
The relations between stakeholders and product development drivers: practitioners' perspectives

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Abstract: Product development is affected by various drivers and multiple stakeholders. This study assesses relationships between different external and internal stakeholders and product development drivers. The relationships between stakeholders and product development drivers are analysed at managerial level in NPD intensive companies, which operate in market-driven environment. The results indicate the most relevant external stakeholders for product development drivers to include customers, suppliers, and partners, whereas the most relevant internal stakeholders include product management, management, and engineering. In addition, key stakeholders for individual drivers are identified. Industrial managers can utilise the findings to improve decision-making, prioritisation, and to reduce unnecessary complexities.

Keywords: Product development; new product development (NPD); product development driver; stakeholder; innovation; learning; DfX.

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1 Introduction

Innovation and product development are vital for companies to achieve their objectives; improve revenues, net results, market shares, and share prices (Ansoff, 1957; Cooper, 2011). Many authors have studied improving the outcome of product development from various perspectives (e.g. Krishnan and Ulrich, 2001).

Stakeholders are groups or individuals who can influence or are influenced by the achievement of the organisation's objectives (Freeman, 1984). Stakeholders have been discussed in the previous literature from many viewpoints (e.g. Mitchell *et al.*, 1997). Due to cross-functional nature of new product development (NPD) many internal stakeholders contribute to NPD in organisations. However, it must be emphasised that product development is not solely an intra-company activity. Today's products are often complex combinations of tangible and intangible components which are created in international development networks, and there are various external stakeholders that must be taken into account by using integrated development methods such as design for excellence (DfX) (Bralla, 1996; Mottonen *et al.*, 2009). Furthermore, the requirements of different internal and external stakeholders often conflict, making product development very complex to manage (Bendjenna *et al.*, 2012).

Various drivers for product development and different external and internal stakeholders affect decision-making in organisations and the project outcome. The previous literature presents several drivers for product development (Acur *et al.*, 2012; Cooper, 2011; Hassanien and Dale, 2012) including strategic aspects (e.g. Ansoff, 1957), drivers for radical products (Veryzer, 1998), NPD and innovation drivers in specific business sectors (Bossink, 2004; Hassanien and Dale, 2012; Kinkel and Som, 2010), and influences of communication and organisational learning on product innovation (Chatterjee, 2012; Salim and Sulaiman, 2013). Stakeholder literature has also addressed many important topics (Aaltonen and Kujala, 2010; Freeman and Reed, 1983; Mitchell *et al.*, 1997; Peters *et al.*, 2009) including requirement engineering (e.g. Glinz and Wieringa, 2007). However, the relevance of stakeholders to product development drivers has previously received inadequate attention. This study aims to provide new viewpoints by assessing the relationships between product development drivers and different external and internal stakeholders.

This study starts with a literature review. The literature review is followed by an empirical study to analyse how the relationships between different stakeholder groups and product development drivers is perceived at the managerial level in NPD intensive companies, which operate in market-driven environment with a large number of customers. The study also identifies the key external and internal stakeholders for individual product development drivers in the companies. Accordingly, this paper addresses the following research questions:

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1. How does the literature view the relationships between product development drivers and stakeholders?
2. How do managers in industrial companies perceive the relationships between product development drivers and stakeholders?

This paper addresses the research questions both through literature and empirical study in the selected case companies. The empirical part of the study is interpretative in nature. The main theoretical approach in this study is deductive, and consists of reviewing earlier literature on product development drivers, stakeholders and DfX.

2 Literature review

2.1 Product development drivers

There are many reasons for conducting product development in companies. These product development drivers can be divided into financials goals, strategy & business environment, marketing & customers, technology, internal & resources, and supply chain related reasons. In terms of financial goals, new products can have a positive impact on revenues (Cooper, 2011; Hassanien and Dale, 2012; Lantos *et al.*, 2009), market shares, net results (Cooper, 2011; Kahn, 2011), and share prices (Cooper, 2011; Lantos *et al.*, 2009).

Strategy is a key driver for product development (Acur *et al.*, 2012; Ansoff, 1957; Kahn, 2001; Trott, 2002). New product strategy is linked to and derived from other strategies such as corporate, marketing, and technology strategy (Trott, 2002). External environment includes important product development drivers, such as competitive environment (Hassanien and Dale, 2012; Kahn, 2001) and shorter product life cycles (Cooper, 2011; Hamm, 2006; Lantos *et al.*, 2009). New trends including, for example, sustainability and globalisation, have a big impact on product development (Cooper, 2011; Hassanien and Dale, 2012; Nidumolu *et al.*, 2009). The external environment also provides constraints and opportunities, such as changes in technology, legislation, and regulations (Kahn, 2001; Trott, 2002).

Customer orientation is essential in market orientation (Narver and Slater, 1990). Customer needs and attitudes are changing, and consumers expect new offerings (Cooper, 2011; Kahn, 2001). Customers and their feedback provide a source for new opportunities and improving the offering (Hassanien and Dale, 2012; Trott, 2002). Product development may also be stimulated by the need to enhance company image and awareness, offer the right product mix, and leverage brand equity and brand halo effects (Kahn, 2001; Lantos *et al.*, 2009).

Technology-push and market-pull can be considered alternative drivers for product development (Hart *et al.*, 2003; Rothwell, 1992). Market and customer needs are essential in the development of market-pull products, whereas technology is the main driver for technology-push products (Ulrich and Eppinger, 2000). Technology advances are an important NPD driver, (Cooper, 2011; Bossink, 2004; Kahn, 2001) but existing technology, products, and unexploited patents can also provide new opportunities (Trott, 2002).

Companies cannot solely rely on external stimulus, but they also need their own foresight in product development (Hamel and Phalahad, 1994). Opportunity and idea sources include senior and top management, and even individuals (Kahn, 2001; Trott, 2002). In addition, underused and new resources, such as excess capacity or acquisitions, can be reasons for product development (Hassanien and Dale, 2012; Kahn, 2001). Existing production capability typically drives the development of process-intensive products (Ulrich and Eppinger, 2000), whereas development of radically new products can also be a way of building new competences in a company (Trott,

2002). Finally, vendors, distribution channel members, and partners may be sources for new opportunities or drivers for product modification (Kinkel and Som, 2010; Trott, 2002).

2.2 Stakeholders

Literature provides various stakeholder definitions (Aaltonen and Kujala, 2010; Freeman and Reed, 1983; Freeman, 1984; Glinz and Wieringa, 2007; Mitchell *et al.*, 1997). In a broad sense, stakeholder is “any group or individual who can affect or is affected by the achievement of the organisation’s objectives” (Freeman, 1984). On the other hand, the narrow definitions, such as groups or individuals on which the organisation is dependent for its continuous survival (Freeman and Reed, 1983), describe stakeholders in terms of direct relevance to the company’s core economic interests (Mitchell *et al.*, 1997). Stakeholders can be classified in many ways, such as primary or secondary, owners and non-owners of the firm, those in a voluntary or involuntary relationship with the firm, resource providers to or dependents of the firm. Internal stakeholders can be seen as formal members of an organisation or a project. External stakeholders are not formal members, but can influence or be influenced by an organisation or a project (Aaltonen and Kujala, 2010; Mitchell *et al.*, 1997).

Stakeholders affect the product demand, and enable product delivery to the end users and the support throughout the product’s life cycle (Ulrich and Eppinger, 2000). Appropriate levels of stakeholder participation in product development projects is needed to ensure correct requirements and avoid problems during the development (Razali and Anwar, 2011; McManus, 2004).

Stakeholder salience depicts how managers prioritise competing stakeholder claims. Stakeholders can be identified based on three attributes: the stakeholder’s power to influence the company, the legitimacy of stakeholder’s relationship with the company, and the urgency of stakeholder’s claims. However, it is ultimately the company’s managers who determine which stakeholders are salient and will receive attention. (Mitchell *et al.*, 1997) Both, primary (internal) and secondary (external) stakeholders can be key stakeholders, if the issue is salient to them (Savage *et al.*, 1991).

Stakeholder prioritisation is needed in decision-making, as stakeholders’ interests conflict, resources are limited, and requirements must be balanced (Bendjenna *et al.*, 2012). Methods related to stakeholder identification in product development include, for example, the framework by Razali and Anwar (2011) and customer value chain analysis (CVCA) (Donaldson *et al.*, 2006). Design for excellence (DfX) (Bralla, 1996) also takes different stakeholders into consideration. Techniques for stakeholder prioritisation include ordinal scale (ranking) and ratio scale methods, such as analytic hierarchy process (AHP), Cumulative Voting (CV), and Hierarchical Cumulative Voting (HCV) (Berander and Jönsson, 2006; Contreras *et al.*, 2008; Saaty, 1980).

2.3 Design for Excellence

The possibilities of influencing the success of new product development are emphasised to be the greatest at the beginning of projects (Gatenby and Foo, 1990; Mottonen *et al.* 2009). Typically, requirements for products change during product development, making their management important. Ensuring sufficient fulfilment of internal stakeholder needs is identified as a key element for successful product development (Cooper *et al.*, 2004; Gupta *et al.*, 2007). Design for excellence (DfX) is seen as one way to systematically address the needs of different internal stakeholders (Bralla, 1996; Boothroyd and Dewhurst, 1983; Gungor and Gupta, 1999).

The first attempts of addressing the needs of internal stakeholders via DfX include assembly and manufacturing considerations, design for assembly (DfA) and design for manufacturability (DfM) respectively (Boothroyd and Dewhurst, 1983; Bralla, 1998; Kuo *et al.*, 2001; Boothroyd

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et al., 1994). Design for excellence has since expanded and is applied in various areas, including design for testability (DfT), design for environment (DfE), design for service (DfS), design for quality (DfQ), and many others (Williams and Parker, 1983; Fiksel, 1996; Kurk and Eagan, 2008; Subramani and Dewhurst, 1993; Cavalieri *et al.*, 2007; Kuo *et al.*, 2001; Kim and Arnold, 1993; Booker, 2003).

Different DfX's have been introduced, to effectively consider different important aspects during product development that cover the entire product life-cycle. Addressing the needs of different internal stakeholders is seen to aid in ensuring product development success (Gatenby and Foo, 1990; Jiao *et al.*, 2007; Bralla 1996; Kuo *et al.*, 2001). DfX philosophies and techniques vary from high-level guidelines to detailed software tools. DfX has been criticised for not providing a holistic approach to decision-making, as each DfX element focuses on only one aspect of the product development challenge. The number of DfX elements to be considered can be vast, and it can be very challenging to take every requirement into account (Holt and Barnes, 2010).

2.4 Synthesis

Product development can be understood as “transformation of a market opportunity and a set of assumptions about product technology into a product available for sale” (Krishnan and Ulrich, 2001). Product development stakeholders, on the other hand, are key parties involved with product delivery to the end-user and support during the entire life cycle (Ulrich and Eppinger, 2000). Product development drivers and DfX requirements are represented by different external and internal stakeholders. In other words, drivers and DfX elements can be seen as stakeholders. Figure 1 illustrates the relationships between product development drivers, stakeholders, and DfX.

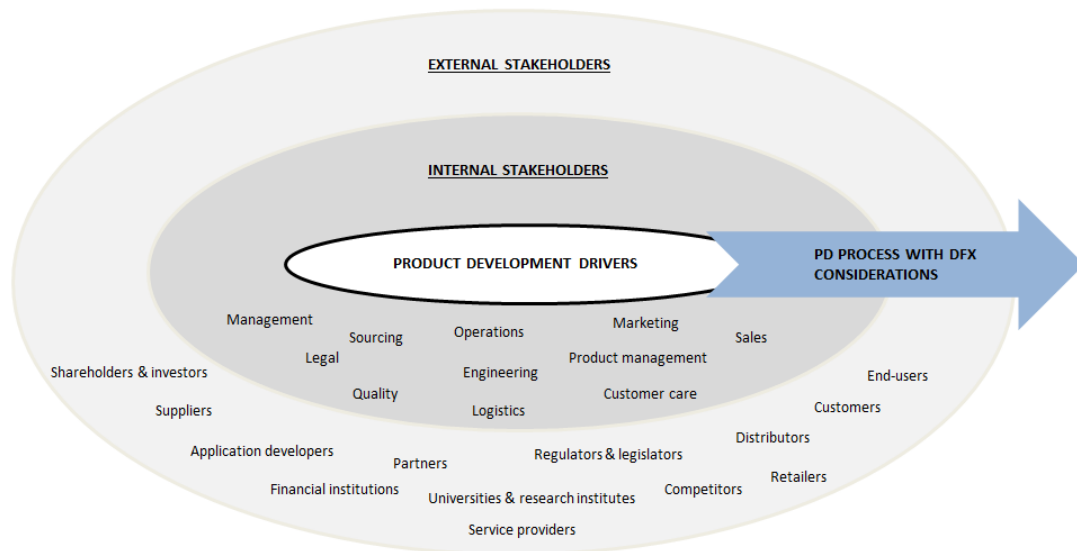


Figure 1. Drivers, stakeholders, and DfX in product development context

3 Research process

The research process of this study is presented in Figure 2. The study was started with a literature review on product development drivers, stakeholders, and Design for Excellence (DfX). The literature review was conducted to create a synthesising list for product development drivers (Tables 2-7) and to identify relevant external and internal stakeholders (Figure 1). A plan for empirical survey was created based on the literature findings. Company representatives were then asked to participate in the survey to clarify which stakeholders they associate with different product development drivers. Finally, the survey data was analysed and conclusions were made.

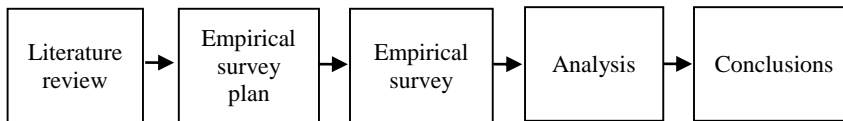


Figure 2. Research process

The empirical data was collected with a web-based survey that was sent to experienced managers in case companies (Table 1). In the survey, stakeholders were defined as groups or individuals who can influence or are influenced by the project. The managers were asked which external and internal stakeholders they associate with each product development driver. It was possible to select more than one stakeholder for each driver. The unifying characteristics for the case companies are product development being critical for their business and market-driven environment with a large number of customers instead of a sole customer deciding product functionalities. The case companies have many decades of product development experience, and all of them are recognised as leading innovators in the markets they are operating. The companies were selected so that they would represent product development in both business-to-business (B2B) and business-to-consumer (B2C) markets. Their products are tangible, and in many cases they are combinations of physical elements, services and software. The case companies operate in machinery, ICT, consumer electronics, and consumer goods markets.

Table 1. Company characteristics

Company	Key characteristics	Product
1	B2B company serving many industries in international markets Annual revenue over 1 BEUR Over 10 000 employees	Tangible products with services
2	B2C company serving international markets Annual revenue below 100 MEUR Hundreds of employees	Tangible products
3	B2C company serving international markets Annual revenue over 10 BEUR Tens of thousands of employees	Tangible products, software, and services
4	B2B company serving international markets Annual revenue over 10 BEUR	Tangible products, software, and services

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	Tens of thousands of employees	
5	B2C company serving international markets	Tangible products
	Annual revenue over 50 MEUR	
	Hundreds of employees	

The target group of the survey was carefully selected to ensure that the respondents had wide knowledge on the topic. The respondents' average work experience in their current company was 10-15 years and the average industry experience around 15 years. Due to cross-functional nature of product development, a broad range of company functions were included in the survey. The respondents represented product development, product management, marketing, operations and logistics. The respondent positions included vice president, director, head of, senior manager, programme manager, and project manager. Figure 3 presents the data collection and analysis.

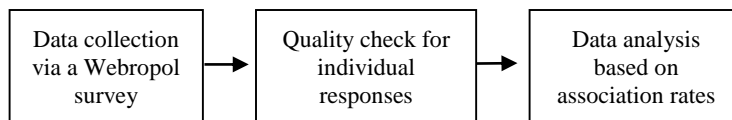


Figure 3. Data collection and analysis

The data collection took place during autumn 2012 via a web-based Webropol survey. In the survey, 18 product development drivers were listed, and the respondents were asked to mark the external and internal stakeholders that they associate with each driver. A total of 21 responses were received, resulting in a response rate of 35.6 %. After the data collection, each response was checked for completeness. One response was excluded from the results due to incompleteness of the answers provided. The responses were analysed based on association rates between the product development drivers and stakeholders.

4 Results

4.1 Stakeholders associated with product development drivers

Experienced managers in the case companies provided their view on *external stakeholders* they associate with the product development drivers. Figure 4 presents average association rates between the external stakeholders and product development drivers. Association rate of 100 % would mean that all 20 respondents associate the stakeholder with all of the 18 product development drivers included in the survey. For instance, in this study, customers received total 171 associations out of maximum 360, resulting in association rate of 47.5 %.

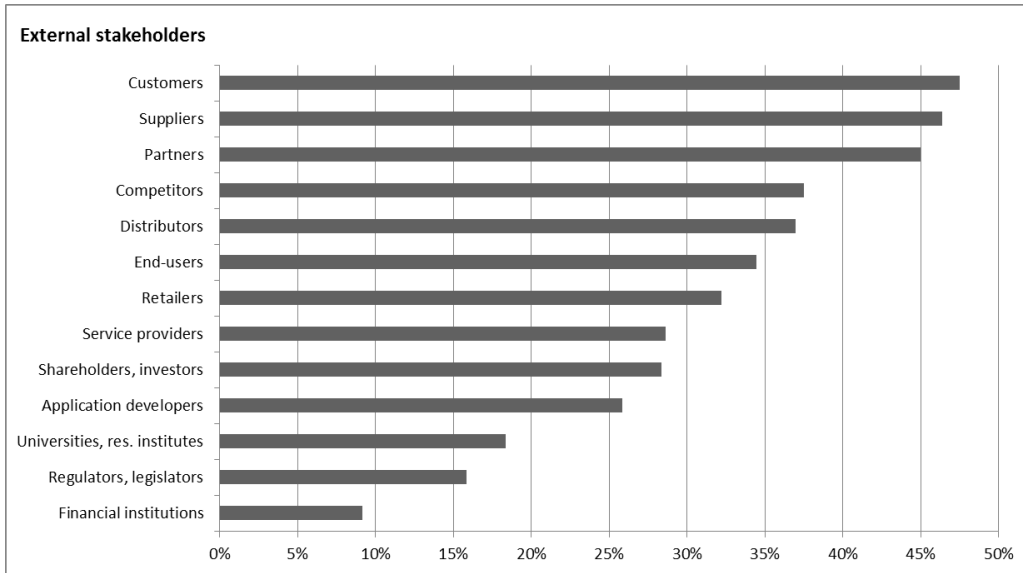


Figure 4. Average association rates between external stakeholders and product development drivers

The results indicate that there are three stakeholders that are most relevant to product development drivers. These stakeholders include customers, suppliers, and partners. These key parties were most frequently seen as those who can influence or are influenced by product development drivers.

In addition to the three identified main stakeholders, seven other external stakeholders form another important group. These include competitors, distributors, end-users, retailers, service providers, shareholders & investors, and application developers. On the other hand, financial institutions, regulators & legislators, and universities & research institutes were least often associated with the product development drivers.

Aside assessing external stakeholders, the study also identified which *internal stakeholders* are associated with different product development drivers. Figure 5 illustrates average association rates between the internal stakeholders and product development drivers. For instance, in this study, product management received total 238 associations out of maximum 360, resulting in association rate of 66.1 %.

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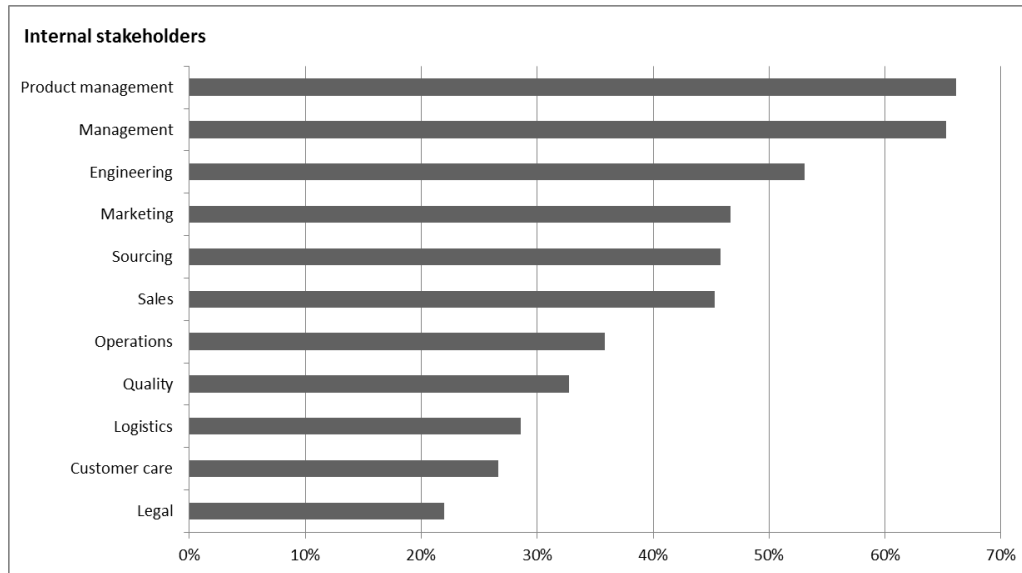


Figure 5. Average association rates between internal stakeholders and product development drivers

The results highlight three internal stakeholders that were associated most often with the product development drivers: product management, management, and engineering. These key internal stakeholders were most frequently seen as those who can influence or are influenced by product development drivers.

In addition, other five internal stakeholders form the second important group. These stakeholders include marketing, sourcing, sales, operations, and quality. Finally, legal, customer care, and logistics were identified as those internal stakeholders least often associated with product development drivers.

4.2 Key stakeholders for product development drivers

In addition to average association rates with stakeholders, the product development drivers were also analysed individually. Tables 2-7 below present the key external and internal stakeholders for product development drivers in the following categories: financial goals, marketing & customers, strategy & business environment, technology, internal push & resources, and supply chain. A stakeholder is considered as a key one, when 60 % or more of the respondents associate it with the product development driver. For instance, in Table 2, total 12 out of 20 respondents associated suppliers with profitability targets, resulting in association rate of 60 %.

Table 2. Key external and internal stakeholders associated with financial goals

Product development driver	Key external stakeholders	Key internal stakeholders
Profitability targets	Shareholders & investors 75 % Customers 65 % Suppliers 60 % Distributors 60 %	Management 100 % Product management 95 % Sourcing 80 % Operations 75 % Sales 75 % Logistics 65 % Marketing 65 % Engineering 60 %
Revenue targets	Shareholders & investors 75 %	Management 90 % Product management 80 % Sales 75 % Marketing 65 % Sourcing 60 %

As table 2 illustrates, the key external stakeholders associated with profitability targets were shareholders & investors, customers, suppliers, and distributors. The key internal parties who can influence or are influenced by profitability targets included management, product management, sourcing, operations, sales, logistics, marketing, and engineering. Similarly, for revenue targets the key external stakeholders were shareholders & investors, and the key internal stakeholders consisted of management, product management, sales, marketing, and sourcing.

Table 3. Key external and internal stakeholders associated with marketing & customers

Product development driver	Key external stakeholders	Key internal stakeholders
Brand and image	Customers 75 % End-users 70 % Shareholders & investors 60 %	Marketing 95 % Management 90 % Sales 75 % Product management 60 %
Offering the right product mix	Customers 85 % End-users 80 % Distributors 65 % Competitors 60 %	Product management 90 % Marketing 75 % Management 60 % Sales 60 %
Customer input	Customers 95 % End-users 75 %	Sales 90 % Product management 85 % Marketing 80 % Customer care 65 %

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As can be seen in table 3, the key external stakeholders associated with brand and image consisted of customers, end-users, and shareholders & investors. The key internal parties who can influence or are influenced by brand and image included marketing, management, sales, and product management. The key external stakeholders for offering the right product mix also included customers and end-users, but in addition, distributors and competitors were considered to be relevant parties. Product management, marketing, management, and sales were considered as the key internal stakeholders for offering the product mix. There were also many stakeholders that were associated with customer input. The key external stakeholders included customers and end-users, while the key internal stakeholders included sales, product management, marketing, and customer care.

Table 4. Key external and internal stakeholders associated with strategy and business environment

Product development driver	Key external stakeholders	Key internal stakeholders
Strategy	Shareholders & investors 80 % Partners 60 %	Management 95 % Product management 85 % Marketing 65 %
Competition	Customers 80 % Competitors 70 %	Marketing 90 % Product management 85 % Management 85 % Sales 70 %
External environment	Regulators & legislators 60 %	Management 70 % Product management 65 %

As table 4 illustrates, only two external stakeholder groups were associated with strategy: shareholders & investors and partners. On the other hand, the key internal parties who can influence or are influenced by strategy were identified to include management, product management, and marketing. Marketing, product management, management, and sales were seen as the most relevant internal stakeholders regarding competition, whereas customers and competitors were the most frequently associated external stakeholders. For external environment, the key external stakeholder group was regulators & legislators, and the key internal stakeholders included management and product management.

Table 5. Key external and internal stakeholders associated with technology

Product development driver	Key external stakeholders	Key internal stakeholders
New technology	Suppliers 95 % Universities, research institutes 70 % Application developers 70 % Partners 60 %	Engineering 85 % Product management 80 % Sourcing 75 %

Existing technology or products	Suppliers 70 %	Product management 80 %
	Customers 65 %	Engineering 75 %
		Sourcing 60 %
		Sales 60 %

Table 5 presents the key stakeholders for technology related product development drivers. Suppliers, universities & research institutes, application developers, and partners were seen as the most relevant external stakeholders for new technology, whereas the key internal stakeholders associated with new technology included engineering, product management, and sourcing. For existing technology or products, suppliers and customers were considered the most relevant external stakeholders, and product management, engineering, sourcing, and sales were seen as the key internal stakeholders.

Table 6. Key external and internal stakeholders associated with internal push and resources

Product development driver	Key external stakeholders	Key internal stakeholders
Company's own foresight	-	Management 90 % Product management 80 %
Organisational learning	-	Engineering 70 % Operations 60 % Management 60 %
New resources	-	Engineering 70 % Management 65 %
Underused resources	-	-

As can be seen in table 6, no external parties were identified as key stakeholders, i.e. meeting or exceeding 60 % association rate, for company's own foresight, organisational learning, and new and underused resources. In fact, for underused resources no key internal stakeholders were identified either. The key internal stakeholders for company's own foresight included management and product management. Engineering, operations, and management were considered those internal parties who can most influence or are most influenced by organisational learning. The most frequently associated internal stakeholders for new resources were engineering and management.

Table 7. Key external and internal stakeholders associated with supply chain

Product development driver	Key external stakeholders	Key internal stakeholders
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Production process	Suppliers 90 % Partners 60 %	Operations 90 % Engineering 90 % Sourcing 85 % Quality 65 %
Suppliers	Suppliers 90 %	Sourcing 95 % Engineering 70 % Operations 70 %
Partners	Partners 65 %	Product management 75 % Management 65 %
Distributors	Distributors 75 %	Sales 75 %

Table 7 presents the key parties who can influence or are influenced by supply chain related product development drivers. Suppliers and partners were seen as the most relevant stakeholders for production process. For suppliers as product development driver, the key external stakeholder was naturally suppliers, and the same logic applied to partners and distributors. Regarding key internal stakeholders, operations, engineering, sourcing, and quality were most frequently associated with production process. Sourcing, engineering, and operations were seen as the key internal stakeholders for suppliers. Finally, product management and management were most frequently associated with partners, and sales was seen as the most relevant internal stakeholder for distributors.

5 Discussion

This study indicates the relationships between different external and internal stakeholders and product development drivers. The stakeholders were analysed based on average association rates with 18 studied product development drivers (Figures 4 and 5). In addition, the stakeholders were also analysed for each individual driver (Tables 2-7). The key findings are discussed below Figure 6, which illustrates the relationships between different external and internal stakeholders and product development drivers based on the average association rates between the stakeholders and the 18 drivers. Based on the results of this study, the external and internal stakeholders were divided into three different tiers to illustrate their relative importance. This division into three tiers provides new viewpoints to the relationships between product development drivers and different external and internal stakeholders.

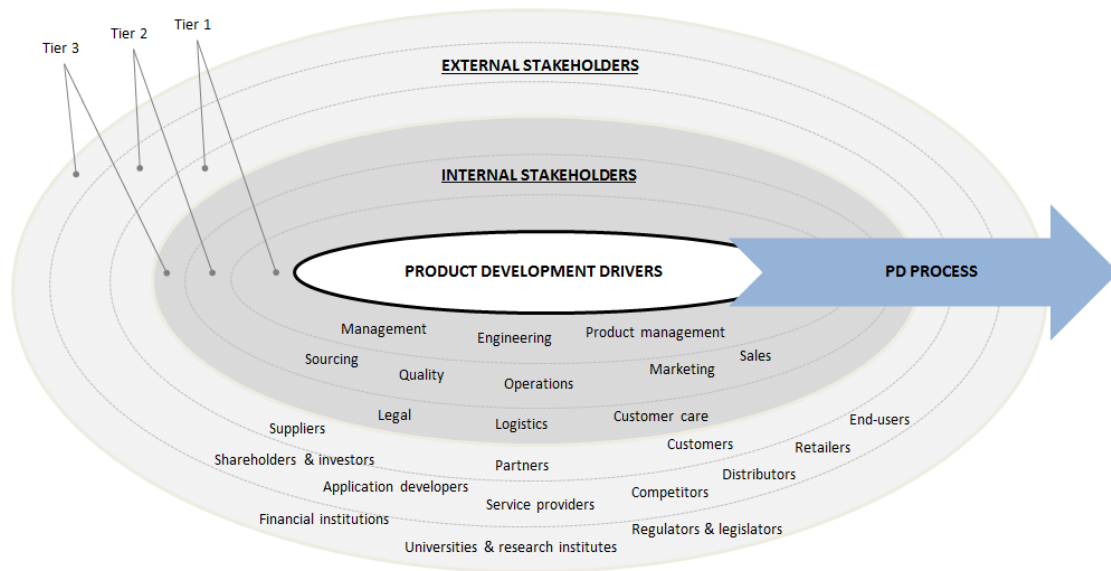


Figure 6. Product development drivers and stakeholders

The most relevant external stakeholders based on total associations with product development drivers in the case companies were customers, suppliers and partners. These key parties were considered significantly more relevant than the rest of external stakeholders. Customers were found to be a key external stakeholder for six product development drivers, and logically, customers were most frequently associated with customer input. The results indicated suppliers to be a key external stakeholder with association rates reaching or exceeding 60 % for five different product development drivers. The most frequently associated product development driver for suppliers was new technologies. Partners were identified as a key external stakeholder for four product development drivers including new technology, production process, and strategy.

The second important group of external stakeholders based on total associations included competitors, distributors, end-users, retailers, service providers, shareholders & investors, and application developers. Despite a somewhat low total association rate, shareholders & investors were identified as a key external stakeholder for four influential product development drivers: strategy, profitability targets, revenue targets, and brand & image. Regulators & legislators, in turn, were among the external stakeholders with lowest total association rates, although their role can be significant in some businesses. Standardisation bodies, internet including communities and bloggers, and media were also highlighted by some respondents.

In addition to key external parties, this study also clarified the most relevant internal stakeholders based on associations with product development drivers. The most relevant internal stakeholders included product management, management, and engineering. Product management was identified a key internal stakeholder for 12 product development drivers; profitability targets being the most frequently associated one. Management was found to be a key internal stakeholder for 11 product development drivers including also profitability targets as the most frequently associated one. Engineering, in total, was identified as a key internal stakeholder for seven product development drivers. Surprisingly, production process was even more frequently associated with engineering than new technology.

The second most relevant internal stakeholder group based on associations with product development drivers included marketing, sourcing, sales, operations, and quality. On the other

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hand, legal, customer care, and logistics were least frequently associated with the product development drivers.

Overall, internal stakeholders were associated more frequently with product development drivers than external stakeholders, which may indicate that internal stakeholders receive more managerial attention than external stakeholders. Views on external and internal stakeholders varied in the case companies, although no solid conclusions can be made due to limited number of companies and respondents included in the study. The variations may be due to the company's market being B2B or B2C, business model, channel structure, and product technologies. The results seemed to indicate higher relevance of partners, customers, and suppliers for B2B than for B2C companies. On the other hand, respondents in B2C companies associated end-users with product development drivers more frequently than respondents in B2B companies. Finally, B2B companies associated sourcing, operations, quality, logistics, and customer care somewhat more frequently with product development drivers than B2C companies.

5.1 Theoretical implications

Literature discusses different drivers for product development (Acur *et al.*, 2012; Ansoff, 1957; Cooper, 2011; Hassanien and Dale, 2012; Nidumolu *et al.*, 2009). Stakeholders have also been covered in the literature from many perspectives (Aaltonen and Kujala, 2010; Freeman and Reed, 1983; Freeman, 1984; Mitchell *et al.*, 1997) including requirement engineering (e.g. Glinz and Wieringa, 2007). However, the relationships between stakeholders and product development drivers have not previously received sufficient attention. This study provides new viewpoints by assessing the relationships between product development drivers and different external and internal stakeholders.

The results of this study indicate three key external stakeholders: customers, suppliers, and partners. The importance of customers has been emphasised in the previous literature (Cooper, 2011; Narver and Slater, 1990). Nevertheless, this study indicates suppliers to be associated almost as frequently as customers with product development drivers. With regards to internal stakeholders, Ulrich and Eppinger (2000) argue that key product development functions include marketing, design (engineering), and manufacturing (operations). This study complements the previous findings by pointing out the relevance of marketing and operations. In this study, product management, management, and engineering were indicated to be the most relevant internal stakeholders for product development drivers. In addition, this study contributes to existing body of knowledge by clarifying the most important external and internal stakeholders for different product development drivers together with their relevance.

5.2 Managerial implications

There are many reasons why companies conduct product development. Similarly, organisations have multiple external and internal stakeholders that can influence and are influenced by product development drivers. These stakeholders are essential for companies to achieve their objectives. Therefore, the key stakeholders should be adequately involved in product development to ensure the right focus. Drivers for different types of product development initiatives differ, meaning that also the key stakeholders vary. In practice, it is impossible to take the needs of all stakeholders into account. Even though various stakeholders must be considered to ensure project success, managerial attention should be allocated based on the stakeholder's importance for that particular initiative.

The results of this study indicate significant variations in relationships between different external and internal stakeholders and product development drivers, i.e. the key reasons for initiating product development in the first place. In this study managers associated internal stakeholders more frequently with product development drivers than external stakeholders. This may indicate that external stakeholders deserve more managerial attention. In addition, the results point out suppliers to be the second most relevant external stakeholder group, while the relative importance of sourcing among internal stakeholders was considered somewhat lower. Collaboration between suppliers, engineering, and sourcing is essential especially in new technology development, and sourcing must be adequately involved in this collaboration to ensure project success.

Based on the results, views on product development drivers and the related stakeholders differ among companies and individuals. Managers ought to understand that product development drivers and stakeholders are company-specific and individual differences can be significant. However, properly aligned views can improve decision-making in product development and its outcome. Therefore, companies should consider systematic efforts to clarify their product development drivers and key stakeholders. This can result in better decision-making and prioritisation, and reduce unnecessary complexities in product development.

6 Conclusions

Product development is vital for companies. However, product development has become increasingly challenging to manage as today's products are often complex combinations of tangible and intangible components that are created in international development networks. Clarifying product development drivers and relevant stakeholders can be seen as a way to improve decision making, prioritisation, and to reduce complexity in companies. This study assesses the relationships between different external and internal stakeholders and product development drivers at the managerial level in NPD intensive companies, which operate in market-driven business environment with a large number of customers. The study also identifies the key external and internal stakeholders for each individual product development driver.

Literature discusses different drivers for product development, and stakeholders have also been studied from many perspectives. However, past literature has inadequately defined the relationships between stakeholders and product development drivers. The results of the empirical study with managers in industrial companies indicate the most relevant external stakeholders for product development drivers to include customers, suppliers, and partners. In this study, suppliers are associated with product development drivers almost as frequently as customers. The second important group of external stakeholders includes competitors, distributors, end-users, retailers, service providers, shareholders & investors, and application developers. In spite of lower total association rate, shareholders & investors is identified as a key external stakeholder for four major product development drivers including strategy and profitability targets. Regulators & legislators, universities & research institutes, and financial institutions are among the external stakeholders with the lowest total association rates. Overall, internal stakeholders are associated more frequently with product development drivers than external stakeholders. The most relevant internal stakeholders in this study include product management, management, and engineering. The results highlight the importance of product management in product development. Product management is identified as a key stakeholder for 12 out of 18 product development drivers analysed in this study. The second most relevant internal stakeholder group include marketing, sourcing, sales, operations, and quality. Finally, logistics, customer care, and legal are found to be the least relevant internal stakeholders for product development drivers.

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Industrial managers should not consider key stakeholders to be the same for all product development drivers, and in all cases. Product development drivers vary, which means that the key stakeholders also differ between initiatives. Although various stakeholders must be considered to ensure project success, managerial attention should be allocated based on the stakeholder's importance for the particular initiative. Furthermore, product development drivers and the related stakeholders may be seen differently by different companies and individuals. Companies should systematically clarify their own drivers and stakeholders, which could result in better decision-making and focus in product development efforts.

The limitations of this study include the number of surveyed companies and participants being limited and the focus being only on companies operating in market-driven business environment. The target group selection may also affect the results. In addition, the characteristics of companies may differ in some ways, making statistically reliable comparisons difficult. It can also be argued that total association rate with product development drivers does not directly correlate with stakeholder relevance, as the results depend on the drivers under study and their relative importance. Recommendations for further study, aside addressing these limitations, include comparing the findings of this study with different types of companies and in different industry sectors.

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