

THE ACCOUNTANT'S CONTRIBUTION TO NEW PRODUCT DEVELOPMENT

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ABSTRACT

A review of the management accounting literature has highlighted the need for accountants to be involved as business partners in decision making. In an increasingly competitive market, companies are continually under pressure to innovate and to bring new products to the market and new product development (NPD) therefore represents a key area of decision making. The current study is designed to address an observed shortage of empirical research investigating the extent and nature of the management accountant's contribution to the NPD process. An eight-stage NPD process is identified and it is found that the accountant is currently occupying an ancillary role, assisting the NPD team with mainly costing information and feasibility analysis. However, this study shows a significant opportunity for the accountant to become a key contributor to the NPD process by adopting a market-based approach and becoming a member of a cross-functional team involved in NPD decision making. Some potential areas of contribution are as follows. The accountant may introduce a system that achieves effective control while encouraging an innovative environment through the implementation of the Balanced Scorecard. The accountant may introduce total quality management into the NPD process and tailor risk and uncertainty management to the needs of the NPD team. There is also scope to make a better contribution to measurement of functionality and product attributes.

INTRODUCTION

The importance of innovation and new product development (NPD) management in the modern commercial environment has been well documented. Firms are faced with severe competitive pressures, which Porter (1980) states are five-fold: intense rivalry between competing sellers; the threat of new entrants to the market; the threat of substitutes; pressures from key suppliers; and pressures from key customers.

Nixon and Innes (1997, p. 40) believe that 'companies now have to innovate just to survive'. Cooper (1996, p. 465) believes that as product life cycles are becoming shorter, 'the message to senior management is simple: either innovate or die'. Bobrow and Shafer (1987, p. 1) state that 'all businesses, institutions, countries and entire civilisations either grow through innovation and change or they die without them. They die because bureaucracy and inertia set in'. Cooper (1996, p. 465) states that 'the long-term survival of a business enterprise hinges upon its ability to successfully introduce new products into the marketplace'. The NPD process is seen as the key driver behind market growth and prosperity.

A literature review revealed little empirical evidence of the accountant's contribution to the NPD process and also showed that the existing literature is quite dated. The objective of this study is to examine the extent and nature of the management accountant's contribution to the NPD process and to identify possible opportunities for the future development and expansion of the management accountant's role in the process.

AN OVERVIEW OF THE NPD PROCESS

What is a new product?

The NPD process may also be called the product innovation process. Scheuing (1974, p. 8) defines an innovation as 'any thought, behaviour, or thing that is new because it is qualitatively different from existing forms'. Garbutt (1989, p. 34) defines a product as 'a tangible physical object or an intangible service which can be offered for use, consumption, or enjoyment, and which satisfies a want or need'. A product is a complex of tangible and intangible attributes, including packaging, colour, price, texture and manufacturer/retailer's services.

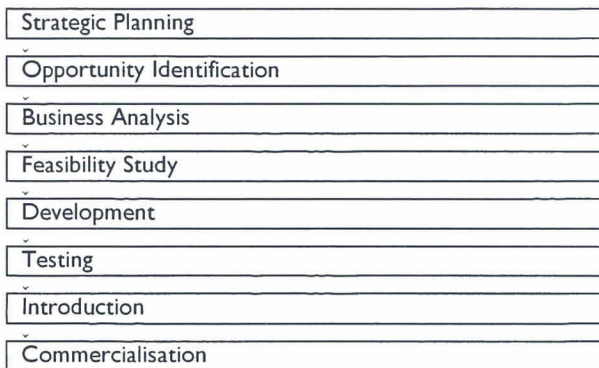
Crawford (1994, p. 11) explains that product innovation can take one of five forms. Firstly, there are 'New-to-the-world-products', which are the result of brand new inventions. Secondly, there are 'New category entries', where a company will enter into a new market by producing a product that they have never produced before, but which has been developed by others and already accepted into the marketplace. Thirdly, there are 'Additions to product lines', where a company develops products that they see as extensions to their current product lines, and which serve to act as 'flankers' to current products or to offer alternatives to customers, such as lower fat versions of full fat food products. Fourthly, there are 'Product improvements', where the make up of current products is altered with the aim of making the product more cost efficient or to provide more benefits to the end consumer. Crawford believes that almost every product on the market today has been improved many times. Finally, he lists 'Repositionings' where products which were originally intended to serve one purpose are re-marketed to serve another.

Cooper (1993, p. 13) adds a sixth form of product innovation to this list, 'Cost reductions', which are new products designed to replace existing products, but yielding similar benefits and performance at lower cost.

The NPD process

Büyüközkan and Feyzioglu (2004, p. 27) define the NPD process as 'the transformation of a market opportunity and a set of assumptions about product technology into a product available for sale'. They state that 'it requires contributions from nearly all functions of an enterprise, whether it is an upgrade or a new concept either to the company or to the market'. Lee, Hwan-Yun and Han (2001, p. 271) agree that the process is 'an interdisciplinary process requiring contributions from nearly all functions of management systems'. Rochford (1991, p. 255) describes an eight-stage NPD process (Figure 1).

Figure 1. New Product Development Process



Source: Rochford (1991, p. 255)

In this eight-stage process, Rochford (1991) is attempting to map the development of a new product until it reaches full-scale entry to the market place at the commercialisation stage. At the strategic planning stage, an initial need to introduce a new product is established and the form of the new product is decided at the opportunity identification stage. This process has been derived empirically from a study of a number of manufacturing companies in the US. At the business analysis and feasibility stages, highly detailed marketing, technical and financial investigation is carried out to assess the product's production and sale viability and, if it is found to be viable, the product will reach the development stage where a prototype is produced. This prototype is then subjected to rigorous quality and safety testing at the testing stage and, if successful, it will reach the introduction stage where it is introduced to the market on a limited scale. If it is found to be successful at the introduction stage, then it will be launched fully into the market at the commercialisation stage.

The accountant's involvement

Rabino (2001, p. 74) states that

The responsibility for product development and/or line extensions that traditionally have been within the bailiwick of the product manager is transferred on an increased frequency to the project team. The team typically consists of individuals drawn out of manufacturing, R and D, design, finance, marketing, logistics or other functional areas.

Johne (1985, p. 25) says that there can also be an 'NPD Department' and 'if it is a line department, it will be on the same lateral level as other functions in the firm'. There has, however, been a move away from such departments in favour of the cross-functional team approach.

Nixon and Innes (1997, p. 40) believe that

Design is an activity which is increasingly important to the competitiveness and survival of organisations, but historically the NPD-accounting relationship has been a largely adversarial one. NPD managers engaged cost engineers to defend their proposals against accountants who wanted to save money.

Bobrow and Shafer (1987, p. 204) find that the finance function may have a conflict with the more creative and innovative members of the design team, such as product designers and marketing. They feel that the accountant's 'strict rationales for spending', 'hard and fast budgets' and 'pricing to cover costs' may be in conflict with marketing's preference for 'intuitive arguments for spending', 'flexible budgets to meet changing needs' and 'pricing to further market development'. Nixon and Innes (1998, p. 36) find that this conflict may arise as a result of 'tensions between product managers who argue taste and instinct, and accountants who argue numbers'.

Rabino (2001, pp. 73-4) states that 'within the project team, the contributions of accountancy have not been evaluated in a very detailed way'. He believes that 'the main argument for development teams is that the synergy among functional areas contribute to the efficacy of the development process'. Rabino also states that his 'review of the literature has not revealed a role for accountants in the development team other than in an ancillary position'.

Much of the NPD literature does not acknowledge the accountant as a member of the NPD cross-functional team. Di Benedetto (1999, p. 530) finds successful NPD to be related to the introduction of cross-functional teams with 'the perceived superior skills in marketing research, sales force, distribution, promotion, R&D, and engineering'. Such literature does not overtly state that the accountant is not a team member, but the accountant is notably omitted from discussion.

Bobrow and Shafer (1987) undertook a study of the contributions of the R&D, finance, production, distribution, legal and communication departments to the NPD process in a number of medium to large size manufacturing companies. They too find a limited contribution by the finance department. They list 129 specific tasks which are carried out during the NPD process, yet they find that the finance department contributes directly to only six of these tasks which are listed in **Table 1**.

TABLE 1: SIX TASKS UNDERTAKEN BY THE ACCOUNTANT IN THE NPD PROCESS

1.	Isolating cost and price opportunities in the distribution mix
2.	Undertaking initial costing based on optimum manufacturing levels
3.	Identifying the need to comply with local tax, licensing, and other financial considerations
4.	Recruiting a key sales representative for the new product
5.	Forecasting profit and loss limits of successful venture and of unsuccessful write-off
6.	Defining special line management attention or policy changes required in large-scale marketing

Source: Bobrow and Shafer (1987, pp. 42–6)

By assigning these six tasks, as found by Bobrow and Shafer (1987), to Rochford's (1991) eight-stage NPD process (Figure 1), the timing of the accountant's entry into the process may be seen (Table 2).

TABLE 2: AN ANALYSIS OF BOBROW AND SHAFER'S (1987) FINDINGS ON THE ACCOUNTANT'S ENTRY INTO THE NPD PROCESS

Stages	Rochford's NPD Process (Figure 1)	NPD tasks directly involving the accountant according to Bobrow and Shafer.
Stage 1	Strategic planning	No direct involvement found
Stage 2	Opportunity identification	No direct involvement found
Stage 3	Business analysis	<ul style="list-style-type: none"> • Isolating cost and price opportunities in the distribution mix • Undertaking initial costing based on optimum manufacturing levels • Defining special line management attention or policy changes required in large scale marketing
and	and	
Stage 4	Feasibility study	<ul style="list-style-type: none"> • Identifying the need to comply with local tax, licensing, and other financial considerations • Forecasting profit and loss limits of successful venture and of unsuccessful write-off
Stage 5	Development	No direct involvement found
Stage 6	Testing	No direct involvement found
Stage 7	Introduction	<ul style="list-style-type: none"> • Recruiting a key sales representative for the new product
Stage 8	Commercialisation	No direct involvement found

Adapted from Rochford (1991) and Bobrow and Shafer (1987)

Bobrow and Shafer (1987) find that the accountant does not contribute to all stages of the NPD process, instead working only in certain specific areas.

The accountant's contribution

Control

Although the studies undertaken by Bobrow and Shafer (1987) and Rabino (2001) suggest a very limited input into the NPD process from accountants, the literature generally identifies many areas where accountants may make a contribution. Simons (1995, p. 80) believes a fundamental problem facing managers 'is how to exercise adequate control in organisations that demand flexibility, innovation, and creativity'. Souder (1987) focuses on several characteristics of innovation, such as the high risk and uncertainty attached and the high socio-behavioural costs, which give rise to the need to introduce control into the NPD process. Hertenstein and Platt (2000, p. 304) find that 'extant management control system literature has not directly addressed this important issue'.

Simons (1995, p. 80) finds that 'one solution is to go back to the fundamentals of control developed in the 1950s and 1960s for machinelike bureaucracies'. This would involve the accountant setting rigid budgets and monitoring with constant surveillance. However, this may disrupt the innovative spirit. There is a field of writing which argues that enforcing budgetary control is ineffective and has a negative impact on employee motivation, which is a key success factor in product innovation. Hope and Fraser (1999, p. 17) state that 'budgets are well known for reinforcing the command and control culture, constraining freedom and autonomy, and stifling the very challenges that excite prospective managers'. In an earlier article, Hope and Fraser (1997, p. 21) state that the traditional budgeting model is 'too bureaucratic, rigid and unresponsive, and it creates a culture that is risk-averse and gives a false sense of security'. They highlight the need to value intellectual capital, which is another key success factor in NPD management.

Bunce, Fraser and Woodcock (1995) find that traditional budgeting is not linked to strategy, encourages sub-optimal performance, and allows the occurrence of wasted opportunities. Hertenstein and Platt (2000, pp. 306-7) feel that the performance of NPD and R&D is 'difficult to measure financially because of the long-term nature of the work and the lag between NPD and R&D work and financial performance in the market'. The accountant may also practice target cost management in the NPD process in an attempt to align NPD strategy with cost control at an early stage.

Investment decisions

Another NPD issue for the accountant to consider is the investment in new technology. This is often vital where the product innovation is a 'new-to-the-world-product' or a 'new category entry'. New machinery may have to be purchased with which to produce the product, or new buildings may have to be purchased to house the production and storage operations. Without adequate resources, developing and producing new innovations may not be possible. Miller and O'Leary (1997) comment on the usefulness of the combined use of engineering and financial knowledge to implement an 'investment bundling' system. This involves implementing an integrated system of asset sharing by identifying

common activities carried out in separate business units within an entity and the drafting of a cost effective plan to set up one common area where this activity can be carried out to the benefit of each business unit. This has been suggested as an attempt to liberate innovation and development from the constraints discussed above.

Nixon (1995, p. 272) states that 'relatively little is known about the actual influence of management accounting practices on investment decisions'. In line with earlier comments made by Kaplan (1986), Nixon comments that 'it is claimed by many researchers that management accounting control systems are one of the most important and most persuasive constraints on the adoption of new technology'. Nixon further states that

Investment is discouraged by techniques that overestimate hurdle rates, have built in bias in favour of more immediate cash flows, and ignore, or discount heavily, the qualitative, long term benefits of much new technology investment. (p. 272)

He finds that there is a belief in the operating environment that accountants in practice are using techniques such as discounted cash flow, which are ignoring 'option value'. This is the link between making an investment at the present time and the future opportunities and benefits that it may bring.

Uncertainty and risk management

Another area where the accountant can specifically contribute to the NPD process is the management of uncertainty and risk management, which Büyüközkan and Feyzioğlu (2004, pp. 29–30) say 'is an integral part of NPD projects'. The accountant can present to the cross-functional NPD team a more realistic and rounded view of a project's prospects by incorporating risk in an appraisal. This enables more informed decision making. By using decision-tree analysis, the expected values of cash flows can be determined and they can then be used to calculate the project's expected net present value. The accountant can also provide useful information to the NPD cross-functional team by way of a sensitivity analysis.

Pricing

Mills and Sweeting (1988) see the pricing decision as being traditionally influenced by three disciplines: accounting, which encourages a cost-based framework; marketing, which focuses on competitors' prices; and economics, which considers supply and demand and the structure of the market. Claret and Phadke (1995, p. 20) believe the cost-based approach to pricing favoured by accountants has become too restrictive and that a pricing approach similar to that of the marketing discipline 'must be part of the competence of management accountants'.

The accountant may also exercise an influence on the pricing decision for the new product. The pricing decision can be linked to competitive strategy, affecting the uptake of the new product on the market and, therefore, determining the pace at which the product moves through its predicted life cycle. In the short term, pricing affects profitability. The relationship can be complex, depending on price

elasticity, volume and fixed and variable costs. In the longer term, the strategic position of the firm can be affected.

Design

Closely linked to the pricing decision, and an activity in which the accountant can play a direct role, is the practice of target cost management (TCM). TCM is an important tool for those companies which are developing new products to compete on a cost leadership basis. Blocher, Chen and Lin (2002, p. 155) state that

the firm has two options for reducing costs to a target cost level:

1. By integrating new manufacturing technology, using advanced cost management techniques such as activity based costing, and seeking higher productivity, or,
2. By re-designing the product or service.

Having been provided with the market price by the commercial members of the NPD team, the accountant plays a key role in determining the desired profit. The accountant then provides the desired profit to the production team and they begin the process of value engineering. Value engineering involves attempting to reduce product cost by analysing the trade-offs between different types of product functionality and attributes and total product cost.

The accountant may also aid the decision process by preparing cost tables. 'Cost tables are computer based databases that include comprehensive information about the firm's cost drivers' (Blocher et al., 2002, pp. 158-9). Cost tables are particularly useful where a company may wish to manufacture products in different sizes or materials while maintaining the same design.

Marketing

Mia and Chenhall (1994) find potential for the accounting function to share information and work more closely with the marketing function. They believe that the information provided by the accountant has evolved to incorporate 'external and non-financial data focusing on marketing concerns, product innovation, strategic planning and predictive information related to these decision areas' (p. 1). They find, however, that this information may be of more benefit to the marketing function than to the production function, since 'marketing is often associated with higher levels of uncertainty than production' (p. 2). They believe the marketing function to be in need of both financial and non-financial statistics from the accountant to assist it in gaining 'an understanding of the complexity of markets, the nature of uncertainty in the environment and the potential impact of alternative decisions' (p. 4).

Quality

Another issue which is important in the NPD process is that of quality. Goetsch and Davis (1994) state that

The day of designing a new product, tossing the plans and instructions "over the transom" into the factory, manufacturing the product following those plans and

instructions, and then trying to inspect and rework the product until it is relatively capable of performing the designer's intent is rapidly coming to an end. (p. 361)

By encouraging continuous improvement, process efficiency and time to market are aided, thus having an effect on project profitability.

According to Blocher et al. (2002, p. 226), 'a quality management system developed without active involvement of management accountants could fail to realise its potential'. With the accountant's 'training and expertise in analysing, measuring and reporting information, management accountants can help design and conduct comprehensive quality information-gathering, measurement and reporting systems'. They describe the activities a management accountant can carry out to become involved in total quality management (TQM). This information is summarised in Table 3.

TABLE 3: THE ROLE OF THE MANAGEMENT ACCOUNTANT IN TQM

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1. Ensure full representation of management accountants on the main quality control committees and quality improvement teams
 2. Make the company fully aware of the competitive benchmarks, competitive gaps, customers' retention rate, and cost of quality
 3. Participate actively in identifying areas of greatest quality improvement opportunities and needs
 4. Develop quality measures to monitor and assess ongoing progress toward quality goals.
 5. Be involved closely in vendor-rating decisions
 6. Review and evaluate quality control effectiveness and the value of training courses for quality control personnel and human resources staff
 7. Gather and continually review scrap and recovery costs
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Source: Blocher et al. (2002, p. 226)

In summary, therefore, although empirical findings suggest that the role currently played by accountants in NPD is very limited, the literature points to a number of areas which offer scope for expansion of this role.

RESEARCH OBJECTIVES AND METHOD

Objective

The accountant's contribution to new product development in an Irish manufacturing context has not been considered in an in-depth way in either management accounting literature or product development literature, thus motivating the current study and highlighting the need for such research. The literature review has revealed a significant shortage of empirical evidence regarding the accountant's contribution. Existing literature is quite dated, Bobrow and Shafer's study having been undertaken in the late 1980s and Nixon and Innes's study in the late 1990s. Thus, this study was designed to examine the extent and nature of the management accountant's contribution to the NPD process. It seeks to answer the following questions:

1. What specific activities are engaged in by the accountant in relation to NPD?
2. What is the nature of the accountant's relationship with the product design team?
3. What are the perceptions of managers and accountants regarding the effectiveness of the accountant's contribution to NPD?
4. How can the accountant's contribution to the NPD process be improved?

Data collection

The field study was carried out in two companies at three separate locations over a two-week period. Data were collected at Company A's operating factory by carrying out interviews with the Financial Director who is a chartered accountant, the Production Director who is a qualified engineer, the Marketing Director and the NPD Engineer. Data from Company B were collected at the company's administrative headquarters by interviewing a senior Financial Accountant and, at an operating factory, by interviewing the senior R&D Manager. The interview style was semi-structured, with each interview lasting approximately one hour. Each interview was recorded on tape and the text of the conversation typed at a later stage. A schedule of questions asked is listed in the **Appendix**.

Company A is a medium sized company. It is a group member of one of the world's largest manufacturers of plastic pipe systems and industrial plastic products. The group currently manufactures over 17,500 products and holds 550 patents. In Ireland, Company A is the market leader in supplying plastic products for gas, water and sewer systems, building, land drainage, cable ducting and irrigation. Given the lack of competition in its industry and the long life cycle of its products (20 to 30 years in some cases), Company A chooses to compete through product differentiation, employing one full time new product development engineer. A formal Cooper's Stage Gate NPD process (Cooper, 1993) is followed at Company A. Cooper's process is essentially a system of decision points which he calls 'gates'. Each 'gate' represents an important discussion using marketing, technical and financial analysis where a cross-functional team will make a collective go or no-go decision regarding the future prospects of the new product. A new product must move through each 'gate' before the following stage may begin. If each 'gate' is successfully passed, the new product will graduate to Rochford's commercialisation stage.

Company B is a parent company and is a leading worldwide manufacturer of electric heating and domestic appliances. The group which this company leads currently employs 8,500 people and has an annual turnover of approximately €1.3 billion. The products of this group are manufactured under many different brand names worldwide. Given the intense competition in its industry and the relatively short life cycle of its products, Company B chooses to compete through cost leadership. An informal NPD process is operated at Company B, with Irish operations employing about 20 people directly involved in new product development.

It is recognised that two case studies with six interviews may not give a fair representation of a national situation. The two companies, while operating in the

manufacturing sector, differ in size of operations, number of employees and target customers. However, the case studies generate many interesting findings for discussion.

FINDINGS

Question 1: What specific activities are engaged in by the accountant in both companies in relation to NPD?

In both companies, the accountant is contributing in a limited fashion to the NPD process, providing mainly costing information. The accountant is occupying an ancillary role and the NPD process is dominated by the marketing function. This study finds the accountant's contribution to NPD to be restricted to the activities found in **Table 4** below, the activities being classified according to the stage at which they are carried out.

TABLE 4: THE ACCOUNTANT'S CONTRIBUTION TO THE NPD PROCESS AT COMPANY A AND COMPANY B

Stages	Rochford's NPD Process (Figure 1)	Activities
Stage 1	Strategic planning	<ul style="list-style-type: none"> Identifying the need to innovate through analysis of past financial performance Involvement in setting a target to have a certain percentage of turnover come from new products
Stage 2	Opportunity identification	<ul style="list-style-type: none"> Assisting the marketing department in identifying opportunities through competitor analysis
Stage 3 and Stage 4	Business analysis and Feasibility study	<ul style="list-style-type: none"> Providing projected cost information for the new product Undertaking target cost management Seeking grant-aid and external financing Conducting business analysis through an assessment of company resources and their alternative uses
Stage 5	Development	<ul style="list-style-type: none"> Assessing new technology investment with payback as the predominant appraisal method Communication with shareholders regarding NPD activities
Stage 6	Testing	<ul style="list-style-type: none"> Analysing the cost of quality for the new product
Stage 7	Introduction	<ul style="list-style-type: none"> Staff recruitment
Stage 8	Commercialisation	<ul style="list-style-type: none"> Organisation of logistics (purchase of materials and storage) for new products

It is found that at different points of the process different business functions have varying degrees of influence. The accountant's contribution tends to be most significant at the business analysis and feasibility stages. It is felt, however, that

many of the tasks which would traditionally be seen as the domain of the accountant are carried out in the NPD process by the marketing department, one such task being price setting. It is, as the Marketing Manager at Company A concludes, the commercial functions that are more involved in the NPD process.

While there was a general consensus among accountants and managers that accountants are involved in the activities shown in **Table 4**, there was considerable divergence between the two groups regarding the effectiveness of the accountant's involvement, as reported under Question 3.

Question 2: What is the nature of the accountant's relationship with the product design team?

The study finds the relationship between the accountant and the product design team to be somewhat tense. It is evident that in both companies the design team holds a perception that the accountant makes only a limited input into NPD. There appear to be three reasons for this finding.

Firstly, it is found that the product designer and the accountant have little interface. This was because product design is found to be a sub-section of the Marketing Department at Company A and of the R&D Department at Company B, and the accountant interacts only with the department heads.

Secondly, there is a perceived creativity gap between the accountant and the designer. Creativity is found to be a key factor in successful product innovation and a highly desirable quality in NPD cross-functional team members. However, members of the finance team at both Company A and Company B are not perceived to be creative people, thus leading to a perceived creativity gap.

Company A's NPD Engineer finds that the uncreative accountant does not understand the concept of innovative learning:

Maybe two and half years or three years ago, I might have spent five weeks of the company's time and salary and it mightn't have meant anything at the time. I might have killed it at the end of the day, but I might revisit those files and say "ah yes there are new materials on the market and now we can use that". That information is not necessarily thrown away because it is always useful and you always learn from your mistakes. But an accountant wouldn't see that. The accountant wouldn't look at the long term.

Thirdly, the financial knowledge of the more technical contributors to NPD at both companies is strong. This leads to some of the costing work for NPD being done by the technical contributors themselves, resulting in their questioning of the need for an accountant's involvement. Company A's NPD Engineer comments on his use of financial measures:

I use raw material costs, process costs, cycle-time costs for moulds. You would use all those tools to assess, and then you would also have to look at what the market can bear when you develop the product, what can you sell it for... I do it myself.

The accountants in both Company A and Company B perceive themselves as having a good working relationship with the design team. They feel, however, that while the more creative disciplines hold the ability to compute basic financial

information and costings, they lack the ability to draw all the information together into a comprehensive financial plan for the entire organisation and to align their financial goals with the goals of the organisation as a whole. Thus, if their relationship is found to be tense at times, the accountants find the reason for this not to be their own lack of creativity but the design team's inward focus on short-term design goals. Company B's Financial Accountant believes that only the accountant has the ability to conduct "a full investigation and a full review" encompassing both internal and external considerations.

Question 3: What are the perceptions of managers and accountants regarding the effectiveness of the accountant's contribution to NPD?

Three distinct perceptions of the accountant's involvement in the NPD process are found: those held by accountants themselves; those held by the more creative disciplines, design and marketing; and a more balanced perception held by more "neutral" participators such as the product makers in the production department.

The Financial Accountant at Company B agrees that the accountant does have an important role as a member of the cross-functional team:

it is very much a combined group, everybody is working together very, very closely... we are not in this little bubble here in the office, we are sitting down with the guys, they are showing you drawings as to how the thing is made.

Company B's Marketing Manager believes there is a definite role for accountants in the NPD process. However, their input is limited to the later stages of the process:

I think in any product development process, it is very much cross-functional in terms of its make up and I would rarely not involve accounting if it is an indigenously developed product... I think there is a role for accountants definitely... I think accountants are more likely to be involved in managing the production side and the things that generate direct costs.

The NPD Engineer at Company A agrees with this perception of late entry into the NPD process. He finds that he has little opportunity to build a relationship with finance team members since he has little contact with them in the course of his work. He believes that the accountant joins the NPD process at the commercialisation stage and has no input to the earlier stages. Similarly, the R&D Manager at Company B feels that the finance team has only a limited input to the NPD decision:

I wouldn't see them as being involved as such... I see two stages to their input into the process... they are in at the costing end of it and at the analysis end of it, where they are saying yes or no to whether this is a viable project or whether or not this product should go ahead.

The Production Director at Company A feels that the accountant has the ability to contribute to all stages of the NPD process, but the degree to which the accountant will involve himself is dependent on his personal ambitions, as opposed to job constraints:

They may well be an accountant, straight out of college at 23 or 24 years of age who may not want to be anything else at the age of 50 or 60 than a pure accountant. But you may well have somebody that comes out of college at the age of 23... and that person may well be motivated and ambitious enough to say that I want a broader role to play in the organisation.

Question 4: How can the accountant's contribution to the NPD process be improved?

The findings show consistent evidence of perceived opportunities for accountants to improve their contribution to the NPD process. It is evident in both companies that NPD is closely linked to overall firm strategy. Company A's Financial Director states that the company has an overall target of generating 15 per cent of turnover from new products. This is confirmed by Company A's Marketing Manager who reports that 15 per cent of turnover has to come from products launched in the previous three years. Both companies feel the need to consider a strategic fit with existing products when planning the development of a new product. However, Company A's Marketing Manager does not see the consideration of strategic fit as an activity which the accountant can contribute to in the role he is occupying at present. He feels a key success factor in implementing any competitive strategy is to undertake a detailed competitor analysis. He comments that the accountant could contribute by gathering information on competitors, but that it is the role of marketing to analyse this information and present it to the NPD cross-functional team.

A prevalent theme found in all interviews is the need to find a suitable method of control in order to achieve the maximum potential from an NPD process without damaging the company's long-term profitability and market position. None of the managers interviewed sees an easy solution to the control problem, with both Company A's NPD Engineer and Company B's R&D Director strongly questioning the ability of the accountant to lead a control system. However, Company A's Finance Director states that the accountant is the best suited member of the NPD team to do so.

Company A's NPD Engineer feels that by allowing the accountant to lead an NPD control system, his ability to find the best solution for a new design may be curtailed. Company A's Marketing Manager feels that control was an important element in the NPD process and he feels that control was best exercised by the accountant. Interestingly, managers at neither company found budgetary constraints to be impinging on the NPD process. An additional useful cost control activity would be to carry out life cycle costing to recognise the significant percentage of cost that is locked in at the early stages of NPD. Company A's Marketing Manager finds that there was a possible role for the accountant in NPD strategic planning by compiling the necessary information to attain grant aid or external financing for the new product.

In Company B, the R&D Manager feels that the accountant is not involved in opportunity identification in his present role and that this task is currently the responsibility of the marketing team. It is felt by Company A's Marketing Manager that the accountant may be alerted to the competitive strengths of a rival company through a competitor analysis. Detailed analysis of financial statements may yield

useful information or alert commercial team members to possible new entries into the company's existing markets. This finding is in agreement with Mia and Chenhall (1994), who identify the possibility of an alliance between the marketing and accounting functions, particularly in the area of product innovation. Company A's Marketing Manager believes that the accountant may provide valuable competitor analysis information with which the marketing team can devise commercial plans.

The importance of the pricing decision was stated many times throughout the interviews, especially at Company B, which competes on a strict cost leader price strategy. It was found that, in general, the needs of the NPD pricing decision can be best served by the accountant moving away from cost-based pricing. Company A's Marketing Manager feels that the accountant does have an input into the pricing decision but as part of a cross-functional team:

Well, market price is market price and particularly in our business which is very competitive... So price is based from the bottom up on manufactured cost and from the top down in terms of what the market can take. Now if you can't fit a margin for yourself somewhere in the middle of all that, then you shouldn't be in it.

Both Company A's Production Director and Company B's R&D Director believe that the accountant can contribute significantly to the feasibility stage of the NPD process by undertaking sensitivity analysis and presenting this to the cross-functional team in the form of a concise and easy to read report. The accountant can best serve the needs of the team by jointly performing this task with the marketing function, which can advise on non-financial considerations such as effect on sales of existing products in the line.

A need is identified for the accountant to increase uncertainty and risk management by using other appraisal methods in order to reduce reliance on payback. The short-term profitability focus of the accountant is criticised by the more creative contributors to the NPD process. Company A's NPD Engineer gives an example to illustrate this point. He says that he may spend time and money today on industrial drawings, but may not develop them any further until two or three years into the future. He feels the accountant may not understand the value attaching to these drawings as he is more focused on the fact that they cannot generate profit in the short term.

At both companies, managers see success for a new product in both financial and non-financial terms. Company A's Marketing Manager says ultimate success comes from the contribution that a product makes to the product line. Company B's R&D Manager believes success is measured in sales and quality. A strong need for all members of the NPD team to adopt a focus on the consumer is found in both companies.

DISCUSSION

The study provides some noteworthy findings regarding the accountant's contribution to NPD. The discussion which follows focuses on some of its prevalent themes.

Contribution to all eight stages of the NPD process

Previous literature finds that the accountant is contributing in a limited fashion to the NPD process. Bobrow and Shafer's (1987) analysis of the accountant's role in NPD can be directly linked to only three of the eight stages as defined by Rochford (1991) (Table 2). This study finds, however, that the accountant is now contributing in some way to all stages but that there is significant potential for an increased contribution. This is explained further below.

The tailoring of control measures to suit the NPD environment

As with Hertenstein and Platt (2000), interviewees at both companies find control to be central to the NPD process. Managers at both companies recognise, as did those in Simons (1995), the need to tailor control measures for an innovative environment for fear of stifling the innovative spirit. In particular, at Company A, a number of potentially conflicting requirements must be accommodated. These include a strong customer focus as desired by the Marketing Manager, presentation of financial information to shareholders as desired by the Financial Director, a concentration on learning, innovation and option value as desired by the NPD Engineer, and a focus on continuous improvement in internal business processes as desired by the Production Director.

Although not implemented in either company at present, a move towards Kaplan and Norton's Balanced Scorecard may facilitate a greater tolerance of innovation and may allow the accountant to participate more effectively in the NPD process. Kaplan and Norton (1992, p. 71) recognise that an 'organisation's measurement management system strongly affects the behaviour of management'. They believe that 'traditional financial accounting measures like return-on-investment and earnings-per-share can give misleading signals for continuous improvement and innovation'. Kaplan and Norton devised the balanced scorecard to give managers a balanced presentation of both financial and operational measures, thus facilitating an innovative environment.

At both companies, managers see success for a new product in both financial and non-financial terms. Company A's Marketing Manager argues that ultimate success comes from the contribution that a product makes to the product line. Company B's R&D Manager believes success is measured in sales and quality. Thus, it is important that the accountant takes both non-financial and financial measures of success into account when designing performance measurement systems. The Balanced Scorecard may be an ideal tool for this in NPD.

Quality

Quality is a key determining factor in allowing products to make the final move between the introduction stage and the full commercialisation stage in the NPD process. The introduction of TQM in the NPD process would be welcomed and the presentation by the accountant to the NPD cross-functional team of quality control information with control charts, histograms, pareto charts and fishbone diagrams would be a useful tool. The need for the accountant to assist in the measurement of quality was identified by all four non-finance managers interviewed. Company B's R&D Manager finds that success is measured by both sales and quality. Thus, by providing a comprehensive quality analysis, the accountant is presenting the cross-functional team with another measure of success to consider.

The accountant may use a cost of quality report as an attention-directing device to improve production efficiency. Comparisons can be made with previous periods or other production processes for similar products and problem areas highlighted. Expressing the information in financial terms gives an indication of the effect on overall profitability. However, the accountant may choose to use non-financial measures such as statistical quality control charts which can be useful in expressing information to lower level staff. Company A's NPD Engineer reports that the accounting and design functions have little interface. By holding regular meetings to gather and present quality information, this interface deficiency may be addressed.

The accountant may contribute to quality measurement by using Kaplan and Norton's Balanced Scorecard. Closely linked to the control function, the Balanced Scorecard will present both financial and operational quality measures, thus facilitating an innovative environment. Kaplan and Norton (1992, p. 74-75) state that 'the internal measures for the balanced scorecard should stem from the business processes that have the greatest impact on customer satisfaction - factors that affect cycle-time, quality, employee skills, and productivity'. This is an important aid to the NPD process since it can help identify the parameters that the company considers important in the pursuit of competitive advantage.

The need to develop an understanding of innovative learning

As with Nixon and Innes (1997, 1998), Company A's Marketing Manager believes that accountants have a certain respect for the innovator, but that accountants do not possess a creative mind frame, thus making them somewhat removed from the process.

Company A's NPD Engineer finds the accountant does not understand the concepts of innovative learning or long-term design plans. While time and money may have been spent on designing a product which does not make it to production, these resources have not been entirely wasted as they facilitate improved development of future products. Similar mistakes are less likely to be made in the future and new information will have been gained. Company B's Financial Accountant confirms this by stating that she does not see research work on NPD as an investment; she believes it is a *sunk cost*. Failure to recognise research work as an investment is a weakness in the accountant's contribution

according to Company A's NPD Engineer. He feels that for the accountant to contribute in a value adding way to his work on NPD, the accountant would need to have a broader technical training, in addition to existing financial training.

Company A's Marketing Manager finds that accountants are adopting an increasingly 'broad base' to counteract criticism of their role in the organisation, but he feels that they are moving into information technology and logistics, since they have more of a strategic fit with these functions. He finds that marketing and accounting are 'mutually exclusive' and that they are 'different disciplines' that attract 'different personality types'. There is a strong need for accountants to participate in marketing workshops to familiarise themselves with the NPD process and current market conditions.

Adoption of a market-based approach

This study finds a useful role for the accountant in identifying the competitive strengths of rivals through a competitor analysis. In particular, it is felt that the accountant possesses a valuable skill in the ability to analyse competitors' financial statements which may yield useful information or alert commercial team members to possible new entrants into the company's existing markets. This stands in contrast to Bobrow and Shafer's (1987) finding that there is no role for the accountant in NPD opportunity identification.

It is found that by adopting a market-based approach to pricing, the accountant can provide useful information to the NPD team. Consistent with Mills and Sweeting (1988), there is a perception of the accountant enforcing a cost-plus approach to pricing. The more technical contributors to the NPD would prefer to see the accountant adopting a market-based approach using techniques such as target pricing, skimming pricing and complementary product pricing. Company A's Marketing Manager feels that the accountant can assist the feasibility and introduction stages of the NPD by practising strategic pricing.

The accountant can adopt a focus on the consumer by attempting to measure functionality and product attributes for new products and benchmarking against competitors' products and customer satisfaction. By collecting and analysing data on costs, prices, market share, sales volume, cash flows, utilisation of resources and competitors, the accountant can provide the NPD cross-functional team with strong information with which to build a competitive strategy. This is in keeping with the earlier finding of the need to develop an understanding of innovative learning, thus facilitating a closer working relationship with the marketing department.

The need to tailor risk and uncertainty measures for the NPD process

In contrast with prior literature, there is evidence that the accountant is involved in investment decisions for new technology required to manufacture the new product. Bobrow and Shafer (1987) do not find a role for the accountant at the development stage. Nixon (1995) finds that little was known about the accountant's involvement in the new technology investment (NTI) decision. Company A's Production Director finds that the accountant had an established

role in NTI. He finds that the accountant is making the go/no go decision to invest in new technology and will do this based on payback. This view is echoed by the Financial Accountant at Company B.

While payback is the technique used extensively at both companies, there is consistent evidence of dissatisfaction at the accountant's focus on short-term profitability in the NPD process. It is found that the finance teams at both companies favour payback, as it is easy to calculate and communicate. The NPD team would welcome the introduction of other appraisal methods by the accountant, such as internal rate of return, enabling a more informed decision to be made. Also, it is felt that more than one appraisal technique should be used to give a more balanced decision.

CONCLUSION

This study offers a contribution to existing management accounting and NPD literature and highlights some important implications for both management accounting practice and education.

While it is felt that the accountant's contribution is at present limited, the study finds the accountant to be less distant from the NPD process than previous literature would suggest. In contrast with Bobrow and Shafer (1987), who find that the accountant contributes to only three of the eight stages of the NPD process, this study finds that in the views of both accountants and managers, the accountant is now contributing in some way to all eight stages. It is perceived that the accountant's work in the process currently begins at the initial Strategic Planning stage by helping to identify the need to innovate through analysis of past financial performance and continues through all the stages to the Commercialisation stage by contributing to the organisation of logistics for new products. Significant evidence is also found which suggests an increased contribution to the process is possible.

Regarding management accounting practice, the study finds that there is potential for the accountant to contribute by tailoring control measures and introducing the use of the Balanced Scorecard into the NPD process. The accountant may adopt a market-based approach to his work on pricing and product feasibility. The accountant may also tailor risk and uncertainty management to the process. The study has shown that the management accounting function has the ability to answer its NPD critics and to provide the commercial and technical functions in the process with more useful information.

Regarding management accounting education, the study finds the need for the accountant to receive training in the commercial functions to enable better participation in the NPD process and to increase cross-functional work with the commercial departments in bringing new products to the market.

There is potential for further research to be undertaken on the accountant's contribution at each stage of the NPD development process. This is particularly relevant in an Irish manufacturing context at the strategic planning and feasibility stages. Research which explicitly examines the accountant's interaction with the

more creative contributions of design and marketing functions may contribute particularly useful insights into the enhancement of the NPD contribution by accountants. In particular, a study into the accountant's use of the Balanced Scorecard in the NPD process may provide some useful insights into the area of NPD control.

APPENDIX

INTERVIEW SCHEDULE

1. Can you describe the New Product Development Process at your firm?
2. How would you define a new product?
3. Do you have set goals for the release of new products? Can you give an example of some of these goals? Who is involved in setting these goals?
4. Who is involved in the New Product Development Process? What specific tasks do each of these people carry out in the process? Are there any conflicts? How do each of these contributors relate to each other?
5. How do you define success for a new product? Who has defined this measure? Do different disciplines use different measures of success? Are there any conflicts?
6. What is the accountant's specific role in New Product Development? When does the accountant enter the process?
7. How does the accountant contribute to your new product work in your role as ____? Are there any conflicts?
8. How do you consider the strategic fit with other product goals and other goals of the organisation? Whose responsibility is it to decide that a product will fit well with existing product lines and should be developed further or not developed?
9. Do you think the finance function or the accountant has a contribution to make to the strategic fit decision? How does the accountant become involved in this decision? What information do they provide? Do they compile reports? Who supplies the information to the accountant to make these decisions? Are there any conflicts?
10. Can you describe the pre-production work involved in the New Product Development Process and who is involved in this work?
11. Who gathers information on material prices and how is this information processed?
12. Is quality an issue in NPD and how is it measured? Does the accountant provide cost of quality reports? What is contained in these reports? How often are the reports compiled? Are they circulated to all functions? What quality measures are used? Are there any conflicts?
13. Whose responsibility is it to carry out competitor analysis? What information is provided? How is competitor analysis measured? How often are measurements taken? Is it industry specific?
14. Do the accounting and marketing functions work together at any stage of the process and if so what is the nature of their relationship? Are there any conflicts? Can you describe the activities carried out jointly by the accounting and marketing functions in any given week?
15. Is there a set budget for New Product Development work? Who is involved in setting this budget? What form does the budget take? Is it flexible? Are there any conflicts? Can you describe any conflicts that have happened in recent time?

16. How is the pricing decision made for the new product? Who is involved in the decision? What techniques are used? Are there any conflicts? Is the effect on other products or product lines considered? What form does this analysis take?
17. What information do you in your role of _____ receive directly from the accountant? Is this information useful to you?
18. Are you aware of the Balanced Scorecard? How does it relate to the New Product Development Process at your company? How would you like to see it used in the future?
19. Are you aware of Life Cycle Costing? Who monitors the life cycle and related costs of products? What form does this information take? How do you use this information in your work?
20. Are you aware of Target Costing? Who sets the target costs and target profit? What techniques are used? How regularly do you receive this information? Is it useful to you?
21. How is control exercised in the New Product Development Process? Who is involved in monitoring control? What measurements are used? Who gathers and presents this information? How is it presented to you? Is it useful to you? Are there any conflicts? Can you describe any recent conflicts in this regard?
22. How do you put a financial measure on product attributes such as functionality? Whose responsibility is it to perform such measurements? How is this information presented to you? Is it useful to you?
23. What type of risk management techniques are used in the New Product Development Process? Whose responsibility is it to undertake risk management? How is this information presented to you? Is it useful to you? What other techniques would you like to see used and why do you feel they would be more useful to you than payback?
24. What type of new product information do you gather and process yourself? How does the accountant help you in this regard?

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