considered a non-respondent. From the database, 1400 companies agreed to be interviewed of which 638 (46%) were actively involved in new product development. Only those companies that engaged in NPD activities in Ireland were included in the analysis. This process eliminated 66 firms, giving a population total of 572 (638 – 66) firms. The high response rate and the high proportion of firms engaged in NPD is an excellent indicator of the robustness of this studies findings.

Table 1 presents the analysis of the respondent details across the eight industry categories. The largest number of firms are in the pharmaceutical/chemical, electronic and electrical engineering and industrial machinery sectors (350 firms in total) which reflects the overall higher number of manufacturing firms in these sectors (CSO, 2003). The type of development projects that respondents engaged in are also detailed. Indeed, characteristic of this sample is the strong focus on innovation and product improvement (64.2 and 66.4%), which is encouraging for policy makers in terms of future competitiveness and reaching international standards where the country currently lags. However, line extensions and products

Table 5 Percentage of Firms Involving External Parties

	Number	*(%)*
Engaged in collaboration	326	(57)
Collaborated with one external party	207	(36.2)
Collaborated with two external parties	85	(14.9)
Collaborated with three external parties	20	(3.5)
Collaborated with four or more external parties	14	(2.4)

(n=572)

Table 3 External Parties Involved in the New Product Development Process

Type of external actor	*Number*	*(%)*
Users from the consumer market	171	(29.9%)
Users from the business market	112	(20.9%)
Competitors	49	(8.7%)
Suppliers	124	(21.7%)
Research Institute	24	(4.2%)
Government	19	(3.3%)
Other parties	6	(1.2%)

(n=572)

targeted for new uses appear to be under-utilised by this study's respondents. Another noteworthy characteristic of the respondents in this study is the lack of formal NPD departments (37.6% of the firms). However, this is probably a function of small size of the Irish firm (66% under 50 employees). Nevertheless, 71.3 per cent of the sample is engaged in continuous new product development. Ownership, employee and turnover figures are also provided. These figures did not have any significant effect on the extent of external involvement in NPD.

Research Findings and Discussion

The data presented in Table 2 shows that the percentage of Irish manufacturers involving external parties in NPD activities is relatively high (57%) and at the outset, a very encouraging trend. It tends to indicate that Irish manufacturers are perhaps heeding the initiatives of the government and involving external parties in their product development process. Nevertheless, on deeper inspection, this finding may be somewhat misleading. The majority of firms tend to involve only one external party in their development process (36%) and even when multiple actors are involved, the respondents indicated that it is the same select few who are continuously used in all their development projects. This display of ossification is in itself a worrying phenomenon because it means that in most instances, Irish manufacturers make the mistake of limiting themselves to just one type of cooperation partner as a reference for development, production and universal product acceptance. Indeed, research in psychology and related fields has consistently shown that familarity of experience beyond a point has a negative effect on innovation, in that ideas become stagnant and stultification and entropy emerge among project members (Esser, 1998; Baron & Byrne, 1987; Katz, 1982; Janis, 1972).

Table 3 profiles the external partners used in the NPD process of the firms surveyed. The main external actors in the NPD process are users and as expected this is high in both consumer and business-to-business markets. Perhaps the interesting feature of the statistics is the high involvement of suppliers, used by 124 firms in the sample. This high supplier involvement is explained by the integrated nature of many operations in which suppliers play a vital role in delivering new products, often being responsible for key components right up to the final stages of manufacture (Biemans, 1992).

A more detailed examination of the different types of external partner involved by industry is reported in Table 4. The high pattern of external involvement is noticeable in the telecommunications sector in comparison to all others and this may be attributable to the rate of change in the industry and the rate of obsolescence making close involvement with external parties of all

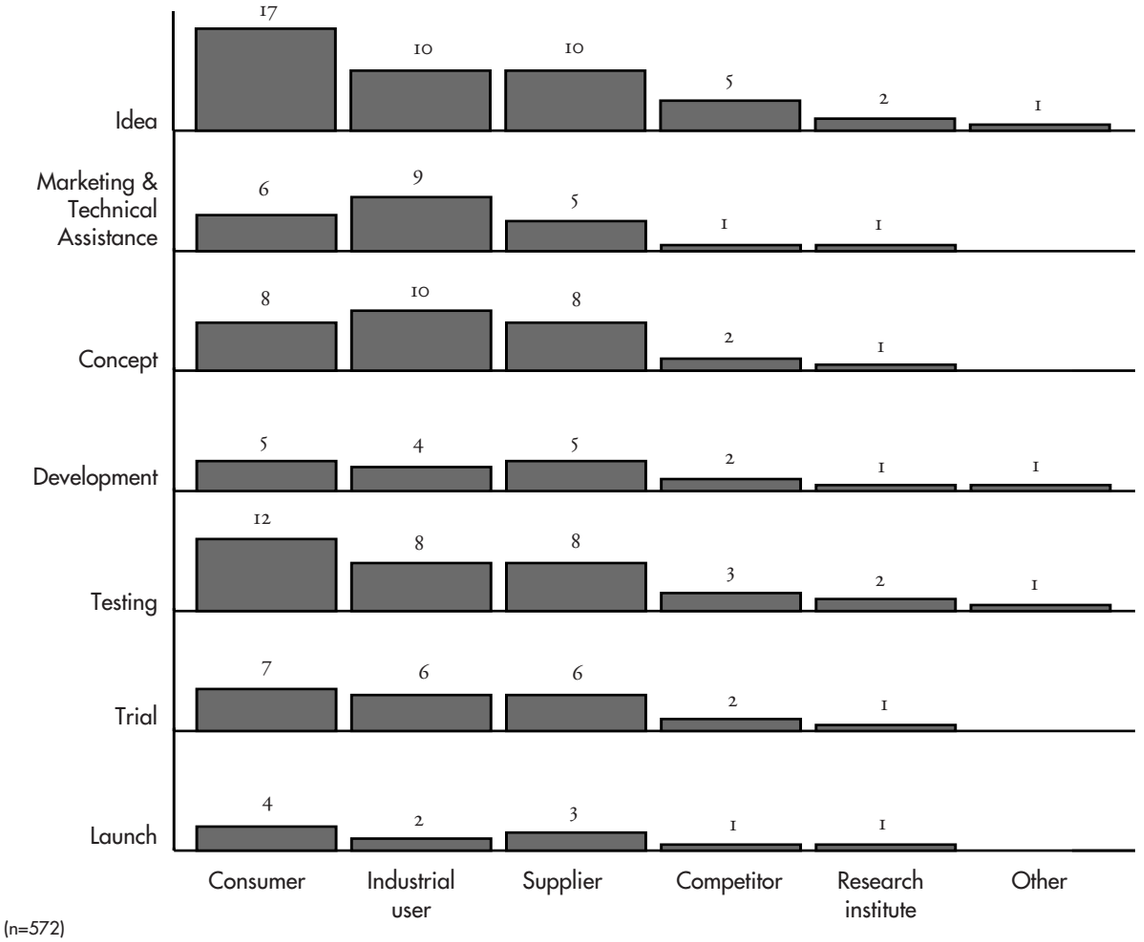
Table 4 Involvement of External Parties by Industry

Industry	*% of External involvement by industry*	*Customer*	*Industrial user*	*Supplier*	*Competitor*	*Research Institute*	*Government*	*Other*
Pharmaceutical/chemical (N=104)	52.8%	31.7%	17.3%	16.4%	5.8%	3.8%	2.9%	0.9%
Electrical & electronic engineering (N=82)	63.4%	28%	30.5%	22%	8.5%	6.1%	2.4%	2.4%
Industrial machinery (N=164)	56.7%	29.9%	14.6%	22.6%	8.5%	2.4%	1.2%	1.2%
Food, tobacco & beverage (N=68)	54.4%	30.9%	17.7%	23.5%	16.2%	10.3%	7.4%	7.4%
Metal manufacture (N=64)	56.3%	25%	21.9%	15.6%	3.1%	4.7%	4.7%	0%
Timber, furniture & paper (N=51)	49%	29.4%	11.8%	19.6%	3.9%	5.9%	5.9%	0%
Telecommunications (N=25)	80%	40%	40%	24%	4%	0%	8%	0%
Others (N=14)	57.2%	28.6%	21.4%	28.6%	28.6%	0%	0%	0%
Total (all industries)	57%	29.9%	19.6%	21.7%	8.7%	4.2%	3.3%	1.2%

types a necessity. In general, the level of customer involvement is similar across all industry types. Industrial user involvement is characterised at a high level in the electronic and electrical sector but seems to be at a low level in other sectors even where higher rates of partnership might be expected, for example, in industrial machinery. The involvement of suppliers is generally high. Competitor involvement, while low, has a higher pattern in the food, tobacco and beverage sector pointing to competitor consortia in new product development. Low use of research institutes and government is evident across sectors with the obvious exception of the food, tobacco and beverage sector, with national institutes such as Teagasc involved in development activities. The latter may also explain competitor involvement in national research projects coordinated by the government or its agencies.

Although the data in Table 4 tends to indicate that Irish manufacturers across a number of industries are involving external actors in their development projects, it nevertheless provides only limited information about their actual involvement in the development process. Most of the data published about cooperation during NPD within the Irish context examines only whether or not firms involve external actors, not the actual involvement of these various parties in the NPD process. Table 5 summarises the extent of external involvement across an eight-stage model of product development (Cooper, 1983). The table demonstrates a low level of involvement overall but does highlight the greater importance of consumers, industrial users and suppliers at all stages. Indeed, the percentages indicate that no significant difference exists between these three parties, as they appear to mirror each other with the same peak involvement throughout the process. The table may be evidence of a pattern of involving different partner types at different stages adding to the complexity of the overall process. However, in general, the low state of practice indicates that the performance implications alluded to in the literature have not attracted a corresponding change in the practice of involving external parties. The results clearly indicate a reluctance amongst Irish manufacturers to involve external actors in their development processes. The implication of this is that Irish companies may not be utilising all the resources available to them and that a competitive advantage can be gained by manufacturers through increased interaction with external actors (Håkansson, 1987; Biemans, 1992). For instance, greater involvement of consumers and industrial users in predevelopment activities can enhance the development process through the provision of innovative ideas and increasing the likelihood of sound product concepts proceeding to developmental stages and justifying their development in the first place (Lilien et al., 2002; Gruner and Homburg, 2000; Biemans, 1992; Cooper, 1983). The low level of cooperation between industry and research institutions such as universities is also disconcerting, especially considering the emphasis

Table 5 The Extent of External Involvement in Product Development Stages (%)



(n=572)

Forfás and the government have placed on developing such innovation clusters (Forfás, 2004d). The main reasons for involving external parties are given in Table 6. These reasons are consistent with the literature but what is surprising is that they do not lead to a greater level of external involvement.

Given that over 43 per cent or 246 companies had no external participation in their product development process, analysis was carried out on the reasons for the slow uptake of the external involvement concept. Using an open-ended format, respondents (n=246; 572 – 326) were asked to indicate the major reason(s) for not involving external parties in any development activity. The responses obtained were categorised by the researchers and are presented in rank order in Table 7.

As can be seen from Table 7, the main reason cited for not involving users and other third parties in the development process was that they had always done it this way and saw no reason to change. These respondents believed that no additional skills outside the company were required and that their development process was self-contained. Similar to Bidault and Cummings (1994), this study's respondents noted that the fear of proprietary information being leaked into the marketplace was a major deterrent for involving external parties in development projects. Other significant reasons for not engaging in collaborative product development centred around the issue of ownership and the belief that external partners would complicate, lengthen and make the development process more costly. This finding is consistent with research by Littler et al. (1995) on technology based products, who found that while the majority of respondents did consider external involvement to be beneficial, they nevertheless felt that it complicated the development process and made it more difficult to control and manage. A small number of respondents also highlighted the fact that the reason that they did not involve other parties was their lack of collaborative experience.

Conclusion

Establishing networks of collaborators to reduce costs and to improve the NPD process remains latent and relatively unused as a mechanism for Irish firms to develop new products. The reluctance of Irish manufacturers to adopt a coopera-

Table 6 Reasons for Involving External Parties in Product Development

Open ended question asked:
What were the reason(s) for involving external parties in your product development process?

Reasons given	*% of respondents mentioning factor*	
In response to supplier/customer needs	43.3%	(141)
The need to be more innovative than competitors	33.7%	(110)
Because of their expertise	22.1%	(72)
To reduce costs	16.9%	(55)
In response to a market opportunity	12.6%	(41)
To reduce development risk	12.6%	(41)
To reduce development times	10.4%	(34)
In response to technological changes	10.1%	(33)
Other	2.2%	(7)

(n=326)

Table 7 Reasons for Not Involving External Parties in Product Development

Reasons for not involving users in development stages	*% of respondents mentioning factor*	
Always done it this way (no additional skills needed)	23.2%	(57)
Fears of sharing proprietary information	19.1%	(47)
External involvement complicates product development, making it more difficult to control and manage	17.9%	(44)
Loss of control (ownership)	10.9%	(27)
Makes product development more costly	10.9%	(27)
Lengthens the development process	10.9%	(27)
Product development is too specialised	5.7%	(14)
Lack of collaborative experience	2%	(5)

(n=246)

tive mindset is in itself surprising considering that the small size of Irish firms would provide a logic for involvement to maximise resources in the process through cooperation. The investment and prioritisation of state policy in the direction of industry–state institution co-involvement in developing new products is still playing a minor role. The objective of national policy to create a national system of innovation through linkages and all parties working together is therefore in an embryonic stage. In general this finding is consistent with the assessment made by The National Competitiveness Council that in terms of developed innovation networks and clusters, Ireland was limited in comparison with other advanced economies (Forfás, 2004a).

Moreover, in this study, the involvement of external parties was not tested for its intensity and it is probably safe to suggest that, if measured for depth, the level of involvement would be much lower than that reported. This study is the first comprehensive study with a sole focus on external involvement in Ireland. Comparison with previous research is therefore difficult as objectives have varied. Ledwith (2000) in a study on electronic hardware products (n=36) found low external involvement on a frequency scale comparable to this study. However, in contrast with this study, Ledwith found a high level of involvement with universities in developing new products. Perhaps the reason for low industry–university cooperation during product development has to do with the inability of Irish companies to identify what research is being carried out in third level (Forfás, 2004a) and the general belief that research conducted in academia has no practical relevance for business (Forfás, 2005c). In a UK study, Freel (2003) found similar results with a comparable sample to this study albeit with a low response rate (11.5%). In the UK study, 50% of the companies did not involve external parties, which is higher than the current study. One implication of this is that involvement is only possible where a set of collaborative competencies is present.

Involving external parties requires a tolerance of risk and complexity. The sources of risks were well described when the firms were asked why they did not involve external parties. These barriers might be considered more ephemeral than real but do give weight to the argument that collaboration is not good for everyone and that perhaps an equally efficient mechanism can be found in non-cooperating firms. Nevertheless, a telling insight that emerged from the response by some firms who suggest the reason for non-involvement was the lack of collaborative experience is that perhaps a fundamental gap exists between what academics describe as best practice and the tools practitioners need to cooperate effectively. Indeed, there is little practice description of the '*how to do variety*' as much comment tends to focus on the pitfalls and factors conducive to success. The process must be described, as must the messy dynamics inherent in a complex multi-actor situation. Understanding the processes that enable manufactures to successfully interact and involve external organisations in their development process is a key part of our research agenda. This ongoing research uses a social exchange view to understand intense involvement, which appears, from this study, to be the preserve of the few. Maybe the rationale for firms switching off the collaborative light is the sheer unknown?

On the positive side, the concentration on innovation and on product improvement in the firms sampled augurs well for the long-term health of the Irish economy. In addition, there is plenty of opportunity to use line extensions and products targeted for new uses as these methods of product development seem relatively underutilised in practice.

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