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## **The uses of product costs in decision-making**

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## **The uses of product costs in decision-making**

**Abstract:** This paper assess the use of product costs in decision-making. Using questionnaire responses and interviews with British management accountants, product costs are used all the time in decision making to support the profit motive in profit/investment centres and to control costs in cost centres. They are used only sometimes in decision making when there are limitations in the product costing system and/or the market has a greater role in decision-making. Operating units use product costs as attention directing information in decision making: to highlight loss making products for special studies to identify any further information required, because market-based information has an important role in decision making and when product costs are not accurate enough to use directly in decision-making. Operating units use product costs directly in decision making because they have confidence in the accuracy of costs or because of ignorance of using the information as attention directing information.

**Keywords:** questionnaire survey; interviews; product costs; decision-making, frequency of use, use directly, attention directing information.

## **The uses of product costs in decision-making**

### **1. Introduction**

The application of information as a guide to economic decisions has been identified as one of the major functions of management accounting systems (Horngren, 1995). Within the management accounting system, the product costing system should report accurate product costs to make decisions relating, for example, to the pricing, introduction, discontinuation and response to rival products (Cooper and Kaplan, 1987; Johnson and Kaplan, 1987). To date, there has been a lack of research that has considered: (1) how frequently product costs are used in decision-making and (2) whether they are used as attention directing information or directly in decision-making. In relation to the first issue, researchers have not considered whether products costs are used all the time in decision making or are used to a lesser extent or are never used in decision making. In relation to the second issue, prior theory indicates that a decision-relevant incremental/avoidable cost approach should be adopted in decision-making (Drury and Tayles, 1994, 1995, 2000). To identify these product costs, product costing information should be used as attention directing information, rather than being used directly in decision making. Attention directing information is used to identify areas of concern for which decisions may be required, and decisions should be taken following special studies (or further investigations). Related to this issue, there have been calls for research into whether product costs are used as attention directing information to identify areas for special studies to be undertaken or whether they are used directly in decision-making (Drury and Tayles, 1995).

Given these two research issues, this paper uses the results of an exploratory research study involving a questionnaire survey of, and interviews with, management accountants working in British manufacturing industry to achieve the following two objectives. The first objective is to identify how frequently product costs are used in decision making and why they are used to this level of frequency. The second objective is to consider whether product cost information is used as attention directing information or directly in decision-making, and why and how it is used this way.

The remainder of the paper is organised in the following way. The second section examines prior research which has considered the frequency with which product costs are used in decision making, and the use of product cost information as attention directing information and directly in decision making in manufacturing industry. The third section describes the research methods in terms of the questionnaire survey and interviews. The fourth section presents the research results and the fifth section concludes the paper.

## **2. Prior research**

### **2.1 The frequency of use of product costs in manufacturing industry.**

Although researchers have examined whether or not product costs are used in decision making in manufacturing industry, many notable surveys have not considered the frequency with which they are used in decision making (e.g. Clarke, 1992, 1997; Cohen and Paquette, 1991; Dean et al. 1991; Drury et al., 1993; Green and Amenkhienan, 1992; Joye and Blayney, 1990; Kellett and Sweeting, 1991; Lukka

and Granlund, 1996, Brierley, 2008; Abdel-Maksoud, 2011). There are exceptions to this; for example, research in the USA found that product costs have been used extensively in decision-making (Emore and Ness, 1991). In relation to activity-based costing (ABC), Joshi (1998) observed, in India, that ABC was used extensively in cost reduction, but less frequently in pricing, output and design decisions. Scapens et al. (1996) found, in the UK, that management accounting information (including product costs) had a supporting role by providing managers with some of the information required for decision-making (see also Cooper et al. (1992) for examples from the USA). In contrast, in Spain, Saez-Torrecilla et al. (1996) found management accounting information had little use in decision making. This research is limited and has only considered the frequency with which product costs are used in decision-making. It has not considered why these costs are used at the frequency specified, and this provides a justification for further research into this topic.

2.2 The use of product costs as attention directing information and directly in decision-making in manufacturing industry.

Although prior research has considered how product costs are used in various decisions in manufacturing industry, such as make-or-buy decisions (e.g. Gambino, 1980; Ask and Ax, 1992; Theunisse, 1992) and pricing decisions (e.g. Govindarajan and Anthony, 1983; Scapens et al. 1983; Drury et al., 1993), it has not specifically considered the use of product costs as attention directing information and directly in decision making in manufacturing industry. Product profitability analysis (or profitability maps) is scorecard information that provides the main source of data about product profitability. This information can be used to identify, for example,

whether loss making products should be discontinued. Product discontinuation decisions can be made directly using the product profitability analysis for companies selling up to three or four products (Drury et al. 1993; Drury and Tayles, 1994, 1995, 2000). However, Cooper and Kaplan (1991) argue that it is not practicable to generate the different relevant costs to use directly in decisions relating to a large number of products because of the range of possible decisions, and the range of possible costs that should be applied in those decisions. When product discontinuation decisions are made in a multi-product firm for up to three or four products, the decisions are unlikely to have an effect on incremental fixed costs and they will be based on the incremental direct costs of the individual products. In contrast, decisions relating to, say, 20 products may affect support department costs and, hence, incremental fixed cost should be included in the decision (Cooper, 1990; Drury and Tayles, 1995, 2000).

In the case of organisations that sell many products, Cooper (1997) recommends that companies use product cost information as attention directing information to highlight those products that need special studies prior to a decision being made. Thus, product cost information is not used directly in decision-making. In the case of product discontinuation decisions relating to hundreds of different products, management need to undertake special studies to identify those revenues and costs that are relevant to the decision for one product or a combination of products.

The special studies could report the long-term incremental revenues and costs of products (Drury and Tayles, 1994) and their long-term incremental cash flows (Cooper, 1997; Drury and Tayles, 1995). Other examples of special studies include, considering the resource supply implications of maintaining or changing the existing product mix, identifying the reduction of resource usage from eliminating products,

and the resources saved or re-deployed as a result of the resource usage reduction or expanding capacity respectively (Johnson and Kaplan, 1987; Kaplan and Cooper, 1998). Johnson and Kaplan (1987) point out that it is difficult to know in advance what data will be used in special studies, thus the cost system should have sufficient data included in it to enable special studies to be carried out.

Although the references provided above are relatively recent, the concepts of attention directing information and special studies are not new. Simon et al. (1954) describe these issues in the context of scorecard questions that examine how a firm is performing; attention directing questions that consider which problems should be identified; and problem solving questions, that identify the best way of carrying out some task. The solution to problem solving questions will usually be obtained through special studies. In this paper, we will use the terminology that has been used in recent literature. That is, of using product cost information as attention directing and directly in decision-making, rather than Simon et al's (1954) terminology.

To the authors' knowledge, prior research has not considered the use of product costs as attention directing information or directly in decision-making. Specifically research has not considered why and how product cost information is used as attention directing information and/or directly in decision-making and the extent to which the frequency with which product cost information is used in decision-making varies with how it is used in decision-making. This absence of prior research provides a justification for conducting exploratory research into this use of product costs in decision-making.

### **3. Research Methods**

A questionnaire and interviews were used to obtain information about operating units' use of product costs in decision-making and formed part of a wider research project about product costing in British manufacturing industry. Potential questionnaire respondents were obtained from a list of 854 members of the Chartered Institute of Management Accountants (CIMA) in Great Britain with job titles of cost, management or manufacturing accountant, and employed in British manufacturing industry. An introductory letter was posted to all potential respondents explaining the research objectives and informing them that they would receive a questionnaire in two weeks time. The questionnaires were accompanied by a covering letter, which assured them of the confidentiality of responses, and a stamped-addressed envelope. Any non-respondents to the mailing of the questionnaire were posted a follow-up letter two weeks later, and a further follow-up letter, questionnaire and stamped-addressed envelope were posted to non-respondents four weeks after the questionnaire had been sent out. After identifying potential respondents who worked in the same operating unit, operating units which had closed down, potential respondents who had left their operating unit and potential respondents who were not involved in manufacturing industry or product costing, the total potential respondents working in independent operating units declined to 673. A total of 280 usable responses were received (effective response rate = 41.6 percent).

A single question asked respondents how frequently they used product cost information in decision making in their operating unit, with examples of possible decisions being selling price, make-or-buy, product mix, output level, cost reduction and product design decisions. The responses to the question were on a five-point scale

scored: 1 = used all the time, 2 = often used, 3 = sometimes used, 4 = rarely used and 5 = never used. Details of how product cost information was used in decision-making were obtained from a single question with responses of: 1 = Used as attention directing information, as a guide to whether special studies should be conducted, 2 = Used directly in decision-making and 3 = Other. Any respondents whose response was “other” were asked to indicate how the product cost information was used.

Of the 280 questionnaire respondents, 56 made themselves available for an interview by ticking a box on the back cover of the questionnaire to discuss their questionnaire responses in more detail. The interviews covered all aspects of product costing, were conducted at the interviewees’ place of work, were semi-structured, tape recorded, and lasted on average for 1 hour 25 minutes. For this paper, the interview questions sought to use the questionnaire responses to obtain further information about why the interviewees used product costs to the frequency specified, and why/how product cost information was used as attention directing information and/or directly in decision-making. The interviewees were analysed using a qualitative/interpretive research approach (Lincoln and Guba, 1985; Miles and Huberman, 1994; Corbin and Strauss, 2008) to identify common themes in the interviewees’ responses that could be coded into a single category.

The operating units of the 56 interviewees had a mean turnover of £96.1m (standard deviation = 203.4), minimum of £3.0m, maximum of £1,327.0m and a median of £35.5m (useable n = 56). They had a mean number of employees of 522.4 (standard deviation = 600.3), minimum of 65 employees, maximum of 3,300 employees and a median of 280 employees (useable n = 53). In addition, of the 55 operating units that used product costs in decision-making, five used variable costing and of the 50 operating units using full costing, 5 assigned overheads to product costs

using blanket overhead rates, 31 used production overhead rates, nine used production and service/support department rates and one used activity-based costing.

## **4. Results**

### 4.1 Frequency of use of product costs.

Table 1 indicates that just over half (54.6%) of the questionnaire respondents used product costs all the time in decision making and a large percentage of respondents used them often or all of the time in decision making (86.7%). The remainder of this sub-section identifies the reasons why interviewees used product cost information to the frequency specified, except that none of the interviewees used product costs rarely in decision-making.

Insert Table 1 about here

4.1.1 Used all the time in decision-making. Operating units use product costs all the time in decision making in profit/investment centres to support the profit motive and in cost centres to control costs. In profit/investment centres, product costs are needed to match against product sales to calculate product profits. They are used all the time to support the profit motive in a number of ways, and an interviewee illustrated this, in general, in terms of calculating profit and calculating product costs for use in decision-making. He said:

The key driver of this company is profit. You have to know what your costs are if you want to know, what your profits are. When you're going to sell something, when you're going to make-or-buy it, or when you're going to invest in a product, you need to know what your costs are, if you

want to know what it's going to cost to make it. So, it's crucial to the whole thing.

Interviewees illustrated why their operating units use product costs all the time in decision making in terms of the types of decisions in which product costs are used to either support the profit or cost control motive. They are used to calculate the profits of products and orders in order to make commercial decisions about whether products should be introduced and sold. In product introduction decisions, a product should be introduced only if it achieves a minimum profit margin. For example, one operating unit was considering entering the own label market and the interviewee said:

We have minimum margin aspirations. We won't take business on below a certain margin, certainly branded business. We are now moving into the area of being able to tender for own label business. So, I envisage a situation where we've got two margin aspirations. Clearly, we know what we want to do with the brand and that's ours to control. But, this is a large factory and we need to put some volume through it. So, there'll be some lower margin products that we'll go to and get to understand what that margin is. We need to look at what the cost base is.

Similarly, an interviewee said that costs were important in determining whether orders, particularly non-standard orders, were accepted. He said:

We've had a sales enquiry for a number of different products, which need modifying. They want their own labels putting on, for example. So, I have to take out the standard labels and put in their free issue labels. They want different packaging on the product. They want different caps. So obviously, I have to do that and then we will decide whether the margin on the product as it will have to be made for this particular order will be profitable.

Product profits are also used to identify areas for cost reduction. This can arise from competitive pressures in the marketplace. These competitive pressures can relate to the competition derived from competitors in the marketplace and customers. An interviewee described how customers influenced cost reductions in the following way:

We're also in an industry where our customers ... are constantly trying either to reengineer their products to get costs out of their products, so that feedbacks out to us to try to get costs out of our products.

Product costs can contribute to achieving adequate profits through product pricing, regardless of whether costs are used directly to calculate a cost-plus price or to support market-based pricing. In operating units using cost-plus pricing, product costs are used to determine the selling price. An interviewee gave an illustration of the continual use of product costs in setting cost-plus prices. He said:

I think it crops up every day when we're getting people from various selling divisions coming along asking for a price on an existing product and their first port of call is: Has the raw material price changed from the standard for the year? If they're wanting to quote, they will come immediately and say: What's the ruling raw material price? If it's a big contract, then we'll also look at raw material and also look at the possible price that we're being confronted with on our costing. ... If it's a big order it will go to the directors, who will get involved and we will look across the costing and say, right, what will we be prepared to pitch this at and what would we go down to.

Although products costs do not determine market-based prices, they have a supporting role in pricing by determining the profit achieved at the market price, and, hence, whether the company is prepared to sell the product in the marketplace. An interviewee illustrated the use of product costs in market-based pricing by saying:

For most of our products, the price is driven by the market and the marketing people have a big input. But, they'll always have the product cost at hand at the time they decide on selling prices. So they'll know if the ideal price was 'x' and they had to come down to 'y', then at least they'd know what margin they're going to get if they come down to that price and they can see the point of breaking even or whatever.

Although cost centres are not involved in achieving profits, they use product costs all the time to control costs. An interviewee described this in the following way.

We are part of an operations function and, as such, our targets are all set and based on costs and cost savings and productivity and cost reduction projects. So, because we are an operating unit, as opposed to a selling and marketing unit, it's heavily orientated to cost control.

4.1.2 Used often in decision-making. Product costs are used often, rather than all the time, in decision-making either because product costs are less important in decision-making or because they are not used in all of the decisions made by an operating unit. Product costs are less important in decision-making when it is taken for granted that the product cost is less than the selling price. For example, an operating unit did not use product costs in many of its product related decisions because product costs did not change much. Product costs were used in the calculation of product profits only when input costs change and for one-off pieces of work or special mixes of chemicals. Similarly, another operating unit made sales as long as they achieved a profit on the sale regardless of the size of the profit margin.

Product costs may be often used in decision making because they are used in some decisions, but not in others. Which decisions they are (not) used in are peculiar to each operating unit. For example, in one operating unit, product costs were used for cost-plus pricing, but they were not used in product design decisions because the company designed what the customer wanted and they were not used in output decisions because of spare capacity in the factory.

In some cases, respondents said that product costs were often used in decision making to support market-based pricing decisions by calculating product profits at a given selling price. These responses were very similar to those provided earlier, when interviewees said that product costs were used all the time in market-based pricing. This difference arises because some interviewees answered the question about the frequency with which product costs are used in decision making in terms of the decisions in which product costs are used. That is, some of those that used product costs indirectly in decision-making said that they are used often, rather than all the time. This illustrates one of the problems with questionnaire-based research, when

two respondents may give a different answer to a question when they actually use information in a similar way.

4.1.3 Used sometimes in decision-making. Product costs are used only sometimes in decision making either because of the limitations of the costing system and/or because market-based information is more important in decision-making. Limitations in the product costing system can arise due to a lack of detailed information being produced by the system, such as, a lack of information about the times taken to manufacture products, a lack of detail about the yields arising from producing products, and having to use a simple method to allocate and assign overheads to products. This type of product costing system is used in operating units where selling prices are determined by the market, and, hence, product costs do not have a direct role in determining prices. In one operating unit, product costs were used only in product discontinuation decisions when products were making large losses, and hence, it was obvious from the cost information that the product should be discontinued.

When the customers are the main driver of decisions, then market-based information is more important than product costs in decision-making. When customers are powerful, it is necessary to sell products at prices determined by the customer regardless of whether or not the operating unit makes a profit at that price. Thus, the profit motive, and the product costs associated with calculating that profit, is not a critical factor in decision making. An interviewee described the impact of the customer in the following way:

If the customer wants a price maybe we choose to do it because from a business point of view it makes sense and then try and look at the costs, rather than saying we can't afford it, then we can't do it. So it's not always product led ... . It's really a decision, keep the customer or lose the customer.

The impact of the market on reducing the use of product costs in decision-making increases as operating unit profits increase. In this case, there is little concern with reviewing individual product profit margins because operating unit profits are high.

This arose in one operating unit, where the interviewee said:

The other factors which are used are probably more important, are the main commercial factors. For example, competition, whether we choose the volume, relationships with customers, things like that. Also, we're in quite a handy position where the margins are so high at the moment that none of our products are ... marginal. So it's more a sort of commercial decision as to the price the market will bear, rather than our product cost.

4.1.4 Never used in decision-making. Only one operating unit did not use product costs in decision-making. This was because the costing system did not calculate individual product costs. Costs were allocated to cost centres, but these costs were not assigned to individual products. Consequently, the operating unit calculated the total production cost, but not individual product costs. Any product related decisions were made using estimates of individual product costs based on management intuition and experience, and not the costing system.

A review of the interviewees' perceptions of the frequency with which their operating units used product costs in decision making revealed that all larger operating units (i.e. with turnover and number of employees in excess of £100m and 500 employees) used product costs all the time in decision making. The larger operating units may have the resources to invest in a costing system in which they have the confidence to use all the time to make a variety of decisions. There were no patterns in the data, however, between frequency of use with the methods used to allocate and assign overheads to product costs.

## 4.2 Attention directing information

Of the 270 questionnaire respondents that provided information about the use of product costs in decision-making, 120 (44.5%) used it as attention directing information, 132 (48.9%) used it directly in decision-making and 18 (6.6%) used it in both of these ways (from their response of 'other' on the questionnaire). The frequency with which product cost information was used in decision-making relative to how product cost information was used in decision-making is shown in Table 2. A Kruskal-Wallis test revealed that there was a significant difference in the frequency with which product cost information was used in decision-making ( $X^2 = 36.171$ ,  $df = 2$ ,  $p = 0.000$ , 2-tailed test). The multiple comparisons between treatments procedure showed that operating units used product costs directly in decision making significantly more frequently than those using them as attention directing information ( $p < 0.025$ , 1-tailed test). The remainder of this sub-section analyses the results of the interviews listed in Table 2 about the use of product costs as attention directing information and directly in decision-making.

Insert Table 2 about here

4.2.1 The use of product costs as attention directing information. The results of the interviews into the use of product costs as attention directing information in decision-making are divided between those using product costs all the time or often in decision-making, and sometimes in decision-making. Operating unit that use product costs all the time or often in decision-making, use them as attention directing information to identify loss making or low margin products for which special studies

are required. Contrary to the writings of Cooper and Kaplan, these special studies do not involve a detailed recalculation of product costs. At best, the information is checked by discussions with staff to check its validity prior to making a decision. For example, the interviewee from the only operating unit using ABC said the validity checking involved:

Discussion with the people who have recorded it and then just throwing it around, rather than doing a decision in isolation ... . What you also may find is that you go in [meetings] thinking one thing and come out thinking another. It's a danger that you just go in and you think well you know the answer and then ... something else comes up in the discussion that needs investigation.

The special studies involve a concern with to whom the products are sold. If they are sold to a customer that the operating unit makes an overall profit on sales, then they are willing to accept a loss on the sale of one or more products as a sacrifice for achieving higher profits on others. An interviewee illustrated this by saying:

If you have hard and fast rules that any product must recover x percentage profit or whatever, then there isn't the flexibility there, and with the type of customers we're working with you do need to have that. You need to temper the actual results to the commercial realities of the situation. So for instance, you may have a wide range of products from one customer and you might, in fact, have some products that you are theoretically making a loss on, but you will do those to get the rest of the products you are making a profit on.

If overall customer sales result in a loss or low profits, then rather than discontinuing the product, operating units consider reengineering the product, or negotiating a higher selling price with the customer. The interviewee referred to previously said that special studies were:

Sometimes customer driven and sometimes driven by ourselves. If we have a particular product where there's some particular difficulty in manufacture, we will try and engineer that. ... The immediate reaction to a product that looks unprofitable is not to rush out to the customer and say you have to pay more for this. It's: Is there a better way of making it? Can we actually simplify the construction? Can we use different materials? Can we make better use of the materials that we're using? And so on.

Interviewees that use product costs as attention directing information and sometimes use them in decision-making, use them as attention directing information for the same reasons that were described above to explain why they sometimes use them in decision-making. These were the limitations of the costing system and/or because market-based information is more important in decision-making. When the product costing system produces relatively inaccurate product costs, product costs are used to identify significant loss-making products for special study. When describing the product costing system, one interviewee said:

It's not amazingly accurate. ... If we are selling products at a loss, and a noticeable loss, that will flag it up ... . It's used more to pull up exceptions, rather than being used all the time.

Thus, operating units use product costs as attention directing information because it is accepted that they are inaccurate. By implication, if the company had a better product costing system they would be used directly in decision-making, rather than as attention directing information.

Operating units that sometimes use product costs in decision making because market-based information is more important, use product costs as attention directing information because it is just one part of the decision making process. One interviewee described how product costs were just one of the factors used in decision-making. He said:

The product cost is just one tool, which is used in the commercial decision. ... Customer, competitive activity, the market, the marketplace, factory capacity, all those other things are considered when we decide whether we want to pitch for a bit of business. So product cost is obviously just one part of the matrix ... . I don't think we want to directly say that if a product doesn't make a certain percentage [margin] we're not going to go with it.

As product costing information is less prominent in decision-making, this can result in decisions being made which are contrary to the information provided by the

product costing system. Although the product cost information can be used as attention directing information, the operating unit may decide not to act on it because of the importance of market-based information in decision-making. In this case, special studies are not carried out. In one case, an interviewee said:

Traditionally, sales people tend to make decisions based on what the customer wants, rather than what the costs say. It is really, do the costs give us what we want? Fine, does the cost not give us the answer we want? Ah well, we'll have to do it anyway. ... In sales terms, we're very flexible with what we do, we try to do what the customer says in a lot of cases. It's attention directing, but it's not necessarily then used all the time.

In other words, the product costs can draw attention to a particular problem, such as a loss making product. However, special studies are not carried out by examining product costs, because the decision about whether to produce the product is made from market-based information, such as the power of the customer and the risk of losing the customer. The interviewee illustrated this by saying:

We may say a particular product is very expensive. Therefore, just on its own [using the product costs], we won't do it. It may be that the sales' people will say, well the customer says they want it and by meeting the customer's needs we are securing the long-term future of the business. So, it's not the product cost that is driving that decision, it's the needs of the customer and the relationship with the customer.

4.2.2 The use of product costs directly in decision-making. Operating units use product costs directly in decision making to make a variety of decisions, such as product pricing, introduction, discontinuation and cost reduction decisions. They are an important part of those decisions. One interviewee expressed this by saying:

It's such an integral part of any decision, ... . The production director will come and say we need to know what's going to happen with this if we are potentially going to go forward with [company name] to do this. Almost the first thing he's after is the cost of doing that. ... It's really the core of any decision we would make.

Although interviewees described the reasons why they use product costs directly in decision-making in terms of the types of decisions in which product costs are used,

they showed little awareness of the possibility of using product costing information as attention directing information. In other words, the choice is either using product cost information directly in decision-making or not using it at all. There is no consideration for conducting special studies to recalculate product costs prior to making a decision. In one case, an interviewee admitted that his operating unit had not considered using product cost information as attention directing, while one interviewee said, "I'm not quite sure what the distinction is". Another indicated on the questionnaire that product costs were used directly in decision-making, but when asked why they were used this way his response indicated their use was closer to attention directing. His initial answer to the question was:

Our product cost information is available. We are usually looking at it when we're directly making decisions.

The implication from this quote is that decisions are based on the product cost information that is produced. However, the interviewee went on to describe the decision making process in more detail. He said:

We've started to look more and more at margin analysis where product costing is becoming a base for actually saying, well hey, there's a problem here. ... Ourselves and the marketing department are actually starting to look at product costs as product is sold, to look at margin analysis and how [the] product mix affects our profitability.

In other words, product cost information is being used as attention directing information. It is being used to identify product profit margins where special studies are required to solve problems. The confusion here seems to be in the interpretation of the word directly. Although the margin analysis produced by this operating unit is related directly to a decision, it is not used directly in that decision. It forces attention to the need for further information to make a decision.

4.2.3 The use of product costs as attention directing information and directly in decision-making. Operating units using product costs both as attention directing

information and directly in decision-making, use it as attention directing information for some decisions and directly in others. It is used as attention directing information by reviewing product profits to identify possible product discontinuation decisions. If profits are lower than expected then operating units conduct special studies to find out why profits are lower than expected. Products costs are used directly in other decisions like pricing and make-or-buy decisions. The interviewee from one operating unit described how product cost information is used in both of these ways.

He said:

This is a double edged sword, both ... apply here. You've got (1), which is the after effect. After the month end's closed and you're looking at individual [product] profitability, you'd start looking at your product cost to find out if that has been the cause of the profit or loss that you've made. But, (2) is looking forward through your sales. The product cost information will be used directly for fixing your sales prices.

A review of the interviewees' perceptions of the use of product cost information in decision making did not reveal any patterns in their responses by the demographic constructs of operating unit turnover, number of employees and methods used to allocate and assign overheads to products.

## **5. Conclusion**

This paper has used a questionnaire and interviews to examine the use of product costs in decision making in British manufacturing industry. Most operating units use product costs at least often in decision making, which shows that product costs have a significant role in decision-making. Operating units use product costs all the time to make a variety of decisions to support the profit motive in profit/investment centres and to control costs in cost centres. However, the greater the influence of the market in decision making, the less frequently product costs are used in decision-making.

There are three different reasons why operating units use product costs as attention directing information in decision-making. First, to highlight loss making products for special studies and to identify any further information required. Second, product cost information should not be used in isolation in decision making because market-based information has an important role in decision-making. Third, when product costs are not accurate enough for direct use in decision-making. The latter two reasons arose when product cost information was sometimes used in decision making, rather than being used all the time or often used. Operating units use product costs directly in decision making because they have confidence in the accuracy of the costs or because of ignorance of the possibility of using the information as attention directing information.

Operating units use product costs directly in decision making more frequently than those using them as attention directing information. This may be because operating units using product costs as attention directing information use other information to make the final decision. Operating units that use product costs at least often and directly in decision-making may make incorrect decisions when there are inaccuracies in the product costs, which may be revealed if special studies were carried out prior to making the decision. In addition, a number of the interviewees using product costs directly in decision making were unaware of the meaning of the term attention directing information. There is a need for management accounting textbooks and courses to emphasize the difference between using product cost information as attention directing information or directly in decision making in order to educate management accountants about the potential problems of using product costs directly in decision-making.

Given the dearth of prior research, which has examined the use of product costs in decision-making, the results of the research should be regarded as tentative and incomplete. The main limitations of the research stem from the methods of sampling used. Given that the initial data collection arose from a questionnaire survey, the possibility of non-response bias is a problem. A further limitation is that the research does not use theoretical sampling to sample the interviewees. Consequently, the results of this research have only enhanced our understanding of the use of product costs in decision-making and have not led to the development of any grounded theories (see e.g. Strauss and Corbin, 1998). Thus, there is a need to replicate this research, not only, in British manufacturing industry, but also elsewhere in the world using theoretical sampling

The research has examined the frequency with which product costs are used in decision making in general, but it has not considered the frequency of use in different types of decisions. There is a need to extend this research to consider whether the frequency of use of product costs in decision-making varies for different types of decision. In addition, the research has provided an indication of the use of product costs in a variety of operating units, but it does not analyse the use of these costs in detail in any one operating unit. There is a need to extend this research to analyse the application of product costs in decision making in detail in operating units using longitudinal case studies. A further limitation of the research is that it considers only the views of management accountants and does not consider the views of non-accountants, such as production, marketing and general managers about the use product costs in decision-making. In addition, it does not consider the use of product costs by those who are actually responsible for the final decisions made in organisations, and this needs to be considered in future research.

This paper represents the first attempt to address the issue of the frequency of use of product costs in decision-making, and their use as attention directing information and/or directly in decision-making. As indicated above, further research is needed to study this issue and we trust that other researchers will be interested to take this research agenda further.

**Table 1** The frequency with which product costs are used in decision-making

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Frequency Used	Questionnaire respondents		Interviewee respondents	
	Number <sup>a</sup>	(Percent)	Number	(Percent)
All the time	153	(54.6)	39	(69.6)
Often Used	90	(32.1)	12	(21.4)
Sometimes Used	27	(9.7)	4	(7.2)
Rarely Used	4	(1.4)	–	(–)
Never Used	<u>6</u>	<u>(2.2)</u>	<u>1</u>	<u>(1.8)</u>
Total	<u>280</u>	<u>(100.0)</u>	<u>56</u>	<u>(100.0)</u>

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Note: <sup>a</sup>  $X^2 = 296.607$ ,  $df = 6$ ,  $p = 0.000$

**Table 2** The frequency with which product costs are used in decision making relative to how they are used

Frequency of use	Use of product cost information in decision making			
	Attention directing No. (%)	Directly No. (%)	Attention directing and directly No. (%)	Total No. (%)
<b>Questionnaire respondents</b>				
All the time	46 (38.3)	95 (72.0)	11 (61.1)	152 (56.3)
Often used	48 (40.0)	34 (25.8)	7 (38.9)	89 (33.0)
Sometimes used	23 (19.2)	3 (2.2)	– (–)	26 (9.6)
Rarely used	<u>3 (2.5)</u>	<u>– (–)</u>	<u>– (–)</u>	<u>3 (1.1)</u>
	<u>120 (100.0)</u>	<u>132 (100.0)</u>	<u>18 (100.0)</u>	<u>270 (100.0)</u>
<b>Interviewees</b>				
All the time	12 (54.5)	20 (83.3)	7 (77.8)	39 (70.9)
Often used	6 (27.3)	4 (16.7)	2 (22.2)	12 (21.8)
Sometimes used	4 (18.2)	– (–)	– (–)	4 (7.3)
Rarely used	<u>– (–)</u>	<u>– (–)</u>	<u>– (–)</u>	<u>– (–)</u>
	<u>22 (100.0)</u>	<u>24 (100.0)</u>	<u>9 (100.0)</u>	<u>55 (100.0)</u>

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