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Management Accounting
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Operations Management

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ABSTRACT

This monograph introduces Management Accounting to Operations Management researchers and illustrates how unleashing this accounting information perspective into the world of Operations Management can improve our understanding of topics of interest to Operations Management researchers and practitioners. We start by offering a crash course in accounting terminology and then introduce the three important properties of accounting information (i.e. imperfect nature, endogenously determined, and multi-purpose). Next, we address four different areas in Operations Management: capacity acquisition and allocation, inventory management, production scheduling, and product design. For each of these areas, we describe the approaches used in Operations Management and Management Accounting and spend considerable attention on how using an accounting approach can spur progress in Operations Management.
1

Introduction

1.1 Main Objective of this Monograph

This monograph is motivated by our observation of an unfortunate trend of pigeon holing and niche forming in business research. This trend is understandable, because researchers require specialist knowledge and a deep understanding of the literature in their field to execute research projects. However, the trend is also unfortunate, as it limits our academic understanding of business practice, which is much less fragmented. In an, albeit very modest, attempt to counter fragmented thinking in academia, we focus in this monograph on the interface between the fields of Management Accounting and Operations Management, which, in practice aim to work together to create value for the firm. Operations Management consultants incorporate a variety of Management Accounting tools in their work. For example, PWC’s Global Operations Survey (2015) indicates that 61% of operations managers believe cross-functional collaboration has the greatest potential for helping the firm reach its strategic goals. Deloitte’s Operations Transformation group offers services in “Revenue cycle transformation” by working with healthcare providers to help them identify ways to increase their net revenues, accelerate cash flow, and reduce costs and in “Strategic cost
transformation” by focusing on structural, enterprise-wide changes that can produce sustainable cost savings and margin improvements.\(^1\) As a final example, McKinsey’s Operations group works with clients to produce rapid, significant, measurable improvements in productivity, cost, quality, sales and other metrics.\(^2\)

In academia, there is some overlap in the topics that are studied in Management Accounting and Operations Management, but research findings in one discipline seldom find their way into scholarly discussions in the other discipline leading to quite separated academic communities publishing in nearly disjoint sets of journals. For example, Shin et al. (2012) use Management Accounting tools such as Activity-Based Costing to study customer cost-based pricing and take issue with the “whale curve” that depicts customers’ cost to serve – a topic that Management Accounting professors standardly cover in their teachings as best practice. It was accepted to Management Science through the Marketing Department and has, at the time of this manuscript going to print, not been cited in any accounting journal. A similar story is true for Nagar et al. (2009). In this paper, the authors explain that excessive work-in-process inventory – a topic that is extensively discussed in the core Operations Management course when covering modern manufacturing practices – can be suboptimal from a job-scheduling perspective but can be optimal when agency relationships are taken into account. The paper was published in Journal of Accounting Research, which is one of the top journals in the accounting area, but has to date never been cited in any Operations Management journal. It appears Operations Management and Management Accounting academics insufficiently read each other’s work, let alone build on each other’s work to develop a


\(^2\)See https://www.mckinsey.com/business-functions/operations/how-we-help-clients. Of course, in practice, conflicts between “finance and control”, which is the label used in firms for Management Accounting, and “operations” exist. A well-known conflict between “finance and control” and “operations” is the conflict in which the finance manager may want to reduce inventories to increase working capital and free up cash, whereas the operations manager may want to keep customers happy by ensuring that products are always in stock and can be immediately delivered.
stronger interface. As Management Accounting essentially deals with developing information and such information is needed to make operational decisions, Management Accounting and Operations Management are intimately related at a fundamental level, suggesting that combining insights from both disciplines provides interesting opportunities to contribute to research and practice.

Our aim is to introduce Management Accounting to Operations Management researchers and to illustrate how incorporating this accounting information perspective into the world of Operations Management can improve our understanding of topics of interest to Operations Management researchers and practitioners.\(^3\) While Accounting may not be the topic that researchers in Operations Management would ex ante judge to be the most exciting pathway to moving Operations Management forward, we hope that, after reading this piece, they will be convinced the opposite is true and be inspired to build bridges between both areas.

1.2 Accounting as “the Language of Business”

Considering accounting as “the language of business” identifies the following properties:

1. Imperfection
2. Endogenous determination by the object accounting describes
3. Serving multiple purposes
   a. Decision-making
   b. Measuring performance

\(^3\)Since this piece was prepared for the Foundations and Trends in Operations Management series, we focus on how Management Accounting can be useful to Operations Management. Of course, Management Accounting research and practice can also benefit considerably from considering the Operations Management perspective. While we hope Management Accounting researchers too may find some inspiration for doing interdisciplinary work in this manuscript, this alternate direction of cross-fertilization is outside the scope of this paper.
Accounting focuses on providing information for improving, assessing, valuing, and predicting performance of objects such as firms, business units, individuals and business transactions, and is often labeled as “the language of business”. This commonly used metaphor reflects three important properties of accounting information. The first property is the notion that accounting is an imperfect language. Although languages are helpful to describe a certain object, and thus have the potential to improve communication, languages often give an imperfect description of the objects they aim to describe. The imperfect nature of a language becomes salient when you do not find a word or expression in another language with the same meaning and connotation. Usually, accounting describes objects by quantifying them (see Kadous et al., 2005). For instance, accounting assigns numbers to the current value of inventory, the total cost of a product or service, or the performance of a supplier. Despite the numerical nature of accounting, these accounting numbers are, in most cases, an imperfect description of the business transactions. For instance, to support various decisions such as product pricing, product line decisions, capacity planning, and product scheduling, management accountants want to understand how costs behave and how much resources are consumed to produce a product, serve a client, or work together with a supplier. To that end, management accountants develop cost functions, which are mathematical descriptions of how cost changes in volume or in the level of an activity or process that consumes resources (see Labro, 2006). Importantly, the calculated cost of producing a product, serving a client, or working together with a supplier is an approximation of the true cost. This approximation can be inaccurate, not in the least because accounting uses linear cost functions to describe non-linear resource consumption patterns. As another example, firms have to determine the monetary value of their inventory at the end of the fiscal year. The inventory value is typically calculated based on the sum of the previous year’s ending inventory level and production during the year from which sales during the year are subtracted. The value of the inventory is then determined by multiplying the inventory level and the monetary value per unit. The imperfection in the inventory value reported on the balance sheet thus depends on the accuracy of the inventory system (as the inventory system contains information
regarding the inventory level) and the accuracy of the costing system (as the costing system contains information regarding the monetary value per unit). Overall, a first important property of accounting information is that it is imperfect.

The second property of accounting information reflected in the metaphor that “accounting is the language of business” is that the properties of a language are endogenously determined by the objects the language aims to describe. For instance, ancient languages like Greek and Latin cannot describe modern objects such as cell phones and personal computers because these objects did not exist in the ancient times. Applied to a business setting, the structure of the objects (i.e., the business transactions, business units, and firms) that accounting aims to describe, determines the properties of that accounting information. For instance, the accounting information that is reported to an operations manager differs depending on whether the production is organized as a push system or a pull system. In a push system, a metric such as inventory turnover rate will be reported to the operations manager but under a pull system, a metric such as the time between the customer order and delivery will be made available. Also, the accounting information that is collected to evaluate the performance of a business unit depends on the responsibility assigned to the business unit. Specifically, if the business unit has the full responsibility for the different tasks, including pricing of the products and services, more aggregated performance measures such as ‘net profit’ and ‘economic value added’ will be collected. However, if the business unit cannot set prices for the products and services delivered, more disaggregated performance measures such as total production costs, and quality-oriented measures such as the number of defect parts per million will be used (Bouwens and Van Lent, 2007; Ittner and Larcker, 2001).

The third property of accounting information reflected in the language-metaphor is that the properties of a language are determined by the multiple purposes for which the language is used. For instance, the plain version of a language and the dialectic version of a language have different properties because they are used for different purposes. Broadly speaking, accounting information has two broad purposes in modern firms. First, accounting information is expected to enable the
operations manager to make decisions that increase firm value, which is often referred to as the decision-facilitating role of accounting information. For instance, an operations manager decides how often the inventory status should be determined, when a replenishment order should be placed, and what the characteristics of the replenishment order should be. An operations manager also decides on product line design and has an important input during new product development processes. Developing production schedules is another example of a task of an operation manager with a big impact on overall firm value and firm performance. The second purpose of accounting information is to resolve agency conflicts between the owners of the firm (Principal) and the operations manager (Agent) or between the operations manager (Principal) and his subordinates (Agents), which is often referred to as the decision-influencing role of accounting information. Firms can use accounting information to measure performance, provide incentives, and hence influence effort decisions. Because the effort of the Agent, who is assumed to be self-interested, is typically unobservable, he has the opportunity to shirk rather than to put in high effort. However, the Agent can be induced to exert effort in a way that generates value for the firm by designing an appropriate pay structure. The pay structure typically consists of a wage which is a function of an observable outcome that is related to the unobservable effort of the operations manager. Such an observable outcome that proxies for unobservable effort is typically labelled a ‘performance measure’. For instance, product costs can be used to evaluate the performance of the operations manager on the firm’s objective to be cost efficient.

Importantly, the properties of the accounting information depend on whether the purpose of the accounting information is to improve managerial decision-making or to measure and evaluate managerial performance. For instance, when improving decision-making is the main purpose, more disaggregation of the product cost is desirable so that the operations managers can see where the biggest cost reductions can be realized. However, when headquarters wants to evaluate a manager’s contribution to a collaborative effort among the firm’s business units to introduce innovations to its internal supply chain that reduce overall costs, they are better served by an aggregate cost measure at firm
level than by a measure of business unit costs, which does not take the interdependence of the cost reduction effort across business units into account. Overall, the metaphor that “accounting is the language of business” nicely reflects the three important characteristics of accounting information: its imperfect nature, the endogenous determination of its properties, and its multi-purpose nature. In this piece, we will explore how incorporating the three important properties of accounting information can improve our understanding of topics studied in Operations Management.

1.3 Delineating the Monograph’s Objective

As Accounting and Operations Management are broad areas, we have to make choices regarding the sub-areas we want to cover in this paper. The two main sub-areas of accounting are Financial Accounting and Management Accounting. Financial Accounting is concerned with the role of accounting information to improve decisions of external decision-makers such as tax authorities, banks, governments, analysts, and investors or to help these external parties assess the firm’s performance and value. Management Accounting is concerned with the provision of accounting information within the firm to improve decision-making and performance measurement. Overall, Management Accounting information serves to make improved decisions and to measure progress towards the firm’s objectives. Since we believe that there is a more intuitive fit between Operations Management and Management Accounting and since our main expertise lies in the domain of Management Accounting, we have chosen to explore how well-established findings in the area of Management Accounting can enrich our understanding of Operations Management topics. As for the type of Operations Management topics we will study in this paper, we have chosen to focus on decision

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4Tax Accounting and Auditing are outside the scope of this manuscript.
problems that stay within the boundaries of the firm.\textsuperscript{5} Such decision problems include problems related to scheduling, inventory management, new product development, forecasting, work process design, etc. By no means do we aim to be exhaustive in the Operations Management topics covered. Instead, our aim is to provide illustrations that may inspire other researchers to think about further Operations Management applications where the imperfection, endogeneity, and multi-purpose character of information used may shed new light and generate new insights.

This paper is organized into several sections. Before we move to developing the three properties of accounting information previously introduced (imperfection, endogeneity, and multi-purpose character) and provide an overview of Management Accounting research on these properties in Section 3, we first provide a crash course in the Management Accounting terminology on costing systems in Section 2. We warn our readers that particularly Section 3 is fairly long, given the amount of introduction to the Management Accounting literature that is necessary to set you up to do a deep dive in its application to the Operations Management topics. We are grateful for your patience. In Section 4, we will give some excellent examples of studies on the interface between Operations Management and Management Accounting. In Section 5 to 8, we explore 4 areas in Operations Management (i.e. capacity planning and allocation, inventory management, production scheduling, and product design) and provide suggestions on how the use of a Management Accounting perspective can generate new insights that are important for research and practice. Section 9 gives some practical advice on how to set up research projects on the interface between Operations Management and Management Accounting. The last section concludes.

\textsuperscript{5}We do not cover topics related to buyer-supplier relationships and the optimization of the supply chain that span beyond the single firm orientation as there already exists substantive work that examines the usefulness of accounting to study these topics (Anderson and Dekker, 2014).


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