

Accounting and new product development

The importance of interactions within social and technical structures

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Abstract

Purpose – The traditional view of accounting as something that constrains innovation and conflicts with creativity is giving way to a more contemporary belief that accounting can enable innovation and support the innovative process. This paper aims to examine this evolving relationship between accounting and new product development (NPD) by exploring how interactions between NPD participants at various stages of the NPD process help to achieve the appropriate balance between firmness and flexibility which is necessary for NPD success.

Design/methodology/approach – A case study method is adopted. Strong structuration theory (SST) is used to examine the complex interactions that take place between managers at various stages in the NPD process, while the concept of minimal structures is drawn upon to explore how these interactions influence the role of accounting in NPD and help to achieve the desired balance between firmness and flexibility.

Findings – The findings of the study reveal that the use of accounting information in NPD is not necessarily prescriptive or normative but is embedded in the everyday interactions taking place throughout the organisation. Formal accounting information, which could be characterised as “push” information, is prepared and presented by the accountant as a formal requirement of NPD, where it is relied upon by the NPD Steering Committee to make stage-gate decisions in the latter stages of the process. This formal accounting information supports the technical structures within the minimal structures framework. Informal accounting information, which could be characterised as “pull” information, is prepared and used by the NPD team to make decisions from the early stages of NPD, often before the formal process has even begun. This information is regarded as a language or given understanding, and is often not even recognised as accounting information by those using it. This type of internalised language formulates the social structures discussed within the minimal structures framework. Together, the formal and informal use of accounting information, and the interactions implicated therein, provides the organisation with the appropriate balance of firmness and flexibility required to effectively govern the NPD process.

Originality/value – The paper contributes to accounting and innovation literature by using SST and minimal structures to explore interpersonal interactions in an NPD context.

Keywords Innovation, Accounting, New product development, Minimal structures, Social and technical structures, Strong structuration theory

Paper type Research paper

Introduction

It has been a traditionally held view in the literature that accounting constrains innovation (Abernethy and Brownell, 1997; Birnberg, 1988; Brownell, 1985; Rockness and Shields, 1984; Ouchi, 1979, 1980). Members of the finance function were thought to conflict with more creative members of the new product development (NPD) team such as product designers and marketers (Bobrow and Shafer, 1987). Nixon (1998) blamed this conflict on long-running tensions between accountants who argue using numbers



and designers and engineers who argue using taste and instinct. This perspective is beginning to give way to the more contemporary belief that accounting can enable innovation (Cooper and Slagmulder, 2004; Davila, 2000; Davila and Wouters, 2004; Hansen and Jönsson, 2005; Widener, 2007). As well as providing information that reduces uncertainty (Davila, 2000), it has been found to facilitate dialogue between the disparate participants in the NPD process (Ditillo, 2004; Bisbe and Otle, 2004; Håkansson and Lind, 2004; Jørgensen and Messner, 2009, 2010; Nixon, 1998) and to perform as a mediating instrument between internal and external parties with regard to expectations and deliverables (Carlsson-Wall and Kraus, 2015).

Despite the increased recognition in the literature of the relevance of accounting in NPD, there remains a distinct lack of knowledge of what it means to practise accounting in an NPD context on a day-to-day basis (Davila, 2000; Bisbe and Otle, 2004; Dunk and Kilgore, 2004; Davila and Foster, 2008; Jørgensen and Messner, 2010). Feeney and Pierce (2016) examined how an agent's structures, both internal and external, were formed, reformed or modified through their actions during NPD, but there appears to be no evidence in the literature of any empirical explorations of interactions between participants in the NPD process. Accounting research in the context of NPD has traditionally had two main characteristic features. Firstly, much of it focuses on the relationship between management control systems and NPD. Secondly, it tends to adopt a largely functionalist perspective. There have been calls for alternative approaches framed in psychology, sociology or organisational theory to provide a fresh perspective in examining accounting and NPD in a less static way (Davila *et al.*, 2009).

In response, this study explores the interpersonal interactions taking place during NPD and how they impact the manner in which accounting information is used throughout the process. There are a number of motivations for the study. Firstly, it examines the interactions that take place throughout NPD and in particular the role of strong structuration theory (SST) in exploring those interactions. Secondly, it investigates how these interactions impact the NPD process and explores the potential for the minimal structures framework to enhance our understanding of these interactions. At a more general level, the study is a response to calls for a deeper understanding of the relationship between accounting and NPD, which moves beyond the impression of accounting as a routine, static component of the NPD process (Davila *et al.*, 2009). Furthermore, it addresses apparent contradictions in the empirical literature regarding the role of accounting in NPD and responds to calls for integration of the disparate streams of literature in the area (Moll, 2015).

The study uses SST (Stones, 2005) to examine the key empirical findings from a case study that explores complex social actions and interactions taking place at various stages of the NPD process. The case study approach facilitates a detailed exploration of the human actions and interactions surrounding accounting information use. Its contextual nature allowed for the study of accounting as a key component of the broader organisational and social systems of which it is a part. Van der Meer-Kooistra and Scapens' (2008, 2015) notion of minimal structures is then drawn upon to demonstrate how the multiplicity of uses of accounting information in an NPD context helps organisations to achieve an appropriate balance of firmness and flexibility required to effectively govern NPD projects. SST allows us to make sense of social actions in organisations. In this study, it works as a lens through which to enhance our understanding of minimal structures, specifically the social and technical structures, at play during NPD.

The remainder of this paper is structured as follows. The next section provides the background to the study, setting out the relevant empirical literature relating to accounting

and NPD. This is followed by a description of the case site, data collection procedures and the use of accounting in NPD. Data analysis procedures are then explained, followed by a discussion of findings. The final section presents the study's conclusions.

Literature review

There is no doubt regarding the importance of innovation in sustaining organisational competitiveness (Chesbrough, 2006; Christensen *et al.*, 2004). NPD is a critical sub-process of innovation encapsulating all of the activities associated with developing a new product (Cooper and Kleinschmidt, 1986). A high quality NPD process typically incorporates a stage-gate system in which all of the steps and activities necessary to complete a new product project from idea to launch are marked by clear decision-making requirements, whereby management must decide on the future of the project (Cooper, 1990, 1996). NPD success has traditionally been associated with an open and collaborative environment in which individuals from a variety of functions of the organisation contribute to the design and development of new products (Büyükoçkan and Fezzioglu, 2004).

Very early works exploring the relationship between accounting and NPD focused on the extent to which accounting information is an effective control tool in conditions of uncertainty, specifically in R&D environments (Hopwood, 1972). This precipitated a series of studies that used traditional control frameworks to explore the nature of organisational control in R&D contexts (Rockness and Shields, 1984; Abernethy and Brownell, 1997). The work of Simons (1987, 1991, 1995) led to further research focusing on how different styles of control can be associated with NPD project success (Davila and Foster, 2008, 2009; Davila *et al.*, 2009, 2014) with a particular emphasis on the effects of interactive control systems on NPD projects (Bisbe and Otley, 2004). This stream of work explores how specific aspects of control systems relate to NPD performance (Nixon, 1998; Davila, 2000; Bisbe and Malagueno, 2009). Revellino and Mouritsen's (2009, p. 361) examination of the relationship between management control and innovation takes a sociological approach and demonstrates how innovation is a complex, non-linear process during which different types of controls are used in a variety of ways at different stages in the innovative process. Their recognition of the existence of a "multiplicity of controls", a selection of which are mobilised at specific times as frames of reference for dialogue, recognises an innovative environment, which is constantly in motion, is rarely consistent from project to project and requires ongoing adaption and evolution on the part of the systems around it.

Ongoing challenges are presented by the need for balance between control and flexibility when managing the contradictory demands of NPD. Some studies have found that control is effective in stimulating creativity and innovation (Bisbe and Otley, 2004; Chenall, 2003; Ditillo, 2004), while others claim it to be overly constraining and limiting to the innovative process (Dunk, 2011; Adler and Chen, 2011). This literature has tended to focus on technical controls such as project milestones, schedules comparing actual progress to plan and budget reports (Davila *et al.*, 2009). Less attention has been given to social controls, which refer to more informal controls, internalised norms and values achieved through a process of socialisation (Otley and Berry, 1980).

Van der Meer-Kooistra and Scapens (2008, p. 366) combine technical and social controls when discussing the notion of minimal structures, which they claim provide the firmness and flexibility needed in the governance of product development projects. They discuss the "package of practices" required to control organisational activities. Within these practices, firmness is a necessary component of control, but it must be balanced with appropriate levels of flexibility. They set out four structures (economic, institutional, social and technical), which combine to form minimal structures. These minimal structures leave

sufficient room for manoeuvre to allow parties to react to situations as they arise, without allowing the type of unconstrained freedom which may have potentially disastrous consequences in terms of achieving deliverables and meeting milestones (Kamoche and Cunha, 2001). Van der Meer-Kooistra and Scapens (2008, 2015) examined governance packages for inter-organisational product development projects, but the principles discussed are also relevant in product development projects within organisations. Minimal structures are facilitated by networks of relationships and promote a type of collaboration which is particularly effective in moulding project participants into a tight, cohesive team where they can work well together. Often, social and out of work activities are organised to bring employees together. These types of overlapping social structures provide the basis for knowledge sharing and institutional trust (Van der Meer-Kooistra and Scapens, 2015). Within these micro structures accounting information is often used to set boundaries for the project. If these boundaries are balanced with a system of strong, social structures they can provide both the firmness and flexibility to foster creativity and innovation within a product development project. Accounting information provision has traditionally been used to set the boundaries between business units and functions (Burchell *et al.*, 1980). Moreover, accounting information helps managers to identify their role within the organisation and foster interplay across those boundaries (Wouters and Roijmans, 2011; Jakobsen *et al.*, 2011; Norreklit, *et al.*, 2010). This type of interplay brings about shared viewpoints and an increased understanding of each other's position and perspective, which furthers informal communications between managers (Laine *et al.*, 2016).

While some studies have examined particular management accounting techniques in an NPD context, such as cost management (Shields and Young, 1994), target costing (Davila and Wouters, 2004) and budgets (Dunk, 2007, 2011), few have explored the use of accounting information in any depth or sought to examine how variations in accounting information use might affect NPD projects. However, recent studies have moved towards understanding how accounting is involved in the development process. Mouritsen *et al.* (2009) describe a key role for accounting in linking innovation to wider organisational controls. Their case study presents an NPD environment in which control, and the use of accounting in that control context, changes and adapts to the organisation as the innovation develops. Christner and Stromsten (2015) report that accounting calculations shape the product development process by mediating between different actors and domains. They found that accounting is regarded in the same NPD project as both enabling and constraining because where it is used to enable a particular development trajectory often entails the constraining of an alternative course of action. Jørgensen and Messner (2010, p. 185) explore what it means to use accounting every day in a complex NPD environment, which is "characterised by pluralistic demands and high uncertainty about outcomes". They report that the manner in which accounting is practised during NPD is subject to variation throughout the process and among different participants.

Insights into the relationship between the finance function and innovation are limited, and those that do exist do not provide a clear and comprehensive representation of the role. Findings seem to vary from reports of a highly evolved finance function, which successfully integrates financial and non-financial information in such a way as to encourage innovation while exercising sufficient control to meet stakeholder objectives (Nixon, 1998; Hertenstein and Platt, 1998) to the accountant being ranked as the most overlooked member of the NPD team (Rabino, 2001). This mirrors reports in the wider accounting literature of a distinction between the traditional number crunching accountant and a strategically focused financial advisor (Caglio, 2003; Burns and Baldvinsdottir, 2005; De Loo *et al.*, 2011). Empirical accounts of the contemporary role of the accountant are still contradictory, with some

indicating a broadening of the accountant's role (Siegel and Sorensen, 1999; Burns and Scapens, 2000; Burns and Yazdifar, 2001; Yazdifar and Tsamenyi, 2005; Byrne and Pierce, 2007; Järvenpää, 2007; Bhimani and Bromwich, 2010), while others suggest that the role of the accountant is still primarily that of a scorekeeper (Burns and Vaivio, 2001; Verstegen *et al.*, 2007; Zoni and Merchant, 2007).

Empirical studies examining accounting and NPD to date have focused on different levels of accounting involvement, and examined the role of the MCS, of specific elements of the MCS and of particular management accounting techniques and calculations. They have been conducted in a wide range of settings, such as R&D departments, start-up firms, entrepreneurial companies and collaborative product development projects, using a variety of research methods including surveys and case studies. This range of approaches and settings has made it difficult to integrate what are several disparate streams of literature (Moll, 2015). With this in mind, our study will draw this diverse literature together and examine a common thread across the varied settings, by exploring the interpersonal interactions that shape the production and use of accounting information during NPD projects.

Empirical setting and data collection

A case study approach allowed us to develop a rich description of the NPD process and to understand how accounting is used, communicated and interpreted by individuals differently positioned within the case context. Magma is a large multi-sectoral organisation operating in natural resources, land-based businesses, renewable energy and manufacturing. The group employs approximately 1,200 people. The manufacturing division, Magma Panel Products (MPP) consists of two companies located at separate plants – Topwood and Metbuild. Topwood manufactures Alpha products. Alpha is a commodity product used in a variety of applications such as wall sheathing, roofing, flooring, hoarding, packaging, wall-partitioning, DIY and general building applications. Metbuild manufactures Beta products, which are used for more speciality applications such as furniture, shop fittings, mouldings, wall and ceiling panels, shop fronts, external signs and flooring substrates.

Topwood's plant has a capacity to manufacture 330,000 m³ of Alpha per annum but is built on an old processing technology. In contrast, Metbuild has been a key player in the European Beta market for three decades and has been consistently committed to R&D, having established itself as a leading innovator with several families of Beta products. Ongoing R&D investment has led to market leading developments at Metbuild, including the launch of a new product range of thicker Beta products. Metbuild now has a very modern plant with annual capacity of 440,000 m³.

Data for the study were collected from multiple sources. Interviews conducted with senior management at Magma corporate head office and MPP divisional level, as well as accountants (heads of finance), managing directors and engineers (heads of operations) within each manufacturing entity provided the primary data source. A list of interviewees is presented in Table I below. In addition, data gathered during site visits, internal information memoranda, board reports, company presentations, annual reports and the company website were crucial to the development of a sound understanding of the case context. Documentation was a particularly useful tool in this study when searching for more detail or depth during interviews and when probing interviewees' responses.

Some interviewees were visited more than once to clarify information obtained from initial interviews. The interviews were conducted within the office space of the interviewees or in the company's boardroom. Interviews were semi-structured to allow themes emerging

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Role	Name	Approx. interview time (hrs)
<i>Magma HQ</i>		
Chief Executive	Bill	1
Head of Strategy	Max	1
Head of Finance	Ian	1.5
<i>MPP</i>		
Head of MPP	Simon	1
Director of Sales	Alex	1.5
Marketing & Business Development Director	Greg	1.5
<i>Topwood</i>		
Managing Director	Nick	1
Head of Operations	Jack	1.5
Head of Finance	Paul	1.5
<i>Metbuild</i>		
Managing Director	John	1
Head of Operations	Pete	1
Head of Finance	Des	1.5

Table I.
List of interviewees

during the course of the discussion to be pursued. An interview schedule was used as a basic guideline, a copy of which is provided in [Appendix 1](#). The interview schedule was tailored slightly to individuals in different roles but the questions asked and issues raised by the interviewer were broadly similar.

What follows is a detailed account of the NPD process in both companies and how it evolved, as well as an examination of the use of accounting, both as part of the formal process and more generally within the NPD environment.

New product development in magma panel products

The Magma manufacturing division (MMD) effectively came into existence after Magma's acquisition of Metbuild. NPD was immediately highlighted as a priority for both companies in the division:

So now we find ourselves having to refocus our energies in a very concentrated way over the next while to get new products onto the market (*Des, Head of Finance, Metbuild*).

With this new strategic focus on NPD came a requirement by Magma for the development of a formal NPD appraisal process:

One thing that Magma have come down very strong on is the requirement that there is a process to be followed, that you tick all the boxes, that you reach various decision-points in the process which will determine whether you go or stop, and that's something that maybe wouldn't have been as formal here in the past (*Des, Head of Finance, Metbuild*).

Over the course of six months, this team developed a document that formalised each phase of MMD's stage-gate NPD process:

[It is] a formal structure where those 'blue sky' things, as well as those predictable things, could be dropped in a funnel, could be captured and then go into a process where you say 'ok, what are the basic protocols – 8 or 9 stages which everything must go through in order to filter out the good, the bad, the ugly [...] (*Greg, Marketing and Business Development Director, MPP*).

The outcome of this project was a document, hereafter referred to as the *1st Generation NPD Process Document*, which was approved by the Magma Group HQ:

We felt we generally had something that looked and felt the same for every project [. . .]. That's what we needed (*Bill, Chief Executive of Magma*).

This document contains the pack of information that accompanies the formal NPD process. As the project progresses, more information is accumulated.

A detailed diagrammatic representation of the process is presented in [Appendix 2](#). This formalised process was followed during Topwood's *BuildSafe* development. The following account includes details of that product's development, with particular focus on the accounting information used as part of the process.

As set out in [Appendix 2](#), the process comprises seven stages. Stage 1, *Concept Generation*, is designed to document the origins of the idea. All projects that are initiated must progress to Stage 2, *Concept Screening*, after which each stage is separated by a stage-gate at which the Steering Committee decide, based on a presentation of the information in the NPD document, together with back-up schedules, whether to proceed to the next stage.

The Steering Committee consists of the Magma Group senior management team, assembled from across the divisions. The NPD Team consists of anybody that is actually working on the project. Members will change throughout the project's duration. There is no representative from finance on the Steering Committee. Every month, the Steering Committee reviews each project in turn to decide if it should be moved on to the next stage. Several NPD projects will be in progress at any given time:

This Group is about prioritising, giving gate approval, giving direction, ensuring resources are in place and making sure we're happy with the breadth and depth of the pipeline (*Simon, Head of MPP*).

Accounting features for the first time in the *BuildSafe* project in Stage 2, *Concept Screening*. Target prices are estimated at £18-£20 per board for the UK market, and €16-€18 per board for the Irish market. These prices are estimated by members of the sales department as a result of discussions with several customers. Project documentation also sets out a manufacturing cost of €5 per board, estimated by the production team based on initial manufacturing specifications. On the basis of these estimates, the proposed *BuildSafe* product offers a margin premium over Topwood's current offering. Several other aspects of the project are also examined during this stage, including manufacturing capability, plant resources, environmental issues and strategic fit. Topwood's Head of Operations, Nick, who was a member of the Steering Committee for this project, confirmed that the project was approved at this stage primarily because of the expectation that *BuildSafe* would be more profitable than the existing offering in that product category.

During Stage 3, *Concept Development and Testing*, several aspects of the proposed project are scored and weighted to develop an absolute rating between 1 and 10, facilitating review and comparison with other projects by the Steering Committee. During the *BuildSafe* development, a return on investment (ROI) and high-level capital and marketing spend is estimated by the NPD Team, who draws on the finance function for support when necessary. These three pieces of information, together with other aspects of the potential new product, including quality of distribution base, availability of internal technical resources, readiness of existing sales skill set and patent/intellectual property issues, are scored and weighted to develop an absolute rating of a figure between 1 and 10 for the project, thereby facilitating review and comparison with other projects by the Steering Committee:

It brings together all of the different dimensions that we have to consider (*Paul, Head of Finance, Topwood*).

Table II provides a breakdown of *BuildSafe*'s absolute rating.

The largest weighted item in the analysis is the ROI. The ROI is described as *the hurdle rate as projects that can get over this rate will be invested in*[1]. In Magma, an acceptable ROI can vary between 5 and 15 per cent depending on the type of project. The rate thresholds for the different divisions are defined in the capital expenditure policy.

The rate for MMD is the company *borrowing rate* + 5 per cent. At the time of the *BuildSafe* development, the company borrowing rate was 3.4 per cent, meaning that the ROI threshold was 8.4 per cent. *BuildSafe* had an anticipated ROI of 10.3 per cent, which exceeded the ROI threshold by 23 per cent, and so ROI was scored at 8 out of 10. The score was collectively arrived at by Jack (the Head of Operations at Topwood) and Paul (the Head of Finance at Topwood). If the anticipated ROI was below the threshold, it would receive a "zero" rating, which would effectively stop the project.

Capital expenditure is also examined at this stage. Though a comparatively low capital investment requirement, it was considered high relative to the value of the projected income stream. As a result, this factor was scored, again by Jack and Paul, at 5 out of 10. There are no specific guidelines governing the scoring for each of the factors. According to Paul, each score is arrived at by the team, or the relevant member of the team, and is influenced by the risk and values associated with each individual project.

BuildSafe received an absolute rating of 7.03 out of 10 and was approved to progress to the next stage. There is no stipulated cut-off point for approval/rejection of a project. All of the factors are examined in detail by the Steering Committee and each project is judged on its own merits.

At Stage 4, *Business Analysis*, the finance function, with support from the NPD Team, develops a comprehensive business case for the product setting out five-year forecasted sales volumes, sales prices, margins, returns and break-evens as well as analyses of planned equipment spend, building and installation costs, production costs, distribution and storage costs and advertising and promotion costs. The accounting information reviewed during this phase is specific and detailed in that it sets out timetables of expenditure, vendor quotes and financing options.

If the project proceeds to Stage 5, *Beta and Market Testing*, a prototype of the new product is built and detailed market and customer testing is carried out. Stage 6, *Technical Implementation*, is a lengthy stage during which capital plant work is completed and personnel and plant resources are finalised. Stage 7, *Commercialisation*, involves the development and execution of product launch, advertising, promotion plans, distribution

Item	Weighting	Score (1-10)	Rating
Anticipated ROI	0.3	8	2.4
Distribution base	0.15	10	1.5
Capital investment	0.15	5	0.75
Internal technical resource	0.12	6	0.72
Existing skill set	0.12	8	0.96
Patents/intellectual property	0.06	5	0.3
Marketing investment	0.1	4	0.5
Total	1		7.03

Table II.
Weighting of various
elements of
BuildSafe's absolute
rating

Note: Extract from *BuildSafe* NPD document

and stocking plans. At this point, the project became a capital project in process, and costs were tracked through the budgetary control process. The only accounting information reviewed as part of the NPD pack at this stage was schedules of capital expenditure that were signed off by the Steering Committee.

Evolution of the new product development process

After the *BuildSafe* launch, the designers of the original process and John, Metbuild's managing director, were asked by MPP to assess its efficacy:

We got together a sub-group [...] myself, John and Pete from Metbuild [...] and we met and surgically dissected this [pointing at *BuildSafe* project documentation] [...] this [pointing at the business case back-up] was holding things up [...] God yeah, it is a pain in the neck (*Jack, Head of Operations, Topwood*).

The over-riding conclusion of this assessment was that this process allowed too many projects to progress too far before being rejected on the grounds of marketability. This sentiment was echoed throughout MPP:

[...] a lot of these things come out of 'production' because somebody thinks they've got a cracking idea because we can make things in circles now and not squares and it looks great. And nobody really used to phone up and say 'well do they want circles instead of squares' (*Alex, Director of Sales, MPP*).

The NPD process was revised, leading to the development of what is hereafter referred to as the *2nd Generation NPD Process Document*. Metbuild's *EBuild* project has progressed through more stages of this process than any other, having reached Stage 5, *Prototype Development and Testing*. The account that follows details the accounting information reviewed during this *Ebuild* development.

The *2nd Generation NPD* process is longer than its predecessor and consists of ten stages, of which the *Business Analysis* stage is the eighth. The first two stages are similar to those in the original process. Stage 1, *Challenge and Concept Definition*, documents the origins of the idea, and, specifically, what the company hopes to achieve in strategic, customer, market and cost-base terms. After completion of this stage, an NPD Team is formed to progress the project. For the *Ebuild* development, this was led by Pete, Metbuild's head of operations, and consisted of Metbuild's technical and production personnel, representatives from MMD's sales and marketing functions, as well as a structural and planning engineering consultant and an environmental consultant. There is no member of finance on this NPD team:

There was some debate here a while ago as to whether or not we should have a finance person sitting on the NPD Project Team. And I think they were right, they decided there was no point. Because what happens is you could have 2 or 3 NPD meetings every month and they could be in London, Dublin, whatever. And there's no point dragging along an accountant and having him sitting there, listening to technical stuff on the product, now I know it gives you a lot of background insight into it which is great, but you can chew up a lot of time with nothing happening (*Des, Head of Finance, Metbuild*).

Stage 2, *Early Screening*, is narrower in scope than Stage 2 in the previous process, challenging the concept in terms of a high-level quantitative assessment. Back-up workings for the *Ebuild* project show a forecasted turnover of €35 m within 5 years as well as potential royalty income from future licensees of up to €27 m over a 10- to 15-year period. This information was largely prepared by members of the NPD team themselves, with some support from the finance function, when necessary. In general, it is thought that the NPD team have sufficient financial know-how to perform these early analyses themselves:

There's a robust enough system within the NPD group themselves, they can handle it themselves (*Des, Head of Finance, Metbuild*).

Estimated target price, estimated manufacturing cost and estimated capital, technical and financial resources, which were previously examined in Stage 2, are now pushed downstream in the process.

A key development in the updated process is the inclusion of Stage 3, *Market Analysis*. This presents a more detailed evaluation of the consumer marketability of the product, which was briefly reviewed in Stage 2 of the previous process:

A big chunk of work has to go around market assessment and whether or not we believe that there is an appetite for this product in the marketplace [. . .] that's absolutely critical (*Simon, Head of MPP*).

This evaluation of the market is conducted earlier than previously in an effort to reduce the time spent on projects, which ultimately do not proceed to launch:

We did the market analysis badly. Now we do that earlier and better (*John, Managing Director, Metbuild*).

This suggests that sales and marketing information is considered more critical to decision-making than any other type of information at the early stages of the NPD process. If a proposed product does not demonstrate adequate sales potential at the outset, the project will not progress. This is the crucial change in the revised process; marketing information is relied upon to perform an earlier screening of proposed projects:

If you talk to sales & marketing, they would say that technical don't respond quick enough. And if you ask finance they will say, well, marketing come along with these wooly ideas, they don't know exactly what they're doing, so you have a little bit of finger pointing going on, but the whole idea here is to have a process that only kicks in resources when they're absolutely required and first of all we need to know the market. So that's one of the reasons why we changed it from there (1st generation NPD document) to there (2nd Generation NPD document). We brought marketing up higher (*Nick, Managing Director, Topwood*).

Detailed schedules of forecasted sales prepared by members of the NPD Team, primarily sales and marketing personnel, indicate that *Ebuild's* demand lies in the range of 20,000 m³ to 40,000 m³ at a sales price point of £1,000 per m³ for raw board. The £1,000 per m³ price point was arrived at by members of the NPD team. The potential market size is described as very sensitive to this price point. 60 per cent of the market opportunity will be accessed through existing MMD channels. Given the fragmented nature of this demand, market build-up is likely to be quite slow; however, the ultimate market size was considered strong enough by the Steering Committee to allow the project to progress to the next stage.

Stage 4, *Project Scope Definition*, defines the project's scope in terms of manufacturing capacity, technical resource and project funding. Metbuild's head of finance, Des, has been working on the financial scoping of *Ebuild* from early in the process, setting out a range of proposed capital projects, all of which are currently under review by the Steering Committee. [Table III](#) sets out the key elements of these four scenarios. Des worked closely with the head of operations to prepare the model underlying these scenarios:

Like once you have a reasonable handle on the capital costs, you're set to look at your options. When you look at the numbers here we're talking about producing about 40,000 m³ per year on a plant that's going to cost about €40 m. Over 10 years, that's 400,000 m³, divide by 400,000 m³ into €40 m, that's €100 per m³ depreciation. Now, my depreciation charge here in [Cork] at the moment is about €18 per m³. So a depreciation charge of €75-€100 is significant [. . .]. Now that's all well and good, but we need a simple model to convey that to the guys (*Des, Head of Finance, Metbuild*).

Project element	A	B	C	D
Average plant capacity	M ³ 50,000	30,000	25,000	15,000
Maximum plant capacity	M ³ 66,667	40,000	33,333	20,000
Operating plan	No. of shifts x weeks per year 4 x 48	5 x 48	5 x 48	5 x 48
Operating efficiency	Average 90%	90%	90%	90%
Plant capacity	Tonnes per hour 6.25	4.1	3.13	2.0
Acetylation plant capex	€ 23,900,000	18,300,000	16,400,000	15,120,000
Add contingency at 15 per cent	€ 3,600,000	2,700,000	2,465,000	2,268,000
Energy refit	€ 9,000,000	7,450,000	7,200,000	5,600,000
Utilisation costs	€ 2,000,000	1,800,000	1,700,000	
<i>Total capex</i>	€ <i>38,500,000</i>	<i>30,250,000</i>	<i>27,765,000</i>	<i>22,988,000</i>
License fee to <i>Ucon</i>	€ 4,000,000	2,400,000	2,000,000	1,200,000
Typical depreciation	€per m ³ per year 58	76	86	115

Note: Extract from back-up workings to project scope definition stage of EBuild NPD process

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and new
product
development

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Table III.
Capital expenditure
scenarios for *EBuild*
project

The estimated capital, technical and financial resources, which were previously examined in Stage 2 are now examined here. It was decided that there is little point in preparing information of such a detailed nature without first establishing if the product has an adequate market potential.

A prototype is developed and preliminary testing is conducted in the market in Stage 5, *Prototype Development and Testing*. *Ebuild* has, to date, undergone a lengthy period of *Prototype Development and Testing*. Two full-scale production trials have been completed, and initial results show outstanding durability and good accelerated weathering performance. Durability, thickness swell and stability are significantly better than in comparable products and compare favourably to non-wood exterior materials. This stage is ongoing. However, given the positive results to date combined with the size and value of the project, the NPD team has begun working on Stage 6, *Preliminary Financial/Business Case Analysis*. With what team members themselves describe as “excellent” support from Metbuild’s head of finance, detailed sales revenues, costings and returns have been prepared based on the four capital expenditure scenarios outlined in Stage 4. Much of this information was previously examined in Stages 2 and 3 of the process. Again, this information is pushed downstream in the process to ensure that it is first established whether there is a market for the product.

More extensive market testing is carried out in Stage 7, *Market Testing*, after which the comprehensive business case is prepared by the finance function in Stage 8, *Business Analysis*. This is the final stage before the completion of capital plant work and the planning of personnel and plant resources, followed by the subsequent execution of product launch plans, advertising and promotion plans and distribution and stocking plans. In effect, the comprehensive business case is prepared immediately prior to the significant commitment of financial resources:

There can be a propensity to get very excited [...]. We’re getting very excited [with *Ebuild*] and we will come to the point internally in the organisation where we’re saying ‘do we pull the trigger or no?’ And I can tell you, the trigger will not be pulled until there is a hard strong business case put across (*Ian, Magma Group Chief Financial Officer*).

This has been identified as the critical investment point in an NPD project:

As we develop products we’re not spending too much on development work [...] but now [in the latter stages of the project] we’re looking at detailed schedules, we’re looking at discounted cash flow (DCF) and we’re looking at a timeframe of ten years, and what’s the net present value (NPV) based on a timeframe and what’s a cost of capital and does this stack up and how vulnerable is this to assumptions and how concrete are our capital costs? [...] I would certainly be looking for reassurance that either Des or Paul have tested this (*Simon, Head of MPP*).

Accounting information in the earlier stages of the process is restricted to sales projections and high-level estimates of capital investment and resource requirements. It does not become prominent until the *Business Analysis* stage and, as the document has evolved, this stage (and, therefore, the apparent importance of accounting information in the formal NPD process) has moved downstream. At this point, many of the key marketing and design decisions pertaining to the new product have been made. In this formal capacity, accounting information does not feed into a new product’s design or development but it is heavily relied upon by the Steering Committee to support any decisions leading to significant financial commitment to the project:

Finance are a good test. They test it and say ‘well come on guys you really are taking the [...] you’re over-ambitious or you’re under-ambitious etc. [...] it is control in the loosest sense of the word (*Alex, MPP Director of Sales*).

The involvement of the Finance function in providing accounting information at this stage adds credibility to this support.

The *Technical Implementation* stage tracks the completion of capital plant work and the planning of personnel and plant resources. This is followed by the *Commercial Launch* stage, which monitors the development and execution of product launch plans, advertising and promotion plans and distribution and stocking plans. As with *BuildSafe*, at this point, the project becomes a capital project, and costs are managed through the budgetary control system.

Informal use of accounting information

When initially asked to discuss accounting and NPD, managers immediately referred to the formally documented process and the *pro forma* schedules of accounting information that form part of this process. During one particular interview, when asked what accounting information is used during NPD, Metbuild's head of operations, Pete, described the review of some ancillary information in Stage 6, *Preliminary Financial Analysis and Business Case*, followed by a more detailed review in Stage 8, *Business Analysis*[2]. When asked if he would use any accounting at an earlier stage, he replied that he would not. The interview was interrupted by Metbuild's Head of Finance, Des, who wished to clarify what time he was meeting Pete to discuss the *EBuild* project. At this point, *EBuild* was at Stage 5, *Prototype Development & Testing* and very little accounting information would have been under review as part of the formal process. The interviewer, having spent some time reviewing the *EBuild* project documentation, asked Pete what the meeting was about. He explained:

I'm pulling together some analyses of the costing implications of getting upright condensers versus flat condensers for the new *EBuild* plant. I just want to run through some of the figures with Des (*Pete, Head of Operations, Metbuild*).

This was the interviewer's first insight into the use of accounting information on an informal basis during NPD in Metbuild. When probed on this, Pete was amused and suggested that he had not considered this accounting information. These analyses are outside of the formal process. They are not reviewed by the Steering Committee and were not initially highlighted by any party in discussions about the use of accounting information throughout the project:

The main thing for NPD is that we get an idea and we develop some early stage screening, and this must be financially based. This first screening comes down to financials - 'is the hill worth the climb?' - and if you think the numbers look ok, you go into more depth [...] and you bring in more expertise (*John, Managing Director, Metbuild*).

The managers on the NPD team, who are actually engaged in NPD activities (as opposed to the Steering Committee who oversee NPD), describe accounting information as having a far greater day-to-day role than that presented in the formal NPD process. Accounting information is drawn upon casually, even subconsciously:

Everything we do here, we develop something and the unit of measure is m^3 and everything comes down to that. And my area is cost per m^3 , that's where I come in, my life revolves around cost per m^3 [...] (*Pete, Head of Operations, Metbuild*).

This is not structured or aggregated in any consistent, recognisable format. It is carried out as needed and is largely intuitive in nature. Pete suggests that such accounting analysis might be performed at lunch on a copy of the newspaper. It is not readily identified as accounting information but rather is considered part of the general discussion of the project. This is facilitated by MPP's cross-functional approach to NPD:

We set the tone at the top really in terms of what will pass muster. The cultural side for me is changing to a different type of governance to the current one which is, well, 'self-regulation' is the wrong phrase but the guys working on the project teams are all on cross-functional teams [...] they will have an inbuilt thing of challenging each other and that's on the numbers as well (*Bill, Chief Executive of Magma*).

Accounting information used in this informal capacity in the earlier stages of NPD is prepared primarily by NPD team members themselves, sometimes with some support from Finance. This is because it is considered difficult for finance to prepare a meaningful financial analysis at the early "fuzzy" stage of the process:

You can't just say to your finance guys 'go and cost that' if the thing does not exist [...] we need to get together and say 'we need a plant this size, it'll cost this etc., etc.,' and we build a model together (*John, Metbuild, Managing Director*).

As the NPD project progresses, the nature and purpose of accounting information changes. The informal, often casual, financial analysis carried out by the NPD team members at the early stages of the process is replaced by the detailed, complex analysis presented to the Steering Committee at the stage-gate reviews. This is when the Finance function becomes more involved in NPD:

I mean we would brainstorm together and if we get a product and we're working on one at the moment that will probably be presented to the next MPP meeting, while it is internal here in [...]. I can do the numbers and John can do the numbers, but if it goes to MMD, Des will have to get involved because it has got to stand up to scrutiny. And it is more than likely that Des will be presenting it anyway. And if I was presenting, Des would take over once the numbers come up (*Pete, Head of Operations, Metbuild*).

The informal use of accounting information is not exclusive to Metbuild. Topwood's Head of Operations also describes the necessity to prepare and review accounting information at the earlier stages of the process, though his attitude to accounting information is not as positive as that of his counterparts in Metbuild:

At the initial stages [of an NPD project] the project manager will scope out the project technically and from a financial point of view, he will research the payback and he will assemble the cost estimates [...]. We do it ourselves. In other companies there would be a project accountant assigned, but not here (*Jack, Head of Operations, Topwood*).

Accounting information generally does not appear to be regarded with the same degree of importance in Topwood as it is in Metbuild:

I mean it is not rocket science. All you need is a set of accounts and a bit of financial analysis around that to be able to compare apples with apples (*Nick, Managing Director, Topwood*).

Moreover, the managers in Topwood do not appear to interact and mix with the accountants in a general sense to the same extent as their counterparts in Metbuild. For instance, it came up regularly throughout the case that Metbuild's managers, including the accountant, regularly play football together. They have a social relationship outside of work. This type of relationship is not evident in Topwood.

Analysis and discussion

While the multiple data sources provided a rich contextual understanding of the phenomena under review, there is a challenge in analysing such a vast amount of empirical evidence. Rigorous data analysis procedures were employed using [Stones \(2005\)](#) composite research strategy. This involves a series of steps, which when applied to a particular agent, can

provide an insight into that agent's behaviour. Transcripts and supplementary materials were coded and analysed using Stones' composite approach. These steps can be applied repeatedly to a number of agents differently situated within a given setting. In the context of this study, this involved analysing the study's case data several times, each time using a different manager as the lens of analysis. Firstly, a conduct analysis was carried out on each manager to explore his concerns, motivations, desires, attitudes as well as the rules and norms associated with his specific role. Secondly, the entire analysis was turned outwards to carry out a context analysis and explore each manager's external terrain and institutional practices[3].

Carrying out this analysis on a number of different actors over a period within a given context allowed us to explore the interactions and interdependencies, which take place between the different managers in the case setting. It also allowed us to understand how those interactions reflect a balance between the firmness and flexibility deemed appropriate for particular stages of the NPD process.

Accounting in the new new-product-development process

The case describes the evolution of the formal NPD process from the seven-stage first generation NPD process to the ten-stage second generation NPD process. Within this formal process, accounting information is pushed further downstream with more emphasis being placed on market analyses at the earlier stages because market information is considered the most accurate early indicator of a new product's potential. This suggests that in a formal capacity, accounting information is about legitimising decisions that have already been taken and providing the Steering Committee with more certainty in advance of the commitment of financial resources.

A superficial observation of this evolution might suggest a demotion of accounting information in an NPD context, but a deeper analysis suggests the contrary. If accounting information was limited to the formal process, it would indeed become less relevant as it is only drawn upon after the big decisions have been taken. However, the case also describes how accounting information is relied upon by members of the NPD team in an informal capacity, from the early stages of the process to support decisions regarding product feasibility and design. In this context, accounting information appears to be acting as a kind of filtering mechanism at the early stages of the process. This is an interesting illustration of the social and technical components of Van der Meer-Kooistra and Scapens' minimal structures (2008, 2015), which effectively guide day-to-day projects. The social component in particular is facilitated by the accountant, often by supporting discussions in the earlier stages, as is evident from Des' discussions with Pete regarding the condensers in the *EBuild* project.

Continuum of accounting information

The formal NPD process requires the examination of specific items of accounting information at predetermined times. This could be characterised as "push" information because it is a formal requirement within the NPD process. This information is generally prepared and, more importantly, presented to the Steering Committee by the finance function. There is consistent evidence that accounting information is only relied upon by the Steering Committee to make stage-gate decisions when it is presented or delivered by finance. For instance, Pete believes that accounting information is only relied upon by the Steering Committee to make stage-gate decisions when it is presented or delivered by an accountant:

The financial element [of the NPD process document] has to be justified by financial people (*Pete, Head of Operations, Metbuild*).

Members of the Steering Committee have come to rely on accounting information being presented to them at particular points in the process by finance to give them comfort with regard to their stage-gate decisions. In relying on the finance function to present this information, the Steering Committee draw ontological security from the routinized procedures and recognisable behaviours associated with finance. Members of the NPD team, cognisant of how the Steering Committee views accounting information and the consequent importance of finance in preparing and presenting this information, draw on this ontological security as accounting information is perceived to be setting out the order of dependency and autonomy within the group.

In contrast, accounting information used in an informal capacity could be characterised as “pull” information in that it is prepared by members of the NPD Team as needed, with support from the finance function when necessary. It is based on the same recognisable procedures and accepted conventions as the formal information, but the interactions around it differ, such that it facilitates day-to-day cross-functional dialogue throughout NPD:

I think it [accounting information] helps people to understand what we’re dealing with. It brings a common meaning to decisions [...] it is trying to ensure that we’re all talking the same language and nothing is getting lost in translation (*Des, Head of Finance, Metbuild*).

The nature and content of the accounting information used informally was found to differ from that used in the formal NPD process. As set out earlier, the Steering Committee reviews detailed schedules of finalised forecasted sales and costs accompanied by financial measures such as ROI. Accounting information reviewed in an informal context is less formulaic and process driven. It is more of a language or given understanding. It is not structured or aggregated in any consistent, recognisable format. Rather, it is prepared as needed and is largely intuitive in nature. As a result, informal accounting information can manifest quite differently in different circumstances. For instance, Metbuild’s head of operations suggests that such accounting analyses might often be performed at lunch on a copy of the newspaper. In this context, it is not readily identified as accounting information but is considered part of the general discussion of the project. What distinguishes this accounting information as informal is the fact that it is improvised and, therefore, varies from project to project.

It is important to recognise that the relationship between formal and informal accounting information is not rigid and dichotomous. They operate on something more akin to a continuum. Formal accounting information relied upon by the Steering Committee is at one end of the continuum. Informal accounting information used by the NPD team on a day-to-day basis falls on the other end. As accounting information is being used, where it falls on the continuum, and the extent to which it may be characterised as formal or informal, is associated with the nature of the interactions taking place between the different participants in NPD.

For instance, the informal use of accounting information draws on accounting as a language:

In manufacturing it all comes down to € per m³ [...] this has built up over time (*Pete, Head of Operations, Metbuild*).

This language is developed and facilitated by the ongoing interactions between the NPD team and accountants. These types of interactions facilitate the managers’ engagement with accounting information in an informal context, which leads to the development or crafting of

accounting as a language. These interactions and the language of accounting continue to reinforce each other through ongoing and often spontaneous interactions. We see an example of this when Pete talks about brainstorming new projects and preparing rough costings at lunch on the back of a newspaper. Pete believes that accounting information provides an organisation-wide interpretive scheme that allows managers from different backgrounds and in different circumstances to make sense of and communicate about NPD issues:

They [consultants] say 'ye [sic] live your lives on € per m³. But it makes a whole pile of sense, and for non-finance people it is easy to grasp [...] accounting information helps us to understand at a very working level what we're dealing with [...]' (*Pete, Head of Operations, Metbuild*).

Accounting information at various points along the continuum is being used to set boundaries for NPD, but in a manner that achieves the desired balance between firmness and flexibility deemed appropriate for different stages of the NPD process. Information positioned towards the formal end of the continuum could be regarded as providing the firm boundaries needed to effectively govern product development projects ([Kamoche and Cunha, 2001](#); [van der Meer-Kooistra and Scapens, 2008](#)). The informal communication and interplay which characterises accounting information positioned towards the informal end provides flexible boundaries in the form of trust and shared understandings. This helps to foster the creativity and flexibility for NPD success ([Wouters and Roijmans, 2011](#); [Jakobsen et al., 2011](#); [Norreklit et al., 2010](#); [Laine et al., 2016](#)). This trust and shared understanding is particularly evident in Metbuild, where the managers have developed a social relationship outside of work (e.g. playing football after work), something [Van der Meer-Kooistra and Scapens \(2015\)](#) discuss as a tool in strengthening social structures.

Accounting as a filtering mechanism

As the process has evolved, and the use of accounting information in a formal context has moved further downstream, it is clear that the interactions that accompany the informal use of accounting information operate as a type of filtering mechanism on which the company has come to rely upon:

I mean, it has got to stand up financially, you've got to have some logic for it, there has to be a filter of some sort before you get into the minutiae (*Paul, Head of Finance, Topwood*).

At the formal end of the continuum, the interactions accompanying the use of accounting information could be characterised as more passive in nature, simply reflecting an acceptance or tolerance of the analysis. Within the formal process, the Magma senior management views the accounting function as a gatekeeper who screens new products, particularly before the company commits financial resources to the projects:

They [finance] have a stewardship function first and foremost (*Bill, Chief Executive of Magma*).

Interactions at the other end are more active and involved:

Because business is profit and loss and we all understand that [...]. There would be an ethos, if you like, within Metbuild, it is very much that anything you do you must justify, down to something for this room, you're just programmed that way [...] and finance has to be in there big time (*Pete, Head of Operations, Metbuild*).

This illustrates how accounting, at varying points along the continuum, is used as a filter or screening mechanism, but at different stages, there are different levels of interactions involved. Jack's attitude below encapsulates the interaction surrounding accounting at the formal end of the continuum:

The finance department set gates and before they sign off [on these gates] they want to see a certain amount of due diligence [...] so there's a certain amount of financial hurdles that they set' (Jack, Head of Operations, Topwood).

However, Jack's attitude is understandable given that he is enthusiastically dedicated to technological advancement and the development of new products and processes in Topwood:

We're innovative, we want to create, we've got a need, let's do it (*Jack, Head of Operations, Topwood*).

Magma's chief financial officer recognises Jack's innovative spirit:

Jack sees the place as an engineering plant with interference from the finance side [...] he reluctantly attends the meetings saying 'can we not just get on with it, why are you [finance] even interested?' (*Ian, Magma Group Chief Financial Officer*).

Jack resents the extent to which accounting information within the formal NPD process slows projects down, describing the process as a "pain in the neck". Within that, accounting information at the formal end of the process has become a constraining influence, which limits Jack's freedom to be innovative and creative:

What matters to them [the Steering Committee] is euros [...] an excel spreadsheet with a bunch of numbers and columns on it [...] That is how they make their decisions [...] I just have to deal with that (*Jack, Head of Operations, Topwood*).

Jack's head of finance, appears to make no apologies for this:

Well the numbers will speak for themselves. It's a basic rule – unless you can sell it for a higher price or we can make it for a lower cost, it is going nowhere and everybody understands that (*Paul, Head of Finance, Topwood*).

Magma's director of marketing describes Paul as someone who appreciates the needs for rules and order:

Paul to me is like the referee in the game [...] he's not in the game, he's the ref. He can send people off, he can give a yellow card and he can blow the whistle [...] He's not playing, but God he's important – there'd be mayhem without him (*Alex, Director of Marketing, MMD*).

In contrast, the head of operations in Metbuild identifies the finance function as an enabling force that supports the NPD team:

We have very good costing models here. I would say from being a non-finance person it allows us the ability to do 'what if' scenarios (*Pete, Head of Operations, Metbuild*).

Pete feels empowered by Metbuild's finance function to such an extent that he is happy to engage with accounting information himself from very early in the NPD process:

People are quite cost-conscious here. And that's because of good financial information. We know the value of our product, we can trot this stuff out. We don't express our energy in KW per tonne, we express it in cost per tonne [...] (*John, Managing Director, Metbuild*).

The three managers in Topwood view accounting information very differently. The managing director relies on it in its formal context as a member of the Steering Committee to make stage-gate decisions. The head of operations resents it for its role, again in a largely formal context, in slowing down projects and restricting investment in innovation, while the head of finance views himself as the policeman who uses it to control resources. These managers' interactions in an NPD context are triggered mainly by the formal NPD process,

giving them few opportunities to understand or influence each other perspectives. In contrast, Metbuild's managers appear to more frequently engage with each other on an informal basis throughout NPD. This has brought about greater alignment in their perspectives and has encouraged the development of accounting information as a prevailing language, on which they have all come to rely as they make day-to-day NPD decisions. The differences between these managers appears to be a result of the increased frequency of their interactions which have brought about greater alignment in their thinking and perspectives, which in turn has had a significant effect on how they perceive and use accounting information.

The role of finance

Despite the increasingly cross-functional approach to NPD described in the literature, the relationship between the finance function and other members of the NPD team has been traditionally adversarial. This is despite widespread acknowledgement in the more general management accounting literature that the role of finance is changing from that of a scorekeeper to one of trusted advisor to the management team. These apparent contradictions in the literature are reflected in the study's findings, which present quite different incarnations of finance in NPD in Topwood and Metbuild.

The involvement of finance in NPD is most visible in both companies within the formal NPD process. At the *Business Analysis* stage-gate, the head of finance for each company presents the accounting element of the business case for the proposed new product. This immediately precedes any significant commitment of the group's financial resources to the project. Metbuild's head of operations is adamant that accounting information must be presented to the Steering Committee by the finance function as it adds greater legitimacy to the information and is perceived by the Steering Committee to be more reliable:

[...] it will not be accepted [...] no it'll have to be him [the Head of Finance]. Because even if I came up with the same numbers it still won't be [...], they're [the Steering Committee] not going to, I won't say trust, but they are obviously going to give a higher level of credibility (*Pete, Head of Operations, Metbuild*).

Pete's perspective is shared by members of the Steering Committee:

You want something that's been blessed [...] I would certainly be looking for reassurance that either Des or Paul has tested this [...] (*Simon, Head of MMD*).

In this context, the finance function is still the ultimate gatekeeper of NPD investment.

The involvement of the finance function in the informal use of accounting information during NPD is less straightforward. Topwood's managing director, Nick, suggests that accountants have difficulty preparing meaningful financial analyses at the early "fuzzy" stages of NPD:

There's a constant requirement for new stuff. So if someone comes along with a NPD idea here from sales and marketing, they will say 'can't accounts help me figure out my pricing and whether I have a margin', and production will say 'well we'll run it through the process as normal, it might take a bit more of this or that, can't accounts factor that in [...]', and accounts then say 'well hold on a minute guys, when you really know what you're doing come back to me' (*Nick, Managing Director, Topwood*).

Topwood's head of operations, Jack, expresses a strong desire for a dedicated accountant to be assigned to an NPD project from the very beginning to assist the team in developing the idea and persuading Magma to invest in it. This would suggest that the finance function's

difficulties or reluctance in dealing with the earlier, more fluid stages of NPD are limiting the role of accounting information in the earlier stages of the process.

Topwood's head of finance, Paul, believes that he and his finance function have created, within Topwood, a widespread understanding of accounting-related issues such that everybody has a good understanding, from early in the NPD process, of the financial aspects of NPD. He believes that this is in his own best interests in that it saves him time in trying to convince the NPD team of the financial implications of their decisions. However, Topwood's head of operations, Jack, does not describe the finance function as particularly supportive in terms of broadening his understanding of the accounting implications of NPD and he criticises the communications skills of the finance team. As a result, he perceives the finance function as being somewhat disengaged from the NPD process:

They [Finance] are control freaks [sic] [. . .] that's why they won't take ownership, it's lovely to be the sniper on the fence just picking people off, and you have no responsibility, you can make people's life a misery. Whereas if you're involved at the outset in a participative way it's helpful (*Jack, Head of Operations, Topwood*).

There is evidence of a perception among Topwood managers that finance has not effectively balanced the multiple, and sometimes conflicting, accounting information demands of the various stakeholders. For example, Jack believes that accounting information during NPD represents the values and ideals of the parent company and that it conflicts significantly with his innovative drive and spirit.

The analyses of Metbuild's managers provide a very different picture. Its head of operations, Pete, describes using accounting information on an informal basis to develop an early sense of the viability of their new product ideas and to understand the implications of his decisions. As the NPD process progresses and decisions lead to greater financial commitment, the finance function is called into the process to lend more credibility to the financial analyses and to legitimate the NPD team's actions, at least in the eye of the parent company Magma. This illustrates how Metbuild's finance function has deliberately empowered the rest of the team with a strong financial know-how, to the extent that they do not need to rely on the finance function for day-to-day involvement in NPD. However, they have retained a role themselves as the ultimate "financial gatekeepers" of the NPD process:

Most of us in this business are in it for twenty odd years, we have the basic maths of it so that if it doesn't stack up, we just don't go near it (*Pete, Head of Operations, Metbuild*).

Metbuild's head of finance, Des, has been more successful than his counterpart in Topwood in empowering colleagues with the financial know-how. He leads an effective and supportive finance function and has "generalised" accounting information to become a language in Metbuild, a language that is frequently drawn upon by the head of operations and the managing director. Des's capacity to engage in dialogue with everybody throughout the organisation at all levels means that he is successfully balancing the often conflicting demands of his role. In simultaneously contributing to control and decision-making in this manner, Des is reflecting the business partner role much discussed in the literature.

Conclusion

The study set out to examine how accounting information is used in an NPD context on a day-to-day basis. In doing so, it had two primary motivations: to use SST to examine interactions taking place during NPD; to explore the potential for the minimal structures framework to enhance our understanding of how these interactions may be implicated in accounting information use throughout the NPD process.

At a more general level and in response to calls in the literature for a less static approach to examinations of accounting and NPD (Davila *et al.*, 2009), the study focused on the individuals involved in NPD and how the relationships and interactions between them are implicated in the manner in which accounting information is used. The findings provide evidence of a continuum, reflecting varying degrees of formality in the nature, preparation and use of accounting information. At the formal end, accounting information is prepared, structured and used in accordance with the prescribed and documented set of procedures for evaluating and approving NPD proposals. Towards the other end, information is prepared by managers on an *ad hoc* basis – the timing, format and content of which can vary widely and are determined solely according to managers' needs. Although often not even recognised by the managers as accounting information, this informal information features regularly in the early stages of considering NPD proposals and is taken for granted by managers in assessing and communicating the most important and relevant financial parameters relating to the early screening of NPD proposals. It clearly plays a key role in any decision to proceed to the formal NPD decision process.

Between the extreme points lies a continuum, in terms of the degree of formality involved in the preparation, format and use of accounting information. The interactions between those involved in NPD differ quite significantly at different points on the continuum. At the formal end, these interactions are restricted to those triggered by the prescribed process and tend to be relatively passive in nature. Moving towards the informal end, interactions become more active and involved, to the point where they are a day-to-day part of NPD. They facilitate the continued development of accounting as a generalised language with which everyone can engage in dialogue throughout the process. These findings regarding the varying degrees of formality and multiplicity of uses of accounting in NPD are consistent with management control research, which reports that the complex, non-linear nature of innovation requires the use of a range of styles of control, used in a variety of ways at different stages (Christner and Stromsten, 2015). Jørgensen and Messner (2010) describe how the way in which accounting is practiced throughout the NPD is subject to variation throughout the process and amongst different participants. Systems adapt and evolve from project to project (Revellino and Mouritsen, 2009). These findings extend this stream of literature by exploring why accounting and control in NPD is heterogeneous and complex. The study's findings suggest that the point where accounting information falls on the formality continuum is influenced by the interpersonal interactions underpinning accounting information use. Not only does this help explain how accounting information can have such different incarnations within one environment, it also goes some way towards explaining the apparent conflicts in the empirical literature between studies that describe accounting as enabling NPD and others that report negative perceptions of its role in NPD.

Regarding the primary focus of the study, insights into the interpersonal interactions underpinning accounting use were facilitated by the use of SST, which provides a lens through which to make sense of social activities in organisations. The findings demonstrate how accounting information used as part of the formal process in the case company has moved downstream, having been replaced by marketing information, which is regarded as the prevailing information driving NPD stage-gate decisions at the early stages. However, accounting information still performs a screening or filtering role in the early stages, in an informal capacity, through discussion and discourse outside the formal process. This necessitates the type of active and involved interactions, which allow accounting to become a generalised language throughout the company. Moreover, it provides a clear example of a significant change in the accountant's role, which carries positive organisational

consequences and helps ensure the continued relevance of accounting in a complex and evolving business environment (Burns and Baldvinsdottir, 2005).

SST helps us to make sense of the interactions underpinning accounting information use during NPD. Our exploration of the social and technical structures in which these interactions are embedded contributes to the minimal structures literature by enhancing our understanding of the terms social and technical structures, and providing insight into their critically important role in the NPD process. As well as distinguishing between formal and informal accounting information, the continuum highlighted in the findings distinguishes between formal and informal interactions between NPD participants. Technical structures encompass those formal interactions which shape the NPD process. They are ingrained in NPD and bring about the firmness needed to regulate the process. Social structures incorporate the more informal interactions which originate within the actors themselves and have the potential to interact, or not, with any given technical structure. Social structures contribute to the flexibility and, specifically, the delicate balance of firmness and flexibility needed to effectively govern NPD. While both firmness and flexibility are clearly visible in this case, the findings suggest that organisations that promote an environment and culture where social structures are encouraged, nurtured and valued are more effective in achieving this balance. In Metbuild, the trust and shared understandings fostered by widely used social structures appear to make managers more accepting of, and compliant with, the technical structures, with the balance of both culminating in a more effectively governed NPD process than that evidenced in Topwood.

This study's enhanced insights into the interpersonal interactions underpinning the preparation, format and use of accounting information, have important implications for accountants as preparers of accounting information, and managers as users of that accounting information. For accountants to contribute to NPD in a meaningful way from the early stages, they must successfully balance the often conflicting accounting information demands of the various users. This requires the accountant to fulfil the dual roles of empowering managers in the company with financial know-how such that they can use accounting information themselves on a daily basis, while furnishing senior management with the type of structured, aggregated accounting information from which they draw ontological security when financially scrutinising new product projects. Indeed, our findings suggest that accountants who interact effectively with social structures are able to engage in the production of broader information, either by producing it themselves or enabling managers to do so. The management accounting literature presents a potential conflict between the broader business partner role (Yazdifar and Tsamenyi, 2005; Byrne and Pierce, 2007; Järvenpää, 2007; Bhimani and Bromwich, 2010) and the traditional scorekeeper role (Verstegen *et al.*, 2007; Zoni and Merchant, 2007). These findings suggest that an effective accountant is indeed a hybrid accountant who manages to incorporate elements of both. The head of finance in Metbuild was achieving this to a greater degree than his counterpart in Topwood. The empowerment of the rest of company with financial know-how would appear to present the biggest challenge, requiring the accountant to loosen his reigns on the accounting information and fully commit to educating the rest of the company in how to use it.

The case provided a valuable opportunity to examine two companies within the same group, operating under the same formal NPD system. The companies presented very different perspectives and a contrasting picture of the role of accounting information in NPD. The use of SST and minimal structures frameworks helped develop an understanding of those differences. In doing so, it highlighted important interactions that take place on an *ad hoc* and continuous basis within the framework of technical and social structures, much

of which has been overlooked in previous research. This approach offers significant opportunities for further research into the role of accounting in innovation and the changing roles of accountants more generally.

Notes

1. Magma Internal Document entitled *Defining Magma's Cost of Capital*.
2. Referring to the tenth-stage 2nd Generation NPD Process.
3. Details of SST analysis procedures are set out in [Stones \(2005\)](#), [Jack and Kholeif \(2008\)](#), [Coad and Glyptis \(2014\)](#) and [Feeny and Pierce \(2016\)](#).

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Appendix 1. Outline interview questions

Note 1 – These questions were tailored slightly to individuals in different roles, in different entities and at different levels

(Prompts if necessary in italics)

Would you mind telling me a little about yourself?

Education

Career

What drives you in your day-to-day job?

Describe the accounting function?

Number of staff

Accounting system

Describe your role in the organisation?

How long have you been here?

Where are you situated in the org structure?

Tell me about NPD here in Topwood/Metbuild from your perspective.

Describe the NPD process in the organisation? How familiar are you with this document?

Has the NPD process changed? Why? Were you involved with the change?

Could you describe the mechanics for me? Talk me through a project as an example.

Could you explain how decision-making works?

Could you tell me when accounting information is used throughout NPD?

Accounting information is any information that you think is relevant to a financial analysis. When is it used most? Why?

When is it used least? Why?

How is this taking place? Are you preparing it/presenting it, is someone else? Why? Explain?

Would there be a strong understanding of accounting related issues here among the non-finance personnel?

What would you put that down to?

When is accounting information overruled? Should it be overruled more or less often?

Could you tell me about your role in NPD and how NPD works on a day-to-day basis for you?

Are you on the NPD team or the Steering Committee?

Tell me about that. Who else is on it? How does it work?

When do you become involved?

Is it automatic or do you get called in?

Tell me about decision-making.

What is your function or role at that stage?

What do you see the finance function as contributing to the NPD process? Why?

Would you like to be more or less involved? What's preventing that?

What do you think the overall attitude is to accounting information in NPD?

Does the rest of the company welcome it, or resent it? Offer specifics. Why?

Do they convey that back to finance?

GRAM
15,2

Do you think the role or relative importance of accounting information in NPD changed for any reason?

Explain

If you could change anything about the role of accounting information, or indeed the role of the finance function, in NPD here in Topwood/Metbuild, what would you change?

Why? What's preventing this?

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Anything we haven't covered that you think is important?

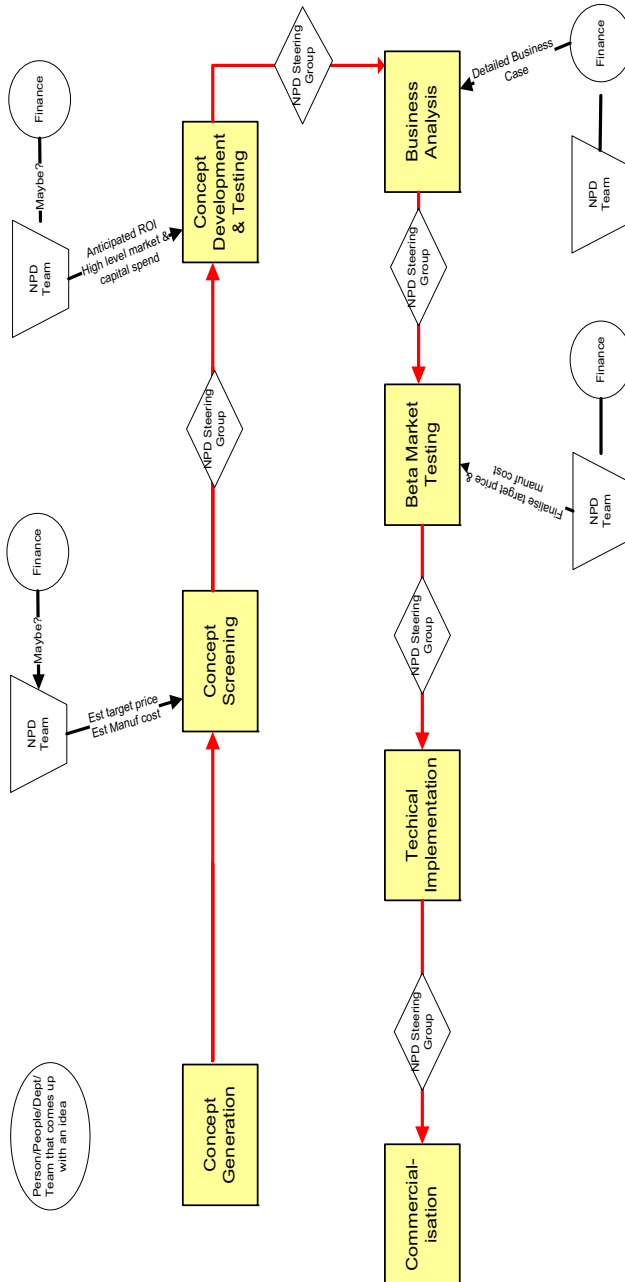


Figure A1. First generation new product development document