

# Instructor's Manual

## Operations Management

**Eighth edition**

**Nigel Slack  
Alistair Brandon-Jones**

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# **Operations Management**

## **Eighth Edition**

**Nigel Slack, Alistair Brandon-Jones and Robert  
Johnston**

### **Instructor's manual**

This Instructors' Manual has two parts.

- Part One provides Teaching Guides, giving an introduction to the topic, key teaching objectives, together with some teaching tips and exercises for each chapter.
- Part Two gives Teaching Notes for each of the 'end of chapter' cases for each chapter.

Also available are PowerPoint slide decks: one for each chapter and one for each of the 'end of chapter' cases.

## Structure of the Eighth Edition

The structure of the Eighth Edition of this book is different from previous Editions. To help understand the changes, the table below indicates how chapters in this edition relate to previous ones.

Chapters in the Eighth Edition		Chapters in the previous Editions
1 Operations management	←	1 Operations management
2 Operations performance	←	2 Operations performance
3 Operations strategy	←	3 Operations strategy
4 Product and service innovation	←	4 Process design
5 The structure and scope of operations	←	5 Innovation and design in products and services
6 Process design	←	6 Supply network design
7 Layout and flow	←	7 Layout and flow
8 Process technology	←	8 Process technology
9 People in operations	←	9 People, jobs and organization
10 Planning and control	←	10 The nature of planning and control
11 Capacity management	←	11 Capacity management
12 Supply chain management	←	12 Inventory management
13 Inventory management	←	13 Supply chain management
14 Planning and control systems	←	14 Enterprise resource planning
15 Lean operations	←	15 Lean synchronization
16 Operations improvement	←	16 Project management
17 Quality management	←	17 Quality management
18 Managing risk and recovery	←	18 Operations improvement
19 Project management	←	19 Risk management
	←	20 Organizing for improvement
CSR distributed to all chapters	←	21 Operations and corporate social responsibility

## Part One

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# Teaching guides

## Starting out

In teaching, how you choose to present your material will shape your students' whole view of Operations Management (OM). In particular, how you choose to start a module (course, programme, set of sessions, etc.) will set the scene for everything else you do. That is why the first session of any course is important. It establishes the 'feeling' of the course; it sets students' expectations and it defines the scope of what's to come in subsequent sessions. So how should you start? Well the first rule is, 'don't try to be something that you aren't'. Your personal style of teaching is yours; don't try to copy someone else's style. The front of the class is an exposing place – students can see when you are pretending. But (and it's a big but), irrespective of your personal style, there are some things that I believe (remember this is a personal view) need to be established right at the beginning of a course. They are:

- Operations management is *relevant to you*.
- Operations management is *important generally*.
- Operations management is *exciting*.

How you convince students that OM is relevant, important and exciting will depend on a number of things, the formal objectives of the programme, the position of the course within the programme, what personally motivates you as a teacher, and so on. But, for me, the key factor is how much experience of business life the students have. The table summarizes how I see the experience of students influencing how we can convey a sense of relevance, importance and excitement.

## Relevance

Relevance means selecting ideas and using examples that have evident meaning to students and communicating the ideas in an engaging way. Select ideas and examples that have meaning because they cover the issues that students recognize from their own experience and they are set in contexts that are familiar to them. So, for example, undergraduate students may have some experience of working in operations processes through vacation work or formal internships, but many will not. This does not mean that they don't have experience of OM processes – they do – but their experience will probably be as a customer – as someone being processed, rather than someone doing the processing. There are three implications of this. First, the topics to cover should be operational, process level – ones rather than the more strategic ones. For example, how are all processes similar at a high level? What are processes transforming? How are they different? What are their objectives?

Degree of work experience	Relevance – <i>it means something for me</i>	Importance – <i>it has value generally</i>	Interest – <i>it involves me</i>
Relatively little – e.g. undergraduate students.	<b>What</b> – operational, process level content. <b>Examples</b> – processes where they are customers. <b>Style</b> – 1 paragraph local cases and 2 minute video clips of local queues.	Consequences of operations success and failure focus on what they can see are obviously important. For example, disaster response supply chains, poor or good University processes.	Quirky/unusual examples.  Exploit feelings as customers, what infuriates you? What delights you?
	↓	↓	↓
Experienced – e.g. Executive MBA students.	<b>What</b> – Introductory models, but move quickly on to the strategic. <b>Examples</b> – A wide range of sectors. <b>Style</b> – Topical examples from business/financial press.	Again, the consequences of operations success and failure ('OM can make or break your business!'). Distinguish between operations that are 'different' and those that are 'better'.	Quirky/unusual also works for experienced students.  Emphasise the challenges facing operations managers.

Second, the examples should be based on processes that the students have actually experienced, probably as customers. Avoid 'widget manufacturing' examples (at best theoretical and dull, at worst mystifying and dull) they will mean nothing to most undergraduates. And anyway, the world is not short of good relevant examples of processes they are familiar with. Third, teaching needs to move from example to theory, not the other way round. This will demonstrate that the standard OM models are not separate from their experiences, but are actually a way of explaining experience.

With experienced students such as an executive MBA class, the problem is the same but the solution very different. Here the big issue is likely to be that many of the class will think of OM as being of real relevance only to those actually working in the operations function. The challenge is to establish the difference between operations as an activity and operations as a function. (Corny trick but it works – ask the class – 'who works in operations?' a few students raise their hands, ask 'who has internal or external customers?' most/all raise their hands, ask 'who uses resources to create value for the firm?' everyone raises their hands, ask again, 'OK who now works in operations?') Again, the introductory models are appropriate, but I find it useful to move quickly on to the strategic consequences of good OM such as low costs, secured revenue, more effective fixed and working capital, lower risks and enhanced capabilities. Illustrate this with examples from as wide a range of industries as possible, always starting with an accessible service example (I use parcel delivery services such as TNT), but including the sectors represented in the class. This is where the business/financial press is useful. There are always plenty of examples relating to OM in the Financial Times or the Economist. With experienced students you really do have to go beyond the conventional narrow boundaries of OM if you want to set the subject in a strategic context.

## **Importance**

Convincing students of the importance of OM means that you have to establish its value to any type of enterprise. For experienced or inexperienced students this requires exploring the consequences of operations success and failure. Again focus on what students will clearly recognize as obviously important. Inexperienced students may not fully understand how good or bad OM affects business, but they do have an intuitive grasp of the importance of how one organizes, for example, disaster response supply chains, healthcare processes and high-profile (banking?) failures. They fully understand good and bad University processes. Ask *'what would happen if we lost your exam scripts?'*; *'how would it help if we returned your assignment feedback in half the time?'*; *'how could we do this?'* and so on. The same principle applies to experienced students – what are the consequences of operations' success and failure? I use the slightly dramatic headline; 'Operations Management can make or break your business!' Again, use examples of enterprises with reputedly good or bad operations. However, with experienced students I think it is useful to distinguish between successful operations that are 'different' from those of competitors (e.g. Amazon, Zara and IKEA) and those that are broadly similar but they are organized 'better' (e.g. Toyota, Four Seasons). Relate this idea to their own organizations. Ask *'are you going to improve by being different (to competitors), or being better?'* This can move on to a discussion of different philosophies of improvement.

## **Interest**

Unless you are personally excited by, interested in and enthusiastic about OM, your students won't be. If you can't be passionate about the subject, go find another subject or job that you can work up some enthusiasm for. As far as your students are concerned, the key task is to get them to feel involved and/or engaged by the subject, and the good news is that students' expectations are in our favour. By that I mean that their expectations are often low. They can associate the subject with mathematical modelling in technical manufacturing companies. There is nothing wrong with mathematical modelling or technical manufacturing of course... eventually. But for most students starting there is a mistake. Instead, use interesting, unusual, even quirky examples. I find that the types of examples that excite students are broadly the same whether they are inexperienced or experienced. Disney World, 'Square watermelons', IKEA, Amazon and Zara, are all favourites (just google them, or better, buy the book, OK). Single slides or a short YouTube clip are great for making what my fellow author, Alistair Brandon-Jones of University of Bath, calls 'hooks'. But in the first session I try as many relatively short examples as will fit. The objective is to demonstrate scope and interest, and not depth that comes in later sessions.

The other aspect of generating interest does depend on students' experience; it is to face them with the challenges of being a good operations manager. With inexperienced students you can exploit their feelings as customers of common processes. Ask, 'as a customer of [insert service] what infuriates you? What delights you? Move them to ask 'why is it like this?' 'Is it deliberately design like that or did the operation make a mistake?' With more experienced students you can emphasise the challenges facing Operations managers. Ask *'how do you balance your responsibilities to owners, customers, the environment, supplier and staff?'* *'What technology changes will have implications for how operations are managed in your company?'*



# Operations management

## 1.1 Introduction

Teaching the material in Chapter 1 of the book is both the most important and the most difficult part of teaching an operations management course. Most important because it is vital that students develop an enthusiasm for the subject and this is best attempted early in the course. Difficult because one has to establish some key principles before the ‘building blocks’ of the subject have been taught. We have found it useful always to work from whatever experience the students have. For post-experience students like MBAs this is not difficult. One can always ask them to describe the nature of operations in the companies they have worked for. One can even explore some of the prejudices they might hold about operations management (dull, obstructive, always screwing things up, etc.) and base discussions on that. Undergraduates are more difficult because they usually have less experience, but even so they have experienced many different operations from a customer’s point of view. Therefore one can ask them about recent experiences as a customer (both good and bad) and base a discussion on the importance of operations management around those experiences.

### **Key teaching objectives**

- To enthuse students with the ‘hands-on’ excitement that can be gained from an understanding of operations management (*‘... I want to prevent you ever enjoying a theatre performance, restaurant meal, or shopping experience ever again. I want you continually to be looking for the operations implications of every operation you enter. You are going to be turned into sad people who cannot go anywhere without thinking of how you could improve the process’*).
- To convince students that **all** organizations really do have an operations function, therefore operations management is relevant to every organization.
- To convince students that **all** managers are operations managers because all managers manage processes to produce outputs. (*‘Even marketing managers are operations managers. What you learn as marketing in business school is really the “technical” side of marketing. Of course this is important, but marketing managers also have to produce marketing reports and information, without mistakes in them, on time, relatively quickly, flexibly enough to contain the latest information, and without using an army of marketing analysts to do so. In other words, they are producing services for internal customers’*).
- To introduce some key ideas in the chapter, namely,
  - Operations managers manage transformation processes, with inputs and outputs.
  - Operations can be analysed at three levels; the level of the supply network, the level of the operation itself (sometimes called the level of the organization) and the level of individual processes.

- Operations differ in terms of their volume, variety, variation and visibility (the four Vs).
- Operations managers engage in a set of activities, devising operations strategy, designing operations, planning and controlling operations and improving operations.

## 1.2 Exercises/discussion points

There are many cases and exercises which one could use to introduce operations management. You might like to try some of these ideas, all of which we have used.

**Exercise** – A useful exercise for demonstrating the ubiquitous nature of operations is to ask the class to identify every service they have encountered from waking up in the morning through to going to bed at night. The radio alarm which wakes them up depends on the operations of the radio station. The water in which they wash (presumably) was delivered by a water utility. The public transport operation transported them to college, etc. through to the bar, or other place of entertainment that they end the day with.

**Teaching tip** – YouTube is a hugely valuable resource for finding videos of operations that can form the basis of class discussion. Many television programmes also can be recorded off-air which illustrate operations. Looking ‘behind the scenes’ of well-known operations such as airports, is a favourite topic for TV producers. Any of these could be used to promote group discussions on what operations management might be like in such operations.

**Exercise** – The four Vs’ dimensions of operations can be used for many types of exercise. For example, one could ask different groups to identify different types of restaurant, food retailer, car servicing operation, cinema, club or pub, etc. and plot the ‘similar but different’ operations on the four dimensions.

**Exercise** – For residential courses, especially of post-experience students, an evening could be spent ‘on the town’, where syndicates are required to sample the services of a restaurant, a retail operation, and an entertainment operation, and report back the following morning. This is a great way of giving participants a change of scene on the Thursday of a one-week course.

**Teaching tip** – Remember ‘role-play’ can be used effectively in an introductory session. The lecturers can role play two operations managers managing separate similar but different operations. For example, the chief tailor of a ‘fashion label’ custom tailor and the production manager at a mass-produced ‘off-the-peg’ garment factory manager. The differences in the types of resource (people and equipment), the operation’s objectives, the four Vs, etc. can all be emphasised during the role play.

**Teaching tip** – ‘Role-play’ can also be used with a standard case study. For example, the Concept Design Services case at the end of Chapter 1 lends itself to role playing the operations manager and marketing director of the company, in order to illustrate their different perspectives.

**Exercise** – All the chapters have ‘Operations in practice’ examples. It is often a good idea to ask the students to read through these examples and then use it to promote a discussion on the topic. In this chapter, LEGO is described.

**Exercise** – Choose examples of operations that most students will know (e.g. IKEA) and devise simple questions that can be used to demonstrate the role of operations. The following could be used to prompt discussion of IKEA.

1. Did either of this company simply conform to the conventional operations model in their sectors or did they devise something new?
2. What did this company do differently from previous furniture retailers?
3. Why do you think they decided to be different from other companies in their sector in the way they manage their operations?
4. What advantages did making these changes give them?

**How is the IKEA operations design different from that of most furniture retail operations?**

- Although some furniture retailers do have large ‘out of town’ operations many use premises within town or shopping malls. IKEA’s operations are very large and purpose built. They feature very large car parks and are located close to major motorway intersections. In fact, everything about the design of IKEA’s operations encourages high volume of throughput. This high volume means that many of the fixed costs of running the IKEA operation such as local taxes, administrative costs and some energy costs are spread over a high volume of individual sales transactions. This reduces the overall cost of making a sale, part of IKEA’s strategy of offering good value for money. The variety of **products** sold in IKEA store is relatively large compared with many furniture retail operations. For example, it includes small items such as glassware and kitchenware as well as very large items such as sofas, tables and shelving systems. Modular design of some products such as shelving systems allows variety to be extended even further from a few basic component parts. These components can be assembled together (by the customers) in different ways to offer an almost infinite variety of combinations. However, as far as the variety of **service** is concerned, it is relatively narrow. Most products are sold in cartons, customers are left to make decisions by themselves without interference from sales staff (though advice is available if requested) and even when ordering special products the order is taken down by staff in a standardised form. The check-out operation, where customers pay for the goods, is also highly standardised with everyone going through exactly the same sequence of activities. Even delivery to the customers’ home is largely a matter of the customer carrying the goods themselves in their own cars (though a delivery service is also available). As far as demand variation is concerned, weekends and public holidays are much busier than working week days, therefore variation is relatively high. However, from IKEA’s experience, demand is relatively predictable. Because of this predictability they can plan to have more staff available at busy periods. However, also because customers are encouraged to perform much of the service themselves, the need to fluctuate staff is less than it would be in a conventional store. Also in conventional stores, because of the high level of expertise and customer contact required, it is much more difficult to obtain the services of part-time staff during peak demands. The relatively standardised and simplified service given by IKEA makes it easier to scheduled part-time staff in busy periods. Finally, customer contact is, in some parts of the operation, high, but overall it is lower than most furniture retail operations. Consider, customers are responsible for choosing which types of furniture they require, working out whether this furniture would fit together in their own home (special sheets and tape measures are provided by IKEA to help customers do this), filling in order forms when special furniture has to be delivered, serving themselves to

smaller items into trolleys, entering the warehouse area and picking out from the warehouse shelves the cartoned larger items, transporting the goods through to the checkout, and finally loading the goods on to their own car. Most of this occurs with very little customer contact. In many instances, the only point at which interaction takes place between customer and service staff is at the point of payment. In effect the customer is 'trained' to perform much of the value adding part of the service themselves. Clearly this cuts down the costs of the transaction as far as IKEA is concerned. These savings can then be passed on to the customer.

**What do you think might be the major problems in running an operation like IKEA?**

- The dependency on a high degree of customer participation has some advantages but it also may have some drawbacks. Customers need to be 'trained' by clear use of signing, by instructions within the brochures and catalogues and by observing other customers' behaviour. Furthermore, the store needs to be laid out such that it is difficult for customers to deviate from the standard route through the store to the checkout. However, some customers may not behave in the prescribed manner and staff will need to be able to cope with these exceptions. If this customers training is not well handled, several difficulties can arise. For example, customers may pick up goods from shelves or the warehouse, change their mind and then leave them around the store in unsafe positions. Alternatively, if customers are puzzled by the nature of the operation they will need tactful help from customer contact staff. The other major problem facing the store would probably be stock availability. The system works best when all items requested by customers are in fact in stock. Out-of-stock items not only disappoint the customer but cause extra cost in terms of administration and ordering. This is an especial problem in modular-based products such as shelving systems. If one particular module is not available it could impact on a large proportion of the customers who want to purchase some combination of modules.

**What do you identify as the 'operations function' within IKEA? How is this different from the 'sales function'?**

- The overall macro operations at IKEA is concerned with serving customers with their required furniture products. In this sense, it is a customer processing operation. However, to achieve this there are in effect two parallel sets of micro operations. The first one deals with the flow of customers such as the show room, the child-minding facility, the checkout operation and so on. The second set of operations is concerned with material flow. These are things such as the goods inwards receiving operation, the warehouse operation and the shelf-stocking operation for the smaller items. In effect these two sets of micro operations are arranged so that products are 'assembled' to the customers (or look at another way, the customers assemble themselves to the products!). It becomes clear that practically everybody within the store is concerned in some way with one of these two sets of micro operations, either transforming customers or transforming material. This means that the operation of 'making the sale' and therefore 'satisfying customers', although sales activities, are in fact the heart of the operation itself. In contrast, the marketing operation is concerned with the technical decisions of pricing, promotion and product selection. These decisions are probably taken at a regional headquarters (which are information processing operations in effect).

**Teaching tip** – It is always worth illustrating the ideas in operations and process management with reference to not-for-profit organizations. Charities, local government organizations and particularly health care services (although some of these are private) provide a wealth of examples. For example, try asking the students to contrast an accident and emergency (A&E)

department of a hospital with a unit that specializes in cosmetic surgery. The former has to cope with very high variety, high variation and high visibility. Demand is relatively unpredictable and it must provide fast and responsive service (relatively at least, it would be measured in minutes and hours rather than weeks and months). The cosmetic surgery unit by contrast, may still have high variety but, because patients are more able to wait, it is unlikely to have very high variation. Because of this, the process can be planned and scheduled in advance so there will be far higher utilization of the process's resources.

**Exercise** – The Pret A Manger Operations in practice example also makes a good exercise.

### **Suggested questions...**

1. What are the advantages and disadvantages of Pret A Manger organizing itself so that the individual shops make the sandwiches that they sell?
2. How can effective operations management at Pret A Manger contribute significantly to its success? And what would the consequences of poor operations management be in this kind of organization?

### **What are the advantages and disadvantages of Pret A Manger organizing itself so that the individual shops make the sandwiches that they sell?**

There are a number of advantages in this type of organization.

- The load on the staff in the shop is equalized throughout the day. The demand from customers for purchasing the sandwiches occurs mainly in the middle of the day. If the staff only sold sandwiches, they would be busy in the middle part of the day and unoccupied at other times. The way Pret A Manger organize their processes, the staff can occupy themselves making sandwiches in the early part of the day, then, as the day progresses, staff will progressively move from making to selling. As demand then reduces towards the end of the day, staff will move onto general cleaning and tidying activities as well as making ready for the same cycle of activities to repeat itself the next day.
- There is clear and direct responsibility for quality, customer service and cost. If there are any problems with quality and availability of sandwiches, it is the same staff that caused the problems who receive customer complaints. (In fact, Pret A Manger get the very complaints.) Similarly, the effectiveness of cost control can be clearly associated with the staff in the shop.
- It is a more interesting job that has a number of different activities (making, selling, cleaning, etc.) than one where an individual will specialize in just one of these tasks.
- It is easier to engender a sense of pride in the high quality and wholesome nature of the products when they are made on the premises.
- It should be pointed out that there also disadvantages. The main one is that the cost of making sandwiches in a sandwich factory (the way the vast majority of sandwiches are made) is very significantly cheaper because of the higher volume.

**How can effective operations management at Pret A Manger contribute significantly to its success? And what would the consequences of poor operations management be in this kind of organization?**

- By developing a culture within each store that takes pride in the products themselves, the way they are made and the way customers are served.
- By listening to customers so that customers' reactions and comments can inform the design of new products.
- By not wasting materials through poor control which would increase the cost of running the operation.
- By developing a sense of fun as well as a sense of commitment in staff so that customers sense a friendly and relaxed atmosphere.