

INTRICACIES OF OVERHEAD COST ALLOCATIONS AND DISTORTION IN COSTING: A SYNTHESIS OF THE LITERATURE

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Abstract

In the early 1920s, direct labour comprised most of the total cost of manufacturing, and allocating overheads using direct labour hours or direct labour cost was sufficient for inventory valuation purposes, which was then the primary object of cost accounting. However, the upsurge of manufacturing overhead as a percentage of manufacturing cost at the expense of direct labour and proliferation of product lines complicated the otherwise relatively straightforward process of overhead cost allocation. Empirical evidence demonstrates that our understanding of how best to allocate overheads is at a nascent stage, and surprisingly most managers still do not know their costs. Moreover, managers have grave concerns about the current practice that allocates overheads to products in an arbitrary fashion. These concerns stem from the fact that managerial decisions are based on cost information furnished by management accountants, which is ostensibly inaccurate. This conceptual discussion paper integrates the extant accounting literature on overhead cost allocation, discusses the ramifications of inaccurate cost allocation, and highlights areas for further research. Consistent with many earlier studies, the findings reported in this article show that the primacy of arbitrary cost allocations is maintained, and that managers are unsure of the accuracy of their costs and apprehensive about the problems emanating from inaccurate cost allocations.

Key words: Overhead, allocation, cost distortion, ABC.

Introduction

Manufacturing overhead cost is defined as the sum of direct and allocated costs of manufacture other than direct labour and purchased materials (Miller and Vollmann, 1985). Cost allocation refers to the assignment of indirect costs to a particular cost object with the aim of making better strategic decisions (e.g., pricing, product mix, customer mix), motivating managers, providing feedback for performance evaluation, inventory and income valuation, and finally to justify costs or obtain reimbursement (Horngren et al., 2008). Previous studies suggest that most companies allocate overheads in an arbitrary manner (Thomas, 1974). Fremgen (1976) described arbitrariness in a reference to indirect overhead costs, which, in his opinion, are neither useful nor appropriate for decision-making purposes. Avoiding cost allocation is generally recommended in the literature except where allocations are made for financial and tax reporting, government contracting and cost-plus pricing purposes (Zimmerman, 1979). Failure of conventional cost accounting systems in meeting the needs of contemporary organisations is well documented in the literature (Johnson & Kaplan, 1987; Shank and Govindarajan, 1988). Underlying causes responsible for the inadequacy of conventional cost systems include that traditional cost accounting was originally designed to value inventory, the cost structure of many companies has changed and direct labour is no longer the dominant cost item and driver, companies' product lines have widened, and managers' priorities have changed (inventory valuation is no longer the primary objective).

Intense competitive conditions, under which most firms operate, necessitate managers know their costs as accurately as possible so they can make better business decisions about issues such as pricing, product profitability, customer profitability, product mix, and resource allocation. In practice, however, cost allocation has posed a significant problem for management accountants for years. Nearly a century ago, overhead allocation was described as the most difficult area of accounting (The Accountant, 1913). What makes this issue problematic is the controversy about how to best allocate overhead costs; interestingly, cost allocation is still regarded as the prominent problem in cost accounting (Kerremans et al., 1991). While Cooper and Slagmulder (1998) observed that many companies allocate support costs to operating units using a 'peanut butter' approach that

spreads these costs in an arbitrary fashion, Pirrong (1993) did not consider the arbitrary allocation as a major issue, suggesting that advantages of cost allocation still outweigh disadvantages even when allocation is arbitrary. Similarly, it is argued that because facility-level costs (including nonmanufacturing costs) are fixed over a wide range of activity, they are likely to be irrelevant for product-related decisions (Drury and Tayles, 1995).

Despite the fact that overhead cost allocation has been an ongoing problem for management accountants and the potential harmful consequences when costs are computed inaccurately are well known, surprisingly there is very little research on allocating overhead costs and its impact on decision-making. This paper contributes to the literature on two levels. First, the study described in this paper contrasts cost allocation practices across nations and highlights the key pitfalls associated with the use of overhead allocation. Second, it accentuates the importance of accuracy in overhead cost allocations and enhances our understanding of the lingering problems around cost allocations under extant literature results. Finally, the present study provides some foundation for future researchers.

The paper continues with a summary of previous research on various aspects of cost allocation (section two). Section three contains a discussion of conclusions and areas for further research.

Summary of Prior Research

The real driving force behind manufacturing overhead is not production volume but transactions dealing with logistics, balancing, quality and change (Miller and Vollman, 1985). Cooper and Kaplan (1987) suggested that many of the transactions that drive costs are largely determined by the complexity of plants' operations. While allocating overheads remains one of the key headaches for management accountants, the topic has received little empirical attention. Shields (1997) reviewed 152 articles published by North American researchers in six leading journals between 1990 and 1997, finding that only 5.3% of articles dealt with cost allocation. Consistent with this, Chenhall and Smith (2011) examined 231 papers published by Australian researchers in 10 leading management accounting journals between 1980-2009, and reported that articles on 'costing' represented

only 4.8% of the total. Finally, Scapens and Bromwich (2010) reviewed articles published by *Management Accounting Research Journal* during 1990-1999 and 2000-2009, and concluded that cost accounting systems and techniques made up 11% of all topics studied during 1990-1999, but only 4% during 2000-2009. The apparently large decline in academic interest in cost accounting is noteworthy, because there is no evidence that cost accounting issues have been resolved in recent years.

The Objectives of Cost Allocation

Joye and Blayney (1990) surveyed the 2096 largest manufacturing companies in Australia and found that the majority (80%) allocated overheads for pricing purposes, cost control (73%) and external reporting (55%), and smaller but substantial minorities allocated overheads for product addition/deletion decisions (24%) and performance evaluation (12%). Cost allocations are made to encourage optimal utilisation of resources, third-party reimbursement, motivation, decision-making (Zimmerman, 1979) and inventory valuation (Johnson and Kaplan, 1987).

The cost allocation process typically consists of: (a) definition of cost objects, (b) accumulation of allocable costs, (c) determination of allocation bases, and (d) the actual allocation to cost objects (Rossing & Rohde, 2010). Top management allocates costs to influence the behaviour of managers to take action in the best interests of the company as a whole (Ramadan, 1989). Two key outcomes that can be expected from allocating costs are better economic decisions and a higher level of managerial motivation (Snyder & Davenport, 1997). Using an experimental design, Wouters (1996) found that cost allocations can serve as a reference point when decision-makers deal with decision risk. Cost allocation is part of an organisation's cost management system, and has four major objectives: to predict the economic effects of strategic and operational control decisions, to provide desired motivation and to give feedback for performance evaluation, to compute income and asset valuations for financial reporting, and to justify costs or obtain reimbursement (Horngren et al., 2008). Kerremans et al., (1991) found that cost information was most relevant for inventory valuation, setting prices, performance evaluation of managers, and sales strategy.

A questionnaire-based survey carried out by Brierley et al., (2006), revealed that product cost information was the least important element in making decisions on selling prices, make-or-buy, cost reduction, product design, evaluating new production processes and product discontinuation. Brierley et al., (2006) finding contrasts with some earlier results (Govindarajan and Anthony, 1983; Kaplan & Atkinson, 1989; Mills, 1988). In general, cost managers rate 'actionable cost information' as their top priority (Ernst and Young, 2003). Given previous studies showed that cost-based pricing was the most widely adopted method for setting prices (Drury and Tayles, 1995); overhead cost allocations which contribute to total costs merit further study.

Bases of Overhead Cost Allocation

In a survey of 658 UK companies in the food sector (Abdel-Kader and Luther, 2006), 17% of respondents considered the use of plant-wide overhead rate to be important and 27% moderately important. Sixteen per cent of respondents thought the use of departmental or multiple plant-wide overhead rates was important and 35% moderately important. Direct labour has been identified as the most popular method for allocating overheads (Cohen and Paquette, 1991). Drury et al., (1993) reported that only 21% of the firms they studied had established separate support department overhead rates; the majority reallocated support department costs to production departments and allocated these costs to products on the same basis as other cost centre overheads. Direct labour is the most frequently used allocation base in the UK, USA and Australia, even though direct labour represents 10-15% of total manufacturing cost (Drury and Tayles, 1995). Surveys in the UK, USA, and Australia have found that approximately 30% of the respondents use plant-wide rates. Japanese companies allocate overhead costs using direct labour cost/hours to encourage design engineers to identify opportunities to reduce the product's labour content and thus promote greater use of technology (Hiromoto, 1988). In India, research conducted by Anand et al., (2004) found that in the first stage of cost allocation, 62% of companies used the direct method to allocate support department overhead costs amongst their production departments; the reciprocal method, which is considered more theoretically sound, was not popular within corporate India. Brierley et al., (2006) argued that the importance product cost information in determining selling price was minimal, and the importance of product costs in decision making was not influenced by the method of

overhead cost allocation. As shown in Table 1, direct labour-based (hours and cost) overhead allocation methods are the most common overhead allocation bases worldwide. Drury and Tayles (1994) attribute the primacy of direct-labour cost methods to the ready availability of details of direct labour hours, whereas details associated with arguably more appropriate cost drivers may entail expensive data collection costs.

Arcelus et al., (1997) noted that research focus should be shifted from identification of the best allocation method to the purpose of allocation. Therefore, there is little justification for searching for an equitable cost allocation, especially if coordinating activities have their own priorities that conflict with the parties' own priorities. Abdel-Kader and Luther (2006) surveyed the British food and drinks industry and found that use of a plant-wide overhead rate was considered 'important' and 'moderately important' by 44% of respondents while 23% indicated using plant-wide overhead rate 'very often' and 'often'. Fifty-one per cent regarded using departmental or multiple overhead rates as 'important' and 'moderately important', and only 13% indicated they use departmental or multiple rates 'very often' and 'often'.

Cost Structure of Manufacturing Companies

Miller and Vollman (1985) classified overheads under four types of transactions: logistics, balancing, quality, and change. Logistic transactions deal with the receipt and movements of materials in a plant. Balancing transactions are incurred to coordinate the supply of and demand for resources in production activities. Quality transactions are performed to ensure that goods are produced to customer requirements. Change transactions are used to revise manufacturing systems for alterations in product or process design. Cooper and Kaplan's (1991) framework posits that a company's overhead is driven by four types of activities: unit-level, batch-level, product-sustaining, and facility-sustaining activities. Unit-level activities are activities to support the production of a unit of output. Batch-level activities are activities to support the production of a batch of outputs. Product-sustaining activities are undertaken to enable specific products to be produced. Krumwiede (1998) reported that many businesses allocate overhead costs to products in proportion to volume-based measures (i.e., machine hours, direct labour hours). It has been long claimed that as a

Table 1: Bases of Allocation of Overhead Costs to Products

	Uyar (2010)	Brierley et al. (2006)	Chongruksut (2002)	Brierley et al. (2001)	Laminmaki & Drury (2001)	Laminmaki & Drury (2001)	Laminmaki & Drury (2001)	Bjornenak (1997)	Clarke (1997)	Drury & Tayles (1994)	Joye & Blayney (1990)	Kato (1986)	Schwarzbach (1985)
Country	Turkey	UK	Thailand	U.K.	New Zealand	UK	Norway	Ireland	U.K	Australia	Japan	USA	
Direct labour cost	19.7%	22.5%	40.8%	4.7%			37.0%	13.0%		29%	23.3%	58.0%	
Direct labour hours	14.8%	46.1%	38.8%	19.2%	38.0%	25.0%	28.0%	39.0%	68%+	54%	58.3%	35.7%	
Machine hour	11.5%	39.8	16.3%	22.5%			29.0%	22.0%	49%	27%	21.5%	27.7%	
Volume of production	19.7%	29.8	60.2%	19.4%			40.0%	28.0%	42%	34%	36.8%	n/r	
Direct costs												n/r	
Direct material cost	4.9%	16.8	25.5%	8.1%			26.0%	7.0%	30%	19%		18.8%	
Prime cost	65.6%												
Set-up times			9.2%								5%		
Production runs, # of parts											5%		
Production time		14.7%		18.5%									
Selling price				1.3%									
Other	0			6.3%						9%	7%	18.4%	20.5%
Manufacturing cost					26.0%					31.0%			
Percentage of selling price					8.0%					13.0%			
Do not trace/allocate non-manufacturing costs to products		20.7%			28.0%					23.0%			

Automated production activities + or direct labour cost n/r: Not reported

result of increased automation and advances in technology, the proportion of direct labour has been declining as a percentage of total cost, whereas overhead costs are on the rise (Cooper, 1988; Cornick et al., 1988; Hardy and Hubbard, 1992). Smith (1989) estimated direct labour costs at no more than 8-12% of all costs.

Table 2 shows that the proportion of direct labour in total manufacturing cost ranges around 15-20%, and has hardly changed since the early 1990s. The outlier in previous research is the CAM-I survey (1988), which found that direct labour comprised 55% of total manufacturing cost in the UK companies surveyed. Research data on direct material cost as a proportion of total manufacturing cost reveal no consistent pattern, ranging between 12% and 61% in 1988 and 2003 respectively. Manufacturing overhead as a percentage of total manufacturing cost varies between 20% and 33%, but this variation does not signify a decline over the thirteen year review period. The sophistication of a costing system is a function of the degree of competition, diversity of products, number of products and proportion of overhead costs that cannot be directly assigned to products (Drury and Tayles, 1995).

In Hussain et al., (1998) survey of small and medium-sized Finnish businesses, 37% of respondents reported no problems in allocating costs to products and 38% indicated that the cost allocation basis was not reasonable. Kerremans et al., (1991) found that the proportion of direct labour costs in automated companies was significantly lower than in companies with mechanical production, and that overhead costs were not significantly higher in automated companies. Witherite and Kim (2006) argued that owing to the proportionately larger overhead costs of service industries, ABC was their logical choice for cost allocation. In the late 1980s, Kaplan (1988) pointed out that although direct labour makes up less than 5% of total manufacturing cost, many companies use direct labour costs to allocate overheads.

Distorted Cost Information

As Worthy (1987) pointed out accurate product costing is critical for product pricing, product introduction and product emphasis especially where multiple products are involved. Most companies allocate overhead costs back to user departments as a percentage of direct labour dollars, headcount

**Table 2: Cost Composition of Manufacturing Companies
(As a Percentage of Production Costs)**

	Country	Usable re-sponse	Direct labour	Direct material	Total direct costs	Other costs	Manu-facturing overhead
Al-Omiri & Drury (2007)	UK	91	14%	52%	75%		10%
Brierley et al., (2006)	UK	280	11%	51%			15%
Hughes & Gjerde (2003)	USA	130	18%	53%	72%		28%
Ernst & Young (2003)	USA	2,000	22%	23%	45%	21% #	34-42%
Chan & Lee (2003)	Hong Kong	41	n/r	n/r	59%		41%*
Chongruksut (2002)	Thailand	89	18.4%	27.6%		14.0%	18.9%
Lamminmaki & Drury (2001)	New Zealand	85	19%	60%	79%		21%
Lamminmaki & Drury (2001)	UK	303	16%	61%	77%		23%
Chen et al., (2001)	Hong Kong	90					36.3%
Nguyen & Brooks (1997)	Australia	120	21.8%	46.7%			31.5%
Lukka & Granlund (1996)	Finland	135	19%	45%	64%		36%
Drury & Tayles (1994)	UK	303	12%	n/r	n/r		n/r
Drury et al., (1993)	UK				75%		25%
Green & Amenkhienan (1992)			11%		75%		25%
Kerremans et al., (1991)	Belgium	90	21%	55%	76%	5%	20%
Joye and Blayney (1990)	Australia	430	17%	60%			23%
Inoue (1988)	Japan		14%	62%	76%		24%
CAM-I (1988)	UK		55%	12%	67%		33%
Schwartzbach (1985)	USA		15%	53%	68%		32%
Miller & Vollmann (1985)	USA	n/r					35%

Automated production activities + or direct labour cost n/r: Not reported

or company sales, and as a result most user departments pay the same amount regardless of how much they use the service (Davis, 1991). Haphazard cost allocation gives rise to distorted cost information (Thomas, 1980). At

the root of the cost distortion problem lies the fact that conventional cost systems are not in fact designed to measure costs accurately but have been developed to value inventory; therefore, cost distortion in organisations that use conventional cost accounting is inevitable (Johnson, 1983; Kaplan 1988). Empirical evidence (Thomas, 1980; Ernst and Young, 2003) suggests that conventional cost systems generate distorted cost information, based on which pricing, profitability, product mix, performance evaluation and other decisions are made. Drury and Tayles (1994) described traditional costing systems as simplistic and falling short of meeting the needs of contemporary organisations. This begs the question of whether all traditional costing systems cause cost distortions. Alnestig and Segerstedt (1996) remarked that Swedish manufacturers often employ a 'proportionality approach' which is in some ways similar to activity-based costing in that it allocates costs so that in the short and long terms they change proportionately with the cost centres to the cost objects. They suggested that the advanced computer systems for materials and production control should be developed to produce appropriate cost allocation data. In their survey of 2000 members of the Institute of Management Accounting in the USA, Garg et al., (2003) found that 98% of respondents reported that some factors cause distortions in cost information and 38% indicated that those distortions were significant. The most frequently reported factors that cause distortion in costs were overhead allocations (30%), shared services (20%), and greater product diversity (19%). Overhead allocation topped the list because operating and selling, general and administrative overheads accounted for 34-42% of operating costs across all industries (Garg et al., 2003). Kerremans et al., (1991) found that although many firms concur that cost information is important for inventory valuation, price setting, performance evaluation of managers, sales strategy and so on, only about one-third of firms reconsider the efficacy of cost calculations regularly, and another third do so occasionally. Studies to date lend support to Cooper's (1989) contention that the lack of precise product overhead costs lies at the heart of distorted product costs and prices.

Merchant and Shields (1993) argued that some companies deliberately use less accurate systems to overstate costs to prevent price shaving by marketing personnel, while others deliberately understate costs to encourage improvement and innovation in production methods or to stimulate consumption of such services as computing and research and development (R and D). Changes in the competitive landscape and increased global competition necessitate accurate product costing (Cooper,

1988), but achieving accurate product costs is difficult (Lamminmaki and Drury, 2001). The CAM-I survey in the UK (1988) and Kerremans et al., (1991) demonstrated that most companies are doubtful whether suitable allocation bases are used, and consequently have concerns about cost allocation. Conversely, however, Fremgen (1976) suggested that as a general rule, allocations of indirect costs are neither useful nor appropriate for management accounting purpose. Cost control, for example, is not facilitated by allocations of indirect costs, and hence indirect cost allocations are generally not useful for decision-making. Although management accountants' primary function is to provide timely and accurate information to management, Ernst and Young's (2003) survey revealed that almost all respondents (98%) concurred that overhead allocation begets distortion in costs. The increase in the proportion of overheads propels the level of distortion in costs for which the use of simplistic overhead allocation bases is responsible (Drury & Tayles, 1995). Provision of inaccurate cost allocation distorts product costing, which in turn leads to incorrect product pricing and causes destructive impact on competitiveness and income. Brierley et al., (2001) found that product cost information is most important for setting the selling price.

Consequences of distorted costs

Volume-based costing can seriously distort the way a firm looks at its strategic options and the way it assesses the profit impact of its pricing and product emphasis decisions. Transaction-based cost data can help to clarify the cost dimension of such decisions (Shank and Govindarajan, 1988). Shank and Govindarajan (1988) pointed to the likelihood that manufacturers will over-emphasise less profitable product lines because distorted cost information can mislead managers about the profitability of different products (Horngren et al., 2008).

Proponents of distorted cost information

Kaplan and Atkinson (1989) suggested that accuracy of product costs should be dependent upon the purpose for which the cost information is required. Hiromoto (1988) recounted his experience at a Hitachi plant in Japan that allocated manufacturing overhead based on direct labour; although managers did not seem to be bothered about whether the use of a direct labour base would lead to bad decisions, they believed using direct labour as a basis would motivate their managers to reduce direct labour content. In other words, the allocation base was determined by the long-term strategy

of improving the competitiveness of the firm by reducing direct labour. Wagenhofer (1996) showed that a cost accounting system that reports systematically distorted product costs can be preferable to an accurate system. The cost accounting system does not serve to become informed about costs but to motivate a profit centre manager to make decisions more in line with what the principal desires.

It is almost always optimal for the principal to forego accuracy in order to improve incentives for a manager, even if this comes at the cost of inducing inefficient pricing decisions. Research by Stratton et al., (2009) used data gathered from 348 US companies, of which 54% were service companies, and found that most respondents believed their system was unable to accurately trace activity costs to final objects and could not accurately trace overhead costs to final cost objects. However, in the case of ABC users, almost 58% of respondents agreed that their system accurately traced overhead costs to final cost objects and 35% per cent disagreed. This finding indicates that ABC made some inroads in resolving the overhead allocation problem. Cooper and Slagmulder (1998) suggested treatment of corporate support costs as discretionary expenses and measurement of outputs from staff departments and quantification of the used corporate services by operating units. Their argument is that the inaccuracy and lack of transparency in cost allocations can be best resolved using activity-based costing.

Avoidance of Cost Allocation

Once a company separates its system for measuring operating performance from that used to value inventory, it does not have to allocate common or noncontrollable costs to individual cost centres. By avoiding allocations, the operating report can be based on accurate, objective data on the cost centre's consumption of resources during a period (Kaplan, 1988). Drury and Tayles (1994) found that 23% of respondents did not allocate non-manufacturing costs to products, presumably relying on an increased mark-up to cover non-manufacturing costs. Lamminmaki and Drury (2001) showed that 28% of the sampled New Zealand firms and 23% of UK manufacturing firms did not attempt to allocate manufacturing costs to products.

Overhead Allocation in Service Firms

Service firms differ significantly from manufacturing firms in that they are labour intensive rather than capital intensive. Most of the labour cost can be traced directly to the firm's output of services with the rest of the cost is usually charged to a single overhead cost pool and then allocated to specific engagements, usually as a percentage of direct labour cost. This charge for overhead will distort the total cost of the engagement if different types of jobs cause costs to be incurred that are not in proportion to the number of hours worked or the direct labour cost incurred (Pirrong, 1993). The overhead costs often constitute a substantial part of the total costs in service firms and it is essential to derive them to the activities causing the costs when producing a service (Hussain and Gunasekaran, 2001). Service organisations do not use cost driver techniques in their cost measurement and allocation procedures. A service firm can collect costs by various functions and allocate them based on cost drivers that cause the costs to vary (Pirrong, 1993). In management accounting, the question of cost allocation is a contentious issue. Overhead is becoming an increasingly large component of product costs, and therefore may cause distortion in traditional volume-based costing methods. In fact, Ernst & Young (2003) demonstrated that operating and sales, general and administrative overheads constitute 34-42% of operating costs across all industries which is quite similar to Al-Omiri and Drury's (2007) finding of 32% indirect costs for service firms. Difficulties in overhead allocation include the diversity of services which make them hard to define and difficult for cost analysis (Mills and Cave, 1990). It was Drucker (1963), who reported for the first time, that it is the number of transactions rather than the number of units that drives overhead costs. Davis (1991) claimed that most companies allocate overhead costs back to user departments on a formula basis, such as headcount, percentage of direct labour dollars, or percentage of company sales. As a result, most user divisions or departments pay the same amount regardless of how much they use the service. Corporate support costs are allocated to the operating units using a 'peanut butter' approach that spreads these costs in arbitrary ways (Cooper and Slagmulder, 1998). The outcome of such a simplified approach is both low accuracy and zero transparency. Transparency ensures both sides to a transaction understand the source of allocated overhead costs, and accuracy ensures that costs are identified and transferred properly.

Transfer Price and Cost Allocation

Ackoff (1993) argued that allocated costs can amount to 40% of total unit costs. While some costs are too difficult to identify, they represent the cost of activities, which have impact on competitive advantage (Johnson and Kaplan, 1987). Davis (1991) claimed that most companies allocate overhead costs to user departments using a formula based on headcount, percentage of direct labour dollars or percentage of company sales. Ramadan (1989) found that top management's motive in cost allocations was primarily to influence the behavior of managers in a desired manner. Choudhury (1990) discussed the implications of overhead cost allocation from a fairness perspective and pointed out to the need for more research on this overlooked dimension of cost allocation.

Is activity based costing an answer to cost allocation problems?

One of the claimed advantages of ABC over traditional cost accounting is its ability to allocate overhead costs more accurately. While Bjørneak (1997) and Booth and Giacobbe (1997) found a positive association between the level of overhead costs as a percentage of total costs and the extent of ABC adoption, Nguyen and Brooks (1997) and Khalid (2005) found no such relationship. This is a rather surprising finding which indicates that volume of overheads is not the major driver for ABC adoption, which it was intended to achieve. Without denying some companies accounts that they benefited from calculating ABC product costs and thus improved their operations, Johnson (1992) questioned the usefulness of ABC in the long term suggesting that ABC is fundamentally a short-term cost cutting tool which may weaken a company's competitiveness in the long run. ABD adoption rates reported in some selected studies (Table 3) shows the sluggish progress in ABC adoption across various countries. Furthermore, findings do not show any clear trend either. Although there are benefits that can accrue from adopting ABC, one of the key pitfalls to avoid is ABC can also lead to cost distortions where the underlying assumptions of ABC have been violated (Latshaw and Cortese-Danile, 2002). Concerns over the efficacy of ABC in accurately attributing overheads to products are voiced by some authors (Noreen, 1991; Innes et al., 2000; Jones and Dugdale, 2002; Armstrong, 2002). It is argued that firms which are using ABC can better control and manage overhead costs (Stapleton et al., 2004). In its

initial years of introduction, activity-based costing (ABC) was described by Johnson (1990) as one of the most important management accounting innovations of the twentieth century. While much has been written on ABC, the results dealing with success of ABC appears to have fallen short of expectations. Evidence pertaining to ABC success in resolving the overhead cost allocation problem is also patchy and inconclusive.

Table 3: Extent of ABC Adoption

	Country	Sample	Industry	ABC adoption rate
Al-Omiri and Drury (2007)	UK	900	Manufacturing & service with a turnover >£50m	29%
Maelah and Ibrahim (2007)	Malaysia	1257	Manufacturing	36%
Kiani and Sangeladji (2003)	USA	Largest 500	Industrial corporations	52%
Krumwiede and Leikam (2002)	USA	44	Non-manufacturing firms	25%
Innes et al. (2000)	UK	Times1000	Manufacturing	19.8%
Chenhall and Langfield-Smith (1998)	Australia	140	Manufacturing firms	56%
Bjørnenak (1997)	Norway	132 largest	Manufacturing	40%
Booth and Giabobbe (1997)	Australia	213	Manufacturing	12%

Conclusions and implications for future research

This paper has discussed issues confronted by firms in allocating overhead costs. It is generally conceded that cost allocations are still largely arbitrary, and management accountants are not confident that the cost information provided to decision-makers is accurate. The fact that most firms set their external prices using cost-based methods (in most cases based on full costs) casts doubt on the precision of external prices. Lack of precision in pricing impinges on the firm's revenue, bottom line and competitive position in the marketplace.

The data reported here suggest that simplistic cost allocation methods prevail among firms, and give no indication that firms plan to tackle the problem. Given the paucity of research into cost allocations, more exploratory research is needed to gain better insight into the problem. Brierley et al., (2001) highlighted two topics ripe for research: how product costs are

calculated and used in decision making, and the way in which overheads are treated in each industry. Research results to date regarding how cost allocation information is used in various managerial decisions are patchy and confusing. Particularly for Australia, knowledge about the proportion of manufacturing overhead in total manufacturing cost is out of date. In addition, there is a need for further research into the treatment of overheads in service industries, which constitute a growing percentage of the gross domestic product of industrialised countries. Despite strong criticisms, reasons behind the continued use of direct labour as a basis for overhead cost allocations should be studied using either in-depth interviews or a case study approach. The literature indicates that the objectives sought for cost allocations need to be explored. Although the introduction of activity-based costing was intended to bring an end to cost allocation problems, its adoption rate [around 15%, according to Innes et al., (2000) and Drury & Tayles (2000)] has remained far below early expectations.

Ideally, future research should also include behavioural implications of cost allocation on divisional manager's performance and motivation. Another fertile area for further research is the examination of the ramifications of distorted cost information on managerial decision-making. Finally, there is a need for a specific investigation of the role of ABC in resolving the cost allocation problem.

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