

# **Direct Measurement of Global Value Chains: Collecting Product- and Firm-Level Statistics on Value Added and Business Function Outsourcing and Offshoring**

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## Abstract:

Global value chains (GVCs) have changed the assumptions behind current data regimes and statistical systems are struggling to catch up. In this chapter, we confront the obvious. It will be exceedingly difficult to fill the data gaps caused by global economic integration without new data. While collecting new data on a globally harmonized basis – for this is what’s needed – is a daunting task, we need to begin. The solution will inevitably include new “bottom-up” business surveys to complement the “top down” efforts of international input-output surveys. This chapter outlines two such efforts: product-level GVC studies and business function surveys. The most direct way to measure the geography of value added is to decompose individual goods and services into their component parts and trace the value added of each stage of production to its source. The procedure yields product-level estimates that identify the largest beneficiaries in terms of value added, value capture (i.e., profits), and employment. However, value added cannot be fully determined by tallying up the physical inputs to products listed as outputs. A range of largely intangible “support” functions (e.g., R&D, sales, marketing, IT systems, etc.) also add value, and like production, these support functions are available from suppliers and service providers outside the firm and in a variety of locations around the world. We argue that these trends require a new statistical unit of analysis to supplement the main activity/industry of the firm – i.e., the business function – and new surveys to capture how and where they are sourced and to quantify their value. The results of two recent business function surveys are presented.

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## **Introduction: why new firm-level statistics on value added and international sourcing are needed now**

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International trade and foreign direct investment have long been central features of the world economy, but their importance has been growing rapidly, especially since the late 1980s. Alongside this quantitative change, a qualitative shift has also been taking place. Because of advances in information technology, which enable business processes to be segmented and potentially relocated, and the rise of industrial capabilities in less developed countries, which offer more options for relocating them, the production of goods and services has become increasingly fragmented across borders. In other words, it has become more common for value to be added to a product in two or more countries prior to final use in both goods and services producing industries. The emergence of global value chains (GVCs)<sup>1</sup> of this sort have led researchers and the providers of official economic statistics to acknowledge a growing knowledge gap in regard to the flow of intermediate goods and services and the location of value added.

Why is this important? It used to be safe to assume that all of an import's value was added in the exporting country. This gave trade statistics a great deal of analytic value and policy relevance. In this simpler world, industrial capabilities could be judged by the quality and technological content of exports, trade rules could be tied to gross levels of trade in specific products or product sets, and exports could be directly related to domestic job creation. "Rules of origin" labeling requirements are based on assumption of nationally bounded production as well, but today, it is difficult to know what labels such as "made in China" or "made in the USA" really mean. With GVCs complicating the picture, we simply cannot know what share of an imported product's or service's value is added in the country that declares it as an export, and thus, are less able to judge that country's level of development from the technological sophistication of its exports, following Lall (2000). Flows of intermediate goods provide hints about the structure of GVCs (see Feenstra, 1998; Brulhardt, 2009; and Sturgeon and Memedovic, 2010), but because we do not generally know how imported inputs are used in specific products, or how they are combined with domestic inputs and value added, it is not possible to extract concrete information about the geographic distribution and flow of value added from trade statistics alone.

What is certain is that using the gross value of trade as a yardstick distorts our view of where in the world industrial capabilities lie, creates uncertainty about the fairness of trade agreements, and even calls into question such fundamental measures as gross domestic product and productivity (Houseman, 2011). These data and policy gaps have triggered innovative efforts to link national input-output tables into larger international (global and regional) input-output tables

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<sup>1</sup> Researchers studying this structural shift in the global economy have generated a very long list of terms to describe it. The international trade literature has stimulated a vast body of research and multiple labels, including a new international division of labour (Fröbel et al., 1980), multistage production (Dixit and Grossman, 1982), slicing up the value chain (Krugman, 1995), the disintegration of production (Feenstra, 1998), fragmentation (Arndt and Kierzkowski, 2001), vertical specialization (Hummels et al., 2001; Dean et al, 2007), global production sharing (Yeats, 2001), offshore outsourcing (Doh, 2005), and integrative trade (Maule, 2006). The enduring structures that embody these new forms of trade and investment have been referred to as global commodity chains (Gereffi, 1994, Bair, 2009), global production networks (Borrus et al, 2000, Henderson et al, 2002), international supply chains (Escaith et al, 2010), and global value chains (GVCs), the term we will use here (Humphrey and Schmitz, 2002; Kaplinsky, 2005; Gereffi et al, 2005; Kawakami, 2011; Cattaneo et al, 2010).

(IIOs) that researchers can use to estimate trade in value added, among other things.<sup>2</sup> With data of this sort, we can begin to answer the question, “Who wins and who loses from globalization?” from the supply side (i.e., winners and losers in terms of value added, value capture, and employment), rather than only the demand side (i.e., winners and losers in terms of consumer prices vs. jobs and wages).

Despite the progress that IIO tables represent, the estimation and cross-border harmonization required to construct them decrease detail and accuracy. National input-output matrices, in countries where they exist, are based on very partial data to begin with, and rely on a range of inferences and (sometimes controversial) assumptions, such as the proportionality of imported inputs across all sectors (Grossman and Rossi-Hansberg, 2006; Winkler and Milberg, 2009). When national input-output data sets are linked across borders, these problems are compounded as industry categories are harmonized at high levels of aggregation and additional layers of assumption and inference are added to fill in missing data. Statisticians must “cook the books” to bring input-output tables from multiple countries into alignment.

Such data gaps are especially acute in services, where product detail is sorely lacking and vast inferences are made to settle national accounts.<sup>3</sup> Almost all of the defining features of services -- that is, they are non-tradable, non-storable, customized, and insensitive to price competition -- are changing in ways that enable and motivate the formation of GVCs. As a result, task fragmentation and trade in services are burgeoning, both domestically and internationally, through the twin processes of outsourcing and offshoring. Computerization is allowing a growing range of service tasks to be standardized, codified, modularized, and more readily and cheaply transmitted among individuals and organizations that might be at great distance from one another.

Clearly, the assumptions behind current data regimes have changed and statistical systems are struggling to catch up. In this chapter, we confront the obvious. It will be exceedingly difficult to fill data gaps without new data. Utilizing existing data in new ways, including generating groupings of traded products that better reflect GVCs, (e.g., Sturgeon and Memedovic, 2010) and linking “micro-data” from surveys to administrative sources such as business registers (e.g., Bernard et al, 2005a and 2005b; Nielsen and Zilewska, 2011) can lead to new insights, but they may never be enough. Statistical analysis that relies solely on existing data sources will always reflect the limits of the content of surveys and data sources. New data will be needed, and because GVCs are by definition a cross-border phenomenon, international standardization will be

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<sup>2</sup> OECD (2011b).

<sup>3</sup> Why are the data resources related to services so poor? One reason is that the data are difficult to collect. While companies might track the source of every physical input to manufacturing, for warranty or quality control purposes, services expenditures are typically grouped into very coarse categories, such as “purchased services”. The absence of tariffs on services, and their non-physical character, mean that when service work moves across borders, no customs forms are filled out and no customs data are generated. Another reason is that service work has historically been thought to consist of non-routine activities that require face-to-face contact between producers and users. Services as different as haircuts and legal advice have traditionally been consumed, in place, as soon as they are produced. The customized and ephemeral nature of many services has led them to be considered “non-tradable” by economists, or at least very “sticky” in a geographic sense relative to the production of tangible goods. Finally, services have long been viewed as ancillary to manufacturing, either as direct inputs (e.g., transportation) or as services provided to people who worked in manufacturing (e.g., residential construction, retail sales, etc.). As such, services have been viewed as a by-product, not a source, of economic growth. Thus, data collection on services has historically been given a low priority by statistical agencies (Sturgeon et al, 2006; Sturgeon and Gereffi, 2009), although the need for statistical evidence for policy making has been clearly articulated (Commission of the European Communities, 2003).

essential. At the same time, resources for data collection and the political will required to burden private sector respondents with surveys are declining in many countries. Clearly, current priorities will need to be adjusted so new data can be collected without unduly increasing the burden on respondents.

While collecting new data on a globally harmonized basis – for this is what’s needed – is a daunting task, we need to begin to test the results of research using IIOs with standardized case studies and proof-of-concept surveys, and, eventually to replace inferred data with real data in both goods- and services-producing industries. The solution will inevitably include new “bottom-up” business surveys to complement the “top down” efforts of IIOs. This chapter outlines two such efforts: product-level GVC studies and business function surveys.

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### **Product-level GVC Studies**

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The most direct way to measure the geography of value added is to decompose individual goods and services into their component parts and trace the value added of each stage of production to its source. The procedure yields product-level estimates that identify the largest beneficiaries in terms of value added, value capture (i.e., profits), and employment. Beneficiaries can be firms, workers, countries, or all of the above. Studies in this vein have shown that China’s export values often bear little relation to domestic value added because many exported products contain expensive imported inputs, and the lion’s share of profits tend to be captured upstream from production, in the design and branding activities of the “lead firm” in the value chains, and downstream by distributors, value added resellers, and retailers.

This situation is common when assembly is performed by domestic or foreign-owned contract manufacturers on behalf of multinational brand name or “lead” firms, a pattern of industrial organization that has been a key driver of economic development in China, elsewhere in developing East Asia, and other places in the world with deep linkages to GVCs, such as Eastern Europe and Mexico (Grunwald and Flamm, 1985; Gereffi and Korzeniewicz, 1994; Borrus et al, 2000; Sturgeon and Lester, 2004). Because foreign components are commonly specified in designs worked out in the lead firm’s home country, key components and subsystems are often sourced from vendors close to the lead firm, in addition to a palette of well-known component suppliers from countries across the globe. In technologically intensive industries and value chain segments, these supplier and component manufacturing firms tend to be concentrated in OECD or newly industrialized countries, especially Chinese Taiwan. To add to the complexity of GVCs, each of these supplier firms might outsource production or have an affiliate in a third country, in a pattern Gereffi (1999) refers to as “triangle manufacturing.”

Product-level GVC studies are designed to shed light on where value is added and captured in these complex cross-border business networks. The first product-level GVC study, on a specific Barbie Doll model, appeared in the *Los Angeles Times* (Tempest, 1996). The Barbie case was then included in a classic paper by trade economist Robert Feenstra (1998) to bolster his argument that the rise of intermediate goods trade was caused, in part, by “the disintegration of production in the global economy” leading to double counting of intermediate goods as they wended their way through international production networks. The findings of this widely publicized case are summarized in Table 1, which shows that only 35 cents (3.5%) of the value of a \$10 “Tea Party” Barbie doll (3.5%) was added in Mainland China, where it was assembled, largely of imported materials.

The lead firm most commonly used in subsequent product-level GVC research is Apple Inc., the company behind the popular iPod, iPhone, and iPad consumer electronics devices, as well as the Macintosh line of personal computers (Linden et al., 2007, 2009 and 2011; Hesseldahl, 2010). Most recently, the OECD (2011, p. 40), examining the sources of components for a late model Apple smartphone (the iPhone 4) that retails for about \$600, estimates that only \$6.54 (3.4%) of the total factory *price* of \$194.04 was actually added in China, where the product is assembled by the Taiwanese electronics contract manufacturer Foxconn. This is because \$187.50 (96.6%) of the factory *cost* came from imported materials and components, most notably from South Korea, the United States, and Germany.

**Table 1. The location of value added and capture for a “Tea Party Barbie” doll, 1996.**

<b>Production, inputs, and contract management</b>	<b>Value (\$)</b>
Materials	.65
Saudi Arabia: Oil	
Hong Kong: Management, shipping	
Taiwan: Refines oil into ethylene for plastic pellets for Barbie's body.	
Japan: Nylon hair	
US: Cardboard packaging, paint pigments, molds	
Production: China (factory space, labor, electricity)	.35
Overhead and coordination of production and outbound shipping: Hong Kong	1.00
<b>Export value (factory price):</b>	<b>2.00</b>
US: Shipping, US ground transportation, wholesale and retail mark ups	6.99
US: Mattel Inc. (lead firm: design, marketing)	1.00
<b>US retail price:</b>	<b>9.99</b>

Sources: Tempest (1996) from U.S. Commerce Dept., Chinese Ministry of Foreign Trade Economic Cooperation, Mattel Inc., Hong Kong Toy Council.

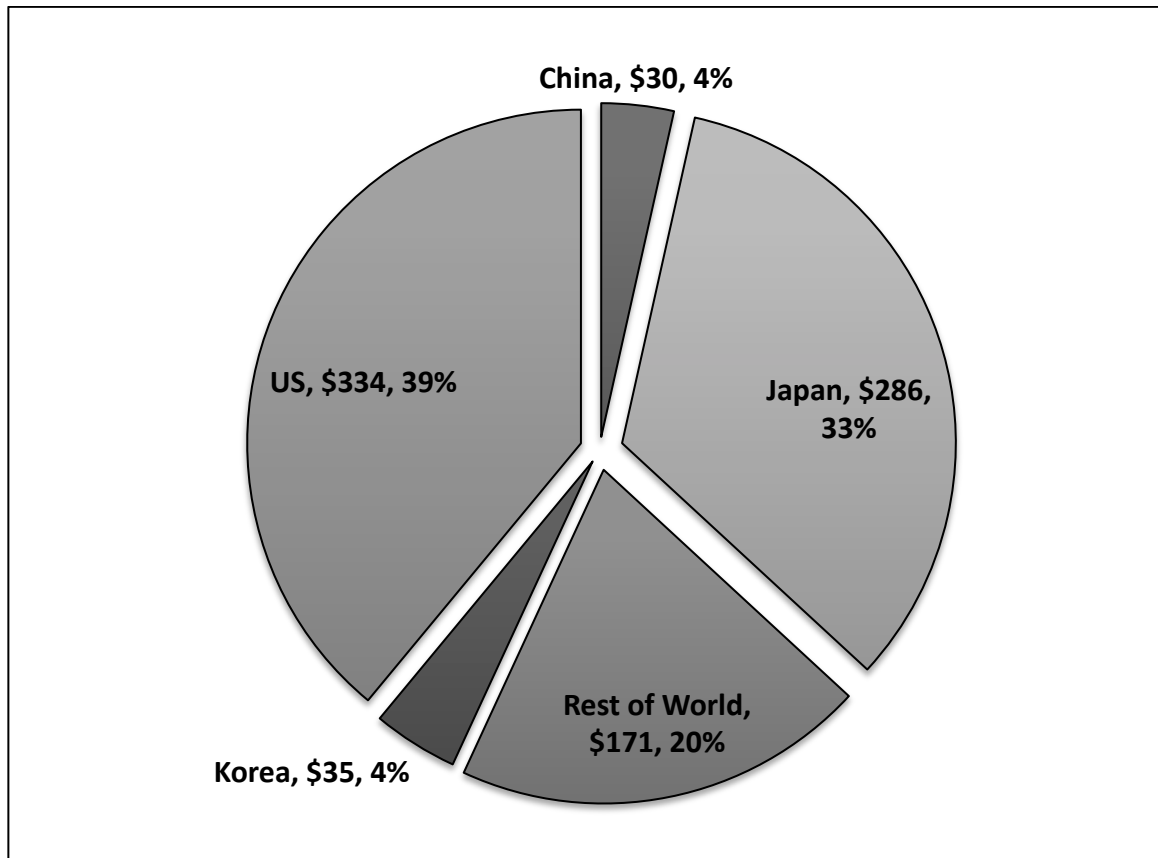
Analysis of traded goods from other electronics firms has yielded similar results. For example, a study of a 2005 Hewlett-Packard (HP) notebook computer model (model nc6230) found that none of the major components originated in China, where a Chinese Taiwan-based contract manufacturer assembled it (Dedrick et al., 2010). Yet the full factory price of \$856.33 would have counted as part of the gross value of Mainland Chinese exports. Ali-Yrkkö et al (2010) obtained similar results in their study of a Nokia mobile phone handset.

Clearly export value is a highly misleading measure of China’s benefit from export trade. A more meaningful measure of the benefit to China’s economy would be calculated in value added terms. A simple approximation of value added is the sum of operating profit, direct labor wages, and depreciation. Going back to the study of the HP notebook computer by Dedrick et al. (2010), because there were no Chinese firms among the major suppliers, China earned no profit (and thus booked no depreciation related to this product). That leaves direct labor. The cost of assembly and test, which took place in China and is mostly wages, came to \$23.76, some of which would be retained as profit by the Taiwanese assembly company. Some of the smaller inputs may have received final processing in China, but this typically amounts to a very small percentage of value added, no more than a few dollars in this case. On this basis, Dedrick et al. estimate that China’s value added to this product at \$30. In this example, then, assigning China the full factory price of \$856.33 overstates its value added by more than 2,800 percent! This is because \$826.33 (96.5%) of the factory *cost* went to imported materials and components, mainly from firms based in South Korea, the United States, and Japan (see Figure 1).

Judging from prior research on similar GVCs (Sturgeon, 2003), it is very likely most if not all high-value components were specified by HP’s design group in the United States, and purchased

by the company’s contract manufacturer under terms that HP negotiated directly with its main component suppliers. This underscores the powerful role played by the “lead firm” in the GVC — HP — even though the company may have taken no physical ownership of work-in-process inventory. HP’s role is as a buyer of manufacturing and logistics services, a conceiver and marketer of the product, and an orchestrator of the GVC. While this role allows HP to extract the lion’s share of profit from the ultimate sale of the computer, it is mostly or even entirely invisible in trade statistics. This creates a difficult methodological problem. To fill in this gap Linden et al. (2009 and 2011) estimated value added and employment in upstream activities, such as R&D and marketing, from the ratio of the target product’s sales in total firm revenues.

**Figure 1. Geography of Value Added in a Hewlett Packard Notebook Computer**



Note: The factory cost of the product in 2005 was \$856. The amounts shown for each country—except China—are the total cost of inputs from firms headquartered in that country. No inputs came from Chinese companies, so the \$30 assigned to China is an estimate of value added that was subtracted from the cost of inputs from “Rest of World”.

Source: based on Dedrick et al. (2010), Table A-3

Product-level GVC studies typically look only one value chain level upstream from final assembly. This can introduce one of two errors when assigning values to imported sub-systems that are also assembled locally. Consider the example of a Japanese-branded hard disk drive assembled in China from imported parts before it is included in a notebook PC. Based on information from an executive in the hard drive industry, the value added by hard drive assembly is about 7% of the price of the drive. If 100% of the value of the hard drive is assigned to China, then local value added is overestimated by 93 percent. If, on the other hand, 100% of the value is assigned to Japan, then local value added is underestimated by 7 percent. Since pragmatic considerations may limit the number of value chain levels in which data can be collected, it is clearly better to err on the side of assigning value to the country where the sub-system’s company

is located. However, that company may produce or purchase high value sub-assemblies and components in a third countries, or more (e.g., Singapore and Malaysia are common locations for the production of hard drive head assemblies). Our point is that deriving accurate figures in product-level GVC studies is challenging. Estimates must be made and these require a great deal of industry knowledge. In input-output analysis such problems will not occur because both direct and indirect value-added for any imported or domestic intermediate inputs are taken into account as a standard part of the estimates. However, in both cases, estimates must be made.

The focus of the product-level GVC research cited in this section is on highly popular consumer electronics products such as those from Apple, Hewlett Packard, and Nokia.<sup>4</sup> This is no accident, since the research mainly relies on data from private consulting firm “teardown reports” itemizing and naming the suppliers of the high-value components used in each product. These reports are based on physical disassembly and examination of component parts. Because such reports are available for only the most high profile items, product-level GVC study methods have been difficult to generalize. Moreover, the electronics products that teardown reports analyze typically contain hundreds of clearly identifiable components with relatively transparent world prices. The most valuable components tend to bear the names of their manufacturers, and can thus be traced to their country of manufacture. Studies of automobiles, which have many model-specific parts without published prices, or apparel products made from fabrics that might have been produced by a number of suppliers in multiple locations, are more difficult to decompose and value after-the-fact. Asking firms for the data directly is possible, but most firms tend to be unwilling to share this sort of strategically sensitive information with researchers, even with assurances of confidentiality.

Despite the difficulties of extending the method to different industries, product-level GVC studies continue to proliferate. Although it has not yet been used in published work, we are aware of several active research projects that are using the product-level GVC approach to study a variety of industries, including wind turbines and other mechanical products, small cc motorcycles and women’s apparel. For consistency and comparability, a standardized, or least mutually compatible approach is needed. In the interest of moving in this direction, we specify a set of research requirements for product-level GVC studies below. The best-case approach we lay out here assumes full cooperation or mandatory compliance by participating firms. While such compliance may be difficult or even impossible to come by, our goal is to set a high initial standard that can be adjusted in the face of pragmatic considerations. Ideally factory prices and costs would be directly from manufacturing companies, at the point of production, or from some other corporate office where data itemizing the bill of materials (BOM) for specific products is held. A BOM typically designates the part number (or other designation) and cost of each input. The basic data needed to collect information on value added at the product level are presented in Table 2.

First, the product needs to be identified, either by its make and model or by its stock keeping unit (SKU) number. Then, the factory price of the product is collected, along with internal costs for labor, materials, and other costs (mostly overhead) directly related to production. Then, a list of the most valuable materials and other inputs, perhaps derived from the BOM, is collected.


The next step is to estimate the profit margins and/or employment associated with the final product and with each of the key inputs. If the analysis extends to the retail end of the value chain, then data about the structure and geography of sales channels (Items 7 and 8 in Table 2)

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<sup>4</sup> An exception is a set of five case studies from the shoe industry conducted by the Swedish National Board of trade (2007).

should also be analyzed, and the average selling price at retail estimated. As this brief description shows, the data requirements for a product-specific analysis are considerable. Again, the data are often hard to obtain because of their commercial sensitivity and the results are difficult to generalize because they only represent a single product.

**Table 2. Basic Data Needed for Product-Level GVC Studies.**

For the finished product:	
1. Make, model/SKU, and average selling price of the product	
2. Value when it leaves the factory (also known as “Factory Price”)	
3. The % of Factory Costs accounted for by “Materials”, “Labor”, and “Other (specify)”	
4. List of top material inputs (however many it takes to account for 75% to 80% of Factory Costs), typically listed in the bill of materials (BOM).	
5. The cost of assembly (converting inputs into final products) as they were in a specific time period (e.g. late 2010) when the product was being made.	
6. Approximate number of units manufactured in the specified period	
7. Share of shipments within the specified period to each type of recipient (e.g., direct to consumer, OEM customer, distributor, value-added resellers; retailers).	
8. Share of shipment in 2010 by country or regional location (e.g., USA, Japan, China, Other Asia, Europe, Other North America).	

For each of the top inputs:
1. Short description.
2. Name of manufacturer/supplier
3. Country where manufactured.
4. Average cost (price) of input to company assembling the product in the specified time period.

An approach that avoids targeting a single product or company is the use of average breakdowns of component values for a generic product type (e.g., notebook PC; 2-megawatt wind turbine). Sometimes data of this sort can be obtained through industry associations willing to co-operate with researchers by requesting data from their membership. These average values can be combined with qualitative value chain analysis (see Gereffi and Fernandez-Stark, 2011) to identify the industry’s key lead firms and main suppliers. With this information it is possible to construct industry-, or subsector-level estimates of the geography of value capture. Again, although it has not yet been used in published work, we are aware of active research using this approach.

As we mentioned earlier, product-level GVC studies can complement studies using official statistics. For example, Koopman et al (2009) combine standard input-output tables with information that separates processing and normal trade, all from official sources in China. This study estimates that about half of the gross value of total Chinese exports is derived from imported inputs, rising to 80% for technology-intensive sectors such as electronics. For export processing production as a whole, primarily consisting of products branded by non-Chinese firms, foreign value added was estimated to be 82% in 2006 (Koopman et al, 2009; p. 19). These findings suggest that the product-level cases of iPods, iPhones, iPads, and similar consumer electronics goods produced in China for export, may not be that extreme.



Product-level GVC studies are important not only because they suggest that the local value in manufactured goods exports can be vastly overstated, but also because exports may overstate the exporting country's technological attainments. Goods manufactured in developing countries are often leading edge in terms of markets and technology. Hence the technological sophistication and competitive stature of an exporter's industrial base can be exaggerated when exports are used as a measure of industrial capability. Not only are most technology-intensive parts produced in industrialized countries, but so too is the "knowledge work" and the intangible assets involved in system-level design, product strategy, marketing, brand management, and supply chain orchestration.

This is important not only for the value that these activities create, but also because they are the key elements in competitive performance, innovation and new industry creation; the bedrock of economic development. Even the cutting edge production equipment and logistics systems used for the manufacture of products such as notebook computers and smart phones are not "native" to Mainland China or other less developed countries in East Asia, but implanted there by firms based in Chinese Taiwan, South Korea, and OECD countries (Steinfeld, 2004). This has important policy implications. The competitive "threat" posed by Chinese exports to advanced economics, at least in the short run, is often vastly overstated, not only in the popular press, but in policy circles as well.

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### **Business Function Surveys**

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There is a pervasive dynamic working against the usefulness of current business statistics. On one hand, production is becoming increasingly bundled with services, and on the other hand, it has become easier to fragment the value chain geographically. Thus, value added cannot be fully determined by tallying up the physical inputs to products listed as outputs. A range of largely intangible "support" functions (e.g., R&D, sales, marketing, IT systems, etc.) also add value, and like production, these support functions are available from suppliers and service providers outside the firm and in a variety of locations around the world.

Thus, GVCs are expanding the arena of sourcing and competition beyond main products to the vertical *business function* slices that can be offered (horizontally, to diverse customers) as more or less generic goods and services within and across industries. Firms do not only outsource the assembly of goods, and source tangible inputs in GVCs (as captured by product-level GVC studies), they increasingly outsource and sometimes even offshore intangible services and support functions as well. These include IT services, back office work such as payroll and accounting, call centers for sales or customer support, and even engineering and elements of R&D (Dossani and Kenny, 2003; Gereffi and Fernandez-Stark, 2010).

We argue that these trends require a new statistical unit of analysis to supplement the main activity/industry of the firm – i.e., the business function – and new surveys to capture how they are sourced and to quantify their value. Business function surveys are ideal for collecting data on the location of value added for three reasons. First, because they consist of intangible services, the value added by support functions has proven very difficult to capture, classify and quantify. Second, the parsimony of business function lists (see Table 3) reduce respondent burden, while still generating data that can be compared and aggregated across firms, countries and industries. In fact, the business function approach does away with any hard distinction between goods- and services-producing firms. The primary output of a firm may be a good or a service, but the array of support functions that may or may not be done by the firm are roughly the same. Third,

experience with ground breaking surveys (Brown, 2008) suggest that data quality tends to be high because business functions are in keeping with the way many managers think about and account for their operations.

Not only is the business function classification useful for tracing the organizational and geographic location of value added, but also as a high-level stand-in for occupational categories, since jobs can also be tallied according to their general function within the organization. Since the business function approach aggregates product and services into a limited number of well-defined categories, it has proven feasible for large-scale surveys. Two of these implementations are described in some detail in the latter sections of the chapter.

### **Business function lists**

We are only just beginning to develop standard methods for collecting economic data according to business functions. In this section we provide some examples from recent and current surveys.

Firms or their main operations units<sup>5</sup> typically have a main output, be it a good or service. In a statistical context, the function that produces this output typically determines the firm's industry classification using standardized activity/industrial codes such as its ISIC, NACE, or NAICS classification. Instead of counting all output and employment under this main output classification, as business censuses typically do, business function surveys supplement the primary output function with a standardized, generic list of support functions (see Table 3). In other words, firm-level data (e.g., occupational employment; wage levels paid; internal, external and international sourcing costs; etc.) is collected for specific functions rather than for the firm as a whole. In the business function frameworks developed so far, the main productive function of the firm has been designated variously as "production" (Porter, 1985), the "core function" (Nielsen, 2008), "operations" (Brown, 2008), and the "primary" business function (Brown and Sturgeon, 2012). Even if the terminology used differs, the approach is similar in the sense that it distinguishes between the primary business function and a generic list of functions that "support" it.

Conceptually, Michael Porter pioneered the business function approach. In his 1985 book, *Competitive Advantage*, he identified a list of nine generic business functions: R&D, design, production, marketing and sales, distribution, customer service, firm infrastructure, human resources, and technology development.

To our knowledge, the earliest use of a business function list to collect economic data was for the EMERGENCE Project (Huws and Dahlman, 2004), funded by the European Commission. This research used a list of seven business functions tailored to collect information about the outsourcing of information technology-related functions, such as software development and data processing. Such industry-specific bias in business function lists can simplify data collection and focus research on specific questions (such as IT outsourcing), but the results cannot be easily compared to or aggregated with other data, and they increase the risk of creating non-exhaustive lists. When business function lists are non-exhaustive, they leave some functions unexamined and block a comprehensive firm-level view of employment or value added. Again, while non-exhaustive business function lists are useful for examining specific business practices and firm-level characteristics, they are not well suited for general use as a parsimonious alternative for, or

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<sup>5</sup> Large firms may have several distinct operational units with distinct outputs. These are variously called divisions, lines of business, or business segments. For such firms it is sometimes best to collect data at this level.

supplement to, industry and occupational classifications. An exhaustive list similar to Porter's was developed for the European Union (EU) Survey on International Sourcing (Nielsen, 2008) and adopted by Statistics Canada for the Survey of Changing Business Practices in the Global Economy (again, see Table 3).<sup>6</sup>

**Table 3. Seven Business Functions Used in the European Survey on International Sourcing**

<p>In the European International Sourcing survey, seven business functions (plus a residual "other" category) were identified using the European Central Product by Activity classification (CPA).</p> <p><b>1) Core/Primary business functions:</b></p> <p>Production of final goods or services intended for the market or third parties carried out by the enterprise and yielding income. The core business function usually represents the primary activity of the enterprise. It may also include other (secondary) activities if the enterprise considers these to comprise part of its core functions.</p> <p><b>Support business functions:</b></p> <p>Support business functions (ancillary activities) are carried out in order to permit or facilitate production of goods or services intended for sale. The outputs of the support business functions are not themselves intended to be directly for sale. The support business functions in the survey are divided into:</p> <p><i>2) Distribution and logistics:</i></p> <p>This support function consists of transportation activities, warehousing and order processing functions. In figures and tables, "Distribution" is used as an abbreviation for this function.</p> <p><i>3) Marketing, sales and after sales services including help desks and call centers:</i></p> <p>This support function consists of market research, advertising, direct marketing services (telemarketing), exhibitions, fairs and other marketing or sales services. Also including call-centers services and after sales services, such as help-desks and other customer supports services. In figures and tables "Marketing, sales" is used as an abbreviation for this function.</p> <p><i>4) ICT services:</i></p> <p>This support function includes IT-services and telecommunication. IT services consist of hardware and software consultancy, customized software data processing and database services, maintenance and repair, web-hosting, other computer related and information services. Packaged software and hardware are excluded. In figures and tables "ICT services" is used as an abbreviation for this function.</p> <p><i>5) Administrative and management functions:</i></p> <p>This support function includes legal services, accounting, bookkeeping and auditing, business management and consultancy, HR management (e.g., training and education, staff recruitment, provision of temporary personnel, payroll management, health and medical services), corporate financial and insurance services. Procurement functions are included as well. In figures and tables "Administration" is used as an abbreviation for this function.</p> <p><i>6) Engineering and related technical services:</i></p> <p>This support function includes engineering and related technical consultancy, technical testing, analysis and certification. Design services are included as well. In figures and tables "Engineering" is used as an abbreviation for this function.</p> <p><i>7) Research &amp; Development:</i></p> <p>This support function includes intramural research and experimental development. In figures and tables "R&amp;D" is used as an abbreviation for this function.</p>
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Source: Nielsen 2008; available at [www.dst.dk/globalisation](http://www.dst.dk/globalisation) and [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/International\\_sourcing\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/International_sourcing_statistics)

<sup>6</sup> In contrast, the EMERGENCE project list (Huws and Dahlman, 2004) and a more recent list developed by the Offshoring Research Network for the purpose of detecting R&D offshoring (Lewin et al., 2009) did not include a category for the firm's main operational function, but instead used a list of commonly outsourced functions (product development, IT services, back office functions, call centres, etc.). Again, non-exhaustive lists of this sort cannot provide a full picture of firm organization or sourcing patterns.

Business function data can be used to inform a wide variety of research and policy questions. For example, they can be used to characterize patterns of business function bundling in respondent firms (i.e., organizational design as indicated by employment or costs/revenues by function), to collect data on wages by function as a high-level stand-in for detailed data on occupational employment, and critically for the purposes of this volume, to examine firm-level patterns of domestic and international sourcing (value added). Potentially, business function lists might supplement, or even partially substitute for the long lists of industry-specific product trailers that underlie input-output tables in settings with severe resource constraints. The main strength of the business function approach is its potential to identify and measure support activities and other intangible assets within the firm (R&D or customer service capabilities) in a way that is easily comparable across sectors and countries.

### **Using business function surveys to collect data on external and international sourcing: The Eurostat International Sourcing Survey**

This section provides some illustrations of business function data from the 2007 Eurostat International Sourcing Survey. The results show how business function surveys can provide insights into a complex and hard-to-research topics such as international sourcing.

The survey was an economy-wide ad-hoc survey carried out by 12 European countries in 2007, covering the so-called non-financial business economy. The survey asked about sourcing decisions made by European firms in the period 2001 – 2006. The focus of the survey was on larger enterprises, as multinational groups of enterprises were considered to be the key players and drivers for international sourcing. A bottom threshold of 100 or more employees was used, although statistical offices in several countries decided to lower the threshold to enterprises with 50 or more employees. This section utilizes the information from 4-12 European countries, based on data availability. The survey did not ask respondents to quantify the value of their external and international sourcing, only to indicate if they had made such choices or not. (However, subsequent business function surveys have quantified the value of sourcing by business function, as we will see in the following section.)

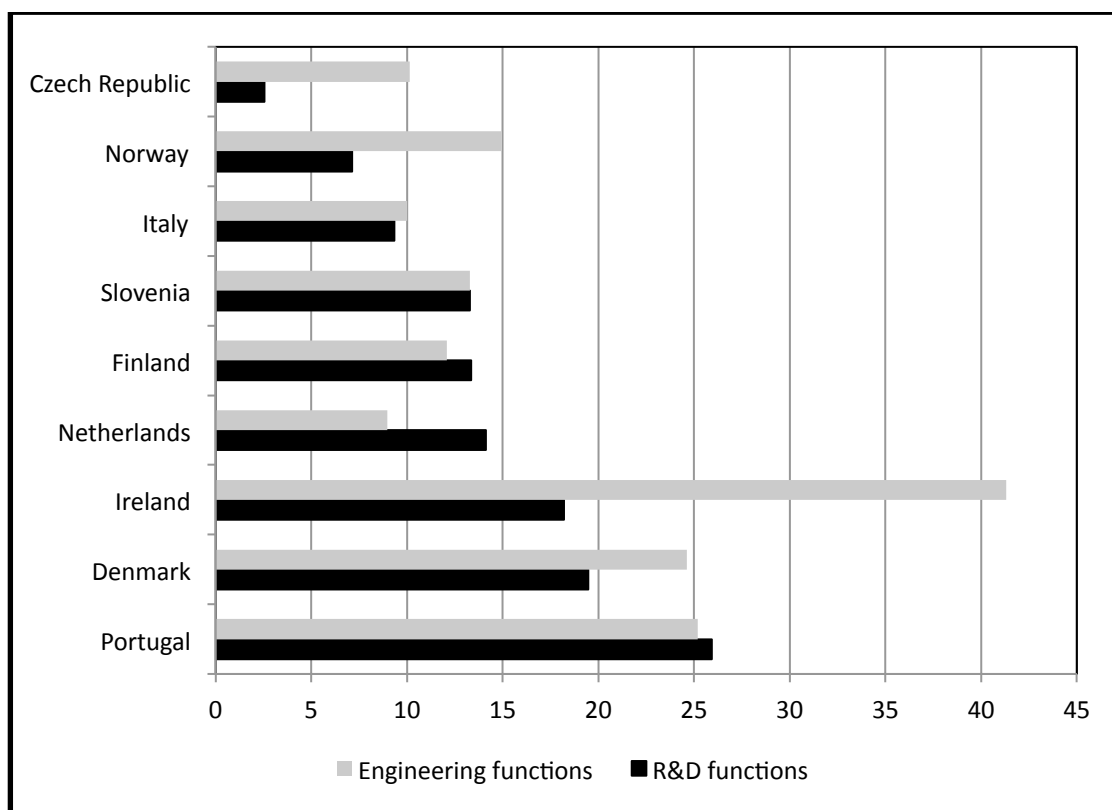
For the 12 European countries listed in Figure 2 the 2007 Eurostat International Sourcing Survey found that 16 per cent of the enterprises with 100 or more employees had sourced one or more business function abroad. More than twice as many enterprises in Ireland and the United Kingdom did so (38 per cent and 35 per cent, respectively). The two small and open Nordic economies, Denmark (25 per cent) and Finland (22 per cent), were also significantly above the average. Germany (13 per cent) was just below the average. Figure 2 shows the frequency of international sourcing for R&D and engineering functions.

The business function most frequently outsourced internationally was the core (primary) function. Interestingly, the core business function is the only function sourced more frequently internationally than domestically. This was especially true for manufacturing firms in high wage countries such as Denmark. More surprisingly, R&D was as frequently sourced internationally as it was domestically.

In the four Northern European countries listed in Table 4, the study found that 30 to 40 per cent of the firms surveyed made decisions to source support functions internationally. Manufacturing enterprises sourced a variety of support functions internationally, but engineering, distribution and ICT functions were the most common. Compared to manufacturing enterprises, service enterprises were more likely to keep their core function in-house while sourcing support functions

internationally, as shown in Table 5. For services enterprises, the functions most commonly sourced internationally are ICT and administration.

**Figure 2. R&D and Engineering Functions Sourced Internationally by Enterprises in Selected European Countries, 2001-2006. Share of enterprises (per cent)**



Source: [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Global\\_value\\_chains\\_-\\_international\\_sourcing\\_to\\_China\\_and\\_India](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Global_value_chains_-_international_sourcing_to_China_and_India)

**Table 4. Business Functions Sourced Internationally by Manufacturing Enterprises in selected European Countries, 2001-2006. Share of enterprises carrying out international sourcing (per cent)**

	Denmark	Finland	Netherlands	Norway
Core/primary function .....	70	71	73	60
Distribution .....	20	21	17	13
Marketing & sales .....	12	23	15	13
ICT services .....	17	21	25	12
Administration .....	9	14	19	11
Engineering .....	22	11	7	17
R & D .....	14	10	15	7
Other functions .....	5	2	2	20

Note: Enterprises with 50 or more employees – except for the Netherlands covering 100 or more employees.

Source: Nielsen, 2008.

**Table 5. Business Functions Sourced Internationally by Services Enterprises in selected Countries, 2001-2006. Share of enterprises carrying out international sourcing (per cent)**

	Denmark	Finland	Netherlands	Norway
Core/primary function .....	28	39	42	16
Distribution .....	28	18	27	7
Marketing & sales .....	24	28	10	27
ICT services .....	41	33	27	42
Administration .....	30	30	25	37
Engineering .....	17	9	4	11
R & D .....	17	21	11	7
Other functions .....	6	10	3	12

Note: Enterprises with 50 or more employees – except for the Netherlands covering 100 or more employees.

Source: Nielsen, 2008.

### **Using business function surveys to shed light on the relationship between international sourcing and employment**

International sourcing has mainly been perceived as a driver of lower-skilled job loss, especially in labor-intensive manufacturing activities, such as product assembly. Indeed, as we have just shown, the 2007 Eurostat International Sourcing Survey found that manufacturing enterprises were more likely to be engaged in international than other enterprises. Why are some jobs vulnerable to international sourcing while others are less so? Economists have developed a variety of measures based on occupational or job characteristics to determine the “offshorability” of jobs (Kletzer, 2009, Blinder and Krueger, 2009). In one example of this approach, survey respondents were directly asked about the difficulty of having their work performed by someone in a remote location (Blinder and Krueger, 2009). Based on the worker’s description of her job tasks, the researchers decided how “offshorable” each job was by using professional coders to rank the “offshorability” of each occupation. Another example identified a list of U.S. occupations (at the 3-digit level) that are “potentially affected by offshoring” based on “offshorability attributes” of occupations, including the use of information and communication technologies, the use of highly codifiable knowledge, and the degree of face-to-face contact (Welsum and Reif, 2009).

The most sophisticated attempt to classify jobs according to their vulnerability to trade is the movability index (“M Index”) developed by Jensen and Kletzer (2006). The M index uses the detailed job descriptions in the Occupational Information Network (O\*NET) database<sup>7</sup> that describe the degree of face-to-face customer contact, use of codifiable information, and appearance of Internet enabled work processes to characterize work in specific occupations.<sup>8</sup> They assign a value to each 6-digit occupational code based on an examination of the O\*NET job description and researchers’ characterization of how movable the occupation is.<sup>9</sup> The M Index is based upon eleven job characteristics divided into two categories: information content (e.g., getting, processing, analyzing information; internet enabled) and job process (e.g., face-to-face contact; performing or working directly with the public; routine nature of work in making decisions and solving problems). A similar concept is behind the literature on “trade in tasks,”

<sup>7</sup> The O\*NET, formerly the Dictionary of Occupational Titles (DOT), is the U.S. Bureau of Labor Statistics’ primary source for occupational information. See: <https://onet.rti.org/>

which also uses O\*Net descriptions consider which work tasks are vulnerable to relocation (e.g., Grossman and Rossi-Hansberg, 2009).

However, there is a fundamental conceptual flaw in using individual tasks and jobs as a unit of analysis in determining how easy it is to fragment and relocate work in the context of geographically extensive, yet operationally integrated production networks. Qualitative field research on how companies set up GVCs (e.g., Dossani and Kenney, 2003; Berger et al, 2005), suggests that the processes of outsourcing and offshoring are rarely dominated by the shift of individual jobs to distant locations or outside suppliers. Although it is certainly possible<sup>10</sup>, this is even less likely with in individual tasks. More common is the outsourcing (and possible offshoring) of larger groups of employees working on a coherent body of activities, such as manufacturing, accounts payable, after-sales service, etc. In other words, it is more likely that *business functions* will be outsourced, rather than individual jobs and tasks. The character (tacitness vs. codifiability) of the tasks, job, and occupations may be far less important than the character of the linkages between domestic and foreign operations: i.e., if instructions and requirements can be easily and clearly transmitted to the remote work site, as well at the ease of transferring the output to the following stage in the value chain. The business function may require the exchange of a great deal of tacit information, but as long as those exchanges occur within the work group, and the inbound and outbound information flow can be codified and transported efficiently, the function can be readily outsourced and offshored, all other factors being equal (e.g., there has to be enough competence in the supply base to take on the function, following Gereffi et al, 2005).

To be fair, not all of the literature on trade in tasks falls into the trap of equating job characteristics with “offshorability.” A study by Lanz et al (2011) estimates the task content of goods and services by combining information on 41 tasks from the O\*Net database with information on employment by occupation and industry for large sets of occupations. This study finds the tasks that can be digitized and offshored are often complementary to tasks that cannot.

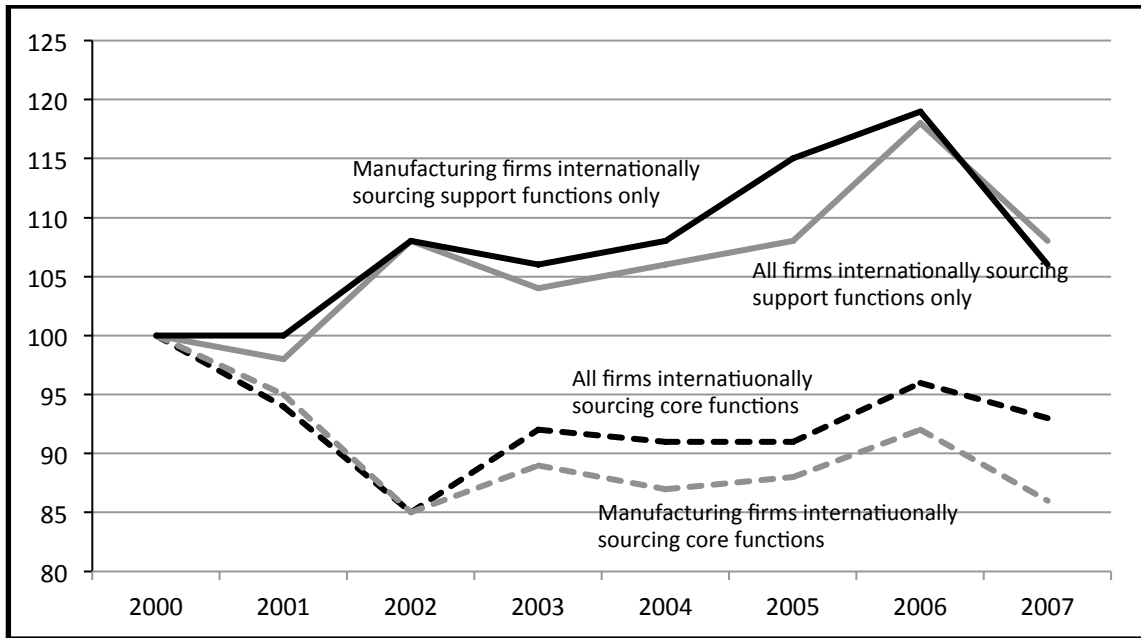
What is the evidence regarding employment from business function surveys? The 2007 Eurostat International Sourcing Survey found that between 20-25 per cent of all surveyed manufacturing enterprises sourced internationally, compared to about 10 per cent of all enterprises in the other sectors of the economy. However, concern about job loss in Europe due to international sourcing could go beyond the issue of manufacturing job loss to knowledge-intensive job loss as well. The survey shows that around 10-15 per cent of the enterprises that did source internationally in the period 2001-2006 sourced R&D functions, as shown by Figure 2.

Analysis of firm-level employment patterns in Denmark in the period 2000 – 2007, using an exercise linking data at enterprise level from the 2007 Eurostat International Sourcing Survey to the Danish structural business statistics register, found differences between enterprises sourcing only their core function internationally, and those enterprises sourcing only support functions internationally (see Figure 3). This exercise shows that enterprises sourcing their core function internationally had a considerable decline in their employment – down to an index of 93 in 2007 – compared to the enterprises only sourcing support functions internationally, which increased employment to an index 108. Enterprises with no international sourcing at all increased employment even faster, to an index of 125. When manufacturing enterprises were analyzed separately, this pattern was even more pronounced. Manufacturing enterprises internationally sourcing only core activities lost the most employees, down to an index of 86 in 2007.

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<sup>10</sup> For example, incoming calls for customer service are sometimes routed to various call centers in different locations depending on the customers question or value to the company (Askin et al, 2007).

**Figure 3. Employment Trends by Type of Function Sourced Internationally, Denmark, 2000-2007**



Note: Based on Median Values of Full-Time Equivalent No. of Employees, Index 2000 = 100  
 Source: Nielsen and Tilewska (2011)

### **Quantifying value added with business function surveys: the 2011 National Organizations Survey**

Both economic theory and research based on extensive field interviews suggest that managers often experiment with a variety of “make” or “buy” choices and on- or off-shore sourcing (Bradach and Eccles, 1989; Berger et al., 2005). Quantifying internal and external sourcing costs is important because firms can, and often do, combine internal and external sourcing of specific business functions. For example, the primary business function (e.g., component manufacturing or assembly) may be outsourced, but only when internal capacity is fully utilized. Or, firms might combine internal and external sourcing for strategic reasons, such as pitting in-house operations against external sources for competition in the realms of cost, quality, or responsiveness (Bradach and Eccles, 1989). Combinations of internal and external sourcing might show a transitional phase of outsourcing, bringing work back in-house (sometimes referred to as insourcing), or building up new in-house functions, and quantitative data collected over time can capture these trends.

The same can be said of location. Managers can decide to locate business functions in proximate or distant locations, in high or low cost locations, near customers, suppliers, specialized labor markets, and so on, and sometimes they combine these approaches and motives. Table 6 captures the four choices managers have in regard to combining the organizational and geographic location of work: 1) domestic in-house (domestic insourced in EU terminology); 2) offshore in-house or foreign affiliate (international insourced in EU terminology); 3) domestic outsourced; and 4) offshore outsourced (international outsourced in EU terminology). The central question in GVC research, then, is not which of these four choices managers make, but how they combine them.



**Table 6. Organization and Offshoring: Four Possibilities**

ORGANIZATION	LOCATION	
	DOMESTIC	INTERNATIONAL
<u>INTERNAL</u> : function within the enterprise or enterprise group	EU terminology: Domestic insourced US terminology: Domestic in-house <i>Function performed within the enterprise or enterprise group within the compiling country</i>	EU terminology: International insourced US terminology: Offshore in-house <i>Function performed within the enterprise or enterprise group outside the compiling country (by affiliated enterprises)</i>
<u>EXTERNAL</u> : function outside the enterprise or enterprise group	EU terminology: Domestic outsourced US terminology: Domestic outsourced <i>Function performed outside the enterprise or enterprise group by non-affiliated enterprises and within the compiling country</i>	EU terminology: International outsourced US terminology: Offshore outsourced <i>Production outside the enterprise or group and outside the compiling country (by non-affiliated enterprise, e.g., suppliers, service providers, contractors, etc.)</i>

Source: Based on Nielsen (2008).

Quantitative employment, wage, and sourcing information by business function was recently collected in the United States by the 2011 National Organizations Survey (NOS), funded by the National Science Foundation.<sup>11</sup> The purpose of the study is to generate direct comparison of domestic employment characteristics with outsourcing and offshoring practices. The 2011 NOS was administered online and by phone to a representative sample of United States businesses plus a sample of the largest U.S. companies. The survey includes two randomly sampled frames: 900 organizations representative of total United States employment linked to the General Social Survey (GSS), and a large firm sample of 975 business segments drawn from the largest companies in the United States (drawn from the 2009 list of “Fortune 1000” firms)<sup>12</sup>, referred to hereafter as the F1K. For these large firms, business segments (also known as divisions or lines of business) are used rather than the firm in its entirety because these sub-units are typically managed with some independence and sometimes make products with very different characteristics than other segments of the same company (e.g., financial products vs. manufactured goods). This two-tier sampling incorporated firms/segments of all sizes and also provided a larger sample of firms (the F1K) likely to be globally engaged. After eliminating duplicates and foreign-owned enterprises, the overall response rate was 30% and was comparable across firms by size.

In the 2011 NOS, questions about business functions were apparently easily understood and answered by senior executives at large and small firms, non-profits, and public organizations.<sup>13</sup>

<sup>11</sup> See: <http://scienceofsciencepolicy.net/award/national-survey-organizations-study-globalization-innovation-and-employment>

<sup>12</sup> In addition, the F1K sample was oversampled for firms with high levels of R&D spending because of keen interest in the topic of R&D outsourcing and offshoring.

<sup>13</sup> “Costs” are defined as follows. For a *manufacturing* business the costs of goods sold (COGS) is materials, labor, and factory overhead. For a *retail* business the COGS what the company pays to buy the goods that it sells to its customers. For a *service* business, it is the cost of the persons or machines directly applying the

Senior executives were able to quantify the number of jobs, wage ranges, and sourcing locations by business function according to their “best estimate.” For example, in the 336 completed surveys, only 4.5% (15) respondents indicated “don’t know” to the question about per cent of total United States employment in their organization according to business function. Of these, twelve were able to supply information about ranges of employment for each function (e.g., 1-10%, 11-30%, etc.), leaving only three respondents unable to answer the question. The survey also asked for sourcing as a per cent of costs, either the cost of goods sold or the cost of services sold, known as “cost of sales” (see Figure 4). This question was also well received by respondents, again according to their “best estimate.”

We present some of the study’s preliminary findings here. First, **Table 7** lists the per cent of costs for eight business functions in four types of United States organizations where the survey was administered: 1) F1K business segments; 2) for profit companies (not included in the F1K); 3) non-profit firms and organizations such as religious organizations and hospitals; and 4) public sector organizations, such as local, state, and federal government agencies. Taken together, samples 2-4 comprise a nationally representative sample of organizations, based on employment.

There are some clear differences in employment allocation (on average) across the four organizational types. Comparing F1K firms to other for profit firms, we see in **Table 7** that, on average, F1K firms have fewer employees working in their primary business function and more working in R&D and sales and marketing.

**Figure 5** shows the breakdown in costs for each of the eight business functions for the four possible combinations of organizational and geographic location discussed above and shown in Table 6 and Figure 4. A striking finding of the study is the low levels of international sourcing, on average, across all business functions, with the highest found in sales and marketing (7% of the function’s costs from international sourcing) and customer services and after sales service (6% of the function’s costs from international sourcing). In the United States, firms and other organizations tend to source most business functions in-house. Functions with the highest domestic outsourcing, on average, are facilities maintenance (13.5% of the function’s costs), IT systems (12% of the function’s costs), and transportation and logistics services (9% of the function’s costs). On average, all firms in the sample spent only 3% of their primary function’s costs on domestic outsourcing and 5% of their primary function’s costs on international sourcing.

Global engagement among United States firms appears to be roughly comparable to, if slightly more common than among European firms. Recall that The 2007 Eurostat International Sourcing Survey found that between 20 -25 per cent of all surveyed manufacturing enterprises sourced internationally, compared to about 10 per cent of all enterprises in the other sectors of the economy. The preliminary analysis of NOS data has not yet broken out manufacturing firms for separate analysis, but of the 191 for-profit firms in the NOS study that answered the question, 24% outsourced at least some of their primary function domestically, while 30% sourced some portion of their primary function abroad (26% from foreign affiliates and 15% from offshore suppliers; 11% did both). While more analysis needs to be done to make direct comparisons between the surveys (the 2007 Eurostat International Sourcing Survey did not include firms with

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service, typically called “cost of sales.” by accountants. For a consulting company, for example, the cost of sales would be the compensation paid to the consultants plus costs of research, photocopying, and production of reports and presentations. For a *public* organization, costs are typically defined in its operating budget.

fewer than 100 employees, or 50 employees in some countries and covers an earlier time period, 2003-2006 as opposed to calendar year 2010), the findings appear to be roughly consistent.

**Figure 4. Data Collection Grid for Outsourcing and Offshoring by Business Function**

**NATIONAL ORGANIZATIONS SURVEY**

Thinking about the same functions, now we're going to ask you some questions about how your organization is structured. Within each functional category, we'd like to know about where the work takes place, whether within your organization or by an outside supplier either in the U.S. or in a foreign country. For each function, please indicate the percentage of costs for each location during calendar year 2010. Please indicate the **percentage of costs** (click definitions link below for an explanation) incurred during calendar year 2010 for PLG Retail in each of the following locations.

(The locations for each function should total 100%)

	...by your organization? <b>DOMESTICALLY</b>	...by an independent supplier or suppliers (no ownership of 10% or more)? <b>DOMESTICALLY</b>	...by a foreign affiliate of your organization (ownership of 10% or more)? <b>INTERNATIONALLY</b>	...by an independent supplier or suppliers (no ownership of 10% or more)? <b>INTERNATIONALLY</b>	TOTAL	Not Applicable
<b>Primary business function</b>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Research and development of products, services, or technology</b>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Sales and marketing</b>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Transportation, logistics, and distribution</b>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Customer and after sales service</b>	<input type="text" value="90"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="10"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Management, administration, and back office functions</b>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Information technology systems</b>	<input type="text"/>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>
<b>Facilities maintenance and repair</b>	<input type="text" value="100"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="100"/>	<input type="checkbox"/>

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Progress - 50%

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If you have any questions please call 1-877-737-5782 ext. 286 between 9am to 5pm Pacific Time Mon. - Fri.

[Frequently Asked Questions](#)

Source: National Organizations Survey

**The picture from the United States changes when only the largest firms in the NOS study are considered. When F1K business segments are broken out and compared to the rest of the for profit cases as in** Source: National Organizations Survey, Preliminary March 17, 2012

**Figure 6** and Figure 7, F1K cases show a much higher level of international sourcing, especially through foreign affiliates, as expected. Interestingly, non-F1K for-profit companies engaged in average higher levels of domestic outsourcing than F1K companies for three functions: transportation, facilities maintenance, and IT services.

**Finally, we present preliminary finding from the 58 NOS cases that were engaged in international sourcing (through affiliates, independent suppliers, or both) and answered a question about the type of offshore location used: those with costs equal to or greater than the United States, slightly lower than the United States, or much lower than the United States. The results, presented in** Source: National Organizations Survey, Preliminary March 17, 2012

Figure 8, show that the lion’s share of international sourcing is to locations with costs that are equal to or higher than the United States. This suggests that the main motivation for international sourcing is to access skilled labor and advanced country product markets rather than low costs and emerging markets. It may also reflect the long-standing investments sourcing and other business relationships held by firms in the United States, especially in Canada and Western Europe. Next in importance are countries with costs much lower than the United States. International sourcing in countries with costs slightly lower than the United States is quite low, which might help explain the low level of integration of middle-income countries (e.g. in Latin America vs. East Asia) in GVCs, contributing to “middle income trap” experience of some developing countries (Giuliani et al, 2005; Rodrick, 2007).

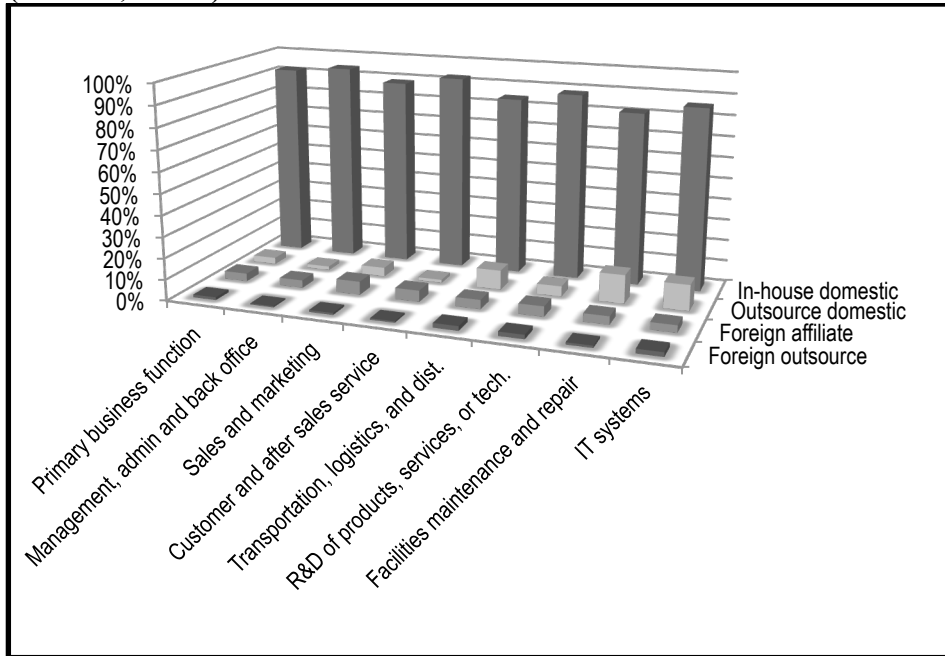
These preliminary findings indicate that despite the concerns voiced in academic literature and in media coverage about economic globalization, GVCs, and the outsourcing and offshoring of service work, these practices are in fact far from pervasive among United States organization. While GVC are real and growing, they might be said to be in their infancy. Identification of trends will only come with follow up surveys using the same framework.

**Table 7. Average share of employment by business function and organization type, December 2011. US-owned firms’ US operations**

	Fortune 1000 (F1K)	For Profit, Non- F1K	Non-Profit	Public Sector	All cases
Primary business function	49.1%	61.3%	66.8%	68.3%	60.1%
Management, admin and back office	9.6%	9.6%	14.5%	11.4%	10.6%
Sales and marketing	11.9%	7.3%	2.7%	1.3%	6.6%
Customer and after sales service	8.2%	6.5%	4.4%	2.8%	5.8%
Transportation, logistics, and dist.	6.6%	5.2%	2.7%	4.7%	5.2%
R&D of products, services, or tech.	7.7%	4.4%	2.1%	2.3%	4.6%
Facilities maintenance and repair	2.4%	2.9%	4.2%	5.2%	3.5%
IT systems	4.0%	2.4%	2.4%	3.5%	3.1%
Average Size (US employment)	15,022	1,616	2,333	4,217	6,272
Number of cases (n)	99	109	39	85	332

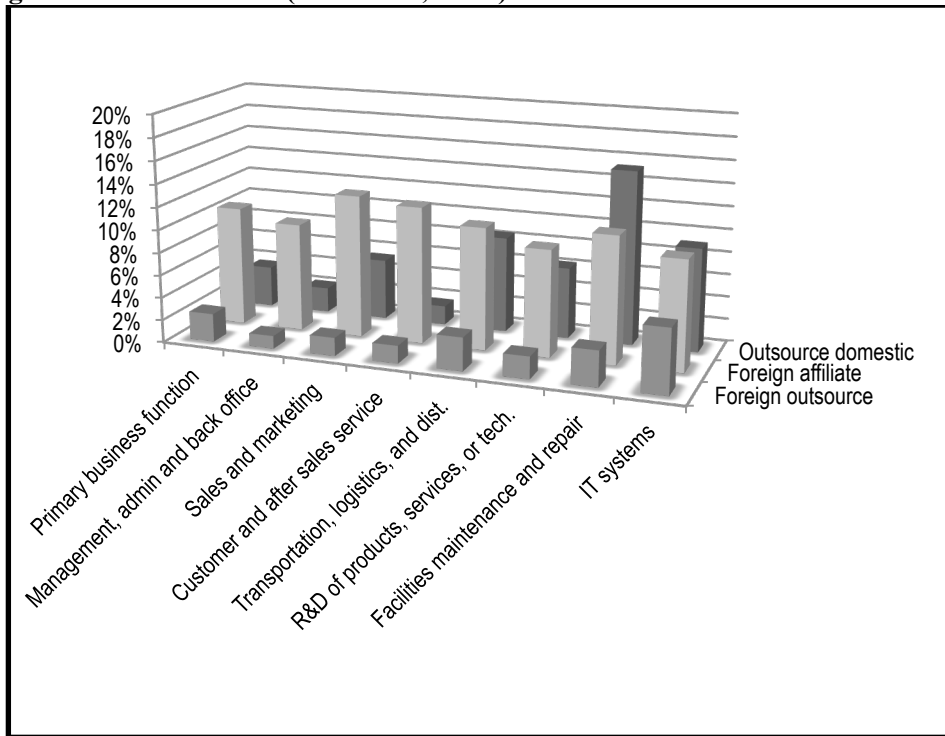
Source: 2011 National Organizations Survey, preliminary, March 17, 2012.

**Figure 5. Location of business functions as a percentage of costs of goods or services sold (all cases, n=306)**



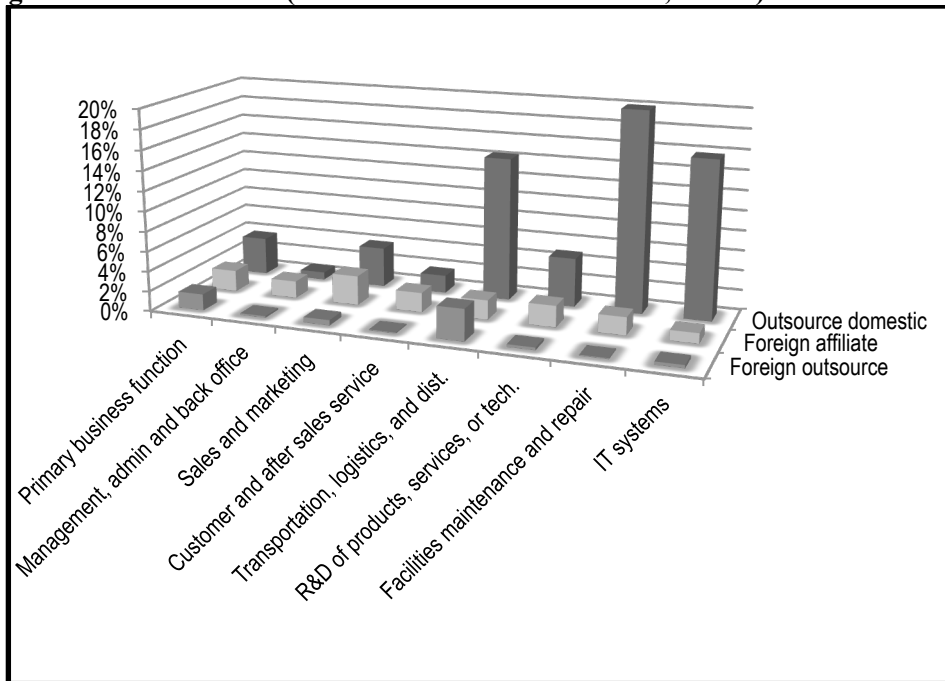
Source: National Organizations Survey, Preliminary March 17, 2012

**Figure 6. Location of outsourced/offshored business functions as a percentage of costs of goods or services sold (F1K cases, n=86)**



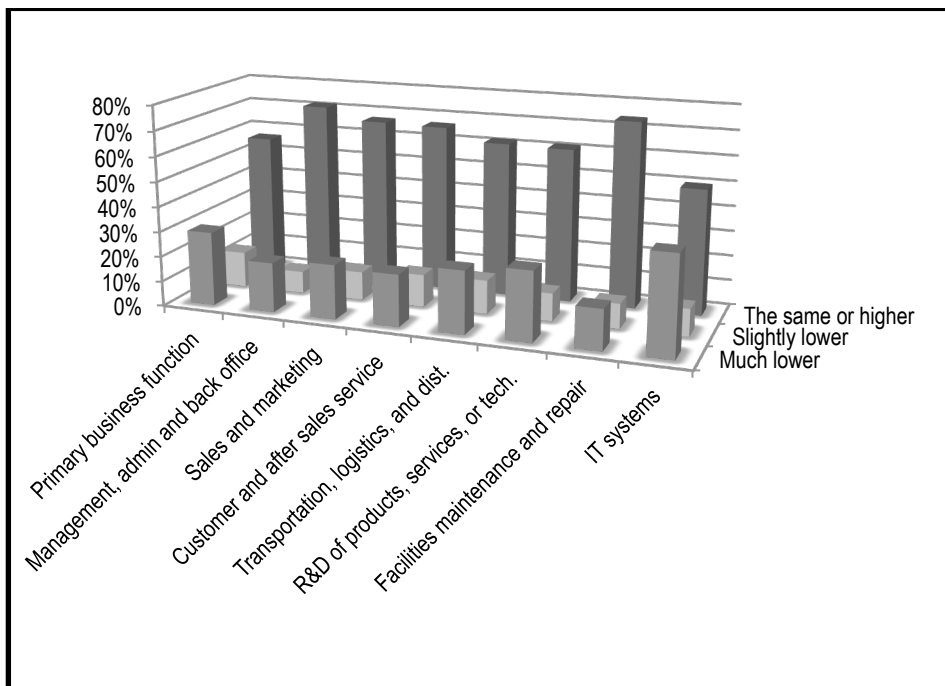
Source: National Organizations Survey, Preliminary March 17, 2012

**Figure 7. Location of outsourced/offshored business functions as a percentage of costs of goods or services sold (Private sector Non-F1K cases, n=104)**



Source: National Organizations Survey, Preliminary March 17, 2012

**Figure 8. Percent of international costs by type of location (operating costs in relation to the United States) and business function, 2010, organizations engaged in international sourcing (n=58)**



Source: National Organizations Survey, Preliminary March 17, 2012

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## Conclusions

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Scalable, comparable data to build accurate meso-level portraits of the location of value added and international sourcing patterns are sorely needed. On one hand, macro-statistics and the IIOs that seek to combine them into larger cross-border matrices are too aggregated to provide reliable, detailed industry-level estimates, and they are difficult to extend into the developing world, where input-output data is less developed or entirely missing. On the other hand, it is not feasible to collect product-level GVC data in large-scale surveys with the purpose of producing aggregated data at industry or country levels, mainly because it places too high of a burden on respondents and data agencies, a problem exacerbated by the strategically sensitive nature of the data. Business function surveys can help fill this void.

The importance of developing international standards in connection with new business surveys cannot be overstated. Global integration is first and foremost a cross-border phenomenon, and understanding it fully will require the collection of compatible, if not identical, data. A coordinated, sustained, and iterative effort is needed. Including developing countries in these efforts is essential.

At the same time, current data collection programs need to be evaluated on a constant basis in order to make negative priorities (e.g. reduce the number of collected variables, change the frequency of or abandon surveys) in order to make room for new surveys on emerging issues without increasing the overall respondent burden. Currently, official business statistics are under considerable pressure, partly to achieve reductions in respondent burden, and partly because of budget constraints. Even under these conditions, it is important to identify new emerging topics of vital importance for understanding the current structure and dynamics of economic development for which no official statistical evidence is available. Such evidence can partly be established by methods that create no additional burden on enterprises, such as the linking of micro data and the construction of IIOs, but new surveys designed with minimal respondent burden in mind, such as business function surveys must also be systematically deployed. Ideally, a global data collection effort can come to rely on automated reporting systems that reduce the burden on organizations while increasing accuracy. While these goals will take time and be difficult to achieve, a concerted and well-coordinated effort is needed now.

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