

**15.778, Summer 2004
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Lecture 1: Introduction to Supply Networks

Class Outline:

Introduction
About the Course
How are services defined?
How is a supply chain defined?
On the Role of Services in Supply Networks
Conflicts in the Supply Chain
What are the factors that require us to go through this learning exercise?

Introduction: About the Course

- Why is the term “services” in the title of the course? Services comprise a field of operations that is sometimes ignored and misunderstood by senior decision-makers. Many companies ask “Why do we need a call center?” and the common answer is “because we have to”. In reality, though, many top firms derive their profits from their focus on services such financial services than their other operations. Hence we wish to emphasize the role of services within the value network through the title.
- In this class we’ll first study the basic principles that underlie the management of services. We’ll look for the basic principles that we can extract from here and use there, going beyond just the sharing of anecdotes.
- With this foundation, we will later attempt to explain the evolving structure of today’s supply chains. In particular we will try to determine how services have redefined and continue to define supply chains.
- We will also try to analyze the structure of supply chains, with consideration to how firms outsource a sub-set of their activities, and the key factors that (should) determine such decisions. We will also discuss some of the technological developments in supply chains, and how they can be used to define new services and offer opportunities for value creation.

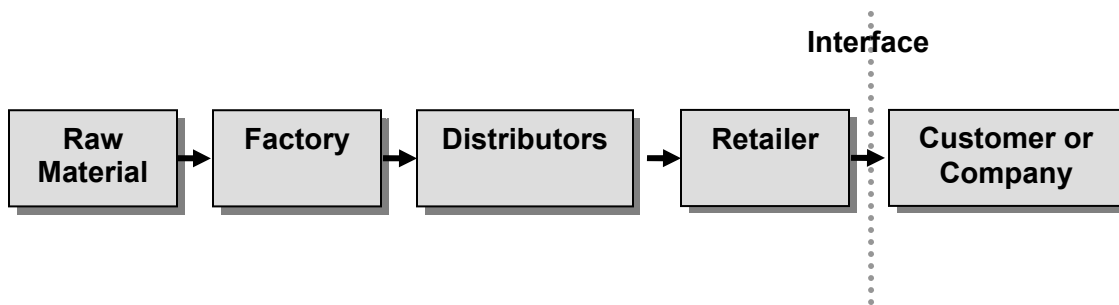
How are services defined?

- “Officially”, services are defined to include everything except for manufacturing, fishery, construction, and mining.
- We also note that the definition has evolved: it used to be that product design was manufacturing, while today it is considered a service. It is also difficult to define services because services are around us everywhere in many diverse forms.
- In terms of the GDP, the service component is as large as health care, and when we consider that services indeed form a large component of health care operations, we can begin to understand the scale and scope that is required of any framework to understand service operations.
- How we will define services: activities that take place most often in interface with the customer.
- Another definition: services are the types of things that if they fall on your foot, they won’t hurt you!
- Services can also sometimes be defined in contrast with internal operations, where for example the customer is not present. In manufacturing operations for example, you can implement a wide range of positive decisions and actions on behalf of the end customers, but without directly engaging them, because we have the extra degree of freedom. In

service operations, however, we have to engage the customer directly or indirectly in the value added activities.

How is a supply chain defined?

- Like in the “Beer Game” played at Sloan
- First four items in the diagram below exist because of the customer. While the physical product in this supply chain shown moves from left to right, the point is really to understand the flow from the point of view of the customer. If you want customers, offer them social value (something that will make their lives better): this can be done by identifying the needs of customers (fax machine, TV remote control) or to do what others do but in a better way.



In reality, though, we have many sources of raw materials, more than one factory, plenty of distributors, many retailers that receive many products – a structure that can be better visualized as a network, and not just a chain. Hence, a popular term for describing supply chains today is a “value network”.

Interface is not only where it's shown in the diagram, but in general where customers interact with any part of the value network.

Historically, we have seen a shift first from decentralized to a centralized network, with the Industrial Revolution. At that time, because of economies of scale and management, and with only a few countries at the forefront of technological innovation, in general, value chains became more or less vertically integrated. This trend persisted for a long time, before it became possible to put a dollar figure on the costs of complexity in management, and before technology transfer and development made it economical to widen the supply base and simultaneously to overcome international obstacles to trade. Today, we're outsourcing many functions to locations and to markets where it is economical to do so – so in a sense we seem to be reversing the cycle. However, the question of the dollar cost on complexity remains—if we could not manage vertical integration living within the boundaries of the firm, how will we do so today? The shift from vertical integration to decentralized operations has also seen a shift in responsibilities for customer service and supply chain cost control. However, while this responsibility lay squarely in the hands of one CEO and his or her organization in the case of the vertically integrated firm, defining such roles and responsibilities in today's value networks is proving to be a fundamental and critical challenge, not only from the perspective of the supply chain participants, but also from the point of view of the health of the global economy.

On the Role of Services in Supply Networks

- Given the preceding discussion on the decentralization of supply chains, we still make the following observation. The defining and strategic challenge for *individual firms or players* in supply chains and value networks today is not only in the manufacturing and coordination component—it lies squarely in the services component. To understand this, note that with the decentralized mode of operations, the space for differentiation for individual firms is now more constrained. Within its own sphere of influence a firm can distinguish itself primarily through a service-oriented approach, where the goal is now to satisfy its own customers in the network, and to gain an edge over its competitors.
- In order to deliver improved service to the customer, a firm has to rely more on its network of suppliers, and in some cases also its competitors. This is primarily because of the interdependence that is a result of the decentralized supply chain structure. Therefore the challenge of delivering improved service, also translates to a challenge of efficient and cost-effective manufacturing, production and distribution / logistics for the firm. This is all the more important in today's world of shrinking product life-cycles and cost transparencies. There is insufficient margin in most businesses, to allow for waste and inefficiency in the supply chain, especially with the expanding and evolving needs of customers. This duality between service quality and productivity is a theme we will revisit many times during the course.
- Many companies no longer can afford to only compete in their markets. They are learning the benefits of collaboration and cooperation. Competition is between one value network and another: it's not Wal-Mart vs. K-mart, but the value network with many components. Supply chains cycle through products at an increasing rate, while this results in the need for firms to forge partnerships and collaborations based on core competencies. New products in a supply chain may indeed be a result of collaboration between firms that may be competing in other markets. Fast product life cycle economics also dictates that technology transfer and learning occur at a faster rate for companies interested in growth within a particular market segment. This in turn results in increased collaboration in supply chains.
- People that are part of many supply chain and value networks (such as UPS or the U.S. Postal Service) are aware of its importance, but not the magnitude of importance – this leads to a great opportunity. In this course, we'll look at supply chains with a critical point of view; there is enough history that we can observe that will allow us to accomplish our learning objectives.

Conflicts in the Supply Chain

When students played the “Beer Game” simulation, what conflicts did we see?

- Many players or nodes in the supply network.
- Every node in network wants to maximize their profit – local optimization rather than global optimization
- Many players have to respond to conflicting needs.
- Predicting customer demand is very hard. Coordination of networks requires synchronization. (We'll address this later in the course: how can we improve forecasting accuracy and how can we deal with inaccuracy?)
- Lead time: if it takes 12 months to make a product, we need forecasting for at least 12 months. Lead time has a big impact on ability to forecast.
- Add capacity: we need to have a systems approach or else we'll just shift the bottleneck elsewhere in the chain.

What are the factors that require us to go through this learning exercise?

- Technology
- Globalization
- Cost of manufacturing – access to labor and expertise anywhere in world, capital, and technology
- Outsourcing – companies starting to outsource what they cannot manage. However, the question remains in that if they believe they cannot manage a certain function, how can they still retain the ability to manage their suppliers and their contribution?