

# **An Exploratory Framework for Measuring Services Value-added**

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## **Abstract**

Services add value not only to goods but also to other services. Should this be understood in terms of a supply “chain” relationship or do we need new ways of thinking to accommodate the value-add relationships between services “tasks”, “performances” and “solutions”. What insights, for the understanding and measurement of value add can we glean from the study of offshoring practices and emerging theories of the firm. This paper will be a first attempt by the authors at a conceptual and statistical framework to understand, to measure and ultimately to facilitate engagement in the regional services value chain.

## **1. Introduction**

*"The two trends with greatest impact on business management in the last decade have been (1) the rise of business ecosystems caused by falling transaction costs; and (2) the empowerment of users caused by the global spread of communication technologies. A business ecosystem is a group of firms that together provide complex products and related services to end users."*<sup>2</sup>

The above quote highlights business trends that may shape globalization processes. New business models or "business ecosystems" of companies have developed over the last years in diverse sectors such as computer and information, health, or finance. On the other hand, the behavior of clients and consumers of products and services also appears to add to the unpredictability and uncertainty of the business environment.

Against these two factors, international supply chains expanded fast. Increased demand for more product variety, cheaper manufacturing capability, especially in emerging countries, and lower cost of transport and telecommunication all have contributed to this phenomenon. To move goods from the supplier to the customer, international fragmentation of production and global supply chains partition the economic process of research, design, manufacturing, marketing, etc. Multinational companies are certainly a driving force in this process: "Accounts differ, but it is probably right to say that there

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are between 63000 and 77000 transnational corporations (TNCs) driving today's global economy." (Stoler, 2009).

What role do services play in international supply chains? Services enable global supply chains by "gluing" them together for an efficient and cost-minimizing production of final goods. That is, a chain or network of services is necessary to produce and sell goods. Services are instrumental for the effective design of global supply chains. While supply chains are more connected to the "industrial sector and engineering", global value chains are an extension of a concept that goes back to Michael Porter's view of the economic process as "activities are organized as separate but coordinated phases" (WTO, 2011).

Global value chains have already been in existence for decades. Asia is nowadays considered the "manufacturing hub" of the world due to its production networks that allow an efficient manufacturing. Asia's exports are by now dominated by manufacturing, with more than 80 per cent of the region's exports stem from this group of products. Distribution networks support global supply chains with the "just in time" delivery of intermediate goods, but sometimes these themselves are involved in the production process. But global value chains exist not only in the manufacturing sectors but also in the services sectors. Research and development and innovation are increasingly "delinked" from manufacturing and take place in different countries (Svensson, 2010).

However, services are not only "enabling" or a "facilitator" to trade in goods such as logistics. Fragmentation of services production itself is taking place and expanding globalization, for example, in knowledge-intensive sectors such as in software products, banking and education, and there are functions such as research and development or legal services that are part and parcel of many corporations. The System of National Accounts defines services as "result of a production activity that changes the conditions of the consuming units [transformation services], or facilitates the exchange of products or financial assets [margin services]". The revised Manual on Statistics of International Trade in Services (MSITS 2010) Transformation services change the condition of consuming units (e.g. repair) while margin services facilitate the exchange of products (e.g. wholesalers or retailers).

Although global value chains and their spreading is driven by trans- or multinational companies (MNCs), small and medium-sized enterprises (SMEs) also benefit of this development as it not only opens for them markets which they have not been able to access before, but also allows them to extend their business opportunities domestically to serve value chains of MNCs. Thus, global value

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<sup>2</sup> Baldwin, C.Y. (2011), Harvard Business School, Working Knowledge, 23/2/2011

chains contribute to globalization along different lines and help creating and ensuring jobs not only abroad but also domestically.

This paper considers how the offshoring of services forms an instance of the reconfiguration of global value chains for the services industries. We will first consider some stylized observations, followed by the development of certain research questions that we use to guide our development of a framework. The framework is loosely organized around three extant literatures - relating to the global value chain perspective, the theory of/boundaries of the firm, and the offshoring of services. Services add value not only to goods but also to other services. Is this best understood in terms of a supply “chain” relationship or do we need new ways of thinking to accommodate the value-add relationships between services “tasks”, “performances” and “solutions”. What insights, for the understanding and measurement of value add can we glean from new trade theory, from the study of offshoring practices and emerging theories of the firm. This paper will be a first attempt by the authors at a conceptual and statistical framework to understand, measure and ultimately facilitate engagement with the regional services value chain.

### **1.1. Some observations on offshoring, services and globalization**

With the fast pace of the globalization (especially of production) and ever increasing international competition, several stylized observations can be drawn from the literature (e.g. Arora and Gambardella (2003) for software and Sturgeon and Gereffi (2009) for manufactures):

1. The competitiveness of firms – services and manufacturing alike - is increasingly determined by their operation across regions, and across multiple networked value chains, sometimes as part of “ecosystems” or clusters.
2. The competitiveness of manufacturing and other “product” sectors are increasingly based on services. As a result, outsourcing, and in particular, offshoring, is occurring across the economy in many sectors and across many business functions, including services and the knowledge-intensive stages of manufacturing value chains.
3. Several factors have influenced this global offshoring pattern, especially now for services. Technology has enabled the offshoring of this work over long distances, as well as reshaped the boundaries of the firm – allowing other firms to participate in the network. Other key factors that enable outsourcing to take place are the codification of the services work as business processes or some form of process, favourable labor arbitrage conditions, and the rise of capable suppliers (i.e. providers) worldwide, inside of and outside of clusters.

4. Offshoring occurs throughout the value chain nowadays, except perhaps in the highest value added segments, such as product definition or creation of the product's architecture. In contrast to Vernon's (1966) product lifecycle hypothesis for manufacturing, the offshoring of services suggests that work is no longer necessarily outsourced in accordance to increased maturity of production techniques or of the stages of the product lifecycle that a firm is involved in; neither does it occur to emerging markets that are mature in those markets. That offshoring occurs on both the back end as well as the "front end" of services work further suggests that it occurs across the value chain depending on where appropriate global labor arbitrage and other business operating conditions are found.
5. The offshoring of services is occurring to a variety of countries, sometimes to countries that have not designated services offshoring as a keystone sector. This suggests that the level of capability at the firm level, complemented by country level factor advantages (or resource endowments), are key determinants of where the movement of work takes place to.<sup>3</sup>

The above stylized observations and their premises can help us to frame the organization of services work and their global distribution.<sup>4</sup> What is perhaps the most important part of this process is the issue of how firms determine the shape of their value chain as it takes place across countries and over time.

## 1.2. Guiding research questions

This leads us to our main guiding research question that frames the construction of our framework: **how can we characterize or model how service firms organize and determine the global distribution of work (offshoring), and are they susceptible to different configurations of value chains?** Following contemporary theoretical approaches, we will adopt a network-centric view of the firm. In the simplest possible fashion, we will illustrate how the configuration of these value chains (or "networks") could be governed by multiple factors, including the leadership and capability of the lead firm, and the nature of the partitioning of the work itself. For the sake of clarity, we define offshoring to be the shifting of work to overseas locations, but where the work could either still be accomplished by the same firm (in a "captive" facility that it owns) or by a provider. If a firm uses a

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<sup>3</sup> Comparatively little is known about how processes of offshoring occur over time within a given firm's value chain. Most analyses tend to view offshoring as a one off activity, rather than tracing it as a longitudinal study. We also know very little about how processes of industrialization take place, in part because they are spurious, but most of all, because they tend to rely on the same above-mentioned interactions between the firm and national levels.

<sup>4</sup> To some degree, some of the above reflects the "OLI" framework in international business for determining multinational enterprise location; this consists of firm-specific, location-specific and internalization (ability of the firm to keep production functions within the firm's boundary) factors.

provider, then the firm itself is referred to as a client. We will henceforth focus on instances of services offshoring, even as we do sometimes recognize the general case of outsourcing.<sup>5</sup>

As an extension of this, it would be useful to shed light on whether the dynamics of outsourcing of services are guided by a particular logic. For instance, what dictates when particular parts of a value chain are outsourced, and what order are these parts (as stages of the value chain) outsourced in? It is already known that for a given firm, greater value is already being created over *different non-contiguous parts* of the value chain.<sup>6</sup> In the earlier example of manufacturing, the outsourcing started with the lowest value added stages of production, and increased with the value added. Further, work tended to be outsourced only when the complexity of the work was mitigated by the standardization of processes. In this era, cost effectiveness was a dominant objective of outsourcing, not only for manufacturing firms, but also for the more cost-oriented of the services firms (McKinsey Global Institute, 2003).

Are the offshoring of services organized any differently in terms of where and when a particular stage of the value chain is offshored? It may be that the overall logic of services offshoring is still cost reduction. However, given that services such as back office functions are not organized as a “value chain”, but as functions within the corporation which are often centrally controlled and already codified as processes, the logic dictating the offshoring of these could be more pliant.

This leads us to how the offshoring takes place. By the “how’s”, we are not referring simply to the existence of enabling factors such as technology or an “imperative logic” of offshoring. Technology and the associated strategic thinking and business procedures also facilitates the piecemeal nature of outsourcing, varieties of integration, and possibly even the switching of providers or the organizational forms of providers.

In section 2, we will develop a view of firms, and especially service firms, as networked, knowledge-based enterprise, such that this can help us to further ascertain the evolutionary pattern by which services offshoring takes place. We will build our views from what is known of manufacturing and other traditional enterprises, or general theoretical developments in the literature, followed by the development of extensions using what is known of offshoring patterns. Section 3 will describe how

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<sup>5</sup> Outsourcing is defined as any work that a firm sends outside of its boundaries to be accomplished by another firm, be it in the same country or overseas.

<sup>6</sup> Acer’s Stan Shih famous “smiley” diagram (see section 3) illustrates Acer’s value proposition as being at both extremes of the U-shaped “value added curve”. Similarly, the recent offshoring of knowledge-intensive functions (e.g. KPO) right after the relatively lower value added (language-intensive) call centers and (skill-intensive) BPO speaks of a similar “discordant” logic of how value added has migrated to offshore locations.

current international trade in services statistics capture offshoring statistics, and the range of issues that need to be addressed as we move forward.

## **2. Elements of a Model of How Service Firms Organize and Determine the Global Distribution of Work**

Our interest in this section is to further develop a view of how global value chains can be seen as networks and how these networks are configured.<sup>7</sup> In particular, how they emerge from organizations' structuring of their production operations in the global environment. We will focus on both manufacturers and services. We take our leave from Sturgeon and Gereffi's (2009) pointed observation:

*"Trade statistics can only hint at the changes occurring in the global economy. Trade statistics alone contain very partial information about the location of value added, and no information about ownership of productive assets and output, where profits are reaped, or how these increasingly complex systems are coordinated."*

While their solution, the GVC, was particularly useful for understanding the networked forms that would emerge given the balancing of transaction costs with other aspects of the performance of the task, we propose that a more salient structure for explaining services would also incorporate some of the explanatory variables more recently observed in cases of services offshoring.

One of our goals is to show how an extended "theory of the offshoring firm" may emerge from considering both the emerging evidence on offshoring and the different theoretical traditions that attempt to understand the networked view of the firm. The networked nature of production shows up in both, the way that products or services themselves are organized as "artifacts", and in the way that organizations and their production across suppliers are organized.

### **2.1. The Character of Services**

While it is well known that as economies reach "developed" status, they generally approach 60-70% of GDP being generated by services, little is known about either the nature of these services as they are bundled and moved around by the firms performing them.

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<sup>7</sup> The network form may provide a cleaner and more distinguishable topological orientation than a value chain, which is to some extent "topology free".

It should be noted that service sectors are not well understood, in part because each sector is so different from the others. Services involve: (1) knowledge – both tacit and explicit, process-oriented innovation, (2) innovation around the activities not commonly associated with the product development cycle, e.g. logistics, customer experience and digital delivery, and (3) activities sometimes delivered as a project, but sometimes possibly as repeated functions or tasks. These are sometimes subject to continuous improvement, customer feedback and other “feedback loops.”<sup>8</sup> As we develop the framework, we also need to be aware of the uses of the data that could be collected with this framework. In a later revisit of trade statistics, we will first look at existing trade in services data and their use in the context of outsourcing-offshoring.

## 2.2. Precursors of a Network-Oriented Conception of the Firm

The concept of “national enterprise” has faded away for many large firms and an increasing number of small firms. Several facets of this emerging model of the firm are highlighted in various literatures that have been developing for the last few decades. In fact, firm-centric models are giving way to a polyglot of perspectives: from knowledge-based theories, to services offshoring models, to network-based theories and even business model frameworks. Many approaches weave some of the newer typologies together with transaction cost based approaches. Some of these approaches have something to do with the “features” of the firm or its product (e.g. knowledge-based approaches), while others have something to do with the features of the industry (e.g. business models, which first emerged during the dotcom era, and have continued to the present day.

In a paper foretelling current day theorizing on the firm, Simon (1991) pointed out that organizations inherently contain many more features than transactions can take into account or that market based mechanisms can: *“A large part of the behavior of the system now takes place inside the skins of firms, and does not consist of market exchanges.”* One of the most common economic models of the firm underlying much of the management literature (including that which addresses the boundary of the firm), is the transactions cost economics (TCE) theory of Williamson’s. As Simon notes: *“A fundamental feature of the new institutional economics is that it retains the centrality of markets and exchanges.”* These models tend to hit their limits whenever actual organizations and their mechanisms are considered (Simon, 1991), or whenever the structure between organizations, or the socialized nature of that structure (Granovetter, 1973), are considered.<sup>9</sup> In fact, many recent network-

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<sup>8</sup> Innovation in services is even more ill-defined, partly given that such innovations occur across disparate sectors, that the innovations are sometimes firm, sector and situation specific, that they are not codified by standard processes, and that academic or practice fields of thinking have not been developed to absorb and make sense of these practices. The lack of clarity in services innovation derives from a number of differences services have with hardware or manufacturing.

<sup>9</sup> Simon contributed a famous analogy of how visiting martians might view our organizations-driven world as one of networks based around organizations, and not as one of organizations based around networks as neoclassical economics would be wont to say. In fact, Simon’s own stylized view of market transactions did not even account for the non-market

based theories embed the TCE view as a cornerstone of their theorizing, but attempt to move the field beyond a transactions-based economy towards one with more structure by way of introducing a structuring element – this by way of recognizing the role of knowledge, innovation, complementary resources, or capability.

### 2.2.1. The Value Chain as a Basis for the Network

Another feature of the modern firm is Porter's notion of the value chain. As with many early contributions, this was based in part on observations of how firms are organized. In his historical overview of how the concept of the value chain emerged, Ghemawat (2002) notes

*"...Porter's value chain...emphasized the importance of regrouping functions into the activities actually performed to produce, market, deliver, and support products, thinking about links between activities..."*

The value chain has by now been suffused through the modern literature on strategy as a mainstay in shaping our view of how firms are organized. The notions of concern to us are those of the links between activities, and of the grouping of functions. It is important to note that while the value chain is depicted as linearly linked and while the functions found in a given firm are often the ones seen as adjacent to one another in the prototypical value chain of Porter's, a given firm's value chain operates within a network of firms, whereby different agents (or firms) within that network participate according to their capabilities.

The matter of understanding how firms' value chains are distributed globally (and the resulting contribution of services to overall patterns of trade) relates to how shifts in the **boundaries of the firm** and of **value chains or networks** generally occur. It is by now conventional to assume that firms will offshore work primarily as a cost minimizing strategy, often by their function, in order of increasing value added (and complexity), and in accordance to whether labor arbitrage conditions dictate a favorable environment (see for e.g. Arora and Gambardella, 2003). Thus, one atypical progression of the offshoring of services for Fortune 500 corporations started at the earliest stages of offshoring with software maintenance for back office departments such as information technology, but was followed by contact or call centers, business processes containing accounting, finance, and for product manufacturing firms, parts of the research and development (R&D) function.

### 2.2.2. First Frameworks for a Network-centric world: The Global Value Chain

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transactions or transactions created by organizations engaged in collaborations, alliances and other forms of cooperation which contribute to networked forms of organization – all of which are large parts of the value exchanges.



We will next turn to the development of a network-centric view of firms' operations. In particular, we discuss the the global value chain as an early conception of the networked enterprise. In fact, many recent network-based theories embed the TCE view as a cornerstone of their theorizing, but each attempts to move the field beyond a transactions-based economy towards one with more structure by way of knowledge, innovation, complementary resources, and capability respectively.

The global value chain (GVC) was an early effort to capture the complexity as well as the main features of the nature of globalizing production networks (Gereffi et al, 2005). It has a dual use - for shedding light on **what is offshored and for what reason**. The GVC provides a direct counterpoint to the product life cycle hypothesis of Vernon (1966), which suggested that work in the relatively mature economies would be offshored once those industries became mature, and the conditions developed in emerging regions to handle the very same work. This hypothesis was first overturned by the emergence of East Asian economies, which proved that labor markets and firms' capabilities could out-develop the development of local market demand. Recently, the emergence of services outsourcing threatens to turn the rest of the hypothesis on its head.

In the GVC view, the governance of a hardware value chain was considered to be a function of the firm's capability, but also of the ability to codify this in order to outsource it, and the nature of transactions. Once a task can be codified, it can be partitioned and outsourced to a lower cost provider. Three elements were proposed as determining the nature of the value chain's governance: the complexity of transactions, the codifiability of the work (which to a degree, also facilitates its modularization and hence, the role of transactions), and the capabilities of the supply base to engage in that work as a part of the network

Complexity is also highlighted in the GVC as a relevant dimension for determining the network's form of governance (i.e. configuration in our terms). However, complexity is defined rather narrowly as *"The complexity of information and knowledge transfer required to sustain a particular transaction, particularly with respect to product and process specifications"*. Thus, since the GVC's theory of partitioning and offshoring is predicated on transaction costs, it suggests a greater concern with the tradeoff between the complexity of the transaction and need to keep the work in house.

One perspective that can be expanded on in the GVC framework is that of the motivations and influence of the lead firm in a network. In such a view of the firm, complexity has as much to do with the management of the network and its reconfiguration (as the work is moved from one provider to another) as it has to do with the outsourceable task. Thus, if we look at the network as emerging from the desire of firms to build a product architecture and to manufacture it, in part by outsourcing

components and subsystems, then the picture subtly shifts to one of network control. There is also a dynamic perspective to such networks. What traditionally dictates against shifting work around is a combination of the cost of managing complexity and the transaction costs (Gereffi et al 2005), but it is possible that, being well codified and process-driven, services work is more easily moved around.

The bottom line is that while Gereffi, Humphrey and Sturgeon have provided us with a valuable approach to viewing offshoring via a networked form of organizations, the application of these concepts to explaining services, and to provide a perspective rooted in the motive forces of firms and developing regions needs more development. The GVC theory was developed with an eye to tracing the various forms of “value chain governance” that have emerged, as well as to recognize the modular and dynamic nature of the chains. We will now turn to examine the application of the GVC framework to the understanding of services production.

### **2.2.3. The Uses and Limits of the GVC Framework for Explaining Services**

From the numbers, a dramatic change is occurring in developing countries with regards to services and knowledge work. Blinder (2006) suggested that the economics of offshoring services might follow the distinctions laid out by the tacit or codified nature of the work, and that the degree of value added of the work was not necessarily correlated to their likelihood of offshored being first. The fact that services that had traditionally not been offshored are offshored nowadays is a significant enough change. The issue of whether higher valued services work will be offshored may not so much a matter of “what” but “when”. Most firms would probably seek to offshore lower value services work first, and only to ramp up the value according to their captive facility’s or provider’s ability to undertake the work – the latter itself being an evolutionary process.

### **2.3 The Nature of Services and Networks**

The notion of the GVC adds a dimension relevant to understanding what services can be offshored - this is the dimension of how knowledge work is partitioned (usually by the degree of task codification). The challenge we now face, as with all parts of the emerging framework that we are tackling, is that of how to translate the above concepts of the global value chain and language of networks to match the world of services.

One of the major differences between products and services would appear to rest on how services are typified by the business functions they supply (Sturgeon and Gereffi, 2009). We consider the following characteristics of services:

- (1) We distinguish between **output-related services** like product development, marketing, inventory management and customer service, and **supporting (i.e. back office) services** like accounting, finance, information systems (based on Sturgeon and Gereffi[ 2009]).

- (2) **Services, especially supporting services**, are often “functions” of a corporation that run **throughout** the corporation (and hence, across the value chain). As a consequence, when a service function is outsourced or offshored, such services as found throughout the entire breadth of the corporation is potentially affected.
- (3) **Output-related services** can also be offshored. In the same way as a product architecture, **a support service can be said to have an architecture**, and hence, specific tasks that accomplish that architecture’s goals are amenable to offshoring, so long as information flows are consistently maintained. This maintenance requires consistency in the interchanges, as well as the ability to handle issues such as exceptions (defined as variations in input), knowledge (or the layer of interpretation or contextualization placed on the information), and changes in processes (which will impact on the information flows). Thus, the offshoring of services is no less challenging than that of products, but if most of it is codified and computerized, systems and training, as well as appropriate interfaces, can be put in place to ensure their successful decoupling and eventual performance by other business units or firms.
- (4) Like products, services are based on **processes**, but the types of processes may be quite different. Many back office service processes tend to be codifiable and manipulated as information, which provides the possibility of outsourcing them. Interviews with MNCs suggest that the movement of work from one location to another to be done is not that difficult, presumably since the work is already centralized, codified and computerized to some degree in firms.

## 2.4. What Determines Network Configurations? Moving Towards a Theory of Network Formation

Generally speaking, the GVC perspective is based on the assumption that goods production is increasingly becoming modularized. The modularity and design literature itself takes its beginning from the codification and standardization of the work, and builds into the theory the nature of the interfaces between components or stages of the work; clearly defined interfaces allow for more cleanly separable boundaries between enterprises.<sup>10</sup> While this literature largely pertains to technologies, and in particular, semiconductors, the same notions can be applied to other sectors, e.g. services (Pavitt, 2003) and animation (Tschang and Goldstein 2010).

We take as our starting point the observation that many existing networks do not simply self-evolve, but are **“structured” by a dominant firm or shaped by its decisions**. This pertains to the “control”

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<sup>10</sup> In the design work of Baldwin and Clark within the modularity literature, modularization essentially leads to decoupling and the shifting of work, in part determining the boundaries of the firm. In one of its extensions, Clark suggests that the extent to which work can be shifted innately depends on the nature of the interfaces between sections of the work.

issue identified in the previous subsection. We need to recognize that the primary firm (or client) is still at the center of the network, and so the theory needs to shed light on what governs the firm's decisions, and to recognize the variety of factors that firms have to deal with as they choose to structure their relations within the network.

Whereas the GVC emphasized the codification and complexity (of the work) and the capability of providers, we suggest that a more complete theory (of how network configurations are shaped by firms) will encompass understanding the following which relate to similar criteria:

- (1) What determines the boundaries of the firm (or where the networks are likely to emerge)
- (2) How lead firms exercise control over the network – this relates to their capability
- (3) What factors influence the firms' offshoring decision (and locations they offshore to).

Our emphasis is on the lead or client firms and on how they determine the network configuration (embodying the directions and sizes of the work flows). One of the more basic network configurations in this is that of a "tree" (also known as a hub and spoke configuration). In this configuration, the lead firm or client is the center node, and offshores work to the other nodes within its "network."

We will now focus on elements of the network structure consistent with outsourcing patterns, or the aspects of the framework that most closely relate to it.

**Table 1. Summary Table of Elements in a Theory of Network Configurations**

General element	Purpose in theory	Context of manufacturing	Context of services
<b>What Determines the Boundary of the Firm (Determinants of network configuration)</b>			
<b>Basic dimensions (determining outsourcing)</b>	Determines limits to offshoring	Product lifecycle stages	Output-based vs. supporting services
<b>Determinants of breakpoints in the work that is offshored</b>	To determine the quantum (scale) of work offshored	Stages of work (e.g. R&D), (dependent on maturity of the product) become the natural interfaces	Since work is process based: segments of a given "stage" of work become interfaces
<b>Network topology (existing, future)</b>			
<b>Network typology</b>	Explains current state of world	Current: Network enacting value chain, and as hub and spoke  Future: Network as fully connected (with end nodes connected)	Current: Network as hub and spoke  Future: unknown network configurations
<b>How structure of the work defines the network</b>	Determinants of innate character of work-specific network	Defined by architecture or other designs, as well as defined subsystems and components	For <b>output-based</b> services: same as mfg. For <b>supporting services</b> : functions can be <b>segmented by process, task or subfunction</b>

<b>How firms exercise control (the ability to configure a network)</b>			
<b>Control over architecture and key points</b>	Explains how lead firms configure network	Control of architecture/ major nodes	Control over processes (how processes are split and combined)
<b>Integration</b>	Core capability to manage the network	Systems integration, capability to manage network etc.	Systems integration, capability to manage network etc.
<b>How firms decide to outsource (modifiers of network structure)</b>			
<b>Role of codification</b>	Enabler of the offshored network	Some work is codified, e.g. designs, manufacturing specifications	Some services (e.g. support services) are easily codified, e.g. software, business processes
<b>Role of technological interdependence</b>	Enabler of the offshored network, mediator of other effects	Technology allows coordination across interfaces in stages of work	Coordination and interfaces is automatic due to being highly codified. Technology reduces economies of scale needed to offshore
<b>Complexity</b>	Determines what is outsourced	Product architecture determines complexity	Service architecture (?) determines complexity
<b>Other factors observed</b>	Mediates decision	Cost, Risk	Cost, Risk

#### **2.4.1. What Determines the Boundaries of the Firm and “Natural Boundaries” for Offshored Work?**

The boundaries of the firm have been an undying preoccupation of many top theorists. Short of expanding on these worthy theories, we can surmise that more recent theories have largely been undergirded by the modularization of components and tasks and their decoupling in a manner suitable for production across a value chain, followed by some manner of dealing with the transaction costs of shifting that work outside of the firm. This was the presumption behind the GVC framework. Modularity was associated with the outsourcing and offshoring phenomenon.

Ultimately, the modularization of the product and tasks, coupled with the natural boundaries at which this occurs, serves to provide a logic for where (in the product architecture) and how segments of work are decoupled. Pavitt (2003) noted that at least for the case of hardware, the relocation of work ensues in the following manner:

*“Vernon (1966) originally argued that relocations to developing countries would happen only in products in the ‘third stage’ of the product cycle, when product characteristics and production methods had stabilized, and the main skills were those of combining stable (and cheap) factors of production.”*

#### **Modularization as the Starting Basis for Network Formation**

Modularization suggests how work is decomposable and therefore distributed. Pavitt (2003) points out: *“the complete disintegration of product design and manufacture has not yet been achieved, but recent advances in modularity and ICT have apparently shifted the balance in its favour in some industries.”*

Pavitt notes that at least in the past, with regards to manufacturing, there are limits to modularization and the partitioning of work across firms’ boundaries:

*“it is doubtful whether we are moving towards a complete, arm’s-length division of labour, with product designers defining modular product architectures and functions in anticipation of customers’ needs, subcontracting firms designing components and subsystems within the constraints of the overall product architecture, and manufacturing firms making the components and sub-systems”.*

### **What Determines Firms’ Boundaries and Network Configurations for Services?**

The first issue that impinges on a network’s configuration is that of what is “feasible”, or the natural breakpoints that dictate the offshoring patterns, and hence, the network’s configuration. To shed light on this, we return to Gereffi et al’s (2005) point that for manufacturing, work that is offshored involves limited product complexity and the ability to “codify” their tasks. Sturgeon (2002) further points out that contract manufacturing for hardware, while increasing in the US, tends to be naturally limited to highly standardized base processes.

At the same time, the natural boundaries of the firm and natural breakpoints are determined by the actual nature of the work. The question is that of whether services are similar to hardware in this respect, or whether they are quite a different matter. We suggest that the extant evidence seems to point to particular “breakpoints” in the structure of offshored services, depending on the sector involved. These natural interfaces are locations by which certain tasks and modules can be moved “outside” of the boundaries of the firm. To observe this, we examine what the production processes and structures of different offshored services look like. Different services have different outputs – be it knowledge (e.g. education), functionality (e.g. transportation), or value addition (e.g. finance) – and these outputs are delivered using a variety and combination of knowledge inputs and processes.

**Software:** The hierarchical nature of software development is well known, and work is often offshored to developing countries. It has taken a long time to transit higher value added work to first mover locations like India, but it has nevertheless been accomplished. The network configuration for a client firm may involve multiple providers. Even for smaller firms, it is not surprising to see software development taking place in parallel in three or more different time zones. Take the example of an actual case of a small steel mill in the United States. It may have a small core team of software developers in India (relocated there in the past), a small team in the US, and small offshoots of the

team in locations in two locations in Europe. Over time, the team may get centralized in India, but with wages increasing in India and staff turnover hitting highs, part of the team may eventually get pulled back to the US, where wages are stagnant and labor turnover is not as high.

**Animation outsourcing:** As with software, an outsourced “creative” service has a similar structure of production. While animation at the conceptual stage is not outsourced, it is entirely possible for the production stage of animation to be moved wholly overseas – usually starting with the easier tasks. Once an animated setting is codified so completely, the task is essentially “painting by numbers”, it is also possible for animation productions to be divided up into scenes and to be shipped to spread out locations to be done. An example was illustrated by Winder and Dowlatabadi (2001), who recall a personal case of a small animated production where the sequences were parceled out to various artists/animators all over, and on completion, were eventually brought back together and integrated.

**BPO:** Finally, we turn to business process outsourcing. Again, it is conceivable that the types of processes can be distributed throughout a firm’s networks. While cases like Procter and Gamble’s offshoring of entire business functions to captive facilities in specific locations, followed by the eventual sale of those units to third party providers like IBM and HP, is rarer, there are also cases of single firms parceling out different parts of a business function to different locations. Thus, one major shipping company pointed out in an interview with an author that they had moved some of their legal work to China, some to the Philippines, and to other locations. This configuration is of the hub and spoke approach discussed earlier, albeit with “smaller spokes”.

In summary, while it seems that on the surface, such services like animation may not seem to be hierarchically organized like products are in their architecture, they are in actual fact organized in a hierarchical way, with a heavy conceptual end being core to the product. In other services like BPO, the services are wholly centralized, and can be offshored either in part or wholesale. Yet other services like call center operations can be offshored in their entirety. In some services, there may be an economics of scale effect, but this effect is only partial, since these effects are offset by a range of other factors that dictate the configuration of the network.

We also have to contrast the ease of offshoring of these codified services with what Blinder (2006) calls personalized services, or services that are less susceptible to being moved around. Hotel guest services that are experienced face to face are an example of this. They may or may not be of a high value, but they cannot be offshored, so they in effect have to be locally provided.

## **2.4.2. How Dominant Firms Exercise Control Over the Network**

The second requirement for addressing the network configuration is to determine how dominant firms develop and maintain control over the network. This is done by two ways:

- (1) By the way in which architecture (particularly in the case of manufactured hardware) is defined and later used to control the network, and the kind of capability – what we term systems integration – that is associated with that need to control.
- (2) By lead firms or clients being the most important force for the formation of production networks. By defining a product’s architecture, the lead firm puts itself into position to coordinate the work of the network.

### **Architecture and key components as central “network controlling nodes” leading to a tree configuration**

One extension to the GVC framework is our recognition that all products, and many services to a degree, contain an inherent architecture with an innate hierarchical ordering, and that this is the source of “power” over a network. We further posit that the “lead firm” in a network may control the architecture of the product, or key components of the product. Thus, while the GVC framework posits networks and hierarchies as being on a spectrum, it turns out that hierarchicalization works not in opposition to networks, but in combination with them. Both situations can also be represented as **“critical nodes”** in a set of nodes denoting the firm’s and network’s capabilities. By occupying a “top most” level of the hierarchy, the firm will control the network as a hub and spoke (or a tree). We further suggest that this control is exercised by a set of interrelated capabilities, operating on the usual factors that serve as inputs to a firm’s “production function”: labor, infrastructure, and other forms of capital.

Evidence of critical components is also seen in certain industries. It is well known that certain products have key components (i.e. ones that uniquely define the overall product), e.g. the print head in the laser printer, the disk drive head, and the microprocessor and operating system in the personal computer. What this suggests is that firms that exercise control over those components are in effect using these components to reinforce the firms’ role as controlling nodes in a network.

The central role that architecture plays has already been discussed. There is an emerging literature supporting this view of architecture being instrumental to a firm’s ability to control the product spaces around it (Jacobides and Winter, 2005). This is also relevant to understanding how specific forms of control that weld standards and other technologies together as a form of “power”, e.g. technological platforms like Apple’s I-tunes that allow it to dictate favorable terms over content providers.



Keep in mind that the goal is to develop a prospective theory that governs the distribution and location of services work in the network, and hence, that will shape the configuration of the network.

### **Integration as Core Capability: Capability as the Means of Control**

The **set of capabilities** that our rough study of modularization and outsourcing suggests rests foremost of all on the idea of *integration or systems integration*, which includes the ability to decouple and manage the network. Integration is highlighted in the literature on systems integration (e.g. Pavitt, 2003). The systems integration perspective on large firms takes systems integration to comprise *“a set of different technological and organizational skills, ranging from component assembly through the understanding and integration of the technological disciplines.”* (Prencipe et al, 2003)

Firms that can **integrate the disparate components across the “network”** can be considered to have a competitive advantage. From an advanced firm’s perspective, this relates to how systems integrators may “design the network” (explored in a following section). This notion of systems integration has reached into sectors as variant as software (Arora and Gambardella 2003), the biotech setting (with the suggestion that hospitals may be positioned as the new systems integrators in the emerging bioeconomy) (McKelvey, 2008), and in the temporary assemblage of resources as projects in creative industries such as film.

### **Capability and Services**

Many features of the above mentioned capabilities also apply to services. For instance, even though software is a more pliant kind of technology that can be shaped to many uses, it also suffers from the hierarchical nature that the eventual product has to take the form of. So like hardware, the product is typically outsourced by defining the architecture, consisting of a hierarchy of an overall system, subsystems, and/or components. The lower level subsystems are then outsourced, then later “reassembled” back at the location which is the source of the architecture. Of course, many formerly hardware-based products are increasingly software-based too. The point this example makes is that a hub and spoke or tree model of network is very much the case for software. The only question is that of how many spokes there will be, and how small they are. Creative products like animation and video games also use design or architecture as a primary form of control and for defining the rest of the product. They also follow a progressive product development cycle from conceptualization to full production. Again, like the case of products with their “controlling nodes”, the conceptual and design stages for animation and videogames respectively are the controlling stages. These are almost never worked on outside of the home market. Typically, an offshored animation product is defined in the

“home (initial target) market” by the story writer and other members of the conceptual team.<sup>11</sup> Once the story and look of the art is clarified, the work is then offshored to the “production team” in other countries to handle.<sup>12</sup>

### **Related Forms of Capability**

The **notion of integration** that we adopt includes the ability to define and control architecture, both within and between enterprises, as well as platform control (in competition with other enterprises). There are a few other integration-related capabilities that relate to the network topologies discussed earlier:

**(1) The first is the capability to manage a networked production process**, in particular, the production networks of manufacturers. Clients would presumably prefer to have economies of scale, and hence, to offshore the work to small numbers of providers. However, the incentive of providers is to scale up as well as to increase their returns. While they are mediated by market competition, they are also indirectly mediated by the ability of clients to segment their work. Hence, clients can be as willing to segment their work in order to deal with multiple providers, especially with regards to IT-enabled processes such as services.

**(2) Control and management of the key components or other intellectual property (IP) embedded in a network as capability.** In certain industries, such as entertainment (e.g. film, animation and video games), firms compete on IP. In others, where there is a well defined architecture, the control of key modules that define product performance are key, such as the print heads in ink jet printers, and the heads (reading/writing to the magnetic media) in disk drives. Patents or copyrights are used to protect these components. In some cases, the control of IP is also associated with the control of the architecture, while in others, e.g. companies producing materials like 3M and Kyocera, the firms’ speciality is the component itself.

### **2.4.3. Why Firms Decide to Outsource (and Hence, Where to)**

We now turn to the trickiest part of the framework - that of the offshoring decision, which in turn describes a network’s eventual configuration. The literature on offshoring is by now replete with a great number of studies that shed light on factors causes firms to outsource. Namely, the external and

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<sup>11</sup> For a series where the work is already mature, it becomes a matter of “painting by numbers”, and most members of the production team may not even need to know the language of the conceptualizing team. For a one time product like an animated feature film, more interactions and iterations are needed.

<sup>12</sup> One implication of the hub and spoke model is that while control rests in the hands of the firm (or multinational as the case may be), the configuration is allowing for a maximal amount of flexibility as the architecting location can freely choose to define the spokes *wherever they may be*. Another implication for this is that a hub and spoke model still works for explaining how these production flows will take shape, but there may only be one or two spokes, i.e. a primary offshoring location.

internal factors that affect decisions on the network. Specifically, the list of factors that impinge on a firms' decision includes the following ones atypically mentioned in studies (e.g. Arora and Gambardella 2003, Lewin et al 2009):

1. A combination of cost and efficiency considerations, quality, and needs for labor.
2. Country level factors relating to offshoring to locations, including not only the labor arbitrage conditions, but labor supply issues (quantity and quality), workforce characteristics (e.g. language ability), infrastructure, and the attractiveness of the regulatory environment.
3. Risk factors with regards to locations and providers. Firms have been observed to slice up work and to move it around the world. This may be because of the **leverage over suppliers** (i.e. the desire to manage supplier (provider) competition), the reduction of country risk (from single countries), and the frictionless nature of carving up work by certain boundaries.<sup>13</sup>
4. Firm level capabilities in the range of organizational options for offshoring (e.g. in-house but offshore using "captive" centers, or using independent providers)

By helping to determine the outsourcing decision, these factors are essentially responsible for the structure of the eventual network as it is configured geographically. Not only do decisions have to be taken at the early stages at the executive and leadership levels, but the ability to manage for outcomes is important. Thus, in addition to all this, all sorts of usual implementation (project management), operational and training capabilities are needed.

As pointed out, many studies have covered this set of factors, but given that control of the network rests in the hands of the lead firm, once the economic rationality becomes viable, the issue becomes a more subtle one of determining where a given firm might choose to outsource to, and which parts of its value chain are the first to go (and how this outsourcing pattern structures its value chain). These are the decisions that will have the ultimate effect on the network configuration, and hence, the pattern of trade.

Outsourcing has been greatly facilitated by technological intercedences. Improvements in telecommunications has had the greatest effect, but the development of specialized software platforms for distributed development and their use for handling codified and process-based businesses has also helped to dramatically shift outsourcing. In particular, it is increasingly possible to bundle work that has been codified as business processes, and to ship it to any, or even multiple locations.

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<sup>13</sup> One of author's interviews with a mid-sized software development firm (provider) showed that some clients were unwilling to put all the work into the hands of single provider, and were dividing their software work into smaller portions and spreading it across multiple providers.

It is also worth pointing out that we have so far focused on integration as a purely technical activity, but that the capability to integrate may involve a variety of types of knowledge, including those pertaining to the above factors.

### **3. Trade in services statistics – what do they currently measure?**

“Services are no longer exclusively an input for trade in goods; rather, they have become a final export for direct consumption” (Mishra et al, 2011). That is, services are more tradable and are more "stand-alone" products rather than input for trade in goods. Baldwin describes in his 2006 book the geographical and organizational unbundling of production in manufacturing. Services production is also increasingly fragmented. For example, the design of a database can be done in country A, its development may be executed in country B, and then the final result is delivered and implemented in country C. Research and development is a similar case in question where internationalization takes place (Svensson, 2010). How do international trade in services statistics account for such exchanges?

International trade statistics, for goods or services, are based on the analysis of gross flows. That is, international transactions are recorded according to their market value or prices. This principle, with some exceptions, is the guideline for all statistical frameworks that record international trade. For goods, rules of origin determine the country of origin to which the full import value is allocated. Macroeconomic aggregates then analyse the trade balance (X-M) of countries at total level. When looking at trade in value added, the trade balance at aggregate level is not changing, however, for bilateral trade balances, relations may change.

The following sections describe first how trade in value added is assessed in goods and then present current trade in services statistics and to what extent they relate to the trade in value added discussion.

#### **3.1. Global Value Chains -- from goods production to trade in services**

For assessing the size of the fragmentation of the production of goods, different approaches are used. These are described as either direct measurement or indirect estimation. Both approaches consider services as "enabling" or "embedded" in goods production, that is, services are facilitating the production of goods in supply chains.

As international merchandise trade statistics are mostly established from customs documents they hold detailed information of international transactions by commodity, value, quantity, origin and destination, etc. Customs record the physical crossing at borders of goods and assign the full gross value of an international transaction to the respective country of origin. But this country of origin

may only be the last assembler in a long supply chain line and may not have created nor benefited of the full value added included in the good (prominent examples are the iPod, iPad or the Nokia 95). That is, international merchandise trade statistics do not reflect the process that helped shaping the completion of the final good. The gross value of a product is allocated to the country of origin but the value added necessary to produce the product may be spread across several countries forming the supply chain as shown in table 1:

Table 2. 2009 US trade balance in iPhones (million dollars)

	China	Japan	Korea, Rep. of	Germany	Rest of world	World
Traditional measure	-1,901.2	0	0	0	0	-1,901.2
Value added measure	-73.5	-684.8	-259.4	-340.7	-542.8	-1,901.2

Source: Miroudot, S., Global Forum on Trade Statistics, 2-4 April 2011<sup>14</sup>

But how is value added defined that is brought by countries at each stage of the production process?

Value added is defined by the 2008 System of National Accounts as the difference between output and intermediate consumption.<sup>15</sup> The 2008 SNA further defines intermediate consumption as "the value of goods and services consumed as inputs by a process of production. The goods or services may be either transformed or used up by the production process"<sup>16</sup>.

Against this definition, there are three methods to either measure or estimate value added in a supply chain to create a final good:

There are three methods applied in research papers:

1. Case studies
  - Examples: iPod, Barbie doll, Porsche Cayenne
2. Direct measurement
  - Foreign trade statistics (share of parts in total trade)
  - Strengthening linkage between trade and business statistics
3. Indirect estimation

<sup>14</sup> Based on Xing, Y., Detert, N. (2010)

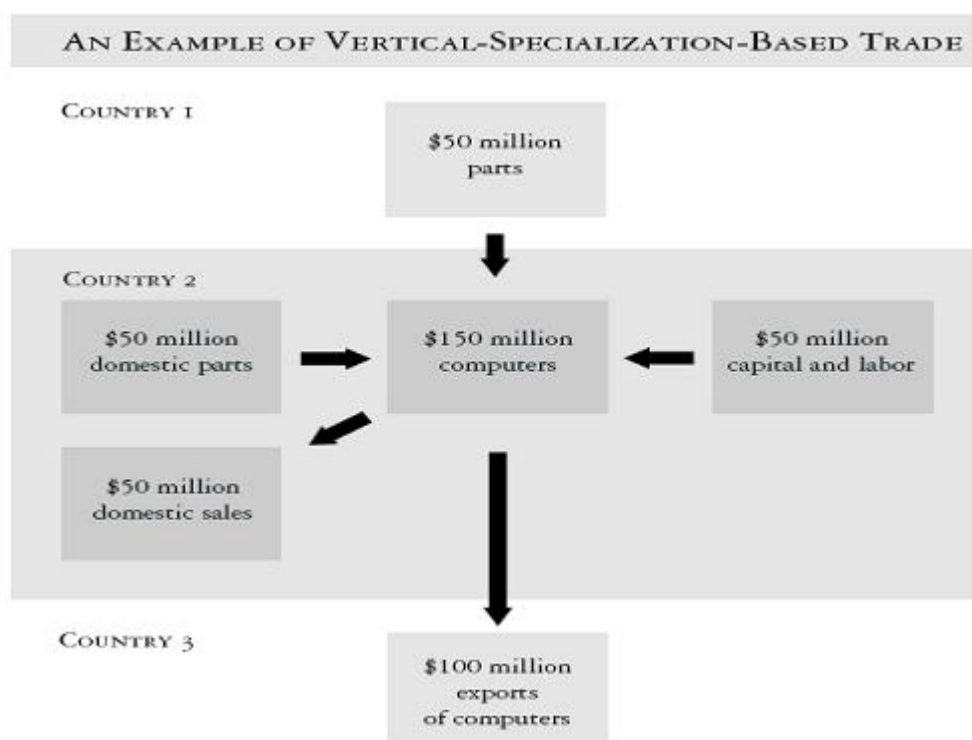
<sup>15</sup> 2008 System of National Accounts, para. 2.65

<sup>16</sup> 2008 SNA, para 6.213. Taking into account the tautology of definitions of macroeconomic aggregates in the System of National Accounts, value added can also be defined through the income account as compensation of employees, taxes and subsidies on products and imports, operating surplus and mixed income.

- Estimates based on national accounts (input/output) and trade statistics

While 1 and 2 focus on the "micro" measurement, 3 is more focused on the "macro" estimation and results depend on the level of aggregation used for deriving the estimates. Individual case studies are most exact but very expensive. Information is often taken from so-called teardown reports. The direct measurement uses existing trade statistics and distinguishes intermediate goods from final goods. This provides a rough estimate. More recently, measures link up trade and business statistics through combining trade and business registers. Thus, this method tries to combine the production process with gross-reported trade figures.

As for the indirect estimation, international input-output tables are commonly used for the analysis of global supply chains when assessing the import content of exports. The measure of imported inputs that are embedded in exports for a typical industry is also known as vertical specialization, as shown in the classical example below:<sup>17</sup>



Source: Hummels, D., Ishii, J., and Yi, K-M. (2001)

### 3.2 The role of services

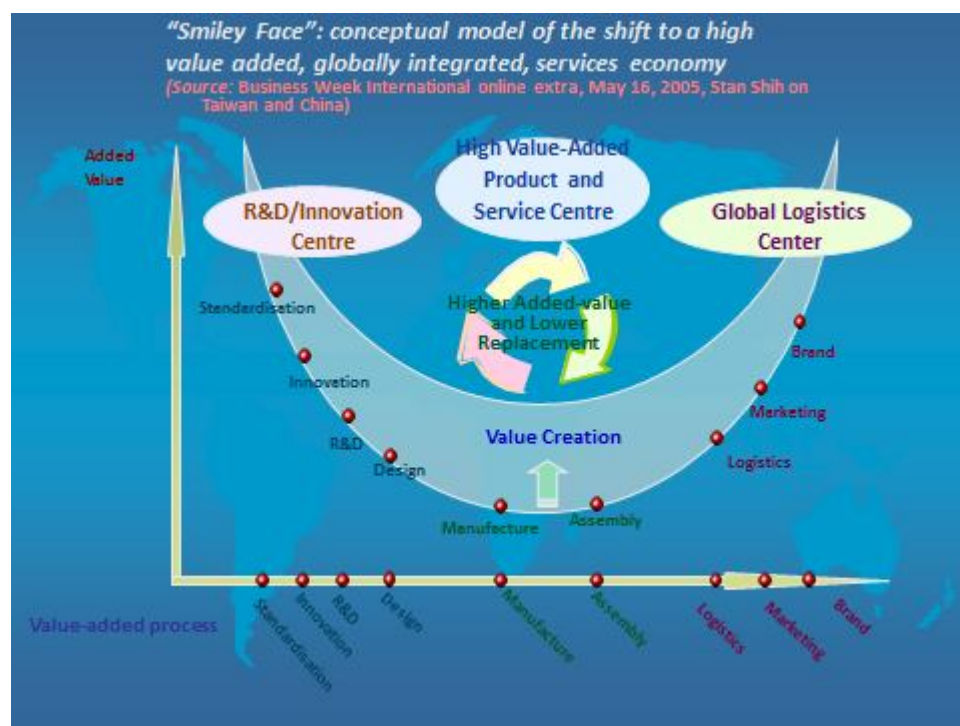
Input-output tables include services, but at a high aggregation level and with less or no detail on the origin and destination of services. Nevertheless, currently available results in academic papers

<sup>17</sup> Hummels, D., Ishii, J., and Yi, K-M. (2001)

measuring vertical trade attach services more importance. Daudin et al. conclude in a study that at world level the secondary sector share in total trade is reduced from some 74 per cent to 47 per cent, while that of services is increased from 17 per cent to 39 per cent (based on GTAP data of 2004). This reflects the case of embedded services in goods as good's trade statistics record the transaction prices of physical flows crossing borders<sup>18</sup>. Services or intellectual property rights are included in the price and are not separated out.

The first part of the paper has shown how services support the facilitation of the supply chain production, mostly through offshoring.

In new business models, enterprises outsource not only the assembly of a goods production, but also many services-related tasks. This is often referred to as trade in tasks. The manufacturing or assembly is accompanied by high value added services activities such as R&D or logistics.



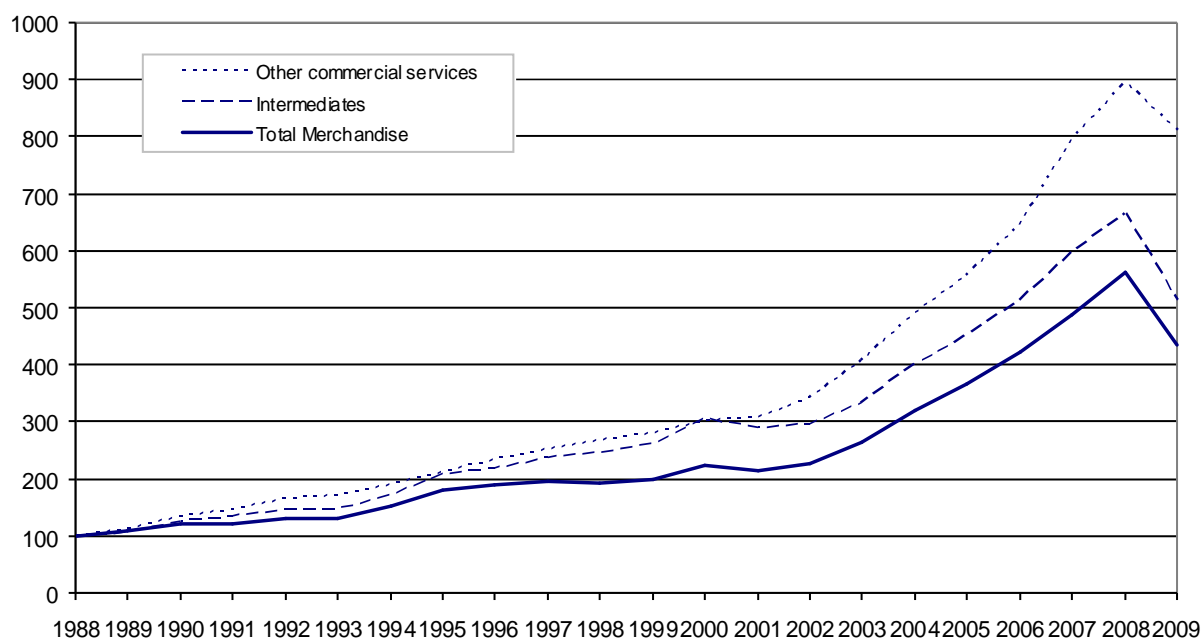
Source: Jane D. Brockman; presentation, Guangzhou, 16 February 2011

The smiley shows that services occur on both ends, suggesting that they are occurring across the value chain, not necessarily in a sequential way. The services supply occurs across countries suggesting that the level of capability at the firm level, complemented by country level factor advantages (or resource endowments), are key determinants of where the movement of work takes place.

<sup>18</sup> Daudin, G., Riffart, C., Schweisguth, D. (2009)

The importance of services as "enabling" a supply chain for the production of goods is also reflected in current trade in services statistics, however, only implicitly.

### Trends in world trade of total merchandise, intermediate goods and other commercial services, Index 1988 =100



Plotting trade in other commercial services (which excludes transportation and travel) against trade in intermediate goods and total merchandise shows that the growth curves are shaped similar for all three lines. Actually other commercial services increase more than merchandise and intermediate trade flows. What is the reason? Are there similar effects at work as for trade in merchandise being "inflated" by trade in intermediates? Merchandise trade flows are recorded gross when passing borders. Services are recorded gross as well in the balance of payments, however, as shown above, for services it is important to agree on a concept for its measurement.

In merchandise we distinguish intermediate and final goods using UN's classification of Broad Economic Categories and allocate imports according to the country of origin determined by rules of origin. For services, it is more difficult to determine what trade in intermediate services refers to? Is offshoring trade in intermediates in services?

And what is the difference in rules of origin for services? The focus here seems more to lie on the origin of services suppliers and the place that services are produced rather than on the service product alone (Fink and Nikomburiak, 2007).



Other commercial services include other business services (professional services) and computer and information services, which both relate to offshoring activities. Unfortunately, other commercial services is difficult to break down further over such a long period but it shows that information on services input in global value chains is important when considering value added. Offshoring activities are often described by business functions (see section on business functions).

**Box 1: Statistics on the International Supply of Services**

Statistics on the international supply of services use two building blocks: the Balance of Payments and Foreign Affiliates Statistics. The Balance of Payments, 6<sup>th</sup> edition of IMF distinguishes 12 services components (see Extended Balance of Payments classification) and covers the supply of services through modes 1, 2 and 4. For practical reasons, Foreign Affiliates Statistics (FATS) are grouped according to activities as specified in the ISIC (Industrial Standard Industry Classification) categories for Foreign Affiliates (ICFA, Rev.1). FATS measure the supply of services of foreign affiliates and thus provide an estimate of the size of GATS mode 3. The latest revision of the Manual on Statistics of International Trade in Services adds for the first time a statistical coverage of mode 4 and describes it in a separate chapter statistics on the international supply of services by mode.

How is the fragmentation of production across countries reflected in trade in services statistics? As said in the introduction, the revised Balance of Payments Manual 6th edition (BPM6) and the revised Manual on Statistics of International trade in Services (MSITS 2010) define services as either transformation or margin services. A third category is knowledge-capturing products.

One of the main characteristics of the revised Manuals described in Box 1 is the "strict application of the ownership" principle in the balance of payments, guided by the System of National Accounts. The most recent revision has finished the exception of this principle included in concepts and definitions of the balance of payments framework, fifth edition (BPM5), and this feature may impact on the way global production is measured.

As a consequence, certain items of this statistical framework have been reclassified from the trade in goods account to the trade in services account and vice versa. For example, goods for processing sent abroad without a change of ownership of the inputs that are assembled abroad, were reclassified to "manufacturing services on inputs owned by others" in the services account. Equally, maintenance and repair cost were also reclassified to the services account of the balance of payments. In contrast, merchanting (where an ownership change takes place, although the good never enters the country of the merchant) was moved to the trade in goods account.

The new Balance of Payments Manual (BPM6) and MSITS (2010) guide compilers for the recording of services outsourcing. These services should be classified to the appropriate services item. For

example, call centers should be classified according to the type of services provided (centers providing computer support should be included in computer services).

Services items that can be related to offshoring or "global manufacturing" in BOP/EBOPS are manufacturing services on inputs owned by others or service items that include IT-enabled services and business process outsourcing such as computer and information services or business services.

Furthermore, services as defined in GATS can be supplied through four modes. Therefore, it is important to relate the analysis of trade in value added in services to these modes. For cross-border trade (**mode 1**), the issue is the definition of intermediate trade. The definition of services as intermediate is ambivalent. Is software a final product or is it input into a supply chain for producing another product? In addition, for the recording of international transactions EBOPS is used which is a classification not detailed enough to make this distinction. For goods there is the UN Broad Economic Classification which helps defining intermediate goods. Discussions as to the establishing of a BEC-like classification for services have just started in international fora, but this may be something difficult to achieve.

**Intermediate goods in UN's Broad Economic classification**

Authors may define the coverage of intermediate goods differently. A study by WTO and IDE-JETRO defines it as including all parts and accessories (BEC codes 42 and 53) as well as industrial primary and processed intermediate goods (BEC codes 111, 121, 21, 22). The fuels and lubricants category (BEC code 3) is excluded.

Source: WTO, IDE-JETRO (2011, forthcoming), Trade patterns and global value chains in East Asia.

**Mode 2:** For manufacturing services on inputs owned by others, only the manufacturing fee (which corresponds to the payment for a service provided) or services fee is recorded which may be more in line with the value added discussion.

**Mode 3:** For FATS, there are two issues<sup>19</sup>. For the affiliates activities, value added is recommended as one of the economic variables for data collection. This provides information on the contribution of foreign affiliates to the gross domestic product of the host country (in which the affiliate is incorporated). Intra-firm trade between parent and affiliate is considered intermediate trade (can also include intra-corporation transferees (ICTs)) as the affiliate supplies services to the consumer abroad.

**Mode 4:** As said above, intra-corporate transferees could be considered a form of intra-firm trade (if the employer/employee relationship remains with parent). If the intra-corporate transferee is

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<sup>19</sup> FATS statistics as defined in MSITS 2010 cover affiliates abroad for which the parent company holds the majority ownership (i.e. control of more than 50% of the voting power at each stage of the ownership chain).

employed with affiliates, it would be a contribution to the affiliates value added to the host country. For contractual services suppliers, independent or employee of a foreign service supplier, the service contract measures the services value and includes next to value added some other costs/fees that are charged.

### **3.2.1 Offshoring**

Cross-border production arrangements – the international fragmentation of production -- can take place between enterprises that are either related – multinationals -- or have no formal relationship in terms of ownership. However, such enterprises may have co-operation agreements or are joint ventures. Global manufacturing activities may involve either partly or wholly-owned affiliates – in which case intra-firm trade becomes important.

Production here is understood as inputs of labor, capital, and goods and services to produce outputs of goods and services. Production and manufacturing are concepts that are employed in a synonymous way – however, production and manufacturing are describing different activities. While production comprises research, development, design, logistics, marketing, etc., manufacturing is merely a specific part of the whole production chain.

Manufacturing and the distribution of goods – logistics on the production side to support the functioning of supply chains, and wholesaling or retailing on the consumer's side are part of the overall process. Enterprises outsource these activities either within the country or abroad (offshoring).

#### **3.2.1.1 Cross-border supply – the case of computer & IT enabled services**

The balance of payments records transactions between residents and non-residents. For trade in services, the MSITS Extended Balance of Payments Classification (EBOPS) is used to classify services. The latest revision of EBOPS in 2010 breaks down "other commercial services" into construction, insurance and pension services, financial services, charges for the use of intellectual property, telecommunications, computer and information services, other business services and personal, cultural and recreational services.

Computer & information services as well as other business services (which include research & development, professional and management consulting, and technical, trade-related and other business services) are often used as proxies as they may include “offshoring” such as IT-enabled services or business process outsourcing (BPO). These services components have shown strong growth in the period of 2000-2008, with the computer & information sector growing strongest. During this period,

these services increased by 19 per cent. Asian economies increased their share in world exports of computer and information services from 15 per cent in 2000 to 26 per cent in 2008. India became the second-major exporter of computer and information services in the world, a leading country in information technology services outsourcing. According to estimates, in 2008, India's exports with \$36.041 billion accounted for around 70 per cent of Asia's exports of computer and information services. The bulk of India's computer services exports is bound for the North American markets. In FY 2008-2009, some 60 per cent of exports reached the United States, and 27 per cent European countries, mainly the United Kingdom (14 per cent).<sup>20</sup> The portion of exports destined to Asian peers was, by comparison, much lower (6.5 per cent) but on an upward trend, in particular, exports to East and West Asia. Around 68 per cent of total services were supplied cross-border, and 32 per cent through Mode 4. Supply through Mode 2 was negligible.<sup>21</sup>

Other economies in Asia also emerged as growing suppliers of computer and IT related services such as Singapore, the Philippines and Malaysia. However, the most impressive growth was recorded in China, where the software industry expanded significantly. By the end of 2008, there were over 16000 software and related services providers in the country employing 8.5 million people. China's computer and information services exports increased by 43 per cent on annual average since 2000. In 2008, the United States was the first export destination, followed by ASEAN countries. Exports to these two markets accounted for over 53 per cent of China's total exports.

This BOP services component however may not only include cross-border services supply but also important shares of mode 4 services supply, which may also be of importance in trade in value added.

The European Union has launched a dedicated survey on international sourcing to investigate the "magnitude and impact of international sourcing by enterprises of both their core business and support functions"<sup>22</sup>. International sourcing is understood as "total or partial movement of business functions (core or support functions) currently performed in-house or domestically outsourced by the resident enterprise to either non-affiliated (external suppliers) or affiliates located abroad." (Nielsen and Nielsen, 2010). Core business functions -- the primary activity of the enterprise -- are differentiated from support functions (distribution, logistics, marketing, ICT services, etc.). Interestingly, the most recent survey results seem to prove that in the manufacturing sector core business functions are more

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<sup>20</sup> "Survey on Computer Software and Information Technology Services Exports 2008-09", Reserve Bank of India, Monthly Bulletin August 2010. The breakdown of India's exports by country is based on data published on "software services" which cover computer services (IT services and software development), but also IT-enabled services (ITES) and Business Process Outsourcing (BPO). In FY 2008-09 (April 2008–March 2009), computer services exports accounted for 73 per cent of India's total "software services" exports.

<sup>21</sup> Breakdown of "software services" exports on the basis of resident-non resident trade in FY 2008-2009.

<sup>22</sup> Eurostat (2011), International sourcing statistics, in: Statistics Explained...insert internet address

frequently sourced internationally than support business functions, while in "other sectors" support functions are more often internationally sourced than core business functions.

#### Share of enterprises carrying out international sourcing in EU

	Manufacturing		Other sectors	
	Core Business functions	Support functions	Core Business functions	Support functions
<b>Total*</b>	<b>17.4</b>	<b>12.8</b>	<b>8.2</b>	<b>7.6</b>
CZ*	3.7	3.3	1.1	1.7
DK	23.9	23.3	4.1	15.8
DE	13.3	11.2	2.6	5.2
IE	49.2	41.9	20.8	22.5
IT	15.9	7.8	1.3	2.6
NL*	13.9	10.5	4.7	8.5
PT*	11.0	13.0	2.9	4.4
SI	17.4	20.1	3.6	7.9
FI	21.7	14.8	5.5	14.2
SE	9.3	4.7	1.0	2.1
UK	52.6	36.6	15.3	17.0
NO	13.5	17.7	2.4	11.2

\* CZ, PT: provisional data; Total, NL: unreliable data.

Source: Eurostat (2011), Statistics Explained online, International sourcing statistics

The core functions comprise production of final goods or services and are reflected in the enterprises' allocation to a primary activity. Support functions are ancillary activities necessary to produce the final goods and services such as distribution and logistics, marketing, computer and information services, research and development.

#### 3.2.1.2 Manufacturing services on inputs owned by others

"Global manufacturing" leads to increased cross-border movements of goods, be they with no substantial change to the product itself or with a substantial transformation of the product. In the first case, trade statistics would record re-exports while in the second case – manufacturing abroad – goods are sent abroad to be further refined or assembled. If the latter is taking place without change of ownership, i.e. the processor does not own the inputs, manufacturing services are provided. The owner pays a fee to the processor. BPM6 specifies in para. 10.63 that "processes that are often undertaken under arrangements for manufacturing services on physical inputs owned by others include oil refining, liquefaction of natural gas, assembly of clothing and electronics, assembly (excluding assembly of prefabricated constructions, which are included in construction), labelling, and packing (excluding those incidental to transport, which are included in transport services)".

## How do we calculate the **manufacturing fee**?

### Example



**X imports manufacturing services for 120 from Y**

**Y exports manufacturing services for 120 to X**

28

Source: based on IMF, BPM 6th edition.

Re-export and merchanting activities (purchase and resale of goods by a resident but the goods never enter the compiling economy) can also be both very significant in some economies. There is no change in the physical conditions of the goods. For goods under merchanting, a merchant may buy goods in one country and sell it to a customer in a third country without actually importing the traded goods into the merchant's country. This activity also arises when parent companies acquire ownership of goods from their own manufacturing affiliates for resale to wholesaling affiliates in third countries or other customers.

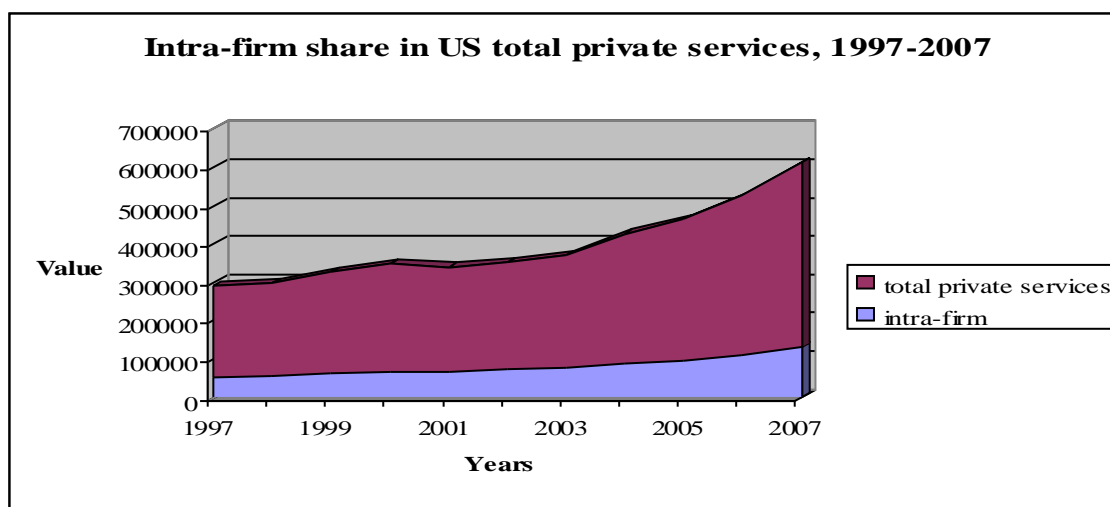
Often, all three aspects go hand in hand and it is difficult to distinguish activities for the purpose of establishing proper trade statistics. Especially in supply chains it is important to analyze where the actual value added is created. What activities in which sectors are contributing and how do we measure this? How do we map these flows for getting the numbers right to have an adequate metrics?

### 3.2.2. Intra-firm trade and the contribution to value-add abroad

Both mode 3 and mode 4 international transactions may contain intra-firm trade. This part of the trade could be considered contributing to the value added of the host country.

#### 3.2.2.1 The case of mode 3: US intra-firm trade in services

When the company abroad is an affiliate, involving foreign direct investment to establish it, trade between the two entities is considered intra-firm. Users analyze these trade flows at global level as well as for trade in intermediate goods, shipments for processing, or intra-firm trade.



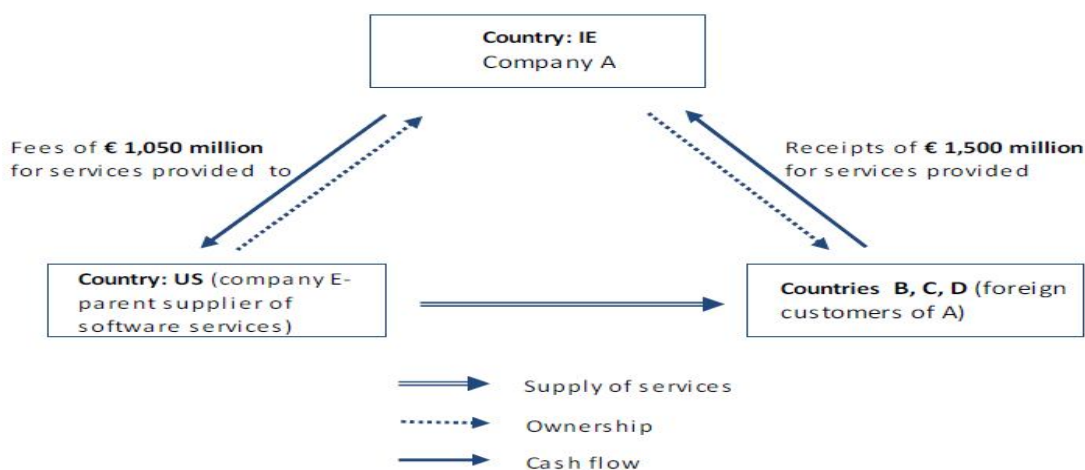
Based on balance of payments statistics, the United States has recorded an increasing share of trade between multinationals and their majority-owned foreign affiliates, growing from 21.5 per cent to more than a quarter of its total trade (27.5 per cent) in 2007.

However, the final supply of services is carried out through the foreign affiliate installed closer to their customers.

### Box: The special case of services subcontracting

This example shows an affiliate of the US in Ireland (IE). Company A has customers in countries B, C, and D. Company A buys for example software services from its parent in the US and supplies them to its suppliers. Profits are recorded by A.

**Chart 6.2.2 Treatment of receipts and expenditure of an Irish direct investment enterprise for services provided by foreign affiliates**



The sub-contracting described here is an example for knowledge-capturing products such as computer software which is traded separately from its production. In this particular case services are traded as a final product and not as "embedded" in other products.

### 3.2.2.2 Mode 4 – the movement of natural persons

MSITS (2010) defines the statistical coverage of GATS mode 4. It includes contractual service suppliers (self-employed or employees of a foreign service supplier), intra-corporate transferees and services sellers (business visitors in negotiator's terminology). Especially intra-corporate transferees may contribute to the value added abroad of the affiliate. The number of these persons moving has increased in the period 2000-2008.

#### Entries of intra-corporate transferees in selected OECD countries, 2000-2008 (Thousands)

	<i>Intra-corporate transferees</i>			
	2000	2007	2008	Average 2003-08
<b>Austria</b>	0.16	0.15	0.15	0.17
<b>Canada</b>	3.90	8.20	10.22	7.15
<b>France</b>	2.16	1.06	1.03	1.26
<b>Germany</b>	1.30	5.42	5.66	3.98
<b>Japan</b>	3.88	7.17	7.31	5.20
<b>Norway</b>	0.17	0.64	...	...
<b>Spain</b>	...	1.40	1.34	1.14
<b>Switzerland</b>	...	6.23	7.32	6.87
<b>United States</b>	54.96	84.53	84.08	71.10

## 4. Is there a need for a framework to measure value added in services trade?

Measuring trade in value added for goods is originating of the discussion of trade in intermediate goods and the country of origin as determined by the rules of origin. Recording gross values and assigning these to the country of origin with the full transaction value does not indicate as to what extent the country may benefit in economic terms. Measuring trade in value added attempts to shed light on a countries position and its benefits from international trade.



For trade in services, the rules of origin are more difficult to apply. As tariffs do not exist, services trade is more hampered by non-tariff measures or domestic regulation. Rules of origin do apply more to service suppliers than to their products alone. The supply of services does also require to specify what is an intermediate product for services to shed some light on the analysis similar to trade in merchandise (the inter-agency Task Force on trade in services has started discussions on this subject), the characteristics of services of a close relation between supplier and customer provide for the extension of the concept of services to the internationalization of services, either through capital (commercial presence) or labor (presence of natural persons). Both such forms contribute to intra-firm trade and to the creation of value added abroad and at home.

In addition, when analyzing trade in value added for goods, it was stated that a country's trade balance is not altered at total level, only for bilateral flows. Trade in services statistics at bilateral level are not yet available in the same comprehensiveness as for trade in merchandise statistics.

Another difficulty is the detail of trade in services statistics. Services are constantly developing, existing classifications cannot adapt as quickly to this innovation of services and an analysis of trade flows and related value added flows is hampered by this lack of disaggregation.

## **5. Conclusions**

This paper has illustrated some of the key features driving current day value chains and their constitution as networks, using both conventional theories on value chains as well as possible configurations for the services sectors, especially the offshoring of those services. These features include the roles and capabilities played by focal firms, the nature of the work in sectors, and the factors that influence firms' offshoring decisions.

The second part of the paper focuses on capturing offshoring in existing international trade in services statistics. It analyses how services offshoring is currently relating to trade in services statistics by mode of supply and highlights some limitations as to the detail of services statistics available, lack of information on what is intermediate and bilateral trade flows.

The recent Global Forum on Trade Statistics, in its vision for 2020 developed by international organizations (UN, Eurostat, OECD and WTO) sets out issues which require further improvement. Information on more detailed services trade statistics is one of the aspects mentioned there as well as assessing international trade flows by mode of supply.

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