

Operations & Supply Chain Management in Service Organizations

Ed Weenk (2019, rev. 2023)

OPS & SCM in Service Organizations¹

Introduction

Operations Management and particularly Supply Chain Management courses (OPS & SCM) typically have their main focus on the flow of materials, information and money. This means that the prime object of study normally are companies involved in some way or another with the sourcing, manufacturing and/or distribution of physical goods.

A question I receive very often from participants in those courses is if the concepts we discuss in the OPS & SCM courses can also be applied to organizations which are not so much centered around physical products, but in some way or another around the provision of services or digital products.

Quite an understandable question, since nowadays many people work in service-oriented organizations, be it in the commercial world (specialized clinics, online banking, leisure & tourism, consultancies), in governmental organizations (tax office, town hall, police, fire brigade), in not-for-profits (NGO's, public schools, public hospitals), or in the production of digital products (apps, websites, streaming, gaming).

Although this Technical Note doesn't pretend to give an extensive or complete overview of the latest state of knowledge and experience in service management, nor replace specific text-books on the topic, its main objective is to link a number of those general physical product oriented OPS & SCM concepts to the world of service organizations, as well as address some of the peculiarities of service management. Thus, it aims at providing the reader with a basic understanding of Operations in service-oriented organizations and in organization focused on digital products.

To create a point of reference, we first introduce a basic framework for OPS & SCM. Then we elaborate on the reasons for increased importance for service operations and on the conceptual differences between pure-product and pure-service organizations. These provide an overview of the **what**-side of the story (products, value propositions).

Then, we will look at the implications for the **how**-side, of an organization's internal operations.

A number of references are made to specific readings from the Service Management domain, of which an overview can be found at the end of this document.

¹ *This technical note was written by Ed Weenk EngD, as a complement to basic texts about Operations and Supply Chain Management and to link towards the operational side of Service Organizations.*

The 2023 revision includes an increased emphasis on the blurring lines between pure product-oriented and pure service-oriented organizations, the blurring between physical and virtual, and some more depth in the aspect of 'customer participation'.

OPS & SCM basic frameworks and how they apply to service-organizations

Typically, the main starting point for any of the OPS & SCM courses I deliver is the following:

“Everyone knows: *what* you promise, you must do!

But *how* do you do this?”

The reason to start here is to create awareness of the fact that in order to be able to **deliver** on my **promises** and to develop a solid solution for my operations and/or supply chain (the “**how?**”), I need to have a very good and clear understanding of what it is supposed to deliver in terms of products and services (the “**what?**”). This understanding would ultimately lead to identification of the relevant characteristics in terms of **demand**, as well as of the **supply** required to meet that demand (Figure 1).

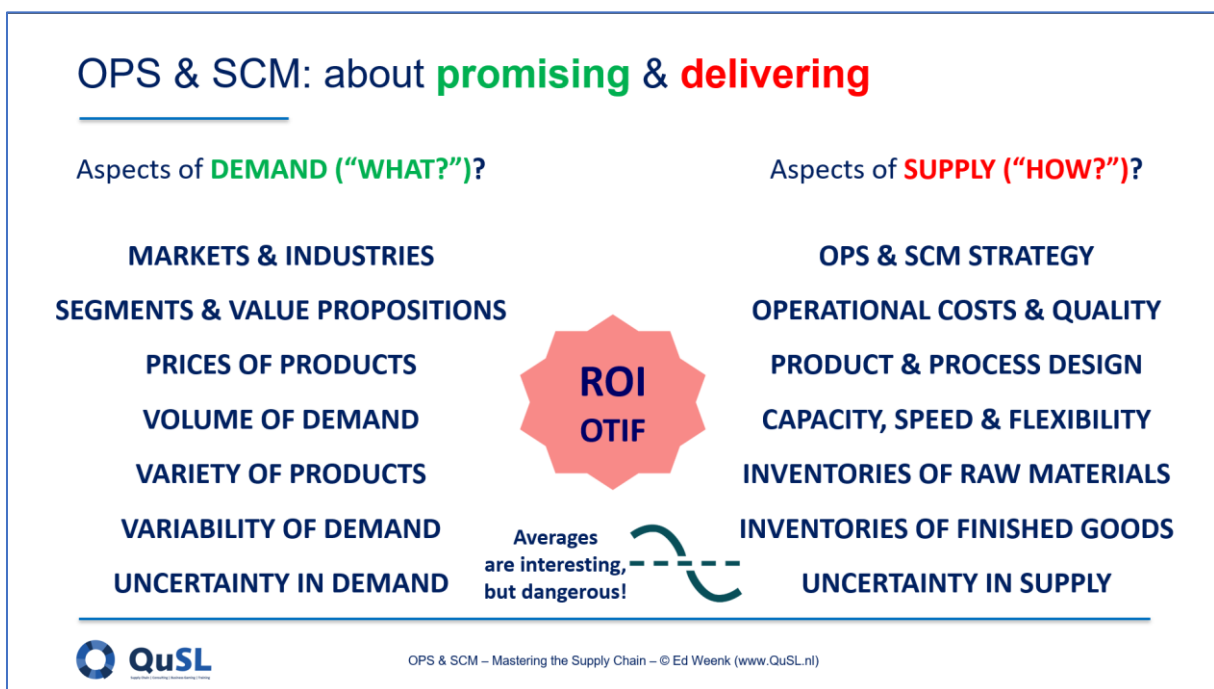


Figure 1 : most relevant characteristics of **WHAT?** and **HOW?**

Following the integral (M)PCIO framework of Visser & Van Goor (2010), the major conceptual building blocks that make up this **how?**-side, are (Figure 2):

- *Physical Infrastructure*, addressing product characteristics, manufacturing process types, manufacturing technology and capacity, distribution and logistics facilities, make or buy;
- *Planning & Control*, addressing the relevant decision making processes, such as forecasting, capacity planning, production planning & scheduling, production & quality control, inventory management;

- *Information & Systems*, addressing the information needs and corresponding system requirements in order to properly support the decision making processes;
- *Organization*, addressing which kind of organizational setup fits best with the design of the previous elements.

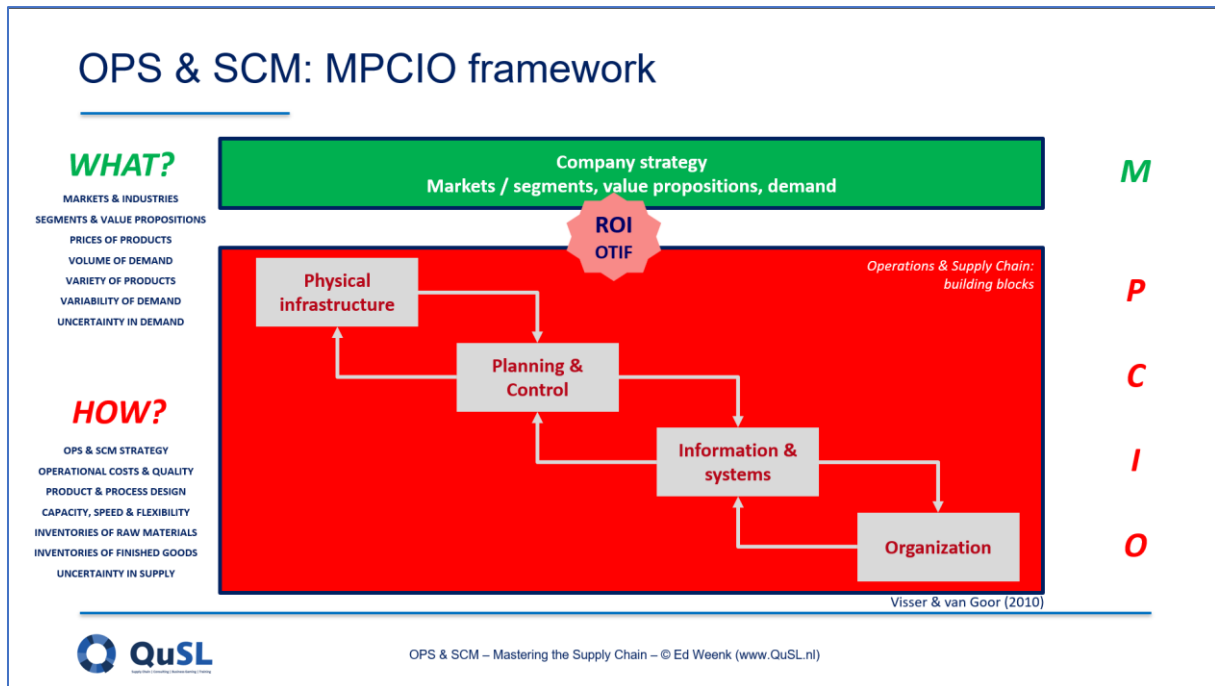


Figure 2 : Integral (M)PCIO framework (after Visser & Van Goor, 2010)

Whereas the original framework was developed for organizations with a clear focus on physical products, in this Technical Note, we will elaborate on how these abovementioned aspects of *what?* and *how?* play out when looking at service-oriented organizations as well as organizations focusing on digital products.

But let’s first take a quick look at why there is an increased attention for service operations and digital products.

Background: increased attention for service-oriented operations

Apart from classical and more obvious service operations, such as hotels, restaurants or banks, there are at least three major trends which are causing the trend towards more attention for service-oriented operations, stretching well into traditional product-oriented operations. However different, there are clear connections between the three trends, in a way that they reinforce each other:

- The market trend towards **convenience**: customers are looking more and more for a hassle-free or ‘friction-less’ experience throughout the entire purchase-to-use cycle and beyond

(hassle-free access, hassle-free purchase, hassle-free delivery, hassle-free use, hassle-free disposal, and so on);

- The business trend towards **servitization**: partly in response to the trend towards convenience, for example, we can see the emergence of ‘*product-as-service (PaaS)*’ concepts, where the customer focus shifts from ownership to the actual use (for example through revenue models such as leasing, subscriptions, pay-per-use);
- The technology-driven trend towards **digitization**: proliferation of new technologies on the one hand leads for example to digital versions of formerly exclusively physical products (digital newspapers, digital showrooms, digital art galleries & exhibitions, streaming of music), but on the other hand these technologies also provide more and more enablers to support the trends towards convenience and servitization (e.g., one-click apps for shopping, timeslot booking, delivery tracking).

As said, these three trends can nowadays hardly be seen as independent from each other anymore and at the same time they lead to more and more blurring lines between the pure product-oriented and pure service-oriented organizations.

The spectrum from product-orientation to service-orientation and the blurring lines

Some would argue that because of the abovementioned trends and the ever-more blurring lines between pure product-oriented and pure service-oriented operations the necessity to conceptually distinguish between these two may even become somewhat irrelevant.

Yes indeed, it can certainly be argued that nowadays there are less and less ‘*pure product-oriented*’ organizations and that service aspects are increasingly important even in the most product-oriented environments, so that we see blended or hybrid forms as the norm, rather than as the exception.

This is particularly true when looking at the organization from a global end-to-end perspective, where the overall picture would be considered a hybrid, but where individual units within the overall value chain may still have a strong product or service focus. For example, a car brand will have product-oriented units focusing on car assembly, but also service-oriented units focused on after-sales, management of dealerships and workshops, and so on.

Something similar is valid when it comes to distinguishing between ‘*physical*’ and ‘*digital / virtual*’, both in the case of products as well as services. In some way, one can even argue that part of the debate is mostly semantical. For example, is the publishing company of an online newspaper a (digital) production company or is it a (digital) news-service provider? And does it matter anyway?

Although ending up in a semantical debate doesn't seem very useful to me in this case, I do think that it does make sense to a certain extent to have a conceptual understanding of the various dimensions at play, even knowing that in practice most cases would be a mix of those. The reason is that there are in fact some important implications from these differences for the actual operations, depending on whether they are more product-oriented, more service-oriented, physical and/or digital/virtual.

So let's elaborate a bit on the spectrum from pure product-orientation to pure service-orientation in order to have a reference point for the discussion, before we go to the details of implications for operations.

The V of Visibility

It may be helpful at this stage to turn to Slack and Brandon-Jones (2018), who in their framework of the four V's, propose an interesting typology of operations. Perfectly in line with some of the terms from the **what**-side of Figure 1, the first three of the V's stand for Volume, Variety and Variation².

FIGURE 1.8 A typology of operations and processes

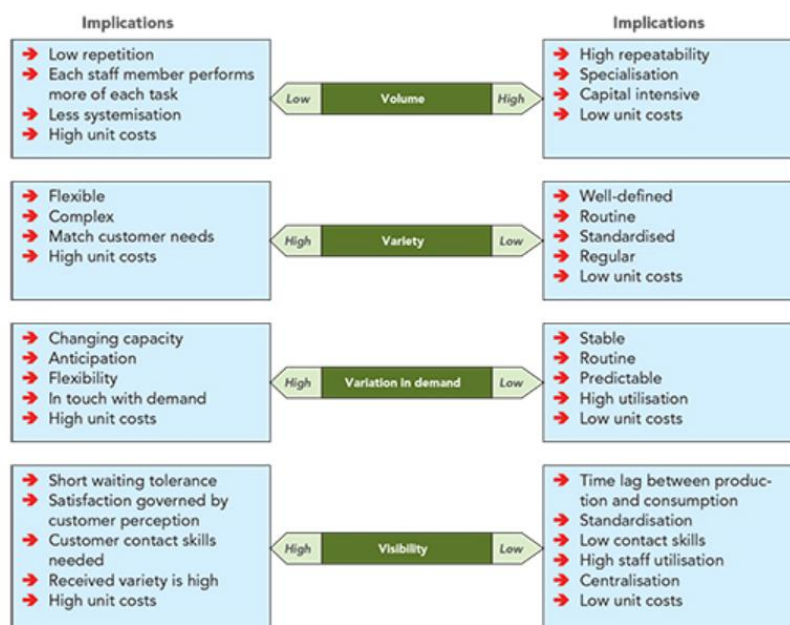


Figure 3 : A typology operations, the four V's (Slack and Brandon-Jones, 2023)

As can be seen in Figure 3 they add a fourth V, which stands for 'Visibility', which they define as "how much of the operation's activities are experienced by customers, or how much the operation is

² Variation is the term that Slack and Brandon-Jones use for the term "Variability" that appears in Figures 1 & 2.

exposed to its customers". So, although in essence very similar to the spectrum as going from pure product-oriented to pure service-oriented, they define this as ranging from low visibility to high visibility, which then leads to an overview as depicted in Figure 4.

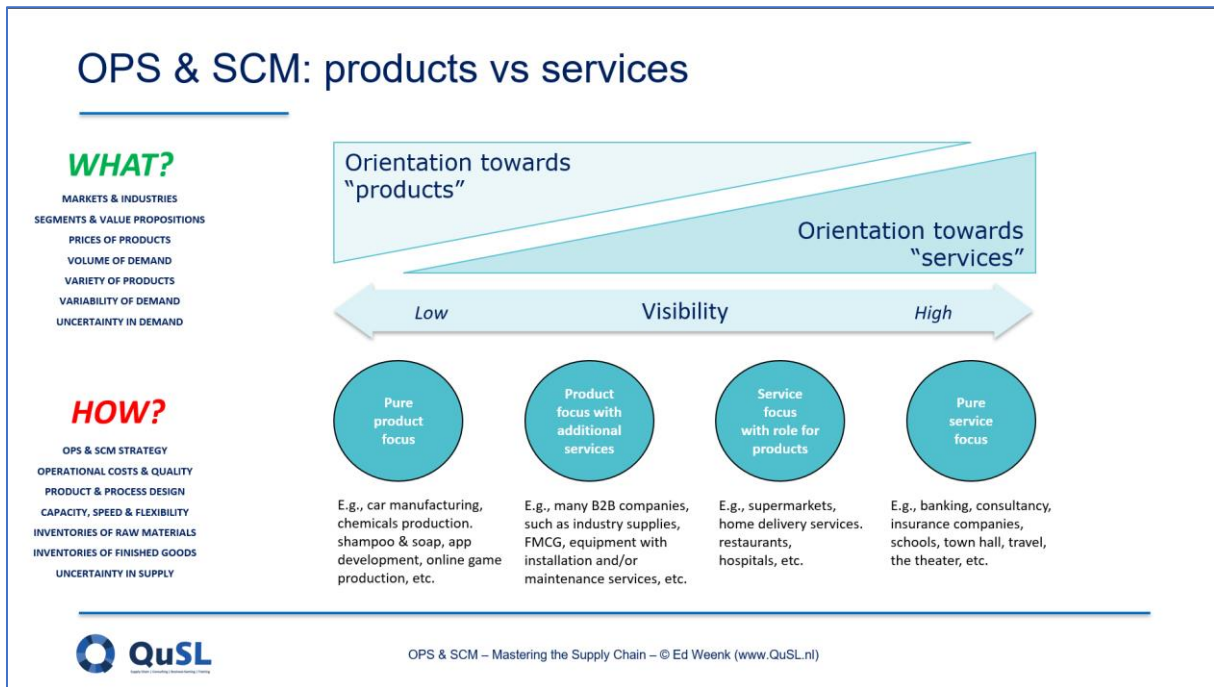


Figure 4 : spectrum from pure 'product focus' to pure 'service focus' (low to high visibility)

On one extreme of the spectrum, with low visibility, we would find the 'classical' production organization, traditionally focused on the production of physical products (cars, furniture, apparel, food), with no visibility of the actual operations towards the final customer, who is not present at all during manufacturing of the product that they will ultimately end up acquiring. Nowadays, we could also include the production of digital or virtual products into this category, such as software, games, apps, and so on, in which the end user typically is also not present during production.

On the other extreme of the spectrum, high visibility, we would find the classical 'pure service-oriented' organizations, in which there is a strong 'experiential' dimension, or at least some form of direct interaction between the supplying organization and the customer at the moment of production. The implication of this direct interaction is relevant for example for how 'quality' is defined and measured, a point to which we will come back later in this document.

Between the two extremes, there are 'hybrid' companies leaning towards services (above medium visibility), however also with a relevant flow of physical goods as part of the service coming from an invisible part of the operations. Examples are supermarkets which include movement and availability of e.g. groceries coming from invisible farmers, processors and distribution centers to the visibility of

the in-person retail experience. Or home delivery services which include timely availability and movement of packages coming from invisible factories and wholesalers to be delivered by a driver whose appearance and behavior at the moment of handover matter in the overall experience. And so on.

The same line of reasoning can be applied to 'hybrid' companies leaning towards production (below medium visibility). An example of this could be any company which in addition to their core activity of manufacturing physical products offer services such as access to a 24/7 technical helpdesk, maintenance packages, installation services, and so on.

The role of customer participation: extent of interaction and extent of customer activity

As the V of Visibility indicates, in some types of operations, we need to factor in the presence of the customer at the place and moment of production. Whereas Slack and Brandon-Jones leave it at the dimension of 'visibility', I think it may be useful to refine a bit more, because it's not only about the customer being present.

In the world of services, the customer is indeed in many cases physically present at the moment that the service is 'produced', but in addition, they can also play a critical role in the successful performance of the service itself. In other words, in some cases, the customer is required to actively participate in the process, which creates an additional challenge that needs to be managed.

Büttgen and Ates (2009) define this customer participation as *"the active involvement of the customer in the production and delivery of a service, by the contribution of personal resources, which influence processes and outcomes"*. They go on to argue that the degree of customer participation is impacted by two different dimensions: the extent of customer activity and the extent of interaction (see Figure 5).

Although the dimension of customer interaction obviously includes personal face-to-face contact, it is not limited to this. According to Büttgen and Ates, it also includes *"the kinds of interaction that typify automated service encounters, which definitely require significant inputs from the customer. [Thus, customer interaction] could be [...] measured as the number and extent of a service provider's activities that are influenced by others"*.

The dimension of customer activity *"relates the number of activities within the service production and delivery process that are carried out by the customer to those performed by the service provider"*.

Büttgen and Ates make a distinction here between compulsory and optional customer contributions: *"Compulsory customer contributions are necessarily carried out by the customer to reach a desired*

service outcome. Self-service in restaurants is a classic case in point, but other instances might be performing training routines in pursuit of sporting achievements or providing essential information in order to receive legal advice. Optional customer contributions are activities carried out by a customer which could, in principle, be contributed by the service provider itself. For instance, it is not compulsory for self-service customers to clear the table after finishing their meal”.

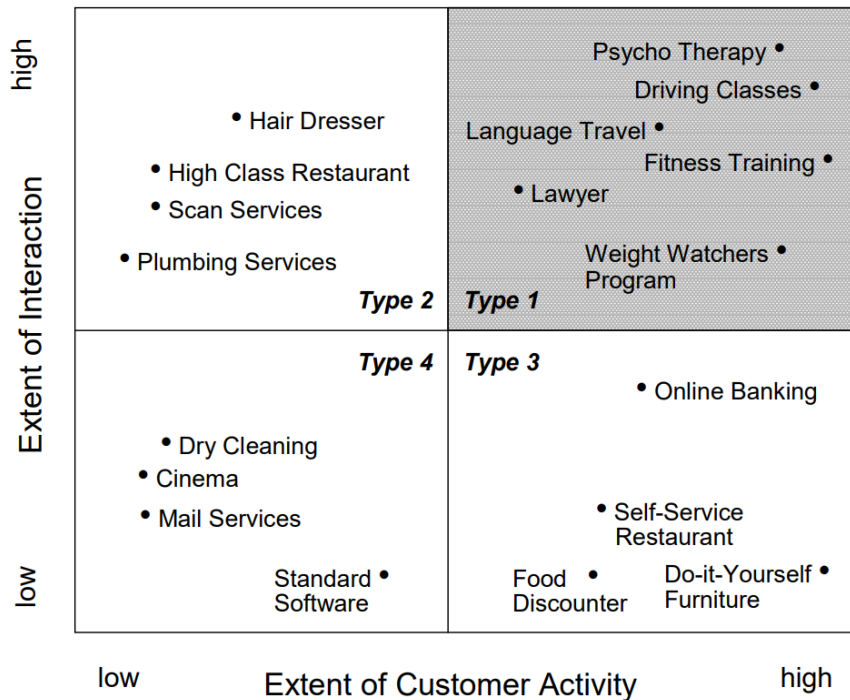


Figure 5: Typology of service based on extent of customer participation (Büttgen and Ates, 2009)

Arguably, the operational setups of each of the examples mentioned in Figure 5 have different peculiarities, depending on the degree of customer interaction and customer activity.

A high degree of interaction will for example have consequences for the design of the physical space in which the service takes place, but particularly also for the people-skills as well as for the preparation and training of the employees who are part of the interaction.

A high degree of required customer activity will call for the design of very robust, ‘fool-proof’ processes, since the customer’s actions play an important role in the final quality of the service and mistakes may be very costly to repair.

Thus, the dimensions of customer interaction and customer activity both have important implications for what the **how**-side of the operation would look like, but the impact may well be on different elements of the operation and in different ways.

In the next section, we will take a more detailed look at the implications for the **how**-side.

OPS & SCM for physical products, for digital products and for services

Decisions about the nature of the products (digital or physical) and where on the spectrum from product to service orientation (or from low to high visibility) an organization wants to be and what degree of customer participation is required for the delivery of the product or service, are in essence part of the definition of the **what**-side of the story. Such strategic decisions, while taking the competitive situation in the industry and identified market potential with certain customer segments as an input, are ultimately about defining the organization's set of value propositions.

Let's now look at how these factors impact on the **how**-side of operations, using the concepts as depicted in Figure 1 and Figure 2 as a reference point³. In the following pages, the focus will be particularly on the main important differences.

OPS & SCM: products vs services		
	Products (physical/digital)	Services (customer participation)
WHAT? Segments & value propositions Prices of products Volume of demand Variety of products/services Variability of demand Uncertainty in demand	Most aspects on the WHAT? -side can be dealt with in a very similar way for physical & digital products and services	
HOW? OPS & SCM strategy Physical infrastructure Operational cost Quality Product/service design Process design Capacity & resources Speed & flexibility Inventories of Raw Materials Inventories of Finished Goods Uncertainty in supply	In function of value propositions (efficient vs agile) Distribution network, flows of goods, distance & time Materials, space, transport, people, energy, systems Product performance, conformance, ... Aesthetics, robustness, technical specs, ... Resources & flows (people, machines, materials, ...) Dimensioning, scalability Multifunctional machinery, multiskilled people, ... Buffering against time and uncertainty Buffering against time and uncertainty External material suppliers, transportation, weather, manufacturing yield, machine reliability, ...	In function of value propositions (efficient vs agile) Service-scape, flow of people & info, distance & time Space, people, energy, systems Uniformity, personal treatment, customer opinion Customer journey, physical space, ambiance, ... Resources & flows (people, systems, space, <u>customer</u>) Dimensioning, scalability Multiskilled people, multifunctional space, ... (buffering through queues and/or demand management) (buffering through queues and/or demand management) External systems or labor suppliers, staff availability and performance, absenteeism



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Figure 6 : differences and similarities between operations in case of products or services

OPS & SCM strategy

Arguably, there is not such a big difference between OPS & SCM strategy in the case of physical products, digital products and services. In all cases, coherence with overall corporate strategy and the elements on the **what**-side should be secured. Also, the notions of efficient (cost-driven, low-cost) versus agile (flexible, responsive) will be relevant in all cases.

³ For the sake of argument in this Technical Note, we focus in the main body of the text on the application of the concepts from Figures 1 and 2, rather than on introducing specific Service Management frameworks. The interested reader, however, may want to take a look at Normann's service management framework as briefly introduced in the Annex. As can be observed, it has certain parallels with the (M)PCIO framework from Figure 2.

Physical infrastructure: flows and resources

Another thing that operations in physical supply chains, in digital supply chains and in service organizations clearly have in common is that in both cases we normally speak about flows, processes and resources.

In purely physical supply chains we typically speak about the distribution network, consisting of so-called 'hubs, or nodes, and spokes', their geographical position typically based on strategic considerations, such as availability of ports, skilled labor, and so on. Examples are manufacturing locations, machinery, factories and warehouses, transportation platforms and modes of transportation. Obviously, we would also include the people working within this network.

In pure service-oriented organizations, especially those in which the degree of physical customer interaction is high, there is an additional dimension to the element of physical space, typically referred to as the 'service-scape'. In such cases, special attention is paid to the way the physical space is designed, including aspects of creating the desired 'ambiance', or 'atmosphere' that fits with the service in question.

Physical infrastructure: the role of distance and time

In the physical supply chain, the first and main flows looked at are flows of materials: raw materials, intermediate products and finished goods. The implication is that distance and time play an important role. Materials coming from China for use in Europe will need to physically travel, either on a boat, by rail, or by plane and each option has specific characteristics in terms of lead time and cost.

In the world of digital products and, to some extent, of services these flows are often about activities or information, sometimes also called the '*workflow*' (think of a digital document flow in a bank or insurance company).

Although conceptually similar, since both can for example be depicted in very similar flowcharts, there is one very big and important practical difference: *in the world of digital products or services, on many occasions time and distance play a much less critical role or sometimes even no role at all.*

For example, the digital flows of client policy information in an insurance company or the content in a digital streaming service travel very fast nowadays and the lead time is practically independent of the distance, which means that subsequent steps in the process could potentially take place in very distant places without affecting the speed of the overall process. In addition, there is nowadays hardly a significant cost of this 'digital transportation', very different than in the case of shipping large physical product volumes from one corner of the earth to the other.

Certain on-site services which are more based on people and face to face interaction, such as consultancy, home care, repair services or medical assistance, can be considered to have a bit of both. Here, time and distance are not so much connected to the movement of materials, but often primarily related to the movement of the people (the service agents) and, if relevant, their equipment. This makes that for example the density of traffic and the zone of influence of the service ('reach' or 'coverage') versus the desired response time become relevant factors.

Product and service design, process design

Arguably, there are probably not that many differences between the way physical products, digital products and services are designed, as far as the design process is concerned. Market research (market pull) and/or R&D (technology push) will lead to potential new product or service propositions, which will then be designed, prototyped and tested. At some point in time, also the production process will be designed and tested. In each case this will lead to a set of 'technical specifications', of the product/service as well as of the production process.

The differences between digital, physical and services are more in the detailed criteria used, which ultimately define the 'quality' of the product and how this quality can be measured.

Quality: product specs and conformance

A key characteristic of services is the fact that at least part of the quality of the service experience is intangible, based on perception, rather than hard objectively measurable facts. For example, objectively measuring the stiffness of a metal construction is definitely very different from objectively measuring the friendliness of a reception clerk at a hotel desk.

For physical as well as digital products, the technical specifications can be documented in a structured way and once the product has been made the conformance to these specifications can be measured objectively (material stress testing, crash testing, durability testing, app response time testing, calculation speed testing, server uptime monitoring, etc.).

In the case of services, the technical specifications can also be documented, for example in Standard Operating Procedures (SOP's), but it is often much less clear what compliance means and what a customer's perception is. Think about how you would define "good quality" from the perspective of an individual customer at the moment of production in the cases of a wonderful experience in a theater watching a musical performance or a dance show, the degree of hospitality in a hotel, the waiting times for attractions in an amusement park, the clarity of explanations and the in-class dynamics of teaching, and so on.

The situation becomes slightly more complex if there is a mix of criteria to be met. For example, the piano-tuner who comes to your home may bring your piano perfectly back in tune according to the objectively measurable criteria of sound and musical scales. However, since this service takes place in the intimacy of your home, for as perfectly as he or she would leave the piano after tuning, you would likely still be upset if the person in question would behave rudely to you.

Or take for example the classical case of a restaurant with plate service: even though the food may have been perfectly well-cooked, treating all of the ingredients exactly as required, following the recipe to the tiniest detail, and complying with all necessary regulatory, safety and hygiene standards, the waiter's behavior at the moment of serving the meal at the table will also play a very important role in the perception of quality of the entire overall service experience.

The interpretation of that behavior as part of the overall perceived quality is susceptible to the perception of the customer at the table and it may even be influenced by many situational factors, which are 'external' to the people at work, such as the personality of the customer in question, the customer's personal preferences, their mood at the moment, the behavior of other customers at the other tables, and so on.

Part of these factors can be expected to be the same or at least similar over time, across different customers in different moments. However some may be specific to the particular moment, such as the customer's mood. In the end, the emotions of someone coming to dinner to celebrate winning a deal at work will be very different from those just coming out of a bad-news meeting. Similarly, a dinner with a group of friends will be very different from a romantic dinner with your partner.

In other words, the perception of service performance also has a context-specific element to it and this leads to relevant operational challenges in terms of how to guarantee uniformity (same experience always in all McDonald's outlets, independent of their location), how to manage the customer's perceptions, how to select the staff with appropriate people skills and how to train them well for a variety of situations they may encounter.

Quality and the role of the customer: extent of interaction ("moments of truth")

A high level of interaction will lead to additional requirements in terms of the design of the physical space or even staff behavior: after all you're in front of the client, either physically or virtually, when the service takes place. You probably don't care if the machine operator was smiling when they assembled your smartphone in the factory, but you definitely care about that smile in case of the waiter bringing you your ordered food to the table. Something similar can be argued for digital services: you will most likely not mind if the operator had a 5-minute interruption of their work

during the assembly of your smartphone, but you will definitely mind those 5 minutes if you're in the queue of the online helpdesk.

In addition, this leads to challenges in terms of what to do if something fails during the execution. Since the customer is there at the same moment, it's really about 'saving the situation' and the challenge is first of all how to prepare your staff for being able to save such moments and at the same time about which degree of freedom to give them to find a solution to turn the negative situation around and make the customer still feel satisfied.

If there's something wrong with the pizza you just got delivered, what can the delivery person do to save the situation? Should they take it back? Give away a free drink? Offer a voucher for the next pizza? Order a new one? Even the difference between the Art and Science becomes a relevant dimension here, i.e. do you want employees to stick to the letter of the standard procedures, or do you allow for the interpretation and 'art' of the employee in question to act to their own judgment (Hall and Johnson, 2009)?

Slack and Brandon-Jones (2023) add another interesting element that relates to this same dimension of art & science: if a service takes place in the presence of the customer, it is much more likely that a wider variety of the service will be requested. If the service agent is in front of you, it is easier to ask for additional things, than if you're dealing with a standardized online platform. For the service organization, this means that it should either be very clear to their staff as to how far they are allowed to go beyond the contracted standard service and/or they should make sure to have people in place that can 'navigate' that tension between standard and customized very well.

This phenomenon of production in the presence of the customer is coined by Normann as *Moments of Truth*, others refer to these moments as *touchpoints*. In a more extensive end-to-end view, we would speak about the entire *customer journey*. See also the article by Rawson et al (2013) about these customer journeys. Part of 'proper' service design is about shaping the entire customer journey, including those parts where things can go wrong ("customer journey mapping")⁴.

Quality, process and the role of the customer: extent of customer activity (co-producer)

The second dimension of the role of the customer in service delivery is the one of *co-producer*. For example, think of the traveler who does all of the booking registration and even the complete check-in for a flight via the internet. Or the consultant or therapist who can only do a proper job if the client is willing to actively collaborate and provide timely and accurate information as an input to the service to be performed.

⁴ Also see "Annex 2: service design".

Customers play a more and more important role in service delivery and in a way this means that part of the process is being “outsourced” to the customer, who then becomes supplier and customer at the same time. With this we then also have more and more dependency on this external figure in the execution of our own process, which means that our process should be robust enough to deal with a wide range of potentially ‘off-spec’ or even undesired customer inputs. What to do in the case the customer has made a mistake in their part of the process? How should they be ‘corrected’ without damaging their perception of the overall customer experience?

Operational cost

In terms of the cost components that appear in the financial bookkeeping, there is not that much conceptual difference between the cases of operations of physical products, digital products and services. What can be very different, of course, is the relative importance of those cost components as part of the total. In a large scale service operation with a high degree of customer interaction, such as a tourist beach resort, personnel costs and probably also space costs will most likely be very significant, which is different from the case of large scale digital services, such as online banking, where most operational costs may be in server capacity⁵.

Capacity and resources, speed and flexibility

At the conceptual level, when it comes to capacity, resources, speed and flexibility, there is probably not that much difference between digital and physical products and services either, although also here the actual complexities may differ quite a bit.

For example, in services with a high degree of direct customer interaction, personnel with great people skills are a critical resource. Scalability of these may be quite challenging, both in terms of costs (salaries, training, recruitment) as well as availability (labor market). This is obviously very different from upscaling relatively cheap server capacity in the case of an online platform.

Inventories and the ‘perishability’ of service capacity

The critical activity of balancing demand and supply and subsequent ‘buffering against time and uncertainty’ as in constantly done in physical product supply chains, typically plays out very differently in the case of digital products and in services. In physical product supply chains, inventory is a critical ‘tool’ to buffer against variability in time and distance or against uncertainty in demand or supply.

⁵ *In these examples, the emphasis is on the operational costs during the phase of execution. The costs involved in the development stage of these services will be of a very different nature and intensity.*

In the case of digital products, inventories play no real role of importance. Once the movie or the song is available in digital format, it can be pretty much streamed in unlimited quantity, given that sufficient server capacity is available. If that condition is not met, then available server capacity may collapse and increasing waiting times will occur.

Inventories also have no real role of importance in 'pure' service companies. How could we store a live theater performance for those people who might not make it on the day of the show while still guaranteeing exactly the same experience to the spectator? Or how would we store today's unused airline seats so that we could potentially move today's empty seats in the plane to next week when a peak in travelers is foreseen? This is of course not possible.

In a way, one could say that *capacity in service organizations is 'perishable'*: if not used today in the moment, then it's lost, like fresh food will also become obsolete if not used on time. It's clear that this puts additional strain on the task of capacity utilization and therefore also the task of demand management gains even more relevance.

Already in 1976, Sasser wrote a classic article about the challenges of matching demand and supply in service organizations in which he addresses different ways of dealing with the issue. On the demand side, this could be efforts aiming to "*affect demand by developing off-peak pricing schemes, nonpeak promotions, complementary services, and reservation systems*". On the supply side, Sasser mentions for example the use of part-time employees, increasing customer participation, sharing capacity or investing in capacity expansion before demand peaks.

Uncertainty in supply

At the conceptual level, the topic of uncertainty is very similar in the different contexts, although as we have seen before, there may be differences in criticality, as well as in potential solutions for mitigation. In physical supply chains, logically material supply in globalized network with complex geopolitical tensions leads to uncertainty, very different from a local tax consultancy, where uncertainty is probably more about expected upcoming changes in tax legislation.

Summary

In this Technical Note, I have tried to link a number of the general OPS & SCM concepts to the worlds of digital products and of services, as well as address some of the peculiarities of service management, thus aiming at providing the reader with a basic understanding of Operations in service organizations.

As hopefully has been illustrated, many of the key principles and frameworks of **what** & **how** at play in OPS & SCM, especially the ones shown in Figure 1, can be directly applied also to service organizations, as well as to the world of digital products. At the same time, we have seen that there are also some important differences to be taken into consideration. As always in OPS & SCM, contextualization is critical.

Thus, physical operations and supply chain, digital supply chains as well as service operations are all part of the fascinating and dynamic world of OPS & SCM.

Annex 1: basic framework for service organizations

Although other frameworks exist, I'd like to take here the framework of Normann as an example. In his classic book 'Service Management' (2001), Normann defined the so-called service management concept as consisting out of:

- *The market segment (who?)*, addressing the people who would be the customers for the service
- *The service concept (what?)*, addressing the exact characteristics of the service that the segment would be looking for
- *The service delivery system (how?)*, addressing the operations behind the service, dealing with aspects such as internal/external staffing, design of physical or digital space, capacity dimensioning, quantity, planning, tools and quality. The delivery system also addresses the potential role of the *Client*, since the client in service organizations often acts as a co-producer (such as the aforementioned example of the traveler booking tickets).

These three elements are indeed very similar to those in the integral framework of Visser & Van Goor. In addition, Normann mentions:

- *The image*, addressing the image the company wants to transmit to the outside world. This might be even more important than in the world of physical products, since products once they are bought they stay and last at least for some time, whereas a service finishes and once it is over, the only things that remain are the memory of the service received as well as the company image.
- *The culture and philosophy*, addressing the internal 'corporate spirit' that the organization wants to spread throughout its workforce, since many of the employees will have direct contact with the customers later on and will thus be the 'face' of the company. This is why particularly many service companies have internal Academies (think of McDonald's Hamburger University in Chicago, Illinois). Also check out the articles by Hemp (2002, 'My week as a room-service waiter at the Ritz') and Firnstahl (1989, 'My employees are my service guarantee') as mentioned in the references.

Figure A-1 gives an overview of Normann's framework of the service management concept.

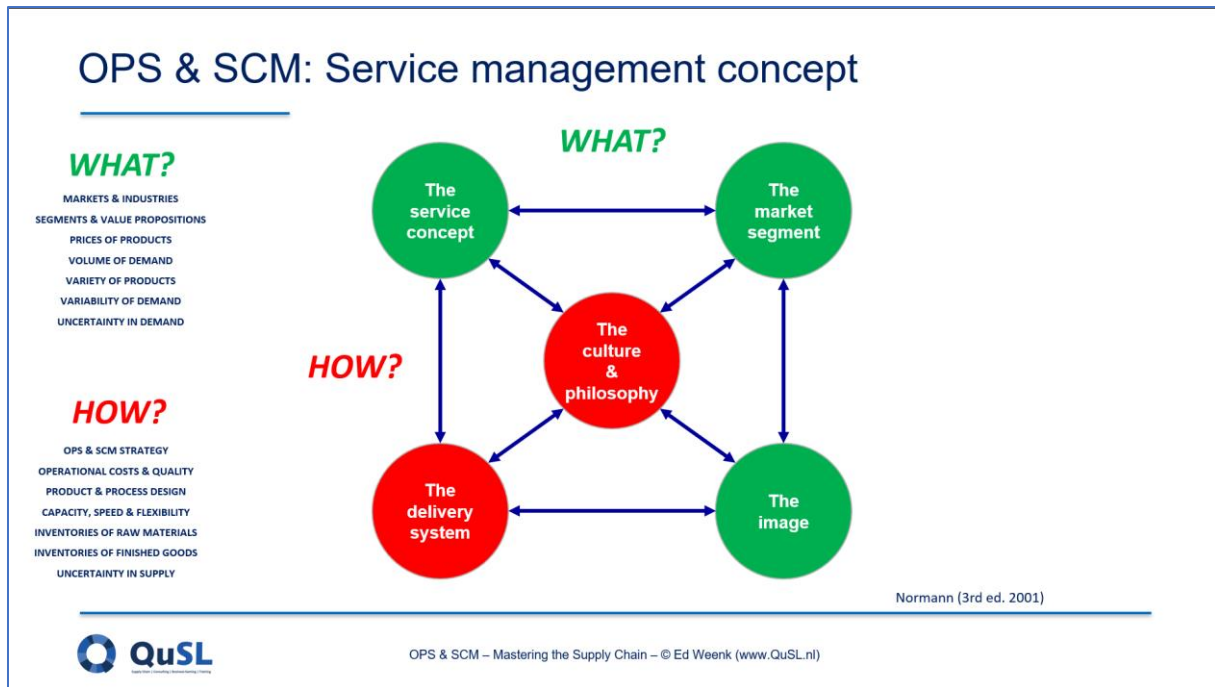


Figure A- 1 : service management concept (Normann, 2001)

Annex 2: service design

How to design services that deal with all of these basic challenges:

- that we also see in physical operations and supply chains, such as resources, demand variety and variability or capacity?, and
- which at the same time are robust enough to deal with the peculiarities of services, for example dealing with the moments of truth, the perishability of capacity, etc.?

Shostack already wrote about this topic in the early 1980's and in basic service design we still take into consideration some factors that she mentioned back then:

- Physical evidence / touchpoints / moments of truth
- Customer actions / actions done or initiated by the client
- Front office / visible provider actions
- Back office / invisible employee actions
- Support processes

The abovementioned elements can be combined and be depicted in a so-called “swimming lane” flowchart. See a generic template in Figure 7 and an example below in Figure 8.

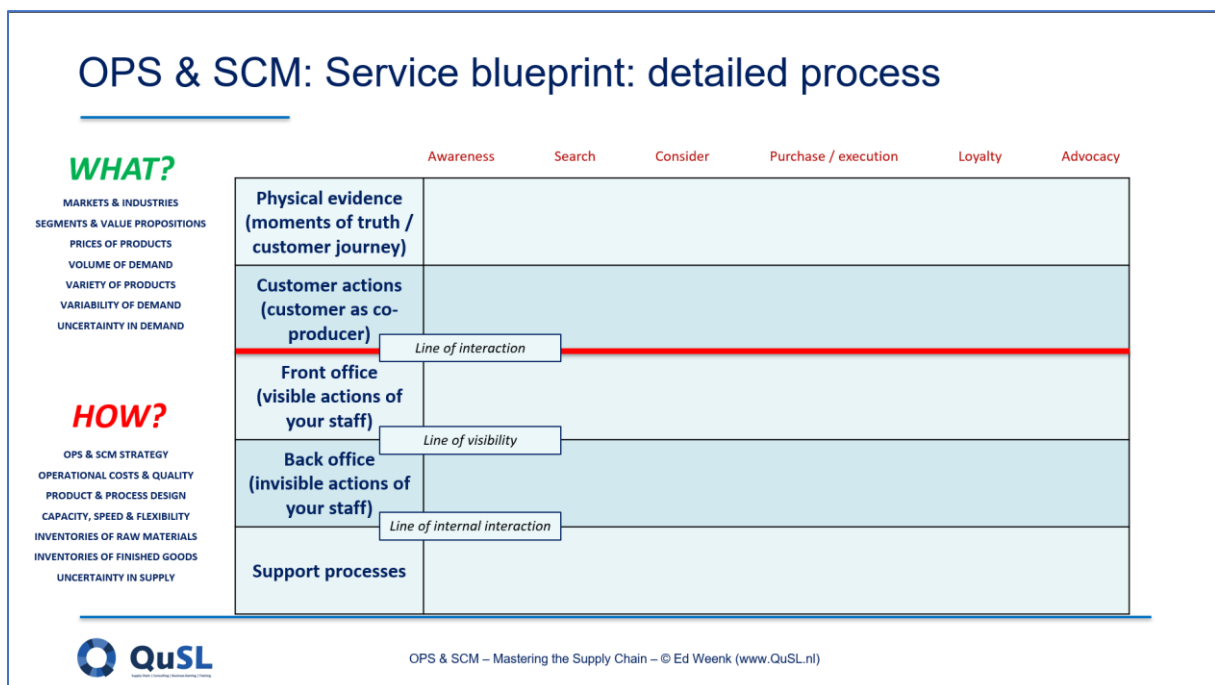


Figure 7 : template of swimming lane diagram for service design

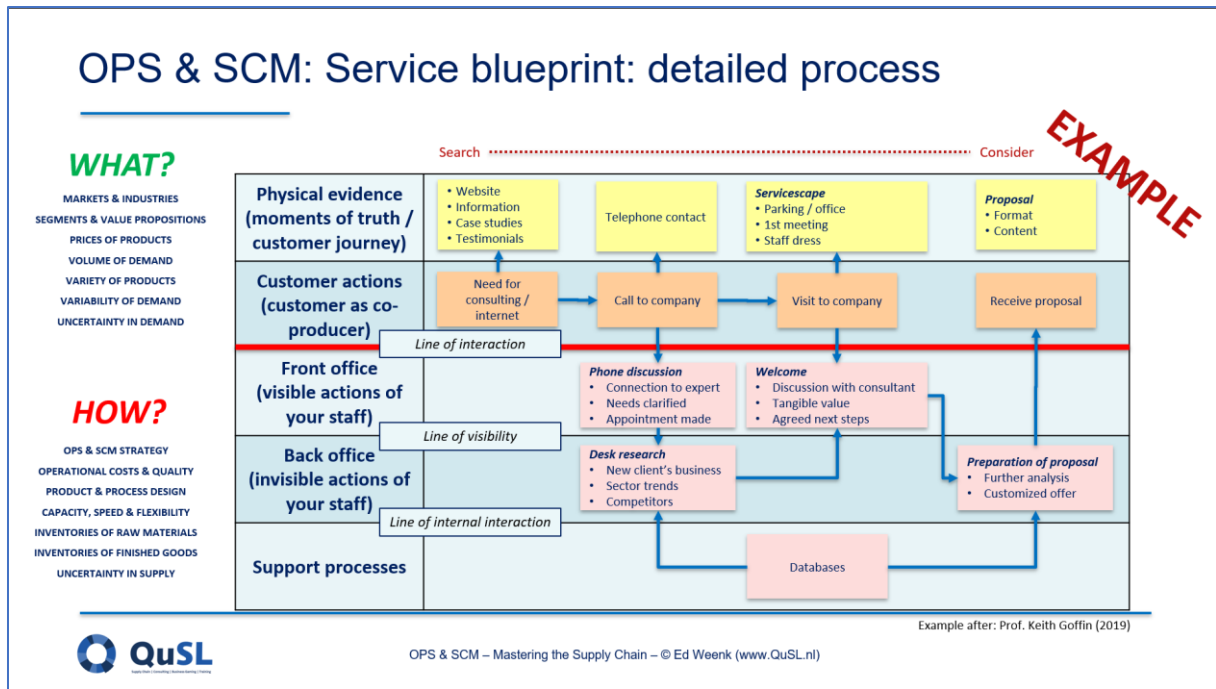


Figure 8 : example of swimming lane diagram for service design

References

Some classics and other recommendable articles on Service Management

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- Slack, N. and Brandon-Jones, A. (2023) *Essentials of Operations Management*, 3rd Edition, Pearson
- Visser, H. and Van Goor, A. (2011) *Logistics: principles and practice*, 2nd Edition, Hessel Visser
- Weenk, E. (2019) *Mastering the Supply Chain. Principles, practice and real-life applications*, Kogan Page