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

TIMOTHY J. STURGEON, PETER BØEGH NIELSEN, GREG LINDEN, GARY GEREFFI AND CLAIR BROWN

1 INTRODUCTION: WHY NEW FIRM-LEVEL STATISTICS ON VALUE ADDED AND INTERNATIONAL SOURCING ARE NEEDED NOW

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)[1] of this sort has led researchers

[1]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 specialisation (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).

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' labelling requirements are also based on the assumption of nationally bounded production, 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, we 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; Brülhart 2009; 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 (GDP) and productivity (Houseman 2011). These data and policy gaps have triggered innovative efforts to link national input–output (IO) tables into larger international (global and regional) input–output tables (IIOs) that researchers can use to estimate trade in value added, among other things (OECD 2011b). With data of this sort, we can begin to answer the question 'who wins and who loses from globalisation?' from the supply side (*ie* winners and losers in terms of value added, value capture and employment), rather than only the demand side (*ie* winners and losers in terms of consumer prices versus jobs and wages).

Despite the progress that IIO tables represent, the estimation and cross-border harmonisation required to construct them decrease detail and accuracy. National IO 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 IO data sets are linked across borders, these problems are compounded as industry categories are harmonised 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 IO 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.[2] Almost all of the defining features of services (that is, they are non-tradeable, non-storable, customised 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. Computerisation is allowing a growing range of service tasks to be standardised, codified, modularised and more readily and cheaply transmitted among individuals and organisations 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. Using existing data in new ways, including generating groupings of traded products that better reflect GVCs, (see, for example, Sturgeon and Memedovic 2010) and linking 'microdata' from surveys to administrative sources such as business registers (see, for example, Bernard *et al* 2005, 2006; Nielsen and Tilewska 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 standardisation will be 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.

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[2] 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 customised and ephemeral nature of many services has led them to be considered 'non-tradeable' 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 (*eg* transportation) or as services provided to people who worked in manufacturing (*eg* 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 policymaking has been clearly articulated (Commission of the European Communities, 2003).

While collecting new data on a globally harmonised basis, for this is what is needed, is a daunting task, we need to begin to test the results of research using IIOs with standardised 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.

2 PRODUCT-LEVEL GVC STUDIES

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 (*ie* 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 tends 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 organisation 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 industrialised countries, especially Taiwan (Chinese Taipei). 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

Table 11.1: *The location of value added and capture for a 'Tea Party Barbie' doll, 1996.*

Production, inputs and contract management	Value ($)
Materials	0.65
Saudi Arabia: Oil	
Hong Kong: management, shipping	
Taiwan (Chinese Taipei): refines oil into ethylene for for plastic pellets for Barbie's body	
Japan: nylon hair	
US: cardboard packaging, paint pigments, moulds	
Production: China (factory space, labour, electricity)	0.35
Overhead and coordination of production and	1.00
outbound shipping: Hong Kong	1.00
Export value (factory price):	**2.00**
US: shipping, US ground transportation, wholesale and retail markups	6.99
US: Mattel Inc. (lead firm: design, marketing)	1.00
US retail price:	**9.99**

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

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 publicised case are summarised in Table 11.1, which shows that only 35 cents (3.5%) of the value of a US$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 2011; Hesseldahl 2010). Most recently, the OECD (2011b, 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 USA and Germany.

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.

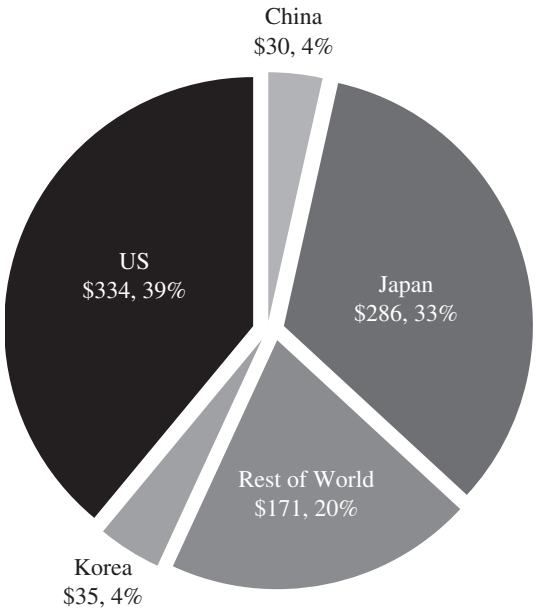

Figure 11.1: *Geography of value added in a Hewlett-Packard notebook computer.*

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

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 labour 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 labour as a source of value added. 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%! 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 USA and Japan (see Figure 11.1).

Judging from prior research on similar GVCs (Sturgeon 2003), it is very likely that most if not all high-value components were specified by HP's design group in the USA, 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 HP—the 'lead firm' in the GVC—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, 2011) estimated value added and employment in upstream activities, such as research and development (R&D) and marketing, from the ratio of the target product's sales in total firm revenues. One outcome of this exercise was an estimate that the share of US-based employees in the total iPod-related wages (from R&D to retail) paid worldwide in 2006 was 70%, considerably higher than the estimated share of US-based companies in the global distribution of gross profit from the iPod hardware alone.

Product-level GVC studies typically look only one value-chain level upstream from final assembly. However, a sub-system company may produce or purchase high value sub-assemblies and components in a third country (*eg* Singapore and Malaysia are common locations for the production of head assemblies for hard drives). Estimates of the actual geography of value added must be made, and these require a great deal of industry knowledge. In IO analysis, industry knowledge is not required 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, as discussed below, GVC analysis can potentially separate the geographical assignment of the two chief elements of value added (wages and profits), whereas IO analysis cannot.

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.[3] This is no accident, since the research mainly relies on data from private consulting firm 'teardown reports' itemising 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 generalise. Moreover, the electronics products that teardown reports analyse typically contain hundreds of clearly identifiable components with relatively transparent world

[3]An exception is a set of five case studies from the shoe industry conducted by the Swedish National Board of trade (2007).

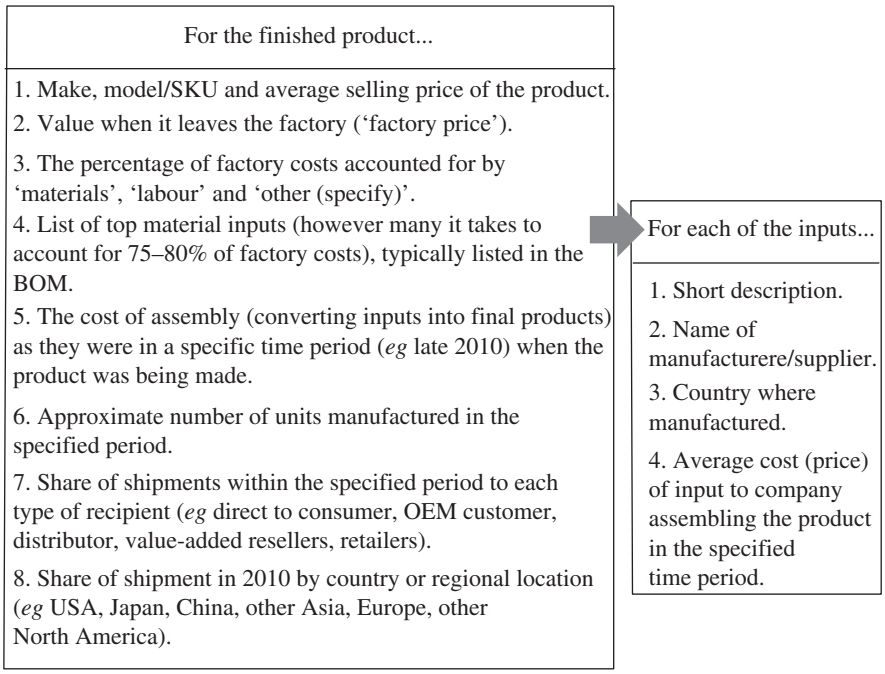

Figure 11.2: *Basic data needed for product-level GVC studies.*

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 standardised, 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 ini-

tial 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 itemising 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 Figure 11.2.

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 labour, 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 Figure 11.2) should also be analysed 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 generalise because they only represent a single product.

An approach that avoids targeting a single product or company is the use of average breakdowns of component values for a generic product type (*eg* notebook PC, 2 MW wind turbine). Sometimes data of this sort can be obtained through industry associations willing to cooperate 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* (2008) combine standard IO 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* 2008, 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.

Again, the product-level approach makes it conceivable to go further and separate out the labour and profit components of value added.[4] Consider the example of a Japanese-branded hard disk drive assembled in China from imported parts before it is included in a notebook PC such as the Hewlett-Packard model nc6230 notebook computer discussed above. According to information from an executive in the hard drive industry, the value added attributable to hard drive assembly wages is about 7% ($4.76) of the $68 wholesale price of the drive, and the value added corresponding to the Japanese firm's gross profit is about 20% ($13.60). If all of the value added of the hard drive (*ie* 27% of the wholesale price, or $18.36) is assigned to China (assuming the drive was assembled there), then local value added is overestimated by nearly 300%. If, on the other hand, all of the value is assigned to Japan, then Japanese value added is only overstated by 35% and Chinese value added is underestimated by a relatively small amount. Since pragmatic considerations may limit the number of value-chain levels in which these types of detail can be collected, it is clearly better to err on the side of assigning value to the country where the sub-system company is headquartered in industries where labour accounts for a much smaller share of value added than does profit. International IO studies, however, would do the opposite, assigning all the value added to the location where the work is performed.

Product-level GVC studies are demanding in terms of industry knowledge, but they are the only method to enable separate treatment of the labour and profit components of value added. They require knowledge of the headquarter locations of participating firms (for profit accounting) and their factory locations (for labour accounting) and must have a means to estimate the split between them. International IOs, by default, assign all the value added to the factory location. Despite the challenges, product-level studies are worth performing from time to time as a check on the robustness of measures of the distribution of value from world trade that are derived from official statistics.

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 industrialised countries, but so too are the 'knowledge work' and the intangible assets involved in system-level design, product strategy, marketing, brand management and supply chain orchestration.

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[4]Value added is the difference between the selling price and the cost of acquired inputs. In practice, however, this is equal to some measure of profit plus wages plus some accounting values such as depreciation.

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 Taiwan (Chinese Taipei), South Korea and OECD countries (Steinfeld 2004). This has important policy implications. While product-level GVC studies suggest that the competitive 'threat' to advanced economies posed by indigenous Chinese capabilities may be vastly overstated, not only in the popular press but in policy circles, massive exports do reflect large-scale employment, even if they are based on non-indigenous innovations and market success. The result could be an increasing disjuncture between innovation and employment that will lead, if not to wholesale economic decline, at least into uncharted waters.

3 BUSINESS FUNCTION SURVEYS

There is a pervasive dynamic working against the usefulness of current business statistics. On the one hand, production is becoming increasingly bundled with services. 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 (*eg* R&D, sales, marketing, IT systems) 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* that can be offered (horizontally, to diverse customers) as more or less generic goods and services within and across industries. Firms not only outsource the assembly of goods, and source tangible inputs in GVCs (as captured by product-level GVC studies), but 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 centres for sales or customer support, and even engineering and elements of R&D (Dossani and Kenney 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—*ie* 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 Box 11.1) reduces 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) suggests 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.

Box 11.1. Seven business functions used in the european survey on international sourcing.[5] In the European International Sourcing survey, seven business functions (plus a residual 'other' category) were identified using the European Central Product by Activity (CPA) classification.

1. *Core/primary business functions:* 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.

2. *Support business functions:* 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 the following.

   (a) *Distribution and logistics:* 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.

   (b) *Marketing, sales and after-sales services including help desks and call centres:* this support function consists of market research, advertising, direct marketing services (telemarketing), exhibitions, fairs and other marketing or sales services. It also includes call-centre services and after-sales services, such as help desks and other customer support services. In figures and tables 'marketing, sales' is used as an abbreviation for this function.

   (c) *Information and communications technology (ICT) services:* this support function includes IT services and telecommunications. IT services consist of hardware and software consultancy, customised 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.

(d) *Administrative and management functions:* this support function includes legal services, accounting, bookkeeping and auditing, business management and consultancy, HR management (*eg* 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.

(e) *Engineering and related technical services:* 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.

(f) *Research & Development:* this support function includes intramural research and experimental development. In figures and tables 'R&D' is used as an abbreviation for this function.

Not only is the business function classification useful for tracing the organisational 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 organisation. 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.

3.1 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[6] 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 standardised activity/industrial codes such as its ISIC, NACE or NAICS classification. Instead of counting all output and employment under this main output classification,

[6]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.

as business censuses typically do, business function surveys supplement the primary output function with a standardised, generic list of support functions (see Box 11.1). In other words, firm-level data (*eg* occupational employment, wage levels paid, internal, external and international sourcing costs) 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, forthcoming). 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 with 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 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 2009 Survey of Innovation and Business Strategy (SIBS)[7] (again, see Box 11.1).[8]

Business function data can be used to inform a wide variety of research and policy questions. For example, they can be used to characterise patterns of business function bundling in respondent firms (*ie* organisational design

[7] See http://www.ic.gc.ca/eic/site/eas-aes.nsf/eng/h_ra02092.html.

[8] 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 organisation or sourcing patterns.

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 IO 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.

3.2 Using Business Function Surveys to Collect Data on External and International Sourcing: The Eurostat International Sourcing Survey

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This section provides some illustrations of business function data from the 2007 Eurostat International Sourcing Survey (Nielsen *et al* 2008). 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 2001–6. 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 uses 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 11.3 the 2007 Eurostat International Sourcing Survey found that 16% 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% and 35%, respectively). The two small and open Nordic economies, Denmark (25%) and Finland (22%), were also significantly above the average. Germany (13%) was just below the average. Figure 11.3 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.

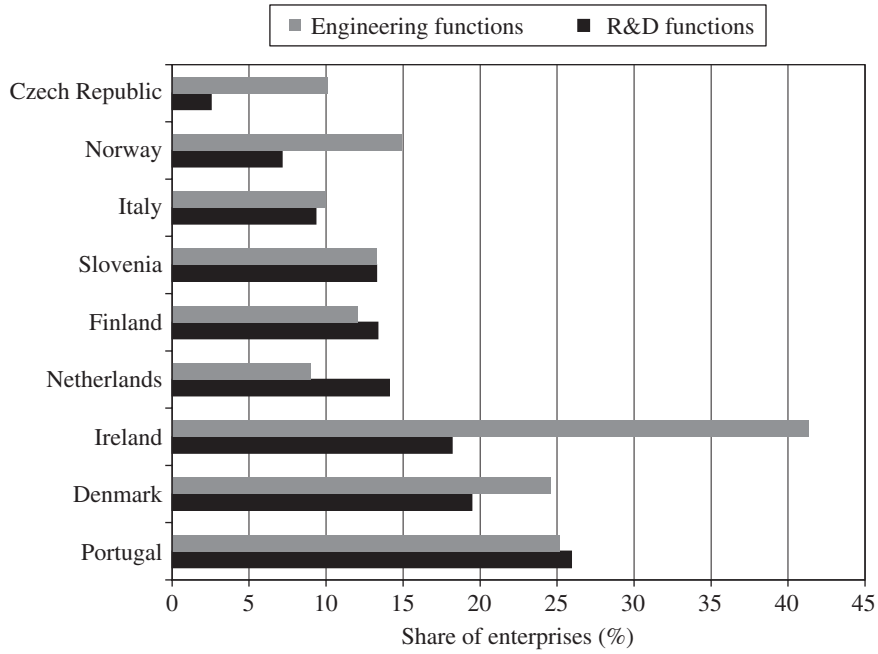

Figure 11.3: *R&D and engineering functions sourced internationally by enterprises in selected European countries, 2001–6.*

Source: Eurostat report data, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Global_value_chains_-_international_sourcing_to_China_and_India.

In the four Northern European countries listed in Table 11.2, the study found that 30–40% 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 11.3. For services enterprises, the functions most commonly sourced internationally are ICT and administration.

3.3 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 labour-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

Table 11.2: *Business functions sourced internationally by manufacturing enterprises in selected European countries, 2001–6: share of enterprises carrying out international sourcing (%).*

	Denmark	Finland	Netherlands	Norway
Core/primary function	70	71	73	60
Distribution	20	21	17	13
Marketing and 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

Source: Nielsen (2008). Enterprises have 50 or more employees, except for the Netherlands, covering 100 or more employees.

Table 11.3: *Business functions sourced internationally by services enterprises in selected countries, 2001–6: share of enterprises carrying out international sourcing (%)*

	Denmark	Finland	Netherlands	Norway
Core/primary function	28	39	42	16
Distribution	28	18	27	7
Marketing and 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

Source: Nielsen (2008). Enterprises have 50 or more employees, except for the Netherlands, covering 100 or more employees.

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 his or 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 US occupations (at the three-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 (van Welsum and Reif 2009).

The most sophisticated attempt to classify jobs according to their vulner-

ability 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[9] that describe the degree of face-to-face customer contact, use of codifiable information and appearance of Internet-enabled work processes to characterise work in specific occupations. They assign a value to each six-digit occupational code based on an examination of the O*NET job description and researchers' characterization of how movable the occupation is. The M Index is based upon eleven job characteristics divided into two categories: information content (*eg* getting, processing, analysing information; Internet enabled) and job process (*eg* 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', which also uses O*NET descriptions to consider which work tasks are vulnerable to relocation (see, for example, Grossman and Rossi-Hansberg 2012).

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 (see, for example, 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,[10] this is even less likely with 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 or after-sales service. In other words, it is more likely that *business functions* will be outsourced, rather than individual jobs and tasks. The character (tacitness versus codifiability) of the tasks, jobs and occupations may be far less important than the character of the linkages between domestic and foreign operations, *ie* 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 (*eg* there has to be enough competence in the supply base to take on the function, following Gereffi *et al* 2005).

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[9]The O*NET, formerly the Dictionary of Occupational Titles (DOT), is the US Bureau of Labor Statistics' primary source for occupational information. See https://onet.rti.org/.

[10]For example, incoming calls for customer service are sometimes routed to various call centres in different locations, depending on the customer's question or value to the company (Askin *et al* 2007).

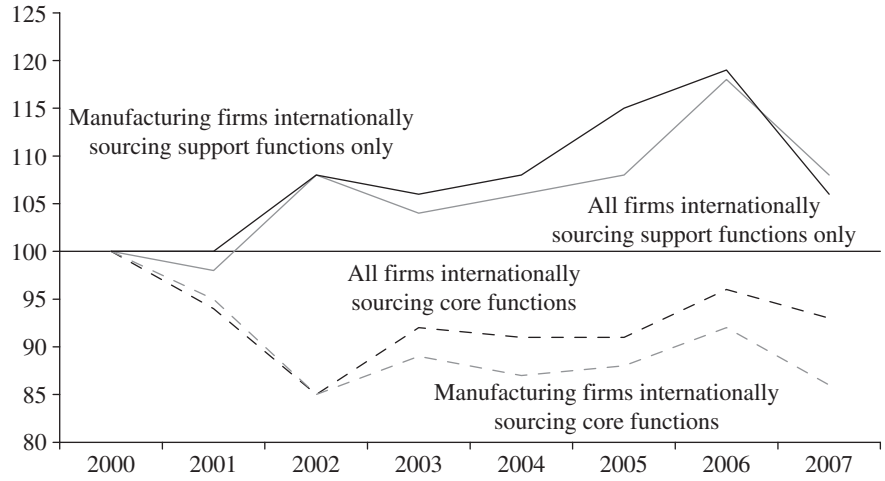


Figure 11.4: *Employment trends by type of function sourced internationally, Denmark, 2000–7.*

Source: Nielsen and Tilewska (2011). Based on median values of full-time equivalent number of employees. Index 2000 = 100.

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 finds the tasks that can be digitised 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 20–25% of all surveyed manufacturing enterprises sourced internationally, compared with about 10% of all enterprises in the other sectors of the economy. However, concerns 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% of the enterprises that did source internationally in the period 2001–6 sourced R&D functions, as shown by Figure 11.3.

Analysis of firm-level employment patterns in Denmark in the period 2000–7, 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 11.4). 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 with 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 analysed 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.

3.4 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 offshore 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 (*eg* component manufacturing or assembly) may be outsourced, but only when internal capacity is fully utilised. 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, specialised labour markets, and so on, and sometimes they combine these approaches and motives. Figure 11.4 captures the four choices managers have in regard to combining the organisational 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.

Quantitative employment, wage and sourcing information by business function was recently collected in the USA by the 2011 National Organizations

Table 11.4: *Organisation and offshoring: four possibilities.*

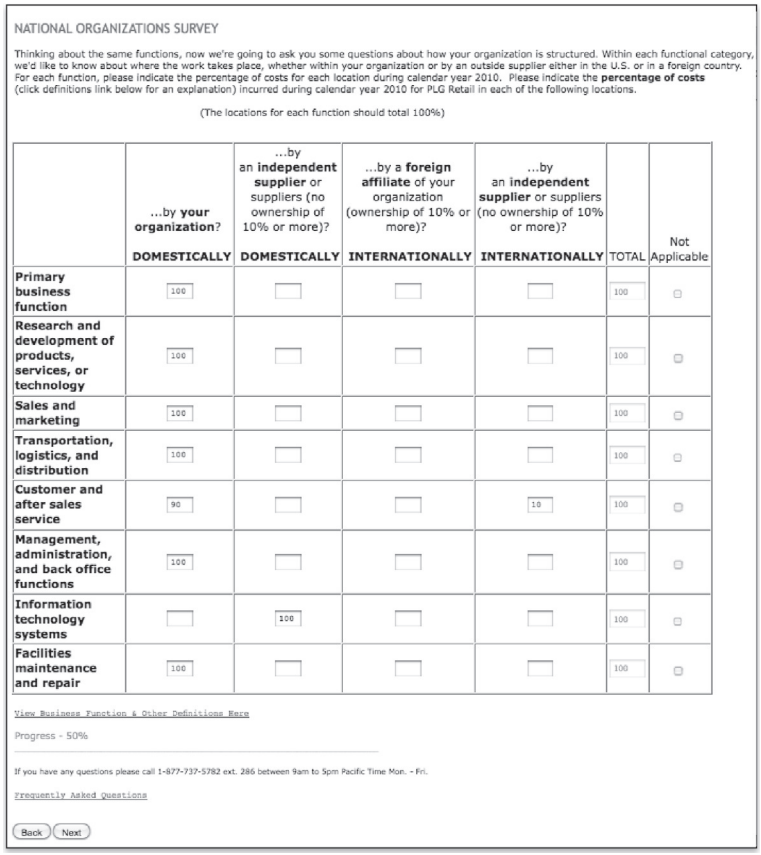
	Location	
Organisation	Domestic	International
Internal: function within the enterprise or enterprise group	EU terminology: domestic insourced US terminology: domestic in-house Function performed within the enterprise or enterprise group within the compiling country	EU terminology: international insourced US terminology: offshore in-house Function performed within the enterprise or enterprise group outside the compiling country (by affiliated enterprises)
External: function outside the enterprise or enterprise group	EU terminology: domestic outsourced US terminology: domestic outsourced Function performed outside the enterprise or enterprise group by non-affiliated enterprises and within the compiling country	EU terminology: international outsourced US terminology: offshore outsourced Production outside the enterprise or group and outside the compiling country (by non-affiliated enterprise, *eg* suppliers, service providers, contractors)

Source: Based on Nielsen (2008).

Survey (NOS), funded by the National Science Foundation.[11] 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 telephone to a representative sample of US businesses, plus a sample of the largest US companies. The survey includes two randomly sampled frames: 900 organisations representative of total US employment linked to the General Social Survey (GSS), and a large firm sample of 975 business segments drawn from the largest companies in the USA (drawn from the 2009 list of 'Fortune 1000' firms),[12] 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 entirely 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 (*eg* financial products versus manufactured goods). This two-tier sampling incorporated firms/segments of all sizes and also provided a larger sample

[11] See the US Office of Science and Technology Policy website: http://www.scienceofsciencepolicy.net/award/national-survey-organizations-study-globalization-innovation-and-employment.

[12] 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.



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

View Business Function & Other Definitions Here

Progress - 50%

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

Frequently Asked Questions

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Figure 11.5: *Data collection grid for outsourcing and offshoring by business function. Source:* National Organizations Survey.

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 organisations.[13] Senior executives were able to quantify

[13]'Costs' are defined as follows. For a *manufacturing* business the costs of goods sold (COGS) are materials, labour and factory overhead. For a retail business the COGS is 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 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

Table 11.5: *Average share of employment (in percent) by business function and organisation type, December 2011 (US-owned firms' US operations).*

		F1K	For-profit non-F1K	Non-profit	Public sector	All cases
A	Primary business function	49.1	61.3	66.8	68.3	60.1
B	Management, admin and back office	9.6	9.6	14.5	11.4	10.6
C	Sales and marketing	11.9	7.3	2.7	1.3	6.6
D	Customer and after-sales service	8.2	6.5	4.4	2.8	5.8
E	Transportation, logistics, and dist.	6.6	5.2	2.7	4.7	5.2
F	R&D of products, services, or tech.	7.7	4.4	2.1	2.3	4.6
G	Facilities maintenance and repair	2.4	2.9	4.2	5.2	3.5
H	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, 17 March 2012.

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 the percentage of total US employment in their organisation according to business function. Of these, 12 were able to supply information about ranges of employment for each function (*eg* 1–10%, 11–30%), leaving only 3 respondents unable to answer the question. The survey also asked for sourcing as a percentage of costs, either the cost of goods sold or the cost of services sold, known as 'cost of sales' (see Figure 11.5). 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 11.5 lists the percentage of costs for eight business functions in four types of US organisations where the survey was administered:

1. F1K business segments;
2. for-profit companies (not included in the F1K);
3. non-profit firms and organisations such as religious organisations and hospitals; and
4. public sector organisations, such as local, state, and federal government agencies.

Taken together, samples 2-4 comprise a nationally representative sample of organisations, based on employment.

There are some clear differences in employment allocation (on average) across the four organisational types. Comparing F1K firms with other for-profit firms, we see in Table 11.5 that, on average, F1K firms have fewer

and production of reports and presentations. For a *public* organisation, costs are typically defined in its operating budget.

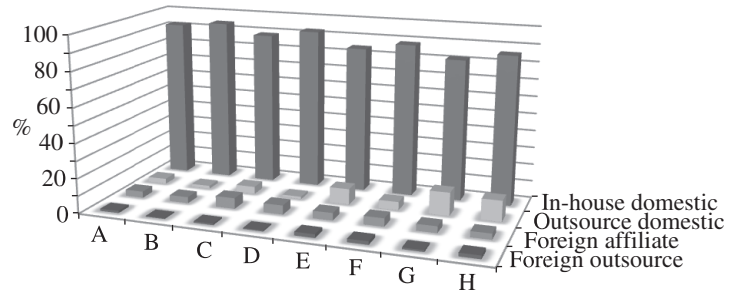

Figure 11.6: *Location of business functions as a percentage of costs of goods or services sold (all cases, n = 306).*

Source: National Organizations Survey, preliminary, 17 March 2012. Categories on the horizontal axis refer to those defined in Table 11.5.

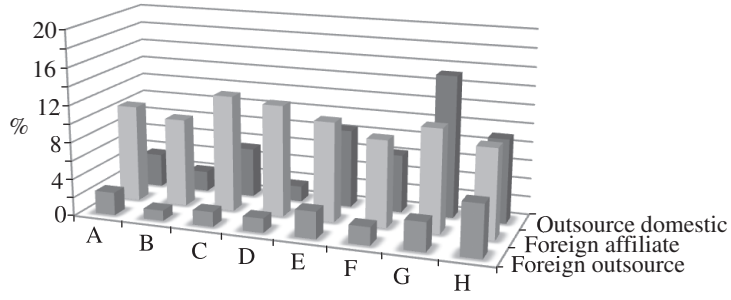

Figure 11.7: *Location of outsourced/offshored business functions as a percentage of costs of goods or services sold: F1K cases, n = 86.*

Source: National Organizations Survey, preliminary, 17 March 2012. Categories on the horizontal axis refer to those defined in Table 11.5.

employees working in their primary business function and more working in R&D and sales and marketing.

Figure 11.6 shows the breakdown in costs for each of the eight business functions for the four possible combinations of organisational and geographic location discussed above and shown in Table 11.5 and Figure 11.5. 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 USA, firms and other organisations 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%

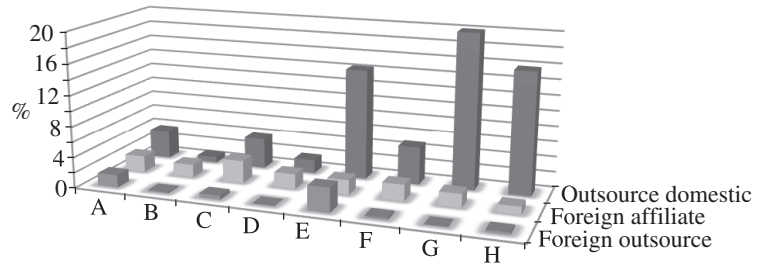

Figure 11.8: *Location of outsourced/offshored business functions as a percentage of costs of goods or services sold: private sector non-F1K cases, n* = 104.

Source: National Organizations Survey, preliminary, 17 March 2012. Categories on the horizontal axis refer to those defined in Table 11.5.

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 US 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 20–25% of all surveyed manufacturing enterprises sourced internationally, compared with about 10% 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 fewer than 100 employees, or 50 employees in some countries and covers an earlier time period, 2003–6 as opposed to calendar year 2010), the findings appear to be roughly consistent.

The picture from the USA 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 Figures 11.7 and 11.8, F1K cases show a much higher level of international sourcing, especially though 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:

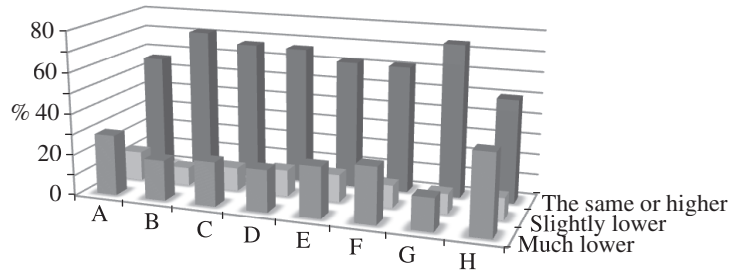

Figure 11.9: *Percentage of international costs by type of location (operating costs in relation to the USA) and business function, 2010, organisations engaged in international sourcing (n = 58).*

Source: National Organizations Survey, preliminary, 17 March 2012. Categories on the horizontal axis refer to those defined in Table 11.5.

those with costs equal to or greater than the USA, slightly lower than the USA or much lower than the USA. The results, presented in Figure 11.9, show that the lion's share of international sourcing is to locations with costs that are equal to or higher than the USA. This suggests that the main motivation for international sourcing is to access skilled labour and advanced county 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 USA, especially with Canada and Western Europe. Next in importance are countries with costs much lower than the USA. International sourcing in countries with costs slightly lower than the USA is quite low, which might help explain the low level of integration of middle-income countries (*eg* in Latin America versus East Asia) in GVCs, contributing to the 'middle-income trap' experience of some developing countries (Giuliani *et al* 2005; Rodrik 2007).

These preliminary findings indicate that, despite the concerns voiced in academic literature and in media coverage about economic globalisation, GVCs and the outsourcing and offshoring of service work, these practices are in fact far from pervasive among US organisations. While GVCs 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.

4 CONCLUSIONS

Scalable, comparable data are sorely needed in order to build accurate meso-level portraits of the location of value added and international sourcing patterns. On the one hand, macro-statistics and the IIOs that seek to combine them into larger cross-border matrices are too aggregated to provide reli-

able, 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 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. The inclusion of developing countries in these efforts is essential.

At the same time, current data-collection programmes need to be evaluated on a constant basis in order to make negative priorities (*eg* 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 organisations 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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