Costing to support strategies for product development. An empirical study of large international companies

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Abstract

The purpose of this study is mainly to investigate the use of Target Costing (TC) and Life Cycle Costing (LCC) to support New Product Development (NPD) strategies in large international companies. Another purpose is to determine how companies apply the TC concept and why this strategic costing technique is adopted to support NPD strategies. The study involves interviews in 7 organizations based in Europe and the United States and operating in Italy. It appears that TC, together with value engineering (VE) activities, is used in all 7 organizations in supporting NPD strategies, while only 2 organizations tend to use LCC. The contributions of this study to the accounting literature pertain to its research content and design. In particular, the paper offers new evidence for the debate concerning the relevance of strategic costing techniques, such as TC and LLC, in supporting NPD as a central dimension of the corporate strategies of the companies.

Keywords: Target costing, Research and development process, New product development strategies, Large international companies, Empirical analysis, Interviews.

1. Introduction

The field of strategy and accounting has gained importance among academics and practitioners. In particular, "new product development has become a central dimension in the strategies of many companies" (Davila,

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2000, p. 383). While for strategy theorists, new product development is currently a relevant source of competitive advantage, leading management accounting and control theorists have provided interesting frameworks for support strategies (e.g., Atkinson *et al*., 2012; Simons, 2014). For example, in contrast with the traditional accounting view, the concept of strategic management accounting (SMA), as a strategic perspective in MA, has played a significant role in strategic management (SM). In particular, SMA technique categories play roles in the implementation of business strategies. In this context, Bromwich and Bhimani (1994, p. 127) suggested that "Providing a strategic perspective in management accounting requires the role of accounting to be extended in two directions. It first requires that costs are integrated into strategy using a variety of strategic cost analyses. The aim is to align costs with strategy. The second element of strategic management accounting is to discover in fairly general way the cost structure of competitors and to monitor changes in these over time".

In contrast to the past work on NPD, which mainly investigated management control systems (e.g., Davila, 2000), the main units of analysis in this study are the relevance and usage of TC and LCC as strategic costing techniques in supporting NPD, rather than the design of management control systems (MCSs[1]).

The aim of this study is mainly to explore and interpret the relationship between NPD strategies and TC and LCC usage and to show whether the value engineering (VE) of a product design is associated with TC usage. The paper includes six sections. The following section, after a discussion of and observations on the previous literature on product development, presents a life cycle model (LCM) as an organizing framework for measuring and managing the costs of NPD. In section three, a set of research questions is carefully developed to address the main focuses of the study. Section four describes the research methods used. Section five examines the interview results and our interpretations. The paper concludes with a discussion and the study's limitations and presents potential avenues for future research.

[1] While MCSs are formal procedures that the organization can use to alter behaviours (Flamholtz, 1983), management accounting systems (MASs) can be used to name the design, as well as the use of financial information in an organization.

2. Theory development

2.1 Literature review on product development and observations

This sub-chapter (2.1) presents the main, specific line of research of the previous literature on product development.

One line of research has focused on how research and development (R&D) departments use financial measures in product development processes. Here, the key observations of some authors (e.g., Rockness and Shields, 1988 and Brownell, 1985) have revealed that financial measures do not play an important role in R&D departments.

A second line of research has focused on financial control in NPD as a financial information tool for project purposes. Here, for example, Nixon (1998) described a product development process in which financial control plays a relevant role. This author concluded that "financial component […] serves to integrate the disparate perspectives" (p. 343). Similarly, Tervala *et al.* (2017) studied the role of financial control in NPD projects. These authors, following Davila and Wouters (2007), reported that "it is important to examine the financial control that supports NPD project managers because these managers often face multiple, sometimes competing, objectives that are set for NPD projects due to contextual uncertainties and ambiguities". Moreover, Jorgensen and Messner (2010) identified strategizing as an alternative means to support NPD activities if financial control information was not available. However, with this literature, we can observe that not much is known about the specific role of costing in supporting NPD strategies and desired future profitability, in which the competition plays a significant role in new innovation to market and production at low costs. Here, the line of research based on the relationship between strategic choices and SMA[2] could be important for determining the role of costing. In this context, indeed, SMA technique categories [3] comprise: (a) strategic costing; (b) strategic decision making; (c) competitor accounting; and (d) strategic performance measurement. Strategic costing includes 5 SMA techniques: (1) TC; (2) LCC; (3) quality costing; (4) attribute costing; and (5) value chain costing (see also Cinquini and Tenucci, 2010).

However, focusing on the specific role of costing in supporting NPD strategies and theorizing a context of innovations to market at a low possible

[2] While field-based research has focused on cross-country comparisons of SMA usage (e.g. Guilding et al., 2000; Cadez and Guilding, 2007), others focused on individual countries (e.g. Cinquini and Tenucci, 2010; Guilding and McManus, 2002).

[3] See for example Cescon *et al*., 2019.

cost, the next sub-chapter presents the life cycle model (LCM) as the organizational framework underlying this study.

2.1. Life cycle model: an organizational framework

While the strategy literature suggests that NPD, especially in the form of product innovation, can be a prerequisite for remaining competitive in a dynamic and technological business environment, new innovations in management accounting (MA) methods are also being developed as techniques for measuring and managing NPD activities. In contrast to traditional approaches to product costing, Atkinson *et al.* (2012) provided an LCM as an organizing framework for managing and measuring cost (and quality). An LCM plays a key role in aligning costs with strategy and provides information that can help managers to understand the entire life-cycle costs of a product/service.

LCMs integrate life-cycle concepts and life-cycle product costing before, during and after the manufacturing cycle. Therefore, LCM, to analyse what creates the costs of new products and services, uses relationships among life-cycle concepts and life-cycle costing (LCC). In particular, LCM provides information to understand cost through three relevant functional life-cycle concepts: (a) research, development and engineering (RD&E) cycle; (b) manufacturing cycle; and (c) post-sale service and disposal cycle. While during RD&E cycles,[4] TC plays its largest role by focusing on cost reduction, the LCC provides cost information across the three cycles[5]. In conclusion, using this organizing framework, we mainly focus our empirical study on the use of strategic costing techniques in NPD, and we explain how TC, and implicitly LCC, helps researchers and engineers to make product design decisions to meet their customers' expectations at a desired cost. Moreover, those interested in implementing strategic cost systems must remember three things. First, it is critical for NPD to promote continuous improvement in the sub-stages of RD&E cycles to create future benefits for competition and enormous impacts on the costs incurred. Indeed, the RD&E cycle is critical

[4] Atkinson *et al*. (2012, p. 327) suggested that the RD&E cycle has three stages: "*Market research*, during which customer need are assessed and ideas are generated for new product; *Product design*, during which scientists and engineers develop the technical specification of products; *Product development*, during which the company creates features critical to customer satisfaction and designs prototypes, product process, and any special tolling required".

[5] While the concepts of SMA were developed by Simmonds (1981), the concept of strategic cost was designed by Shank and Govindarajan (1989) to promote strategic cost analysis (basically).

because "A large portion of the funds commitment takes place during the product conception phase whilst 80 percent of expenditures are determined prior to the start of production, depending on the industry" (Bromwich and Bhimani, 1994, p. 191). Second, product development is a corporate strategy that is often very expensive, and in terms of capital investments, it requires the development of new strategic capabilities, involves project risk management and calls for an accurate capital investment process for evaluating organizational performance. In this context, for example, the classical financial analysis of cash flows for investment purposes is often a black box that can generate distorted information. Third, product development is a long-term decision, and it makes sense to integrate strategic cost analysis with cash flow analysis.

We now present our research questions for generally understanding the use of TC and LCC as strategic costing techniques to evaluate product development strategies during the life cycle.

3. Development of research questions

As indicated in the introduction, the present study mainly investigates cost techniques in supporting NPD strategies to remain competitive[6].

Here, a logical research question concerns the types of strategic costing used for managing and measuring costs that are feedforward oriented. The literature has provided an original distillation of accounting techniques as "strategic". For example, extensive research has documented a relationship between strategic cost techniques and business strategies (e.g., Cadez and Guilging, 2008). In parallel another example is Kato's study of Japan (1993, p. 33), focusing in particular on the importance of TC. This author stated that TC […] "is an activity which is aimed to reducing the life-cycle costs of new products, while ensuring quality, reliability, and other requirement, by examining all ideas for cost reduction at the product planning, research and development process". (For a similar study of Japan, see Cooper (1996)). "Koga and Davila (1998) find that target costing fulfils an informative role to facilitate learning and experimentation, yet they find no support for target costing used to address goal divergence problems or coordination issues" (Davila, 2000, p.386).

These considerations lead us our first research question (RQ).

[6] See also Bhimani and Langfield-Smith (2007) on the importance of financial and non-financial information in strategy development and implementation.

RQ1: Are TC decisions associated with product development strategies? Is TC more important than LCC to new product development?

We also pose a follow-up question related to TC concerning value engineering (VE) in new product design. In the academic literature on MA, VE is a key activity of TC. In particular, VE activity "examines the design of each component to determine whether it is possible to reduce costs while maintaining functionality and performance" (Atkinson *et al*., 2012, p. 331).

These considerations lead us to our second research question.

RQ2: Is VE activity in product design associated within TC in support of NPD strategies? Does TC tend to support VE analyses for new product design?

4. Research methods

4.1 Qualitative methods

In line with enquiring into state research questions, our research design adopts a qualitative method (See Creswell, 2014, p. 139). The use of qualitative research, consistent with the research method, focuses on few concepts and explores a single aspect in great detail.

In summary, interviews exploring the research questions were designed to incorporate practitioners' insights into the practices of large international companies based in Europe and the United States and operating in Italy in the areas of cost systems and in general in the area of management accounting systems (MASs).

4.2. Sampling procedures

The target population included large international companies. We assumed that these firms use more advanced MA methods to remain competitive. The database was obtained from the Italian Industry, Commerce, and Agriculture Confederation (CCIAA). Senior corporate accountants, as preferred respondents, were identified by sending a letter to the corporate (or their division) of large international companies operating in Italy in the manufacturing industry. A letter sent to the companies explained the objectives of the research, asked whether there was an interest in participating in the

project with their senior corporate accountants and requested the respondents' names and e-mail addresses. Seven large international companies agreed to participate. The sample covers four countries of origin: Italy, Sweden, Germany and the United States. Information on the large international companies covered in the interviews is presented in Table 1[7].

Table 1 - Information of companies involves in the interviews

Companies	Country of origin	Industry	Size Sales (M€)	Interviewee
A	Italy	Automotive	110.000	Controller
B	Italy	Telecommunications	19.000	Planner
C	Sweden	Home Appliances	12.100	Controller
D	USA	Oil & Gas	3.500	CFO
E	Germany	Cutting Tools	104	CEO
F	Italy	Home Furnishing	107	CFO
G	USA	Capital Goods	24.872	Controller

Prior to conducting the interviews, a glossary of terms was provided to the respondents. The glossary mainly explained the following variables: (a) new product development; (b) target costing; (c) value engineering; and (d) life cycle costing[8]. Then, the respondents completed online interviews exploring the research questions (a form of written interview). The preference of the respondents, sparse around the world, was to complete a predetermined research question sheet using online means by e-mail, instead of semi-structured interviews face to face (more time consuming for the respondents) and using a tape recorder. Before they sent the responses (the complete research question sheet), the 7 senior corporate accountants were sent 3 (on average) reminders.

4.3. Interviews: the first and second stages

In the first stage of interviews, we asked the respondents the following formal questions.

[7] The 7 companies differ by country, industry and size. The sample differs also in terms of ownership models and equity markets, but these variables were not examined in the study.

[8] An associated term to achieve its assigned target cost is value engineering. "Value engineering […], is a systematic, usually team-based, approach to evaluating a product's design in order to identify alternatives that will improve the product's value – defined as the ratio of functionality to cost. […] Value engineering looks at all of the product's elements, including the raw materials, the manufacturing process, the type of labour and equipment used, and the balance between purchased and self-manufactured components" (Kaplan and Atkinson, 1998, p. 228).

Q1 What does the company do, and what principal strategies are used to invest in product development?
Q2: To what extent are these strategic activities based on target and life cycle costing?
Q3: Do value engineering analyses play a role in new product design?

In the second round of interviews, we asked the respondents to integrate the previous analysis with the following two formal questions.

Q4: How do companies use target costing to align costs with strategies regarding new product development strategies?
Q5: Why do companies adopt target costing in their specific practices to support new product development strategies?

The interviewees were encouraged to elaborate on each question and to conclude with a summary.

5. Results

5.1. Interview results of the first stage

The interview results of the first stage, including an interpretation of raw data/information collected with the responses to questions Q1 to Q3, illustrate the use of TC, VE and LCC to support strategic product development activities. The interview results, structured as a template, are analysed and discussed below.

5.1.1 Company A

Company A, an Italian organization, is a publicly listed company pursuing a global strategy in the automotive industry. Its different strategic business units (SBUs) operate in private sector markets exposed to an increasingly competitive and growing technological environment with a medium to long product life cycle (PLC) length of 6-7 years.

In addressing questions in terms of the extent to which strategic activities for investing in NPD are based on TC and LCC, the Head of Investment and Platform Controller explained:

"During the product planning phase, a specific Cost Engineering Department elaborates on different loops of analysis to determine the target cost of (new) products. The current definition of cost serves as a milestone in the product planning process, which is fundamental to the future of a project".

This statement is indicative of the role of TC in NPD decision making. Company A, with a medium-long PLC, views LCC information as less relevant. The use of TC is very important in the planning phase as a means of reducing costs during the RD&E cycle. In this large international company, which operates in a highly competitive environment in which product (and process) technologies change rapidly, kaizen costing (KC) is adopted during the manufacturing cycle for the limited improvement of production process costs by increasing efficiency.

In relation to the use of VE analysis, the interviewee noted:

"The target costing method is consolidated under the Cost Engineering Department and in the company after target costing and focuses on the appraisal of any new products through the value engineering process".

In our view, from the characteristics of Company A, the VE process is fundamental to evaluating product design, to identifying the alternatives that will improve a product's value and to reviewing all of a product's elements.

5.1.2 Company B

Company B, an Italian organization, is a publicly listed company pursuing a multi-domestic strategy in the telecommunications sector. Different SBUs operate in private-sector markets (Europe, South America and the Mediterranean Basin). These markets are being exposed to an increasingly competitive technological environment characterized by a short PLC (1-2 years).

In addressing the questions in terms of the extent to which strategic activities for investing in NPD are based on TC and LCC, the Head of Strategy Planning noted:

"Considering the NPD process previously described, some strategic decisions are made regarding costs […] Target costing is determined during the new product planning phase".

This statement is indicative of the role of TC in NPD decision making. Company B assumes that continuous and rapid technological/service innovation serves as a key business strategy for staying competitive. An increasingly competitive environment requires new product development with new product technologies. The TC method plays a central role in decision making and strategy execution for cost reductions in the RD&E cycle. While internal product design is a strategic activity, the use of kaizen costing (KC) is secondary because the production process is basically external. Company B does not determine LCC and instead uses the business planning as a simulation tool to determine cash flows for capital budgeting purposes. More emphasis is in turn placed on strategic considerations.

In relation to the use of VE analysis, the interviewee noted:

"(The company) is often a leader in innovation [...]; we engage in reverse engineering activities. In addition, we have a start-up acceleration programme that gives us the opportunity to insource skills and ideas that help us to improve upon our services. Value engineering and value for money studies are systematically provided".

5.1.3 Company C

Company C, a Swedish organization, is a publicly listed company pursuing a global strategy for the home and professional appliances industry. Different SBUs operate in private sector markets that are being exposed to an increasingly competitive environment and new product technologies with a medium-length PLC (5 years on average).

In response to questions regarding the extent to which strategic activities for investment in NPD are based on TC and LCC, the Global Industrial Operation Controller suggested:

"We consider two cases: existing products and new products […] Target costing is used for new product projects (we refer to this as top down because it starts with price assumptions and target margin

definition). In parallel, we adopt a bottom-up approach to cost calculation".

For Company C, the role of TC in NPD decisions is relevant. In particular, it is interesting that the company adopts two parallel cost systems. While absorption costing is used to measure and manage the costs of an existing product, TC is consolidated at the business level for new products. In this increasingly competitive environment with growing product technologies, the approach to target costing that is used plays a central role in decision making and strategy execution. The goal of remaining competitive requires cost reductions in the RD&E cycle. However, since internal product designs are developed by the corporate research department, KC is relevant to cost reduction during the manufacturing cycle. Basically, Company C develops a form of LCC primarily to forecast cash flows for capital budgeting purposes.

In relation to the use of VE analysis, the interviewee added:

"The company determines target costing and applies value engineering".

In summary, Company C emphasizes strategic cost analysis and the use of TC and VE. Strategic considerations and financial analysis applied to strategy decisions on NPD investment are especially considered.

5.1.4 Company D

Company D, an American organization, is a publicly listed company pursuing a global strategy in the oil and gas industry. Different SBUs operate in private sector markets that are being exposed to an increasingly competitive environment of product technologies with a long PLC (8-9 years).

In response to our questions in terms of the extent to which strategic activities for investment in NPD are based on TC and LCC, the Finance Manager argued:

"*We use life cycle costing during the NPD planning phase to reduce costs (the manufacturing process, sourcing and procurement strategies), which is necessary for guaranteeing competitiveness across a*

product's life cycle. We also define a product cost target for engineering design that enables a supply chain to deliver a competitive cost and consequently allows for an acceptable level of profitability".

In Company D, the roles of both LCC and TC in NPD are indicative. Why is LCC used? In contrast to other companies with longer PLCs, Company D combines TC and LCC as strategic costing techniques to reduce the cost of new products to stay competitive in the global market. Corporate accountants do not consider it unrealistic to assess long life cycles. Cultural characteristics have important influences on the development of a given strategy.

Regarding the use of VE analysis, the interviewee added that:

"For value engineering, we try to develop products that meet customers' needs and to improve customer benefits and the business case. We depend on each new product component to understand and validate potential target costing".

In contrast to Companies A, B and C, Company D emphasized TC, VE, and LCC to support strategies for investing in NPD. In particular, from informal discussion, Company D seems to use more advanced and structured SMA techniques than the other companies to align costs with strategies.

5.1.5 Company E

Company E, a German organization, is a public, non-listed company pursuing a multi-domestic strategy in the cutting tools industry. Different SBUs operate in private sector markets that are exposed to a relatively stable competitive environment of growing product technologies with a medium to long PLC (6-7 years).

In terms of the extent to which strategic activities for investment in NPD are based on TC and LCC, the General Manager noted:

"*We ascribe* […] *different levels of relevance to different types of projects. For projects based on existing state-of-the-art technologies (range extension/upgrades of existing products), the main instruments used include price benchmarking and, when necessary, target costing. An evaluation of life cycle costing is only applied for larger projects".*

Our interpretation is that Company E basically relies more heavily on financial considerations, such as financial appraisal techniques, which are based mainly on traditional accounting concepts. However, a stronger emphasis is placed on project teams created from a company's principal functions in obtaining information useful to new product strategy development, but company E considered TC less important than benchmarking. LCC is slightly less central.

On the use of VE analysis, the interviewee noted:

> *"Value engineering (even when not referred to [in] this way) is performed regularly. Every time the price positioning of a product must be defined, one of the main keys is the value for customers/users. For example, when we conclude that our product offers a 20% advantage in longevity relative to our competitors, we may decide to position (and market) it at a 10% higher price".*

5.1.6 Company F

Company F, an Italian organization, is a family business and non-listed company pursuing an exporting strategy in the home furnishings industry. It operates in private-sector markets exposed to a relatively stable competitive environment of growing product technologies with a long PLC length (8-9 years).

In terms of the extent to which strategic activities for investment in NPD are based on TC and LCC, the Chief Financial Officer (CFO) noted:

> *"The NPD process is based on target costing. The target cost is set according to the product type and based on our competitors".*

For Company F, the role of TC is relevant in supporting NPD. Why is LCC absent? While the use of TC is considered an important means of reducing the cost of new products in the context of rapid product innovation, LCC appears to be impractical over a longer PLC. The development of product technologies has forced Company F to develop new products with original furnishing designs for niches in exporting markets and at the lowest possible cost. Moreover, our interpretation is that Company F relies more heavily on financial considerations, such as ratio analysis.

Regarding the use of VE analysis, the interviewee noted:

"Target costing is applied to determine the standard cost of new products before moving into the production stage. Should output not be satisfactory (in terms of theoretical marginality for the company), the estimates are adjusted through the application of the value engineering process by searching for alternative supply chains or less costly technical solutions".

5.1.7 Company G

Company G, an American organization, is a publicly listed company pursuing a global strategy in the capital goods sector with established industrial experience. Different SBUs operate mainly in private-sector markets, which are exposed to an increasingly competitive environment of growing product technologies and with a very long PLC length (≥ 10 years) in major industrial sectors.

In terms of the extent to which strategic activities for investment in NPD are based on TC and LCC, the Head of Product Development Finance Investment commented:

"*Cost targets are used, in particular, when developing a new product or a new component for a product (e.g., a transmission product, cab or engine). Product initiatives consider initial investments made in the design, manufacturing and launching of a new product but not the maintenance of the product throughout its life cycle […] Given the long life cycle of the products of our industry, it is not only unpractical but also impossible and unrealistic to assess and plan for the whole life cycle when initiating the renewal of a product range or single product. Clearly, close attention is given to mega-trends and to long-term impacts of certain technologies considered to shift the demand in certain directions to avoid a decision being made within a shorter timeframe (typically 5-8 years in most of our cases) as it might result in suboptimal outcomes over the long run".*

While the role of TC in NPD decisions is indicative, less important is the use of LCC because management considers it impossible and unrealistic to assess and plan the whole life cycle. For this case study, considering the long length of the involved PLC, the use of TC is important primarily during the

planning phase as a means of reducing costs through product design. Then, Company G, similar to Company A, operates in an increasingly competitive environment in which product (and process) technologies change rapidly and develop their use of KC during the manufacturing phase to reduce product costs during the manufacturing cycle to increase efficiency and to remain competitive and profitable.

Regarding the use of VE analysis, the interviewee noted:

"*Benchmarking and tear-down techniques*[9] *are used particularly for those products for which we experience less than average profitability. In particular […], some standard tools are used with the aim of creating and managing a special catalogue with materials, weights, dimensions, shapes, and diving photos".*

In summary, the interview results of the first stage suggest that cost management through TC and LCC has been used by the studied companies to measure and manage the costs of new products and services. In particular, the study shows that TC, as a specific means of reducing costs in the RD&E cycle, is more important than LCC in supporting corporate strategies for investing in NPD. Our results also show that all seven of the companies engage in VE activities (in a few cases, with a tear-down approach).

While the study shows differences regarding strategic and financial considerations, the interviews revealed some contextual insights concerning the manner in which notions and applications of TC, VE and LCC are expressed. These differences are considered below.

Company B, which pursues a multi-domestic strategy based on technological and service innovation, is an interesting case because the company's management team emphasizes more strategic considerations, such as competitive advantages, rather than financial considerations in evaluating NPD. While the RD&E cycle is developed internally, the manufacturing cycle is created externally. Consequently, costs are predetermined by TC, and during the manufacturing cycle, the company monitors quality standards.

In contrast, Company E, a smaller large-sized organization that pursues a multi-domestic strategy focused on product performance, places more emphasis on financial considerations. Moreover, the use of TC occurs mainly within the context of larger projects. Similarly, Company F, a smaller large-

[9] In VE, tear-down approaches focus mainly on product design. See Kaplan and Atkinson (1998, p. 229).

sized organization that pursues an exporting strategy based on the best Italian design, combining quality products with an affordable price, places more of an emphasis on financial considerations. The company uses TC, but the amount of information provided through TC is minimal and is influenced by strategic management requirements.

Companies A, C, D and G, which pursue global strategies, opt for a combination of strategic and financial considerations using sophisticated financial and non-financial information rather than only financial information in their product development strategies. Moreover, these companies use TC extensively in their RD&E cycles (and KC in the manufacturing cycle) to reduce the costs of product design and to improve efficiency levels. In contrast, among these large international organizations, which pursue global strategies, the field-based evidence indicates that LCC is not considered important. For example, senior corporate accountants from Companies A and G, the largest organizations in the sample, attribute this pattern to the involvement in industries with long PLCs.

In conclusion, in our view, TC usage is a well-known and consolidated practice in large international companies.

The key aspects of the first stage regarding the different characteristics of the companies in the usage of TC, LCC and VE in supporting R&D/NPD are summarized in Table 2 (www.sidrea.it/costing-support-product-development).

5.2 Interview results of the second stage[10]

In the second stage, which integrates the first analysis, interviews were conducted with the same senior corporate accountants and included two critical questions for a qualitative study. In this second stage, the interviewees were asked to answer the following 2 questions: (1) How do companies use TC to align costs with strategies of new product development? And (2) Why do companies adopt TC through their specific practices to support new product development strategies?

Moreover, in these second stages, 5 to 7 senior corporate accountants were involved in the interviews.

[10] An equally very interesting study examined how BSCs are applied in Finland and why companies adopt them (Malmi, 2001). Here, our study basically was inspired by the discussion in Malmi.

5.2.1 How companies apply the TC

With this question (Q4), we aim to understand/assess in particular if TC is used as a better performance measuring system or as a strategic management system in supporting NPD strategies.

Here, senior corporate accountants first commented on the business environment (the levels of international competition are increasing at high rates, and customers are demanding new technological products and services); then, they identified the markets situation (companies must rapidly introduce product innovation into the market at the lowest cost possible), and finally they closely connected the subsequent actions (companies are forced to reduce the costs of new products and services and apply new accounting and control methods to remain competitive).

Here, for example, interviewee D from a company in the home and professional appliances industry commented:

> "*Target costing is a crucial step of the product development process. It is central for different reasons, such as for making decisions when a project is launched; it requires alignment between marketing (the function that requires a product) and R&D. The target cost is the synthesis of new product features/requirements and technical solutions. As a target, it serves as a reference for the execution of a project. According to this perspective, target costing is both a measurement system and a means of strategy execution"*.

Informal discussions were conducted with the respondents to clarify better how companies apply the TC, and the interviewees indicated that they use TC both as a performance measure system and as a strategic management system. In this context, in very few informal discussions, the large international companies concluded that TC is used as a strategic management system.

The qualitative results of question Q4, provided by formal and informal interviews with senior corporate accountants, in synthesis indicated that TC is a strategic technique focused on cost reduction during the RD&E cycle and basically is used as a strategic management system supporting NPD strategies.

In parallel, it is important to remember that, from the field evidence provided by senior corporate accountants, if the length of the PLC is very long there are effects on the use of LCC. Therefore, there is an association among industry, PLC and LCC.

5.2.2 Why companies adopt TC techniques

With this question (Q5), we aim to provide, in particular, some insight into why the international manufacturing companies adopt TC. Obviously, the results are provided on the basis of limited empirical evidence (5 companies).

Interviewees were asked to comment on why their company adopted TC, through their specific practices, to support NPD strategies. The 5 companies (A, C, D, E and G) provided responses to this question and suggested that many reasons influenced the adoption. For example, some informal discussions provided the following reasons: the abandonment of some traditional cost accounting methods, the consultant's role in designing and adopting strategic cost accounting techniques, and the introduction of balanced scorecards (Kaplan and Norton, 2001).

The qualitative results of question Q5, provided by formal and informal interviews with senior corporate accountants, in synthesis indicate that the main factors influencing the adoption of TC in the company is driven by the necessity for sophisticated strategic tools for quality management and information for decision making, strategy development and execution in supporting NPD.

Interviewee A, from a global company in the automotive industry, noted there was a need for a new control mechanism. In particular, the Head of Investment and the Platform Controller commented:

> *"We adopt TC […] to reduce new product costs to be more competitive".*

The following comments made by interviewee G, from a global company in the capital goods sector, were insightful:

> *"The company uses target costing techniques to add products that are accretive to the existing level of profitability as a way to increase shareholder value in line with strategic targets, as defined and periodically updated in our so-called Strategic Business Plan […] A portion of management variable compensation is linked to the achievement of these targets. All three aspects mentioned in the question are therefore valid for (the company)".*

In conclusion, our qualitative study indicates that the main factors that influence the adoption of TC seem to be that the company needs advanced strategic tools for quality management and information for decision making in supporting NPD.

6. Discussion and conclusion

In the following discussion, we reflect on the results collected from the large international companies operating in Italy in different industries and compare the empirical evidence with our research questions. We also draw international comparisons from field-based research on SMA conducted over the last two decades[11].

6.1. Summary of the interview results and research question comparisons

It is important to note that the strategic literature focusing on NPD has suggested that this type of strategy orientation is expensive and risky, especially when taking the form of product innovation (Johnson *et al.*, 2014).

Moreover, corporate strategies for product development play critical roles in long-term profitability and are a prerequisite for remaining competitive in a dynamic and technological international business environment.[12]

In this context, the accounting literature offers a strategic perspective on MA. This issue is very relevant, but how is it done in practice? To empirically assess the conceptual basis for supporting product development strategies, we summarize how it is undertaken by large international companies using the LCM as organizational framework. Let us examine our summary of results based on our research questions.

Before summarizing the results of the research questions, we believe that is important to report that the large international companies with a global strategy (Companies A, C, D and G) promote the deployment of strategic and financial considerations, with a combination of financial and non-finan-

[11] See the special issue in Moll (2015) for a collection of papers seeking insight into accounting and control and NPD processes.

[12] For the threefold classification of international firms (global, multi domestic, exporting firms) see Mouritsen (1995). It is important to remember that companies competing internationally can use a combination of strategy type and corporate strategy orientation.

cial information in a context of large investment in new product development. Moreover, risk analysis techniques (sensitivity analyses in particular) are employed in the evaluating strategies.

RQ1, exploring whether TC is more important than LCC for new product development, is supported. This result can be considered consistent with evidence from Japan reported by Cooper (1996), who observed a strong orientation towards target costing for managing the costs of future products. Our empirical evidence shows that TC is used in all seven large international companies studied, whereas very few (2) companies tend to use LCC systematically.

As a plausible assumption, we can adopt our interview results as a proxy for our survey results on the use of TC and LCC given by several previous international studies. From descriptive statistics measured on a scale of 1-7, the survey results of previous studies (e.g., Guilding *et al*. (2000) on the UK, the USA, and New Zealand; Cadez and Guilding (2007) on Slovenia and Australia; and Cinquini and Tenucci (2010) on Italy) tended to confirm a stronger orientation towards the use of TC and lesser adoption of LCC. International comparisons have shown that TC registers higher usage scores, especially in Slovenia (3.64), Italy (3.62) and the US (3.19). In contrast, LCC appears to be adopted less in Australia (2.21), New Zealand (2.43), and the UK (2.60). The heavy use of TC and the limited use of LCC found in Cinquini and Tenucci's (2010) survey on Italy can be considered in line with the interview results of our qualitative study.

RQ2, on whether TC tends to develop VE analyses in the new product design stage, is supported. We show that VE activity is used across the seven large international companies studied.

However, it could be important to remember that the aforementioned field-based evidence does not consider some relevant different practices. In particular, we believe that these differences are associated with several variables that reflect different strategic choices, industry and the "culture" of management[13].

In this discussion, some field-based evidence, provided by the second stage of this study, is summarized.

Our results with formal and informal discussions indicate that TC is used as a strategic management tool, and the reasons for the adoption of TC are many. The main reason seems to be that large international companies need advanced strategic tools, such as quality management and information, for decision making in supporting NPD.

[13] We thank one of the referees for pointing out this interesting extension.

6.2. Limitations and future research

In interpreting the findings of this study, certain limitations must be considered. In particular, our qualitative results could be corroborated through the adoption of a combination of qualitative and quantitative methods. This study is also limited by the number of large international companies examined.

We cite some areas for further research. One area would involve a cross-country investigation of the deployment of strategic costing, together with capital budgeting evaluations in new product development. Such research would prove useful in emphasizing national practices. It would also be fruitful to examine costing attributes (as a strategic costing techniques) in managing and measuring the costs of new products. In this regard, Bromwich (1990) suggested that strategic cost management that goes beyond competitors' information must consider the number of attributes (benefits) that each product offers to a consumer such that they can buy the product. Demand for goods is derived from their underlying characteristics, and a firm should therefore identify a set of benefits for consumers to generate more customer value than rival products and to provide a firm with a competitive advantage.

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