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Excerpt

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PART I



# **Operations within Organisations – Building Blocks**



# What is Operations Management and Why is it Important?

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## Learning objectives

After reading this chapter, you should be able to:

- define the meaning of ‘operations management’
- explain the role of operations management within organisations, including how it relates to other functional areas
- describe the differences and similarities between goods and services, and show how these affect our understanding of operations management
- describe the decisions that fall within the field of operations management;
- discuss the trends that are encouraging organisations to focus on their operations
- trace the historical evolution of the field
- describe typical careers that can be developed within the operations management area.

### Box 1.1: Management challenge: Woolworths Limited

Woolworths Limited is the largest retailer in Australia, collecting about 18 cents in every dollar spent in the retail industry. With a nominal capital of 25,000 pounds (approximately \$A70,000 today), Woolworths opened its first store in Sydney in 1924. The company posted annual revenue of close to \$38 billion, and net operating profit of over \$1 billion in 2006. Along with its flagship Woolworths and Safeway supermarkets (which has close to 40 per cent market share in that

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industry sub-sector), it also owns Dick Smith Electronics, Tandy Electronics, Big W discount store chain, and Dan Murphy's liquor stores, among others. It has also formed alliances with companies such as Caltex to retail petrol. Currently, it operates close to 3,000 stores, petrol stations and hotels in Australia and New Zealand. The company employs more than 140,000 people. It has made massive investments in recent years in new technologies, refreshing its stores and new distribution centres, which are expected to fuel its next decade of competitiveness and operational capacity and capability.

So, how did Woolworths become so successful?

### Introduction

Unlike other functional areas within organisations, many people find it hard to clearly and easily understand what activities come under the field of Operations. Finance, for example, deals with the use (and sometimes abuse) of funds. Marketing is primarily responsible for positioning, pricing, selling and liaison with customers. However, when it comes to Operations, it is not so clear-cut. This is because the word 'operations' is sometimes (wrongly) used interchangeably with 'operational', a word that is the opposite of strategic, and connotes detailed, localised, short-term, day-to-day activities.<sup>1</sup> Further complicating the situation is the use of context dependent labels in place of the generic word. For example, in manufacturing companies, production is frequently used in place of operations; in logistics firms, fleet management is typically used; and in a large restaurant, the title of duty manager is common instead of operations manager.

The purpose of this chapter is to remove the ambiguity associated with the term operations management. First, we explain what it means. In defining the term, we find that it is relevant to explain what role it plays within organisations and how it relates to other functional areas. Further, it is necessary to understand how the definition is affected by the apparent differences and similarities between goods and services. Second, we describe the typical and emergent decisions that fall within the field of operations management. The performance outcomes related to these decisions, in terms of productivity, efficiency and effectiveness, are described. Third, in order to understand the drivers of contemporary practices relating to operations management, it is necessary to have some understanding of how they have evolved over time. As such, a brief history of the field is provided. The chapter concludes with a description of typical career opportunities available to operations management practitioners.

## What is operations management?

Although we may not consciously think about it in these terms, life for most of us without the goods and services we consume would be a lot different to what it is today. Consider these examples. Banks process billions of transactions every year. Telephone companies switch billions of phone calls and data packets around the globe every day. Most of us take the supply of electricity, water and gas for granted most days, but it is worth noting that these utilities are created and supplied to our homes and businesses through massive operations and supply networks. Car companies are able to assemble seven to ten thousand individual parts into a complete car in about four days, and have them rolling off the production line every ninety seconds or so. Government agencies such as Centrelink in Australia make hundreds of thousands of social security benefit payments every week.

How are all these things possible? The answer is quite simple: they all depend ultimately on operations management. The whole built environment and all the services we consume, are deliberately produced, and the design, conduct and continual improvement of these systems of production is the province of operations management. A sound operations management system leads to timely, reliable and accurate provision of goods and services to end-users. In this sense, one could think of operations management as being the productive heart of the organisation.

To define the term operations management, let us consider the two words separately. Operations, at the most general level, are all about the conversion or transformation of inputs into outputs. Inputs can be traditional resources such as labour, equipment, facilities, raw materials, processed components, time, and non-traditional resources in the form of knowledge, skills, customer relationships and reputation.<sup>2</sup> The outputs can be products, services, information and experiences. The transformation of inputs into outputs can be physical conversion or alteration, transportation, storage or inspection when dealing with goods.<sup>3</sup> For services, the change would be more at a personal or even psychological level. From a value perspective, value is created when the value of the outputs is greater than the sum total of the value of inputs.

As for the word 'management', there has been long debate about its meaning. For our purpose, we take the perspective of the functions that managers perform. The five traditional functions that managers perform are planning, organising, coordinating and controlling of resources.

Combining these separate definitions into one, *operations management* can therefore be defined as the *planning, organising, coordinating and controlling of transformation of inputs to outputs*. These aspects can be represented in the form of a simple model as shown in Figure 1.1.

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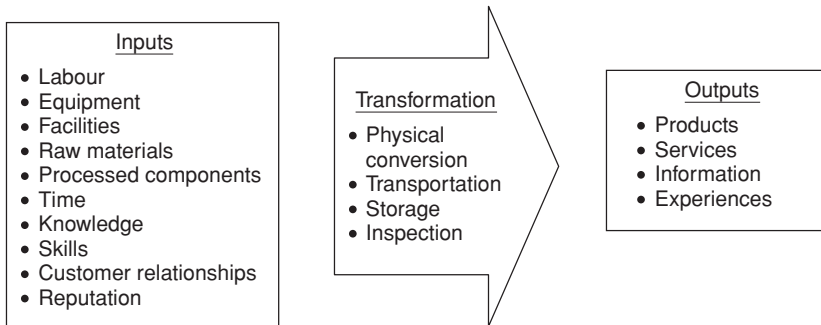


Figure 1.1 Input–transformation–output model

### Box 1.2: Toyota Australia

Toyota Australia produces motor vehicles for domestic and export markets. Its parent company, Toyota Motor Corporation, is the largest automotive company in the world.

The Toyota Group was established in Japan in 1937. It manufactures automobiles in 26 countries and regions throughout the world. Its vehicles are sold in more than 140 countries and regions under the Toyota, Lexus, Daihatsu and Hino brands. It employs more than 260,000 people worldwide, including approximately 4500 people in Australia.

Toyota Australia operates its manufacturing activities in Melbourne and sales and marketing activities in Sydney. Starting with importing Land Cruisers in 1958, it assembled Corona and Corolla in the late 1960s. Toyota Australia began building engines and body panels during 1970s to 1980s. By 2005, Toyota had built 10 million Camrys. The new Aurion is also built locally.

So, how are cars built? An average car consists of anything between seven to ten thousand parts and components. In Toyota Australia's case, some of these are produced in-house, whilst many are made by suppliers. The production rate in Toyota Australia's plant is an average of 400 vehicles each day. It is easy to imagine that chaos would reign if a good system is not present for coordinating the production and receipt of various parts and their subsequent assembly!

Most car companies break the process for building a car into discrete and manageable sections. Toyota Australia's website ([www.toyota.com.au](http://www.toyota.com.au)) provides a summary of each stage of its production process:

- **Building the engine.** The Engine Plant is where the engines for the cars are built. It uses Toyota's latest technology, which enables improved fuel economy, lower emissions and improved performance. This is the first Australian-built engine with an aluminium block using high-pressure die casting. Many of the engine components are also manufactured in-house, including, pistons, cylinder head covers, exhaust manifolds, intake manifolds and bearing caps. Once completed, the engines head straight for the final assembly line.

- Producing body panels and parts. The Press Plant produces steel panels and parts for the cars. The largest press has a stamping force sufficient to produce an entire body side of a car. Having a single panel for the side of the car, from windscreen pillar to tail-light, brings greater strength and quality while reducing weight and manufacturing complexity. The Press Shop also builds a number of small components for Toyota vehicles. The body panels and parts are taken to the neighbouring weld shop.
- Welding the car shell. The welding process is not simply attaching the top, two sides, base, four doors, bonnet and boot lid. The welding to make each car shell involves 250 processes and 526 parts. Robots do 105 of the welding jobs with the remainder being done by some 145 people each of the two shifts per day. Maintenance of the welding equipment is carried out by 38 people. The shell or body of the car then moves to the neighbouring paint shop.
- Painting. Employees wearing lint-free overalls are air-scrubbed before entering the dust-free world of the paint shop. The car shells are immersed in water with cleaning fluids, in a phosphate dip to prepare the metal to accept the paint, and in the rust-proofing fluid. A spray bell turning at 35,000 revolutions per minute then applies the primer and two coats of water-based paint with a fine mist. The painted car shells are moved to the neighbouring assembly shop.
- Assembling. The painted car shells wind their way through seven assembly lines of about 250 metres each, travelling at a similar pace to a car in a car wash facility. Bumper bars, door trims, fuel tanks and trim fabrications, produced at another plant, are brought to the main plant for assembly of the vehicles. Within three hours, the car goes from a shell to a fully-tested finished product driven out of the assembly shop. Of the 182 functions, robots only perform the engine chassis and tyre fitments. One of the last functions before testing is reuniting each car with its doors.
- Although profitability data is unreliable, there is little doubt that Toyota Australia is by far the most profitable and successful automotive producer in the country. Consider the following:
  - In 2006, it produced more than 111,000 vehicles in a plant that was built for a capacity of 100,000 vehicles per year.
  - Nearly three quarters of the total production were exported.
  - The Australian produced vehicles are some of the highest quality vehicles in comparison to those produced in other Toyota factories around the world, including Japan (personal communication).
  - The three other local manufacturers (GM Holden, Ford and Mitsubishi) have seen rapidly declining market share in the last few years. This has led to financial stress and consequent plant closures and layoff of employees. Only Toyota has been able to increase its market share relative to others.

The natural question that emerges is: How has Toyota Australia managed to achieve such success when its competitors are struggling?

There is no doubt that the key factor for this outcome is the overall philosophy under which all parts of Toyota globally operate under. Known as the Toyota

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Production System, or TPS for short, it defines how Toyota employees conduct themselves, how work is designed and executed, how Toyota relates to suppliers, etc. Many of the buzzwords in the operations management area such as ‘lean operations’, ‘just-in-time’ (JIT), ‘kaizen’ (continuous improvement), etc., were initially developed under the aegis of TPS. The key elements of TPS are discussed in detail in Chapter 2 and elsewhere in this book, so a full exposition on these will not be provided here.

Another factor that has contributed to the success of Toyota Australia is its heavy investment in plant and equipment. Since 2004, it has spent more than \$800 million in Australian manufacturing facilities. This is at a time when many manufacturers are relocating to countries considered to be cheaper for production.

*Source*  
[www.toyota.com.au](http://www.toyota.com.au)

### Role of operations management in organisations

The above definition of operations management covers all aspects of an organisation that is involved in the creation and delivery of products and services to customers. As such, operations management plays a critical role in the success of organisations. The exact role of operations management can be viewed from multiple perspectives. One could look at it as a standalone unitary function within an organisation. It is also possible to look at operations management as it is practiced across all functional areas in the organisation. Further still, since outside parties such as suppliers and customers are inherently involved, there is a logical reason to view operations management from this extended perspective that is described as supply chain management. Aside from the functional role, operations management can be analysed for the strategic role it plays in organisations. In this section, all these roles are described.

### Operations management as a standalone function

At the most basic level, operations is frequently seen as a distinct functional area alongside other key areas such as finance and marketing. In this context, the role of the operations management function is limited to simply producing goods and services.

As examples: in manufacturing firms, the operations area would be dealing with the production and assembly tasks that takes place on the factory-floor; in the school education context, operations is what happens in the classroom; in the hospital, operations would be what happens in the surgical theatres and wards; and in the hospitality industry, operations is about what happens

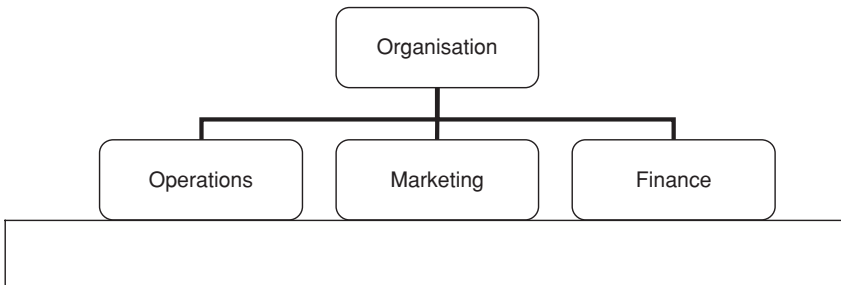


Figure 1.2 Operations–finance–marketing functions existing alone

in the kitchens and bars. Figure 1.2 provides a general description of this view of operations management.

The standalone approach to operations management has many weaknesses. Many organisations that face stiff competition in their industries find that this structure makes them slow, cumbersome, bureaucratic, and generally unresponsive to customers. These organisations have largely abandoned this form of organisational structure in favour of one where there is a high level of inter-functional interaction. A strong feature of these organisations is the presence of teams in which members are drawn from different functional groups. This approach has proven to be a boon particularly at the design stage of new products. For example, Japanese car manufacturers have used this approach to design totally new cars and associated production facilities in less than eighteen months. Their competitors, who have long used the sequential approach to design, which used to take at least three years, have only now caught up with modern practices.

### Operations management as a ubiquitous function

As opposed to a separate function, it is possible to view operations management as a ubiquitous concept that has a pervasive presence and permeates all aspects of the organisation. For example, operations management in a hospital would involve determining the size of the facility, deciding which types and quantities of equipment to acquire, arranging these facilities and equipments so the hospital is run efficiently, determining staffing levels and schedules to provide quality care, managing inventories of food and bedding, all in addition to the activities that clinical and medical work that takes place in the theatres and wards.

When viewed from this wider perspective, it is evident that operations are not confined to a specific area. The broader role can be difficult to deal with as the traditional functional boundaries are blurred, and members of the organisation need to develop strong understanding of what happens within



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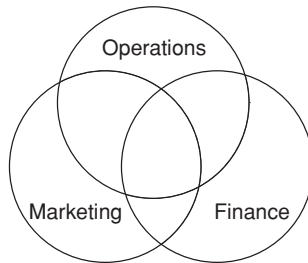
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Figure 1.3 Overlapping roles for operations, marketing and finance functions

other functional groups as well as their own. Further, all functional groups need to be able to practise effective operations management. Figure 1.3 represents this view of operations management and shows the strong overlapping of functions, with operations management acting as the foundation upon which all other functions have an input.

### Operations management within supply chains and networks

As competition in many industries has intensified, many firms have responded by attempting to develop stronger and deeper relationships with their key trading partners. This is an attempt to share market intelligence, collaborative arrangements for product development, and facilitate transactions efficiently. The idea is to ultimately develop seamless streams across the full length of supply chains so that final end-users of goods and services receive them in a timely fashion. (More about this perspective in Chapter 7.)

The entities exchanged between trading partners in supply chains and networks include physical goods, information and funds. If the operations management functions of the individual firms within the chains and the networks are not effectively integrated with others, then the transfer of these entities between the partners is not smooth. As a result, the experience of the final customers suffers and can be unsatisfactory. This adversely affects the performance of all members of the supply chain or network.

### Operations management from a strategic perspective

Does operations management have a strategic role in organisations? If an organisation believes that the efficient and timely delivery of quality products or services to their customers leads them to generate profits, which then leads

to them developing a sustainable competitive advantage over their rivals, then the answer to the question is an emphatic ‘yes’.

Operations strategy involves firms competing with others along several dimensions. These include competition based on price, focus on quality, speed of delivery, dependability, flexibility and innovation. The conventional view has been that organisations need to choose one of these dimensions because there are mutually exclusive of each other. However, many firms, particularly Japanese multi-national corporations, have shown that it is possible to compete successfully along multiple dimensions. (More about Operations Strategy in Chapter 5.)

Whichever option is chosen, it is clear that all dimensions of competition require an operations management focus. For example, price based competition involves strong cost minimisation efforts. It has been estimated that on average, more than half of all workers in a typical organisation are involved in the operations function, and over three-fourths of a typical organisation’s material and equipment costs are incurred by the operations function.<sup>4</sup> This means that relatively small reductions in operations costs (say one to two percent) can produce large increase in net profit (in the order of five to twenty percent). Likewise, improvements in quality, speed of delivery, flexibility and innovation all require adjustments to the way the operations function is carried out.

### **An operational perspective**

While operations management has a strong long-term strategic role to play in organisations, it has an equally strong short-term, daily operational role as well. A large part of operations management deals with the planning, organising, controlling, leading and monitoring of day-to-day use of resources. Somebody has to run and oversee the daily activities of the organisation’s production of its goods and services, and this is indeed a key part of operations management.

In support of these operational activities, a plethora of tools and techniques have been developed over time to assist in the detailed and localised decision-making and management processes. Many of these are quantitative models, whilst others are more conceptual in nature. Many of these are discussed throughout this book.

### **Integrated role of operations management**

The above points make clear that the role of operations management can vary depending on how organisations view it, and decide to use it. These multiple roles can be classed into two general categories. The first category involves a functional view, consisting of a continuum that has the standalone, ubiquitous and supply chain perspectives involved. The second category involves