International Sourcing in Finland and Sweden

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This book summarizes the key findings of the *International Sourcing in Finland and Sweden* (acronym: InSource) collaborative research project of ETLA, the Research Institute of the Finnish Economy, and KTH, Royal Institute of Technology in Stockholm. This effort has been kindly supported by Tekes, the Finnish Funding Agency for Innovation, and Vinnova, Sweden's innovation agency.

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Foreword

Tekes, the Finnish Funding Agency for Innovation, and its Swedish sister organization VINNOVA joined forces in 2014 to study the renewing manufacturing industries. Under this umbrella, Tekes and VINNOVA supported half a dozen international research projects, including our *Intangibles and International Sourcing* (acronym: InSource), and facilitated intense interaction between researchers and policymakers in Finland and in Sweden.

As a part of InSource, ETLA and KTH have conducted several microeconomic analyses that shed new light on the nexus between innovation and globalization (Baum, Ding, Lööf, Rouvinen, & Tuhkuri, 2017; Deschryvere, 2017; Ketokivi & Rouvinen, 2015; Ketokivi, Turkulainen, Seppälä, Rouvinen, & Ali-Yrkkö, 2017; Lööf & Nabavi, 2015; Tuhkuri, 2016a, 2016b; Tuhkuri, Lööf, Mohammadi, & Rouvinen, 2016a, 2016b; Ylömäki, 2016). In this book, we discuss what this body of work, along with additional work by others and us, implies for Finland and Sweden.

We wish to thank Tekes and VINNOVA for their support. We are most grateful to our colleagues representing the ROAmING project (under the same Tekes-VINNOVA umbrella) for providing Chapter 5 for this book, which superbly complements our work. Professors Gaaitzen de Vries (University of Groningen) and Martin Kenney (University of California, Davis) have offered invaluable guidance during the project. Gaaitzen's expertise is most visible in Chapter 2; his help has been indispensable for our understanding of the *World Input-Output Database* (WIOD) and related calculations. Martin has tirelessly challenged and inspired us to delve into the practical operations of global value chains and to think through the implications of, e.g., transfer pricing practices employed by multinational enterprises. We are indebted for all that we learned from Gaaitzen and Martin.

Finally, we are deeply honored that Professor Richard Baldwin – a world-leading thinker in this domain and the original inspiration for the InSource project (via his work for the Prime Minister's Office of Finland in 2006) – wanted to join us for the final InSource event on 24 August 2017.

Richard's most recent book (Baldwin, 2016) – a *Financial Times Best Economics Book of 2016* – challenges us again to think about what lies ahead with yet another "unbundling" induced by artificial intelligence, telepresence, and other emerging technologies.

August 2017, Helsinki and Stockholm,

Jyrki Ali-Yrkkö (ETLA), Hans Lööf (KTH), Ali Mohammadi (KTH), and Petri Rouvinen (ETLA), the editors of this book and the coordinators of the InSource project.

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Executive Summary

Deep Nordic Engagement in New Globalization

Since 1990, Finland and Sweden have entered and become deeply engaged with *New Globalization*, which is characterized by geographically fragmented production and intense cross-border knowledge flows:

- Some 1/3 of business sector employment in both countries directly serves the operations of global value chains in its day-to-day jobs.
- In both countries, approximately 40% of gross exports consist of imported inputs.
- Some 30% of Finnish and 20% of Swedish manufacturing firms (with over one hundred employees) have offshored some of their business activities.
- Approximately 40% of Finnish and 50% of Swedish corporations' global employment is located abroad.
- Foreign-owned units provide some 20% of Finnish and 30% of Swedish business sector value added.

New Globalization was made possible by advances in information and communication technology. The phenomenon began between the mid-1980s and mid-1990s, as governments worldwide engaged in reducing barriers to cross-border exchange. Since then, large multinational enterprises have been at the helm with little political control or oversight. Thanks to the internet and its increasingly prevalent digital platforms, smaller businesses and even individuals are also starting to participate in and have influence on New Globalization.

Competition among companies has become more intense. At the same time, opportunities to compete internationally have multiplied, and the bounty for succeeding has grown. Both companies and countries have become more specialized. The ones initially well-endowed with commercially applicable knowledge – including the countries of Finland and Sweden as a whole as well as leading Finnish and Swedish corporations, have greatly benefitted from this development.

The penetrating feature of global value chains is their circular nature. Their smooth operation depends on instant transfer of instructions, quick and cheap movement of intermediate inputs and final outputs. They depend on cross-border flows of goods, services, investment, capital, ownership, technology, and workers.

Manufacturing is geographically more fragmented than services. Within manufacturing, direct assembly, fabrication, and processing stages are clearly the most internationalized aspects. It is nevertheless the case that all business activities have become more geographically dispersed.

Swedish Corporations Are More Active in Bringing Activities Back Home

In looking at inbound and outbound moves on business activities to and from Finland and Sweden, we find that offshoring is more prevalent than backshoring. Movements in both directions are more prominent in Sweden than in Finland but inbound and outbound flows are more balanced in Sweden.

Predictably, labor cost is the main motivation to move out business activities. The main rationales to move activities inward are quality; flexibility; lead-time, access to skills, knowledge, technology; and production's proximity to R&D.

Despite globalization, in some cases, a company commands large chunks of a value chain, and stages of a value chain may co-locate. The need for a corporate control of successive stages as well as the need for co-location are both complex issues that cannot be addressed without appreciating the idiosyncrasies of specific cases. As a generalization, we find that for consumer electronics and textiles, value creation and capture are largely detached from the location of physical manufacturing activities, but that co-location often has a central role in engineering.

The Location of Innovative Activity Still Has a Strong Home-Bias

Despite the best efforts of multinational enterprises, the technologies that they initially controlled have become increasingly shared. This has diminished the economic value created in direct production relative to the pre- and post-production stages, which in turn has led to servicification of many manufacturing industries and has also emphasized the role of intangibles in economic value creation. In this process, innovation has become more important for both companies and countries.

Innovative activity is much less geographically dispersed than direct production, and to a large extent, it is still located in the home economies of multinational enterprises. To the extent that it does happen, offshoring of innovative activity is mostly done within the enterprise group, and oftentimes new locations are found in the developed countries.

In considering innovative activity in the New Globalization context, it is important to differentiate between stages of innovative activity and to make a distinction between the movement of previous activity and the initiation of new activity.

Innovative activity may be divided into research (R), development (D), and commercialization. Of these, the last two have been more exposed to the forces of globalization. In other words, development, design, and testing have been more prone to an increasing geographical dispersion, whereas the research part has remained more concentrated. If relocated, the pull factors of R and D are quite different: In addition to local suitably educated labor, the R component seeks an appealing urban environment that is attractive to well-compensated recruits all over the world as well as proximity to world-class universities and research institutions that are in suitable fields and are entrepreneurially orientated. Local market size and cost considerations are more important for the D component. In practice, relatively few global cities capture a large fraction of all cross-border investment in innovative activity.

In our case studies, we observe both skintight coupling and complete irrelevance of co-location in the relationship between direct production and the innovative activity contributing to it. It nevertheless seems that in most cases, innovative activity in the home economy has *not* followed production to the host economy. However, new Greenfield investments in innovative activity are more likely to be done in current production locations.

In simply looking at the task content of innovation jobs in Finland and in Sweden, we find that a large fraction of these jobs are potentially offshorable. The actual numbers nevertheless reveal that this potential has not been realized. One of the reasons for this apparent puzzle is that only looking at the task level fails to acknowledge locational differences in employee productivity, which – besides individual characteristics – are also derived by the immediate team and more extensive surroundings.

This broader ecosystem cannot be moved, even when the job tasks can be. Specialization has also been a contributing factor: our empirics suggest that in order to escape intensifying competition, companies have increased the share of innovators in their domestic labor forces. Furthermore, compared to China, for example, companies in Finland and Sweden have a higher ability to retain and protect their knowledge assets. Lastly, in comparing wages of comparable individuals in alternative locations, Finland and Sweden are often surprisingly cost competitive in innovation tasks.

Policy Principles Underlying the "Nordic Model" Are Still Applicable

New Globalization underlines the importance of the age-old principles of good policy conduct. Firms today are served with an expanding smorgasbord of choices with outsourcing (make or buy?) and offshoring (where?). Consequently, they have grown more sensitive to national and local authorities' actions. As firms compare locations worldwide, they value transparency and stability in policymaking. Features of global value chains highlight the importance of local skill building, flexible labor markets, and assistance and re-training for those that face unemployment due to abrupt changes.

Based on our work, we suggest the following policy considerations in the New Globalization context:

- **Neither national nor global but city-level innovation ecosystems that connect to similar agglomerations internationally**. Even though knowledge flows globally to a larger degree, the fruits of innovation are to a considerable extent captured by individuals performing innovation – not only by companies paying for it. Some of this personal learning remains tacit. People can only be in one physical location at a time. Thus, a normal day-to-day working and living environment, normally a city, defines the boundaries of a nucleus innovation ecosystem.
- **Implementing policies for attracting and sustaining high-potential individuals of foreign origin**. Building an internationally competitive city-level innovation ecosystem includes attracting the best and the brightest globally. This calls for a special set of measures, which should include minimization of any associated bureaucracy and time delays.

- **Redefining the motivation and nature of public support for private innovative activity**. With global value chains, the knowledge created via innovative activity spills over globally more easily and it is also more actively transferred across borders by multinational enterprises. The geography of knowledge exploitation and profiting from it is increasingly disconnected from its creation. These changes need to be reflected in the practice of innovation policy. At the least, policymakers should have an explicit and coherent stance on domestic *vs* foreign actions/actors in each dimension. As far as direct public support for private innovative activity is concerned, we suggest tying it to
  - Having at least some of the activity be performed by individuals residing in Finland/Sweden.
  - Using only corporate policies for transfer pricing.
  - Perhaps also having Finland/Sweden among the company's primary tax jurisdictions.
- **Focus on international immobile and (for others) hard-to-replicate factors of production that generate local positive spillovers**. The most extreme example in all three dimensions (immobile, hard-to-replicate, local positive spillovers) is agglomerations of networked high-skill labor that trust each other and share other forms of social capital. Indeed, human capital is quite immobile, tacit, and local, while already codified technology, say, in the form of blueprints, patents, and trademarks, is internationally mobile – national policy should emphasize the former. This calls for considerable internal agility and sustained investment at the new front line of global competition – that is, at the level of the individual.

1 Introduction: Finland and Sweden Have Entered the Era of New Globalization

Jyrki **Ali-Yrkkö** (ETLA), Hans **Lööf** (KTH), Ali **Mohammadi** (KTH), and Petri **Rouvinen** (ETLA)

Abstract

Finland and Sweden have entered an era of *New Globalization* characterized by geographically fragmented production and intense cross-border knowledge flows. Although a popular uproar has brought the steady deepening of this phenomenon to a halt, the phenomenon is not about to reverse.

The consequences of this new era are not well understood, even among experts. In fact, even with considerable effort, it is difficult to "get one's arms around" the phenomenon due to the complexity of both its actual operations, global value chains, and its key actors, multinational enterprises. The flows and structures of this new era are deeply interconnected in ways that are often uncovered only when they are disrupted by, e.g., sudden policy changes.

In this book, we study what *New Globalization* implies for Finland and Sweden both as countries and as innovation systems. Chapters 2 and 3 provide more macro and more micro views on global value chains. Chapters 4 and 5 study international sourcing first from a more general European perspective and then from a more in-depth Finnish and Swedish perspective (thanks to our colleagues in a companion ROAmING project). Whereas Chapters 4 and 5 assume a corporate perspective, Chapter 6 studies international sourcing from the perspective of individuals and their jobs. We discuss our final observations and implications in Chapter 7.

Implications of Geographically Dispersed Production in the Nordic Context

Global Value Chains (GVCs) spice up internationalization with two new aspects – geographically fragmented production and cross-border knowledge flows – with these changes:

- Global competition operates at the level of tasks, and comparative advantage becomes denationalized as multinational enterprises mix and match different nations' strengths and thus control boundaries of competitiveness (with nationally clustered production, nation-states had more control).
- Creative destruction becomes more sudden and starts to operate at a finer resolution.
- Value creation shifts towards services and intangibles because offshoring reduces both the cost of fabrication and serves to commoditize it (via incentivizing better codification and inducing wider diffusion of related knowledge).

How did we end up here, and what does it mean for Finland and Sweden both as countries and as innovation systems? This is what we explore in this book and in the InSource project that underlies it.

What is a Global Value Chain?

A value chain comprises the entire range of activities that are involved in providing a product or service. These activities include both arm's-length relationships and exchanges within an enterprise. Global Value Chains (GVCs) span multiple countries.

The smooth operation of a GVC requires the instant transfer of instructions, the quick and cheap movement of intermediate inputs and final outputs, and a certain modularity of functions that do not occur within one organizational structure in a specific location (Grossman & Rossi-Hansberg, 2008). The operation of GVCs depends upon coherent contractual, governance, and legal principles that are shaped by national policies in multinational enterprises' (MNEs') home and host locations.

New Globalization

The increasing prevalence of GVCs in manufacturing since the early 1990s and in services since the early 2000s has induced an era of *New Globalization* (Baldwin, 2016). Among other things, it has broken up the old corporatist *Team Finland* and *Team Sweden* by eroding national labor's quasi-monopoly on using domestic firms' expertise.

The New Globalization has been driven by decades of advances in ICT and related drastic reductions in communication and coordination costs. The phenomenon was, however, unleashed between the mid-1980s and mid-1990s as governments worldwide engaged in reducing barriers to cross-border exchange. For global value chains, three aspects were crucial (Baldwin, 2016, p. 105):

– Moving investments (and profits) in and out of a country,
– Availability of a range of connective services such as telecoms, shipping, and customs clearance,
– Enforcement of intellectual property protection to guard the knowledge that multinational enterprises move about.

Trade's share of the world's GDP peaking in 2008 has led many to suggest that the New Globalization has already run its course. However, Baldwin (2016) notes that there is a long way to go simply because both the knowledge-per-worker imbalance and the wage differentials between developed and developing countries remain large. Thus, opportunities for arbitrage are abundant.

In our view, applicable trade restrictions that have been on the increase since the 2008–2009 crisis and the popular uproar against globalization – as evidenced by the backlashes from voters with respect to Brexit and the Trump election victory – are bound to have consequences. We nevertheless believe that global value chains are not going away as a phenomenon. One should also note that in this case, the comparison point of the early 2000s features the rapid industrialization of developing countries, particularly China, and the commodity super-cycle (related to infrastructure building in China and elsewhere), both of which inflated international trade. Timmer et al. (2016) further suggest that a shift in demand towards less trade-intensive services was a contributing factor in the recent drop in the global trade-to-GDP ratio.

Finland and Sweden Are Deeply Engaged in Global Value Chains

Finland and Sweden are deeply engaged in global value chains:

- Even our most conservative estimate suggests that one-third of business sector employment in Finland and in Sweden, i.e., some 500,000 Finns and 900,000 Swedes, directly serves the operations of global value chains in their day-to-day jobs.
- Each Finnish (gross) export euro and each Swedish export krona requires approximately forty per cent of imported inputs.
- Approximately thirty per cent of Finnish and approximately twenty per cent of Swedish manufacturing firms have offshored some of their business activities (note: this Eurostat survey only concerns firms with at least one hundred employees).
- Approximately forty per cent of Finnish and approximately fifty per cent of Swedish corporations' global employment are abroad.
- Foreign-owned units provide approximately twenty per cent of the Finnish and approximately thirty per cent of the Swedish business sector value added.

Finland's and Sweden's engagement in GVCs has steady deepened in the past few decades and, from what we can observe, it is not about to reverse, despite the anti-globalization sentiment prevailing in most developed countries. At least until now, Finland and Sweden have benefitted greatly from their engagements in GVCs.

Structure of the Book

Chapter 2 by Jyrki Ali-Yrkkö – *Global Value Chains: A Macro View* – discusses aspects of global value chains mostly in light of available country-level indicators, including global input-output databases.

Chapter 3 by Jyrki Ali-Yrkkö – *Global Value Chains: A Micro View* – goes into the nitty-gritty of the actual operation of GVCs.

Chapter 4 by Hans Lööf, Ali Mohammadi, Mika Pajarinen, Petri Rouvinen, and Joonas Tuhkuri – *Prevalence of International Sourcing in Europe* – provides a Europe-wide overview of cross-border sourcing, particularly with respect to innovative activity.

Chapter 5 by Jussi Heikkilä, Miia Martinsuo, and Jan Olhager – *Prevalence and Characteristics of International Sourcing in Finland and in Sweden* – deepens the overview provided in Chapter 4 in the cases of Finland and Sweden. Chapter 5 is a contribution of the ROaMING project – another project that is under the Tekes-Vinnova umbrella, as our InSource is.

Chapter 6 by Hans Lööf, Ali Mohammadi, Mika Pajarinen, Petri Rouvinen, and Joonas Tuhkuri – *Consequences of International Sourcing on Jobs* – examines the potential consequences of international sourcing from the perspective of individuals and their jobs, in contrast to the corporate perspective assumed in Chapters 4 and 5.

Chapter 7 by the editors of this book – *Observations and Implications* – provides our conclusions and our thoughts on what our findings imply with respect to economic policy.

2 Global Value Chains: A Macro View

Jyrki **Ali-Yrkkö** (ETLA)

Abstract

Companies operating in both Finland and Sweden participate actively in global value chains. Foreign inputs are used in production, and outputs are often refined intermediates that are exported. In both countries, the foreign content of manufacturing exports is 37–38%. Since 1995, this share has increased more rapidly in Finland than it has in Sweden. In recent decades, Finnish and Swedish companies have searched globally for new markets. Despite this expansion, bilateral trade and investment remain important for both countries.

Background

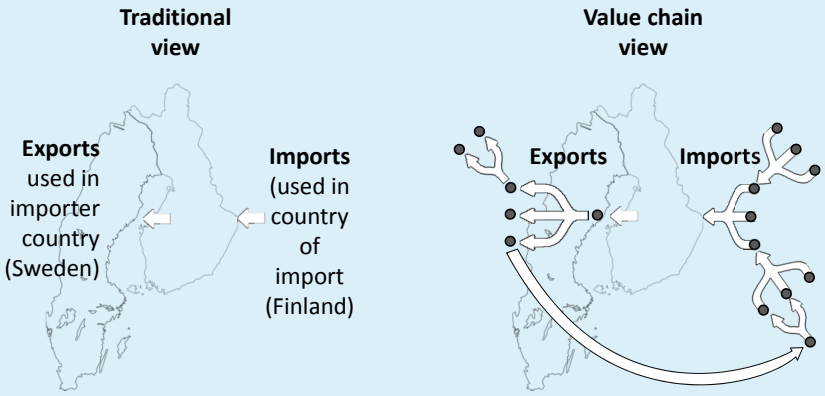
An increasing volume of products and services is being produced by **Global Value Chains** (GVCs), each of which can involve dozens or even hundreds of firms. Previously, most industrial firms were more or less vertically integrated, meaning that component manufacturing, sub-assemblies and final assembly were all done within the same company. More recently, companies have increasingly focused on narrower ranges of activities that, in turn, have lengthened value chains. At the same time, these chains have become more international. Since the early 1990s, GVCs have been a worldwide phenomenon in manufacturing.

The time span from national chains or clusters to GVCs has been relatively short (Baldwin, 2006; Baldwin, 2012). Only a few decades ago, value chains operated predominantly on a national basis. Thus, activities that transformed raw materials into components and final products were primarily located in a single country. Mostly final products were exported and imported (Figure 2.1).

Naturally, the smooth operation of GVCs calls for a well-functioning transport infrastructure among regions, countries and continents. This functioning is an essential but not sufficient condition for the operation of GVCs. Other things should also be able to flow (Figure 2.2).

Figure 2.1

The view of international trade has changed



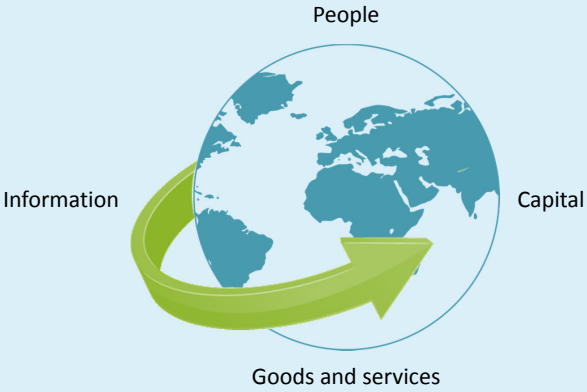
In addition to movements of tangible goods, flows of information and data between countries are equally important prerequisites for GVCs. They reduce the need to keep the activities of value chains near each other, thus enabling coordination and communication between activities located in multiple countries. Thus, the glue that previously kept the production stages together has at least partly disappeared.

Although communications technology enables the geographical dispersion of activities, companies still have an interest in keeping some information within the company. In these cases, companies can utilize the benefits of overseas locations by establishing subsidiaries in those countries. However, this ability requires capital flows between countries because without this possibility, companies cannot make foreign direct investments and become multinational enterprises (MNEs).

The improved communications between remote regions has not completely removed the benefits of face-to-face interaction. A number of employees of MNEs travel frequently around the globe, visiting their own units, customers, and suppliers. Moreover, MNEs often hire some of their employees from other countries and send their home-country employees to abroad to work as expatriates. All of these activities generate increasing people flows between countries.

Figure 2.2

GVCs mean flows around the globe



In recent decades, both FDI (Foreign Direct Investment) and international trade have grown faster than the world GDP has (Figure 2.3). The level of annual FDI flow is currently more than 60 times greater (in current prices) than in the beginning of the 1970s. In 1979, the annual FDI flow was more than 4 times greater than that in 1970, and the 1980s and 1990s witnessed the same growth rate. Thus, overseas investment quadrupled every ten years, but this trend ended in the 2000s. FDIs no longer grow at the same pace as they previously did, which is partly explained by the lack of cross-border mergers and acquisitions. These deals previously caused large year-to-year variations in FDIs. Compared with FDIs, annual changes in international trade are clearly smaller. Trade dropped drastically in 2009 due to the financial crisis but recovered in the following year. Note that since 2011, international trade has not grown. Although the overall weakness in the world economy is certainly one determinant, servicification and the stalling of international production fragmentation have also contributed to the slowdown of global trade (Timmer et al., 2016). Despite this recent development, international trade today is no less than 52 times (in current prices) greater than that in the early 1970s.

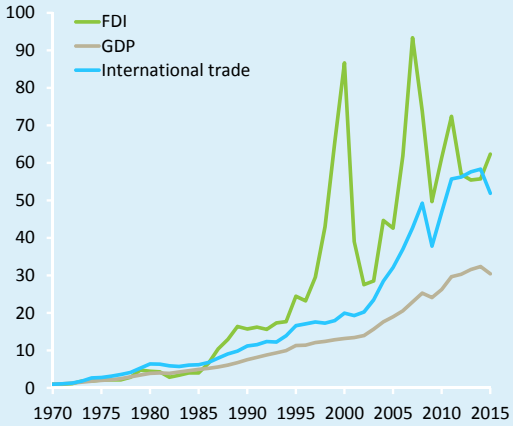
The Unbundling of Production Stages

In the first unbundling, production and consumption locations were separated but different stages of production processes typically co-located. In the second unbundling, however, these different stages of production

Figure 2.3

International trade and foreign direct investment have grown faster than world GDP

Author's calculations. Data sources: FDI (World Investment Report, FDI outflow); GDP (World Investment Report, GDP in current prices); and Trade (World Investment Report, Exports of goods and non-factor services, in current prices). Indexes, 1970=1.



were separated from each other (Baldwin, 2006). This progression means that an increasing number of products are produced in a multi-stage process, and these stages are in multiple countries.

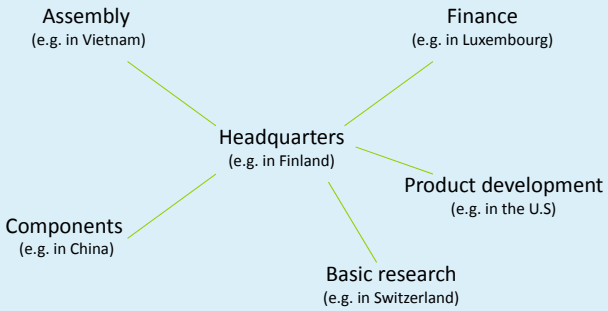
The structure and length of GVCs vary between firms and industries. In some value chains, unbundling touches only operations related to tangibles; raw materials are sourced and refined in one country, component manufacturing in the second country and assembly operations in the third country.

However, in some other value chains, unbundling also involves service types of tasks, and the corporate structure has become much more complicated (Figure 2.4). Basic research is in a different country than is product development, finance functions are concentrated in the world's finance centers, assembly operations are offshored to low-cost countries, and sales units are established close to customers. Due to unbundling, a number of companies have transformed into multinational enterprises (MNEs) with units located in more than one country.

An outcome of this second unbundling is that international trade consists of not only final products but also intermediate ones. These intermediates are exported to another location, where they are used in the production process of the next stage, and the output of that stage is potentially exported again.

Figure 2.4

Value chains have dispersed globally



In contrast to common belief, intermediate trade accounts for the majority of international trade. Raw materials, components, and services that are needed to produce final products are increasingly traded from one country to another (Figure 2.5.).[1] Because trade is measured in gross terms, the values of raw materials and other intermediates are counted every time they cross a border. When GVCs are heavily fragmented, the total value of international trade caused by a single final product is potentially much larger than the price of the final product. This point also explains why the growth rate of international trade can continuously outpace the growth rate of world GDP.

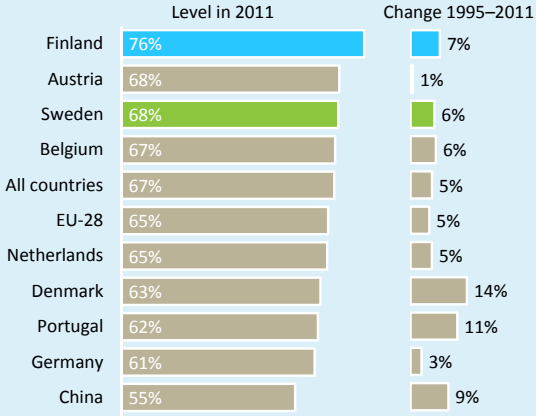
Both Sweden and Finland export remarkable quantities of goods and services that are used to produce final products (left-hand column in Figure 2.5). Intermediates account for 68% of Sweden's total exports, slightly exceeding the EU average. In Finland, the share is even higher. As much as three-fourths of Finnish exports are intermediates. There is no single explanation for Finland's high share of intermediates, but intermediates include some products – such as diesel engines – that are not usually perceived as such.

Since the mid-1990s, the shares of intermediate exports have risen significantly in most countries (right-hand side column in Figure 2.5). In Finland, the share of intermediates has risen by 7 per cent, and in Sweden, it has increased by 6 percentage points. These growth rates are slightly greater than that in the entire EU-28 area.

Figure 2.5

Share of intermediates of total exports, % and percentage points (change from 1995–2011)

Data source: WIOD (World Input-Output Database).



The composition of exports differs between destination countries. Although intermediates account for the great majority of exports to one country, some countries are more important destinations of final goods and services than others (Figures 2.6 and 2.7).

China is an important export destination for Finland and Sweden. Of the total Finnish exports, more than 10% go to China. Although the corresponding share is clearly lower (5.8%) in Sweden, China is the fourth most important destination for Swedish exports.

When the exports to China are split into intermediate and final goods, intermediates account for as much as four-fifths of exports in both Sweden and Finland. However, export destinations such as the UK exist, for which the composition of exports from Sweden and Finland differs. Intermediates account for almost 80% of Finnish exports to the UK, but the corresponding figure for Sweden is only 65%. Parallel differences between Sweden and Finland also exist in exports to the Netherlands and the United States.

Sweden and Finland trade intensively with each other. As much as one-tenth of the total Finnish exports are directed to Sweden (Figure 2.6), and close to 6% of Swedish exports are directed to Finland (Figure 2.7). Intermediates play a significant role in this bilateral trade, accounting for approximately two-thirds of the total amount.

What You See Is NOT What You Get

As mentioned previously, businesses today increasingly use of imported components, services, and sub-assemblies in their own production, which is often further exported for use as an intermediate product in some other country.

These imported intermediates have a striking implication for national economies. The GDP of a country participating in the value chain is increased only by that part of the value added that is generated in the country concerned rather than by the total value of exports. The higher the share of imported inputs is, the smaller the contribution to GDP of one euro generated from exports.

This point highlights the need to examine international trade in not only gross terms but also value-added terms. It is therefore interesting to

Figure 2.6

Most important destinations of Finnish exports and the types of exports (shares of the total exports)

Note: Author's calculations based on WIOD data, 2011. Note that these bilateral figures are not necessarily the same as in the data by Statistics Finland. In WIOD data, preference was given to import data. Thus, for instance, Finnish exports to China were measured by using information on how much China imports from Finland. This figure was presented previously by Ali-Yrkkö et al. (2016).

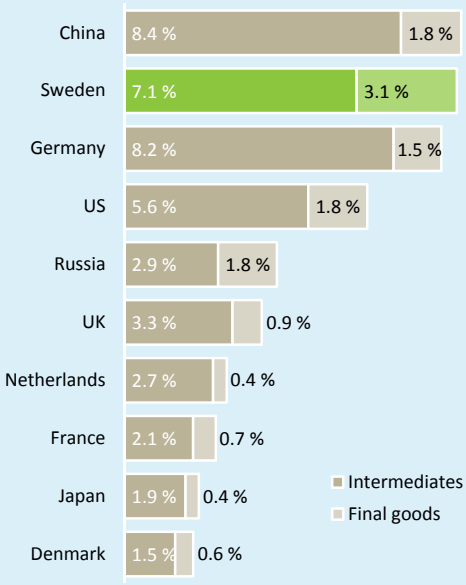
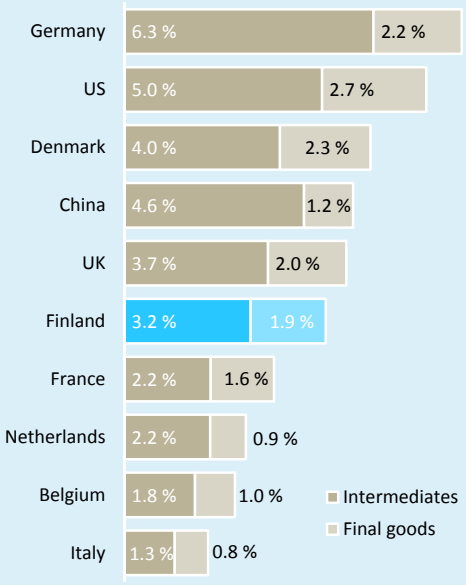


Figure 2.7

Most important destinations of Swedish exports and the types of exports

Note: Author's calculations based on WIOD data, 2011. Note that these bilateral figures are not necessarily the same as in the data by Statistics Sweden. In WIOD data, the preference was given to import data. For instance, Swedish exports to China were measured by using information on how much China imports from Sweden.



consider the extent to which foreign value added contributes to the total value of Swedish and Finnish exports, for instance, and to consider how the globalization of value chains has affected the ability of exports to drive economic growth.

In most countries, foreign value-added accounts for more than one-third of the total value of output created by the manufacturing sector (left-hand side column Figure 2.8). In Finland and Sweden, the shares of value added generated abroad (38% in Finland and 37% in Sweden) are close to the EU average and slightly greater than the world average.

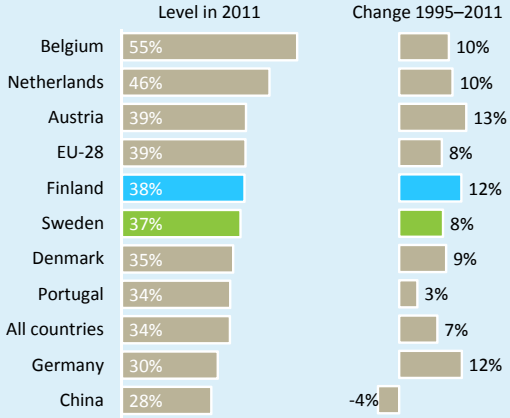
The increasing share of foreign content dilutes the ability of exports to generate domestic GDP. Assuming that the share of foreign value added is the same in industrial products sold on both the domestic and export markets, the above figures (Figure 2.8) have an important implication (Ali-Yrkkö et al., 2016). One euro worth of industrial exports contributes to increase Finnish GDP by no more than 0.62 euro (1 - 0.38) and Swedish GDP by 0.63 euro (1 - 0.37). In service branches, the share of domestic value added is higher, but because services still account for a relatively small proportion of exports, the figure for industry can be considered representative of exports.[2]

Although differences in the shares of foreign value added are rather minor, the rate at which those shares have changed differs noticeably (right-hand column in Figure 2.8). In Finland, like in Austria and Germany, the share of

Figure 2.8

Foreign content of manufacturing output/exports, % and percentage points (change from 1995–2011)

Source: Authors' calculations based on WIOD database.



foreign value added has increased rapidly. However, in Swedish industry, the pace – 8% – has been at the same level as in the whole EU area.

The difference in paces between Finland and Sweden raises the question of contributing factors and a suspicion that some single industry explains it. For that reason, we compare the development in Finnish and Swedish industry at a more fine-grained level (Figures 2.9 and 2.10).

The levels of foreign content are approximately at the same level in Sweden and Finland in most industries, including the food, machinery, and pulp & paper industries (Figure 2.9). However, this statement does not hold in all business fields; for example, it does not hold in industries producing metal & metal products, transport equipment, or chemical products.

Figure 2.10 reveals interesting similarities but also differences between Finnish and Swedish industries. First, since 1995, all Finnish industries have increased their use of foreign inputs. The same also holds in Sweden except, surprisingly, in the textile industry, in which foreign content has decreased.

The industry breakdown shows that most Finnish industries have been more active in increasing their use of foreign inputs (Figure 2.10), which in particular involves firms producing refined petroleum, metals & metal products, and textiles. In contrast to this general observation, some Swedish industries exist wherein the share of foreign value added has increased slightly faster than in Finland. These industries include pulp and paper, machinery, and transport equipment. These observations suggest that there exists no single industry that explains the observation that Finnish manufacturers have increased their use of foreign inputs more rapidly than have their Swedish counterparts.

Economic Integration between Finland and Sweden

Sweden and Finland have a long trade and investment relationship with each other. In the 1860s, Sweden already accounted for close to 10% of Finnish total international trade. At that time, Finland was less important (3% of trade) for Swedish trade. However, the share increased rapidly in the 1960s, reaching approximately 6% of the total Swedish international trade (Andersson, 2005, p. 19). Although Swedish and Finnish companies now operate globally, bilateral trade remains important for both (Figure 2.11).

Figure 2.9

Foreign content of exports/ gross output in the manufacturing sector, %, 2011

Source: Authors' calculations based on WIOD database.

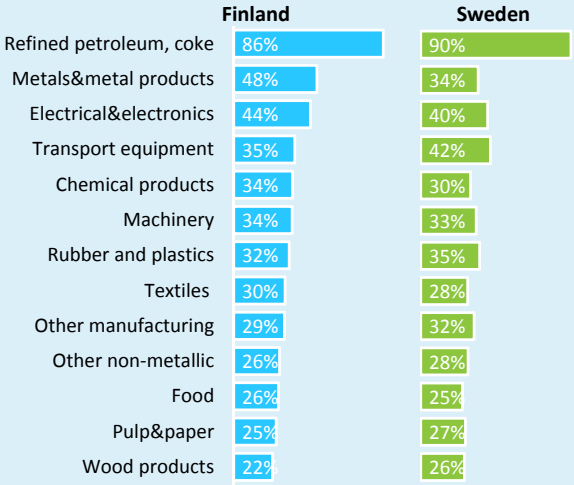
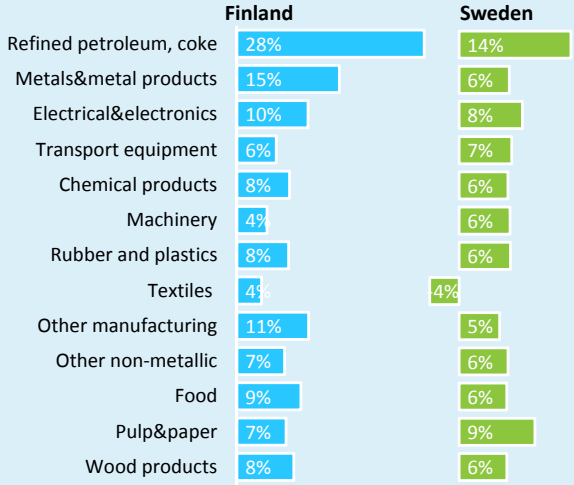


Figure 2.10

Changes in foreign content of exports/gross output in the manufacturing sector, percentage points (change from 1995–2011)

Source: Authors' calculations based on WIOD database.



Currently, the total exports from Sweden to Finland exceed €13 billion, accounting for more than 6% of total Swedish exports (Figure 2.11). Approximately one-third of these exports consist of various services, such as transportation, travel, and IT services. Since 2013, Swedish exports to Finland have decreased, but the most recent figures suggest that the period of decline is ending.

Over the past several years, the Finnish trade deficit with Sweden has widened slightly, but this change does not involve goods and services equally.

Figure 2.11

Trade between Finland and Sweden, 2016

Sources: Author's calculations. Data sources: Statistics Finland; Imports of goods and Imports of services from Sweden; and Exports of goods to Sweden and Exports of services to Sweden. UN Comtrade Database: Finland's share of the total goods exports of Sweden and Finland's share of the total services exports of Sweden. These UN-based shares address the year 2014.

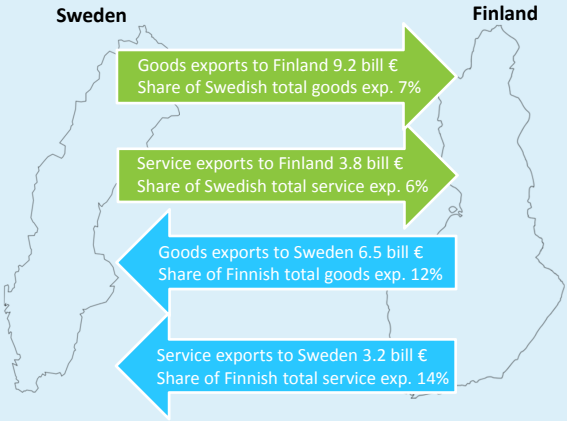
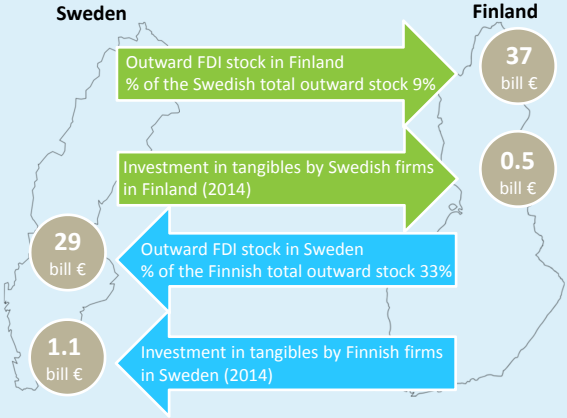


Figure 2.12

Investment between Sweden and Finland, 2015

Data Sources: Statistics Finland: Finnish outward FDI stock in Sweden and its share (2015), Swedish outward FDI stock in Finland (2015); Statistics Sweden: Share of Swedish outward stock in Finland (2015); Eurostat: Investment in tangibles by Finnish firms in Sweden, Investment in tangibles by Swedish firms in Finland.



The goods deficit with Sweden has widened, but the services deficit has simultaneously narrowed. Regardless of this deficit, Sweden is indeed an important destination for Finnish exports. As much as 14% of Finnish services exports and 12% of goods exports go to Sweden.

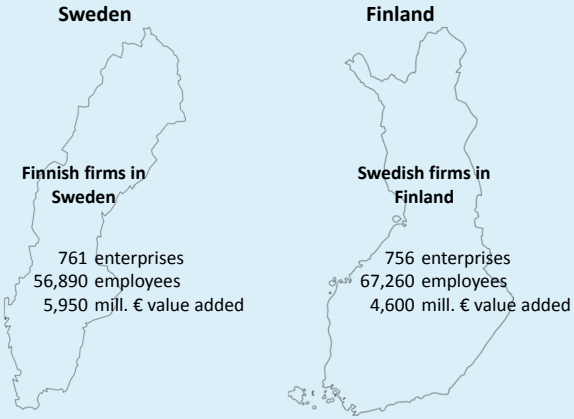
The economic integration between Sweden and Finland also involves investments between the countries, including mergers, acquisitions, and greenfield investments (Figure 2.12). Cumulatively, Finnish companies have invested more than €29 billion in Sweden, accounting for one-third of the total Finnish outward FDI (Figure 2.12). Sweden has a long history as a location for Finnish overseas investments, including for instance, the Swedish elevator company Asea-Graham, which Kone acquired in 1968. Investments in Sweden rose significantly in the late 1980s, when Finnish large companies such as Nokia, Metsä Group, and Kemira acquired large units in Sweden (Ali-Yrkkö et al., 1998).

Swedish companies have also invested large amounts in Finland. These investments (€37 billion) exceed the Finnish investments. Over the past 20 years, investment flows have been driven by very large mergers and acquisitions including the Merita bank acquisition by Nordbanken, the merger between forest companies Stora and Enso (in 1998) and the acquisition of the telecommunication company Sonera by Swedish Telia (2002). Large M&As between Sweden and Finland have continued during the past several years. In 2014, a Swedish SSAB acquired the leading Finnish steelmaker Rautaruukki, and two years later (in 2016), Munksjö and Ahlstrom merged.

Figure 2.13

Roles of foreign affiliates between Finland and Sweden, 2014

Source: Author's calculations based on Eurostat (Foreign-controlled enterprises). Figures address the year 2014.



Due to these and dozens of smaller transactions, Swedish companies in 2014 generated €4.6 billion value added in Finland, accounting for 2.6% of the Finnish GDP (in base prices), and employed more than 67,000 employees in Finland (Figure 2.13).

Currently, Finnish companies have more than 760 subsidiaries operating in Sweden. These companies generate close to € 6 billion value added, accounting for 1.6% of Swedish GDP (in base prices). The total employment of these firms is approximately 57,000, representing 1/10 of the total employment of foreign subsidiaries in Sweden.

3 Global Value Chains: A Micro View

Jyrki **Ali-Yrkkö** (ETLA)

Abstract

Detailed product-level analyses of value chains reveal substantial differences in value creation between different products and services. In the consumer electronics and textile industries, value creation and capture are largely detached from the location of final assembly but manufacturing activities still play a dominant role in engineering products. As a response to the tightened competition from low-cost countries, a number of manufacturing companies have upgraded their value chain position by also offering services. The evidence from Sweden shows that servicification is quite important for revenues and sales growth.

Introduction

On 22 September 1996, the Los Angeles Times published a shocking piece of news: only 3.5% of the $10 overall value added of a Barbie doll remained in the location suggested by the "*made in…*" label of mainland China. This observation provided an excellent example of the misbelief concerning value creation and its geography.

The key aspect of global value chains (GVCs) is that they shift attention from the country level to the firm level. In fact, GVCs go even deeper and call for analyses at the job-task level. By using fine-grain data, it is possible to follow the value behind individual products and to discover who creates the value and where that value is created. Thus, these micro- or product-level analyses complement the aggregate picture with macro-level analyses and offer a richer view of value chains and their complexity (Kenney, 2013). These chains are often far more complex than is commonly thought:

> *National Semiconductor manufactures wafers at three fabrication plants, or "fabs": South Portland (Maine), Arlington (Texas), and Greenock (Scotland). Wafers are then shipped to the company's assembly and packaging houses at Melaka (Malaysia) and Suzhou (China), where they are subjected to final testing and from where they are shipped directly to the production lines of customers worldwide. … For a particular project, we could have a marketing engineer in Germany and design engineer in Korea, a layout engineer from Santa Clara, a production engineer based in Longmont (Colorado), and test engineers in Melaka and Santa Clara" (Invest Korea, 2010).*

This type of geographical division of tasks is not a very old phenomenon. Previously, value chains were predominantly local, and different stages of production processes were co-located, which, in turn, meant that the value added of these stages was also created largely in the same location. Due to this co-location, the value added of different tasks or functions was less relevant.

Global Value Chains as Smiling Curves

In the early 1990s, Stan Shih – the founder of Acer – observed that in the computer industry, assembly creates much less value added than do pre- (e.g., R&D) and post-assembly (e.g., distribution) activities. When this observation is presented in a graph with a Y-axis for value-added and an

X-axis for value chain stages, the resulting curve looks like a smile. However, when Stan Shih presented his original idea he also noted that every industry has its own value-added curve. Thus, what is true in the computer industry is not necessarily true, for example, in the petrochemical industry.

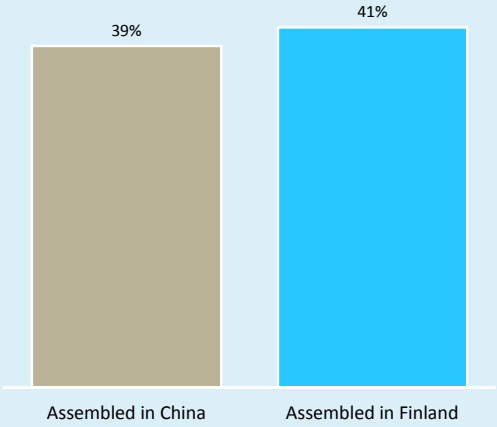
Due to the low value added generated by assembly/fabrication and cost-saving opportunities, many companies from developed countries have offshored assembly operations to China and other low-cost countries. Companies often continue their R&D, design, and marketing operations in high-cost countries, which means that business functions or tasks that used to be co-located are currently geographically unbundled to many locations.

Due to this unbundling, an offshoring function having low value added does not necessarily negatively affect the national economy to the degree that one might expect. The anecdotal evidence concerning consumer electronics and textiles supports this point: The analysis of the Nokia N95 mobile phone reveals that the assembly location has little effect on the value captured by the home country (Figure 3.1). For a 'Made in Finland' phone that is assembled in Beijing (and sold outside Finland), Finland (the headquarters country) captures 39% of the value added, whereas for a 'Made in Finland' phone assembled in Salo, it captures 41%, i.e., only two percentage points more (Ali-Yrkkö et al., 2011).

Figure 3.1

Value added captured in Finland when a Nokia N95 smartphone was assembled in China (left) and in Finland (right)

Source: Ali-Yrkkö et al. (2011).



The case of a smart phone suggests that value creation and capture are largely detached from the location of final assembly. Internal services, return on intellectual property rights, and other intangible aspects of the global value chain largely determine, where value added was created and captured.

The assembly operations of handsets are largely automated; thus, even when handsets are assembled in a high-cost country such as Finland or Sweden, the assembly or manufacturing cost per unit is very low com-

Figure 3.2

Value added breakdown of jeans

Data source: Ruffier (2011).

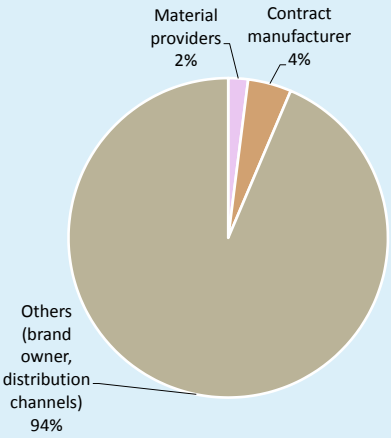
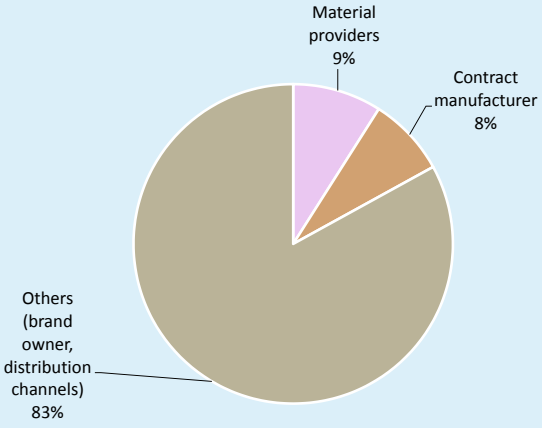


Figure 3.3

Value added breakdown of 4 other textile products (other than clothes)

Data source: Ali-Yrkkö (2013).



pared with the retail price. This point also holds in the textile and apparel industry (Figures 3.2 and 3.3).

Let us take a pair of jeans as an example (Figure 3.2). These “made in China” jeans are sold at €50 to European consumers. The Chinese manufacturer buys cotton and other materials from its suppliers, produces jeans and adds a margin. The manufacturer sells these ready-made jeans at €3.2 to the European company that owns the brand and distributes them to Europeans. Thus, of the consumer price of €50, more than 90% is created outside the manufacturing location (Ruffier, 2011).

These observations are echoed in the analysis of four non-apparel textile products (Figure 3.3). The value chain structure is similar to the jeans example; a European company owns the brand, but it has outsourced production to a Chinese contract manufacturer who, in turn, purchases materials from its own suppliers. The value-added share of these suppliers is only 9% of the pre-tax consumer price, and the contract manufacturer captures no more than 8%. Thus, more than four-fifths of the total value is created and captured by firms operating in other stages of the value chain; wholesalers and retailers capture one-half of the value added, and the brand holder captures one-third (Ali-Yrkkö, 2013; Ali-Yrkkö & Rouvinen, 2015). These results highlight the dominant role of wholesaling, retailing, branding and design, and the submissive role of manufacturing and material provision in certain consumer products.

The past decade has witnessed the rise of sustainability issues that also affect the structures of value chains and labor conditions of workers in these chains. As a response to the critics concerning both labor conditions and environmental issues, some young companies have differentiated themselves from their competitors by opening their books to make their value chains more transparent. In Sweden, one of those companies is Gothenburg-based Nudie Jeans, which provides detailed information about suppliers and their locations (Figure 3.4). In Finland, a Lahti-based company named Nurmi Design has opened their books by also providing details concerning value capture by value chain participants (Figure 3.5)

However, not all products are directed to consumers. In Sweden and Finland, investment goods and other business-to-business products account for a large share of exports. The value added and creation allocations of these products potentially deviate from those of consumer products.

Figure 3.4

Value chain participants of Swedish textile company Nudie Jeans Co

Source: www.nudiejeans.com/productionguide/, Visited on 1 March, 2017.

Nudie Jeans co

JEANS
The fabrics used for our jeans come from suppliers in Turkey, Italy and Japan. We source from following manufacturers; BOSSA, ISKO, ORTA ANADOLU, ITALDENIM, KAIHARA and TRC. The organic cotton used in the fabrics is grown in Turkey. Buttons, Rivets and Snap Fasteners are made under environmentally safe (EMAS) and transparent production conditions by BERNING & SÖHNE in Germany.

FABRIC FOR SHIRTS
The fabric comes from suppliers in Turkey, Portugal and India. The cotton in the fabric comes from Turkey and India. For the shirts produced in India Fairtrade and Organic cotton was used.The organic fabrics are either EU Certified or certified by GOTS.

TRANSPORTATION
The transportation is generally arranged in the following ways: Fabrics are transported from Turkey to Italy by truck or freight. The finished product is then shipped from Italy by truck, train or truck on train, to our Swedish warehouse, KORALLEN. For direct deliveries in Europe we use truck; for direct deliveries to other overseas countries like USA, Japan and Australia we use airfreight.

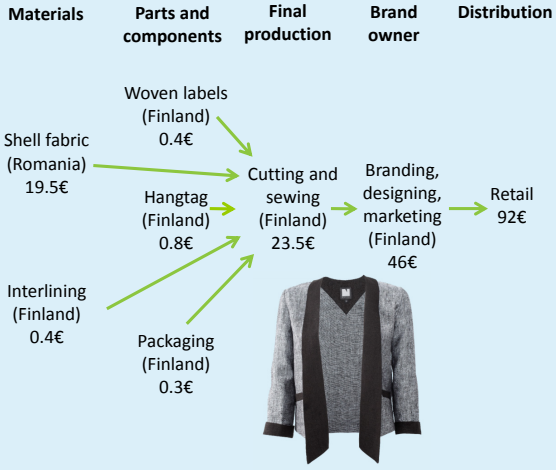
FABRIC FOR SHIRTS
The fabric comes from suppliers in Turkey, Portugal and India. The cotton in the fabric comes from Turkey and India.

FABRIC FOR T-SHIRTS AND SHIRTS IN INDIA
OOur Fairtrade cotton is bought from Chetna Organic, an Indian non-governmental organization.

Figure 3.5

Value chain and capture of blazer manufactured in Finland

Source: Tahvanainen & Pajarinen (2014).



The role of a distribution channel is typically different for b-to-b products because the majority of companies sell their products directly to other companies without using retail shops. This also relates to our analysis based on nine engineering products (Figure 3.6).

The analyses of these products reveal that the value created in physical activities, including raw material and component supplies and manufacturing towards the final product, still play a dominant role in engineering types of goods (Figure 3.6). Component providers and their vendors create, on average, 39% of the total value (pre-tax customer price) of these products.

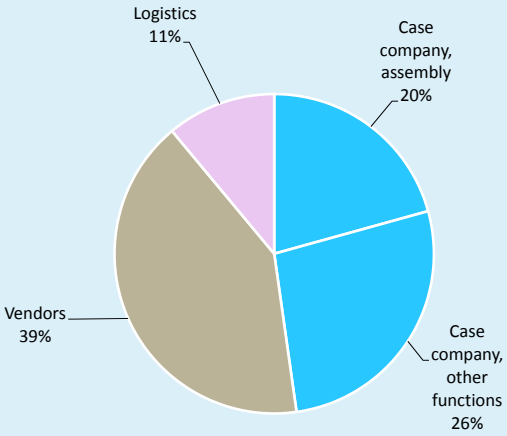
The value created by inbound and outbound logistics providers is also significant (11% on average). The remaining value-added share is created by the brand owner itself. In all of our cases, the brand owners use their own plants in final assembly. In contrast to textile and consumer electronics products, the final assembly of engineering products accounts, on average, for 20% of the total value, which suggests that in engineering products, assembly is quite important. However, in most cases, its value-added share remains dominated by the case company's other value added, which is attributable to broadly understood headquartering functions (the case company value added excluding any in-house assembly, logistics, or distribution).

As mentioned previously, a number of industrial companies have relocated or expanded their manufacturing operations to low-cost countries

Figure 3.6

Value added breakdown of engineering products

Note: The shares are averages calculated from 9 case studies.
Source: Author's calculations based on Ali-Yrkkö & Rouvinen (2015).



in recent decades. This also concerns our case companies. The case companies producing these products place the assembly in multiple locations, mostly in Finland and China. In contrast to the Nokia N95 case presented above, the assembly location of engineering products has a significantly larger effect on domestic value added (Figure 3.7).

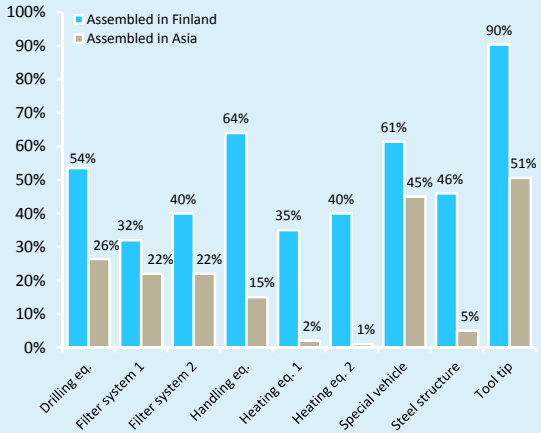
With local assembly, Finland's value-added share ranges from 32% to 90%, but with offshore assembly, the share ranges from 1% to 51% (Figure 3.7). The difference between onshore and offshore is between 10 and 49 percentage points, which appears large in light of the intuition gained from studying consumer electronics. Note that these calculations are based on actual transfer prices used by these companies. In some cases, these prices are not necessarily perfectly in line with the OECD transfer pricing guidelines.

We attribute this observation to four factors. First, assembly itself has a larger role in these products. Second, unlike in electronics, intermediate inputs are commonly locally sourced and localized support functions might be required; the company might employ local sales and marketing staff and perform location-specific development due to, e.g., national idiosyncrasies in building codes. Furthermore, in selected cases, the factory floor is also a breeding ground for innovation embodied in future offerings, which calls for the presence of local research and development staff. Third, in contrast to electronics, intangible capital tends to be more tacit and embodied in the production process. Fourth, the assembly plant is more

Figure 3.7

Value added captured in Finland when engineering products were assembled in Finland and in China

Data sources: Ali-Yrkkö (2013); Ali-Yrkkö & Rouvinen (2015)



commonly an entity to which a larger fraction of profits is allocated. As mentioned previously, our calculations are based on actual transfer prices and allocation methods used by these companies. In some of our cases, manufacturing units do not compensate their use of patents, brands and other IPRs, notwithstanding that these IPRs are created and owned by units located in Finland. In these cases, these overseas units create artificially large shares of value added.

GVC Upgrading and Servicification

Global value chains evolve over time and the fortunes of participating companies change. In some value chains, the lead firms proactively provide technical and other assistance to upgrade the competence levels of their suppliers. The analysis based on Atlas Copco, Alfa Laval, and 7 other Swedish-based engineering companies provides anecdotal evidence about the propensity to upgrade the technological competence of their suppliers located in Brazil, China, India and Mexico (Ivarsson & Alvstam, 2009). More than one-third of their suppliers in these countries were assessed as having improved their technological competence because of cooperation with their customers. Evidence from other industries and countries suggests that local producers often learn from global buyers' methods to increase the speed of response and to improve production processes (Schmitz & Knorringa, 2000; Piore & Ruiz Durán, 1998)

The value chain positions of firms also change because of firms' proactive operations. At the firm level, firms have an incentive to obtain a larger slice of value added and better financial performance. At the country level, upgrading potentially raises developing countries from poverty to prosperity.

Only a few decades ago, the core competence of industrial companies was assembly and fabrication. In that era, manufacturing competences varied significantly between countries and companies. Because these competencies and the production technologies of developed countries outperformed developing countries, companies in developed countries succeeded well despite their production being in high-cost countries such as in Sweden or Finland.

Today, the competitive landscape has changed drastically. Manufacturing competences can be found everywhere, and new companies have been established to provide contract manufacturing services. Thus, the ability

to manufacture is less frequently the factor that enables a company to differentiate itself from competitors, which, in turn, has pushed the price or value produced by manufacturing activities to a lower level. Thus, many companies in developed countries have offshored manufacturing to low-cost countries. Some traditional industrial companies have even outsourced manufacturing entirely to other companies; at the same time, they have moved to new activities in the value chain (Figure 3.8).

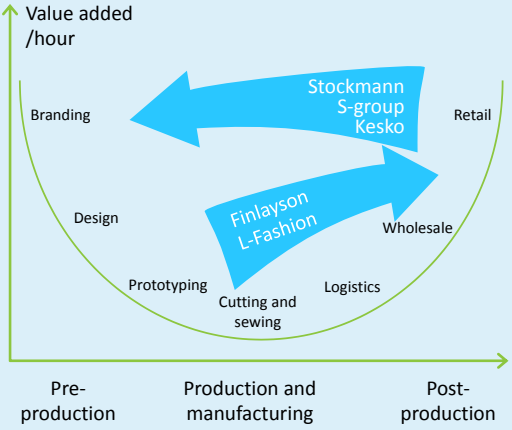
The developments of traditional Finnish textile and apparel companies Finlayson and L-Fashion provide good examples. Previously both had large in-house factories. In recent decades, all manufacturing operations have been outsourced to other companies. Furthermore, these companies have established new post-production operations by setting up in-house retail shops.

At the same time, large wholesale and retail companies such as Stockmann, S-group, and Kesko have expanded their positions in the value chain (Figure 3.8). They have created private labels, but instead of establishing in-house production facilities, they source products from specialized contract manufacturers. In some product lines, they also use in-house designers to engineer the products.

Large retailers have increasingly launched products with their own brands, and goods with private labels are currently available in a wide range of industries, from textiles to chemicals. Private label products have reached

Figure 3.8

Companies are not locked into their current positions in value chains



substantial market shares in several countries (Figure 3.9). Private labels account for 25% of Swedish and 22% of Finnish consumer packaged goods spending (Nielsen, 2014); both of these figures are slightly lower than the EU-average 27%.

In contrast to Finland, there exist several large Swedish retail chains operating globally. Headquartering in Sweden, companies such as Ikea (home furniture), H&M (clothing) and Clas Ohlson (hardware) have retail stores in several countries. From a GVC-perspective, these companies have in-house brands, and they control the production. However, that production is outsourced partially or completely to other companies. As the Ikea example shows, the supplier base is often very large, comprising hundreds of vendors providing different types of products and services (Figure 3.10).

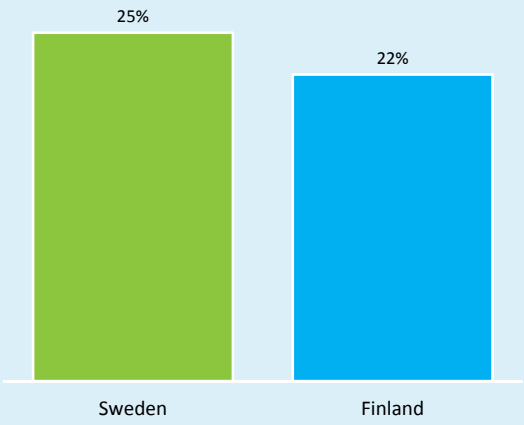
Companies may attempt to upgrade their GVC positions in many ways (Kaplinsky & Morris, 2001):

– *Process upgrading* means that a firm improves its productivity by increasing production process efficiency. Doing so usually requires knowledge and both capital and tangible investments.
– *Product upgrading* means introducing improved products that have a higher value added.
– *Functional upgrading* occurs when firms enter a new GVC segment. A manufacturing firm can establish research and development, or a vendor can acquire production plants.

Figure 3.9

Share of private labels in Sweden and Finland

Note: Private label shares of packaged goods market. Source: Nielsen (2014).



– *Chain* (or *intersectoral*) *upgrading* is achieved when firms participate in new value chains, e.g., to manufacture new products.
– *End-market upgrading* means entering into new market segments in terms of both location and industry (Fernandez-Stark et al., 2012).

Based on Finnish data from more than 4,500 companies, Ylömäki (2016) concludes that firms do not appear to favor any special upgrade type over another but rather mix the above strategies. Although the division of upgrading types is helpful in conceptualizing the phenomenon, the types may not be separable in empirically.

Innovation is one way to escape competition. Indeed, Tuhkuri (2016) finds that Finnish firms exposed to intensifying imports competition from China responded by employing more designers, architects, engineers and similar occupations related to innovation. Thus, cooperation with China and other low-cost countries increases the possibilities for northern countries to concentrate on their comparative advantages in technology-, skill-, and innovation-intensive products and services.

Another response to intensifying competition has been a shift towards services. As Lodefalk (2010) notes, *"Offers of service packages may be bundled with manufacturers, including distribution to the final customer but also financial solutions, technical support and sometimes even operation of the delivered products"*. The Nordic telecommunications giants

Figure 3.10

Supplier network of Ikea

Source: Ikea Sustainability Report (2016).

Ericsson and Nokia provide excellent examples: Instead of only producing equipment, the companies also install and operate telecommunications networks. Today, as much as 43% of Ericsson's sales come from services, equaling the share of services in Nokia (Figure 3.11). In addition, both companies receive revenue by licensing their intellectual property rights.

The aggregate figures from Sweden show that servicification of manufacturing is anything but a marginal: The manufacturing sector's service sales almost doubled – from 13.6% to 20.3% of total sales – between 1997 and 2006 (Lodefalk, 2010). A comparison to Finland would be extremely interesting. However, to our knowledge, no such studies exist concerning Finland.

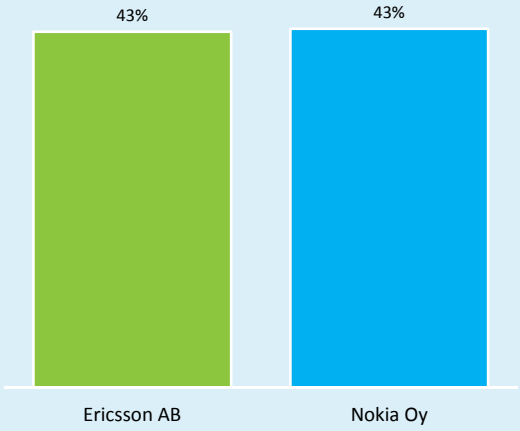
In addition to output, services play a role on the input side, as the example of Sandvik Tooling shows (Figure 3.12). Swedish manufacturing company Sandvik Tooling needs over 40 different types of services in its operations (Kommerskollegium, 2012). Some of these types include in-house services, whereas others are purchased from suppliers.

The manufacturing sector increasingly uses intermediate services, thus creating strong links between the service and manufacturing sectors (see, e.g., Lind, 2011). Recent analyses based on new databases provide strong support for the view that the development of the manufacturing and service sectors is intertwined.

Figure 3.11

Services account for a large share of net sales by Ericsson and Nokia

Sources: Ericsson's annual report, 2015, p. 43; Nokia's annual report, p. 3.



The composition of exports provides an excellent example of this intertwining. Based on gross figures, services in 2011 accounted for only 26% of Sweden's total exports (32% in 2015); in Finland, the corresponding share was 28% (29% in 2015). However, the picture changes remarkably when we analyze the share of services in value-added terms (Figure 3.13).

A large part of the upstream value added embodied in gross exports is produced by the service sector, creating more than 50% of gross exports in both Sweden and Finland (Figure 3.13).[3] Thus, on a value-added basis, the share of services is approximately double compared with the share calculated in gross export terms, highlighting the need also to follow international trade in value added terms.

The role of the domestic service sector is clearly more important for exports compared with the foreign service sector. Thus, domestic service providers contribute significantly to the success of downstream sectors – well-functioning domestic service markets are important for succeeding in international markets.

Figure 3.12

Servicification of Sandvik Tooling

Source: Kommerskollegium (2012)

Until now, we have focused on the role of services in manufacturing. Naturally, the service sector itself produces most of. Due to their unique features, digital services are particular interesting to consider in detail.

One such service is a Swedish game called Minecraft (by Mojang), in which players mine different blocks to create and build structures at will. In these types of services, R&D, design, and production are intertwined, and production is, in fact, largely programming (see Figure 3.14).

Figure 3.13

Services value added of gross exports

Data source: OECD TiVa database, figures concern year 2011.

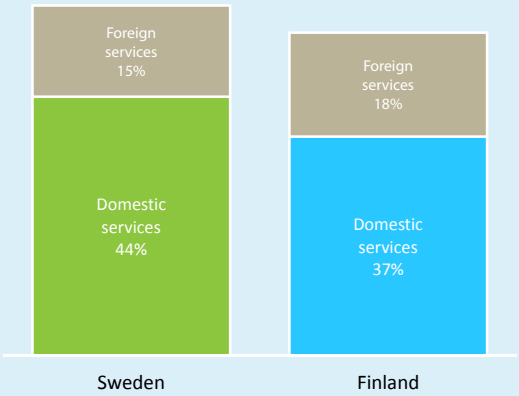
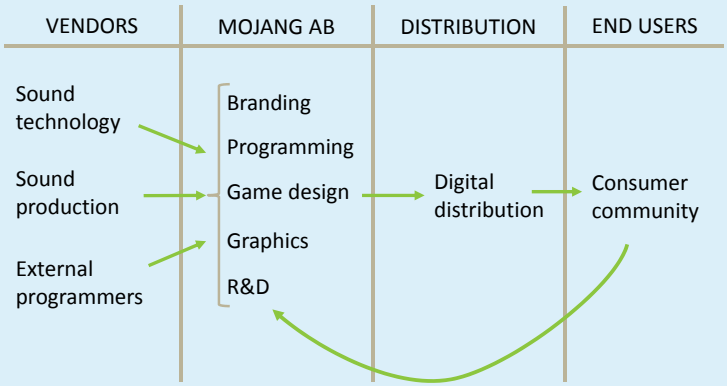


Figure 3.14

Value chain of Minecraft game



Source: Adapted from Kommerskollegium (2013).

The production of a digital game, such as Minecraft, includes programming and game and graphics design tasks. Mojang has kept these tasks largely in-house, using external vendors only marginally, whereas tasks related to sounds and music are outsourced. In contrast to goods production, games and other digital services are not typically fully finalized when they are initially launched. Based on comments from users and ideas that are obtained in-house, the game is constantly improved. Moreover, many other digital services follow a similar adaptive development pattern. In Figure 3.14, the arrow from consumer community to R&D describes this continuous development process (Kommerkollegium, 2013).

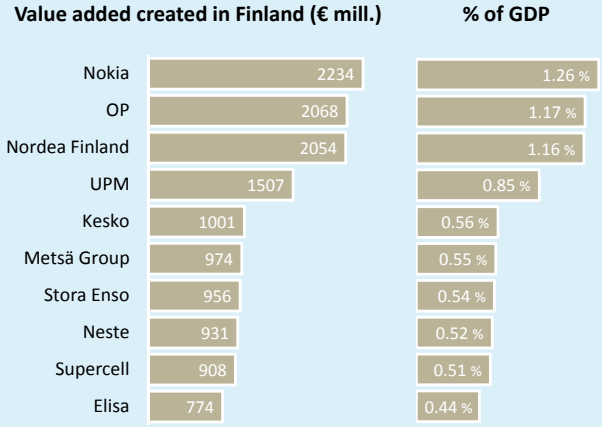
In contrast to any tangible goods, producing one additional unit of digital service does not necessarily cost anything, whereas the quality remains 100%. Due to the lack of variable costs, such a business is hyper-scalable. These hyper-scalable business models are usually based on intangible assets.

Another example: Currently, the most successful Finnish game company is called Supercell. In 2015, Supercell generated net sales worth €2.1 billion with less than 180 employees (Supercell's annual report, 2015). This revenue was largely channeled to Finland, which, in turn, has reflected the value added of Supercell's unit located in Finland. Thus, Supercell has risen to become one of the top 10 companies contributing to the Finnish GDP (Figure 3.15).

Figure 3.15

Largest contributors to Finnish GDP, 2015

Note: The list includes the 10 largest companies in terms of value added created in Finland. The shares of GDP have been calculated as follows: (Value added created in Finland, € million)/ (GDP in basic prices, € million).
Source: Ali-Yrkkö et al. (2016).



In 2015, Supercell generated €908 million value added in Finland, accounting for 0.51% of Finnish GDP (Figure 3.15). The company differs remarkably from other companies in the top 10. First, Supercell was established only 7 years ago, whereas other top 10 companies have a history of decades. Another difference concerns the nature of the business. Like the Minecraft game presented previously, Supercell's business is based purely on intangible assets, in contrast to the other top 10 companies in Finland.

Oscillation from One Extreme to Another

Although the general trend of the past 20–30 years has been vertical disintegration, not all companies have followed this trend. Even when they do not, company structures and operation modes that used to outperform others do not last forever.

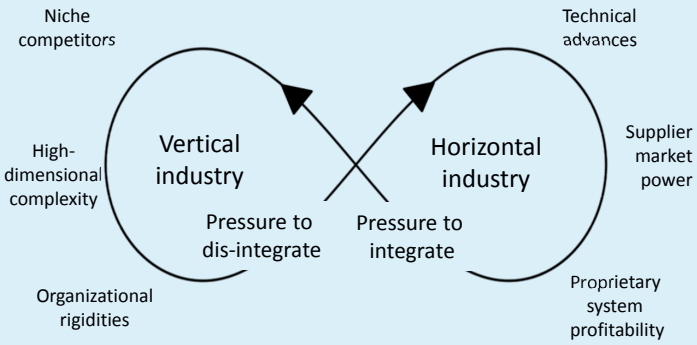
In terms of firm make-or-buy decisions affecting the structure of industries and value chains, Fine (1999) as well as Fine and Whitney (1996) described this phenomenon as a double helix, an infinite double cycle between vertically integrated companies and horizontally disintegrated ones (Figure 3.16).

When an industry structure is currently vertical and the product structure integral, disintegration forces such as niche competitors and organizational rigidities eventually appear that push the industry towards horizontal and modular configuration. However, this arrangement will not be permanent.

Figure 3.15

Swinging between integrated and dis-integrated structures

Source: Adapted from Fine (1999).



The market power of some suppliers and other integration forces push towards more vertical integration and integral product architectures.

From the GVC perspective, due to integration forces, current and typically relatively long value chains potentially become at least temporarily shorter. However, as time passes, disintegrative forces will appear, pushing the industry structure to a more horizontal structure that, in turn, most likely lengthens value chains.

Ikea, a Swedish furniture retailer, provides a recent example of vertical integration. In August 2016, Ikea announced that it would buy close to 13,000 hectares of forests in Romania. Following this latest acquisition, IKEA controls over 46,700 hectares of forests in Romania and is the largest forest owner in the country. Thus, Ikea becomes a vertically integrated company having retail stores, manufacturing plants (Ikea's subsidiary Swedwood produces wood-based furniture on three continents) and raw material sources in-house. However, in addition to these in-house activities, Ikea has more than 1,000 suppliers located in dozens of countries.

4 Prevalence of International Sourcing in Europe

Hans **Lööf** (KTH), Ali **Mohammadi** (KTH), Mika **Pajarinen** (ETLA), Petri **Rouvinen** (ETLA), and Joonas **Tuhkuri** (MIT)

Abstract

This chapter explores the offshoring of large manufacturing firms' business functions in Europe. By offshoring, we mean that a business function is moved totally or partially abroad and that it was previously performed domestically, either in-house or outsourced. Our analysis employs the previously untapped and unique *Eurostat International Sourcing Survey*.

We find that Finnish manufacturing firms have been more active in offshoring than have Swedish ones. This difference is evident in both high tech and low-tech industries. The magnitude of R&D offshoring is small in both countries. A large majority of R&D is offshored within the enterprise group.

Some R&D jobs have been lost from offshoring; however, the negative employment effect has been moderate. The survey does not allow the full, net employment effect of R&D offshoring to be evaluated, which could be either negative or positive.

Introduction

Firms in developed countries have moved – for a long time – low-skilled manufacturing tasks to developing countries (Vernon, 1966; Autor et al. 2013). Recent advances in technology, particularly in transportation and communications, have also allowed moving high-skilled tasks abroad (Acemoglu & Autor, 2011; Lewin & Peeters, 2006); for example, many high-end R&D facilities are located in India (Dossani & Kenney, 2007).

In the process, jobs such as those in R&D, which had been expected to remain in the developed nations, now appear to be at risk of being relocated. It has been argued that the distinction between tradable and non-tradable activities made by David Ricardo (1817) in the early 19th century is being altered (Spence, 2011).

Most trade in the world occurs between firms – not between firms and consumers (Caves et al. 2007). Firms trade tangible goods, such as coal or rear windows, but also intangible goods, for example, new ideas and blueprints. Firms also trade tasks (Baldwin & Robert-Nicoud, 2014). To distinguish it from a more coarse trade in goods, trade in tasks refers to the fine-grained international division of labour (Grossman & Rossi-Hansberg, 2008). Small parts – fragments – of production processes are traded within or between firms and different locations (Timmer et al. 2014). A number of these tasks are intangible.

This chapter explores the offshoring of business functions in manufacturing firms from 10 European countries. Of the different business functions, we particularly examine the offshoring of research and development (R&D), which is one measure of the geography of innovation (Florida, 2012). We emphasize on Finland and Sweden but also examine the results for the other European countries in our sample.

The analysis is based on the *Eurostat International Sourcing Survey* conducted in 2011. We describe the phenomenon and offer insights from previously untapped and large-scale official data. The data offer a novel analysis of international sourcing and new measurement of the globalization of firms' business activities. The survey is targeted at firms employing at least 100 workers and includes nearly 40,000 European firms with nearly 17 million employees. We report country- and industry-level averages unless otherwise stated.

Our main concept, offshoring, is defined in the survey as total or partial movement of business functions (core or support business functions) currently performed in-house or currently domestically sourced by the resident enterprise out of the home country to enterprises within or outside of the enterprise group located abroad.

Likelihood to Offshore

The ten countries included in the survey are Belgium, Bulgaria, Denmark, Estonia, Finland, France, the Netherlands, Portugal, Slovakia, and Sweden. On average, 18.5% of the firms that responded to the survey have offshored some business activities. As Figure 4.1 depicts, the percentage is the highest in Denmark (36.5%), followed by Finland (29.8%) and Belgium (24.3%). In contrast, the percentage is the lowest in Bulgaria (1.6%), followed by Slovakia (11.1%) and France (11.2%). In Sweden, the percentage is 18.8%, approximately ten percentage points lower than in Finland, indicating that large Finnish firms have been more active in offshoring in general than have large Swedish firms.

In Figures 4.2 and 4.3, we utilize the technology levels of industries based on the classification used in the survey.[4] In all countries except Estonia and Slovakia, offshoring is more probable in high-tech than in low-tech industries. The difference is the highest in Denmark, in which 47.8% of firms in high-tech industries and 27.5% in low-tech industries have offshored business functions. Conversely, 9.6% of Estonian firms in high-tech industries and 17.0% in low-tech industries have offshored.

In high-tech industries, offshoring propensity is the highest in Denmark (47.8%), Finland (36.6%), and Portugal (31.5%). The propensity is the lowest in these industries in Bulgaria (4.2%), Estonia (9.6%), and Slovakia (9.9%). In low-tech industries, Danish (27.5%), Finnish (25.9%), and Belgian (20.8%) firms are most likely to offshore business functions. In contrast, the probability is the lowest in Bulgarian (1.0%), French (9.1%), and Slovakian (11.8%) firms in low-tech industries.

Comparing Finland and Sweden in Figures 4.2 and 4.3, it is evident that Finns have been more active in offshoring in both high-tech and low-tech industries than have Swedes. Of Finnish firms, 36.6% in high-tech have offshored business functions compared with 22.1% of Swedish firms. In low-tech, 25.9% of Finnish firms and 16.4% of Swedish firms have offshored, respectively.

Figure 4.1

Share of manufacturing firms employing at least 100 workers that offshore business functions, %

Source: Eurostat, International Sourcing Survey 2012.

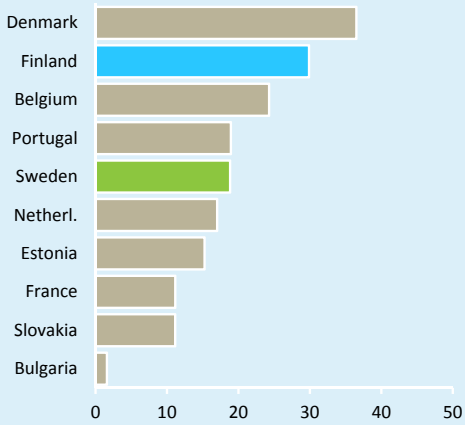


Figure 4.2

Share of *high-tech* manufacturing firms employing at least 100 workers that offshore business functions, %

Source: Eurostat, International Sourcing Survey 2012.

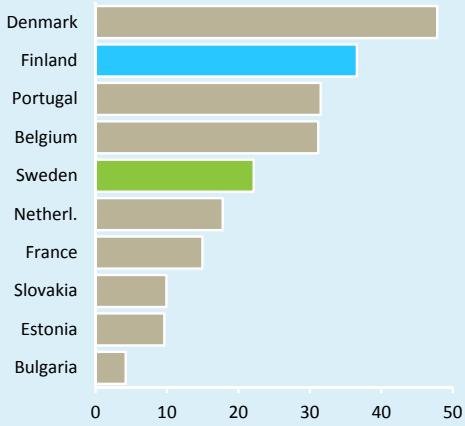
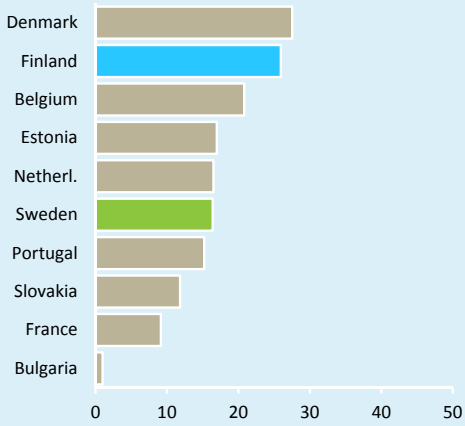


Figure 4.3

Share of *low-tech* manufacturing firms employing at least 100 workers that offshore business functions, %

Source: Eurostat, International Sourcing Survey 2012.



Offshoring by Business Function

The survey divides business functions into core and support. The core business function is defined as the primary activity of the firm. It includes production of final goods or services intended for the market (performed by the firm; yielding income). Support business functions are, in turn, performed to facilitate the production of goods or services intended for the market. The outputs of the support business functions are not themselves intended directly for the market. There are six sub-groups of support business functions: (1) distribution and logistics, consisting of transportation activities, warehousing and order processing functions; (2) marketing, sales, and after sales services including help desks and call centres; (3) ICT services; (4) administrative and management functions including, e.g., HR management, legal services, accounting, bookkeeping and auditing; (5) R&D, engineering and related technical services such as technical testing and design services; and (6) other support functions that do not belong to any of the above groups.

Figure 4.4 depicts the percentages of offshored business function types, divided into the core and support functions. The percentages that have been calculated in the sample include firms that have offshored either type of business function. On average, in the sample of ten countries, the support business functions have been offshored slightly more frequently than the core business function; of firms that have been offshoring, 62.7% have offshored the support business functions and 58.0% the core business function, respectively. In Denmark, Finland, France, and Belgium, production of goods and services, i.e., the core business function, has been offshored more frequently than have the support business functions. The difference is the largest in France, in which among the firms that have been offshoring, 80.5% have offshored the core business function and 36.3% the support business functions. In Bulgaria, both business functions have the same frequency (50%), and in the rest of the countries, the support business functions are more likely to have been offshored than the core business function. Thus, the difference is the highest in Slovakia, in which among the firms that have been offshoring, 79.5% have offshored the support business functions and 38.4% the core business function.

Comparing Finland and Sweden, we observe different patterns of offshoring types. In Finland, it has been more common to offshore core production, whereas Swedish firms have offshored the support business

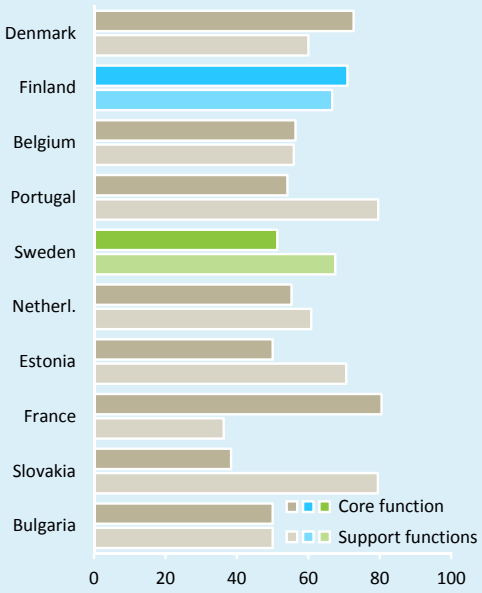
functions more frequently than they have offshored core production. The propensities to offshore the support business functions are quite close to each other in the two countries. However, in the case of the core business function, the proportion in Finnish firms is clearly greater than that in Swedish firms. From the sub-categories of the support business functions, Finnish firms have most frequently offshored functions related to marketing (29.8% of the offshoring firms) and distribution/logistics (29.1%). In Sweden, the most popular sub-categories have been support functions related to administration and management (30.5%) and ICT services (28.6%).

Compared with other business functions, the offshoring of research and development (R&D) is highly interesting because it can be interpreted as a measure of the geography of innovation. It is also related to the accumulation of intangible capital, which is a significant input to productivity growth in the longer term. In the following, we examine this business function more closely.

Figure 4.4

The shares of offshored business function types as a percentage of manufacturing firms employing at least 100 workers that offshore business functions

Source: Eurostat, International Sourcing Survey 2012. Note that the shares do not add up to 100% because firms may offshore both types of business functions.



Magnitude of R&D Offshoring

The survey measures R&D activity jointly with engineering functions. Although this measure can hide some of the role of innovation activity when narrowly viewed, it is the finest resolution at our disposal.

How many manufacturing firms offshore R&D compared with the total amount of firms? Figure 4.5 depicts the share of firms that offshore R&D by country. In our sample of 10 European countries, 3.4% of firms offshore R&D, on average. The share is highest in Denmark – 9.0% – almost three times the average. Bulgarian firms in the sample do not report any R&D offshoring.

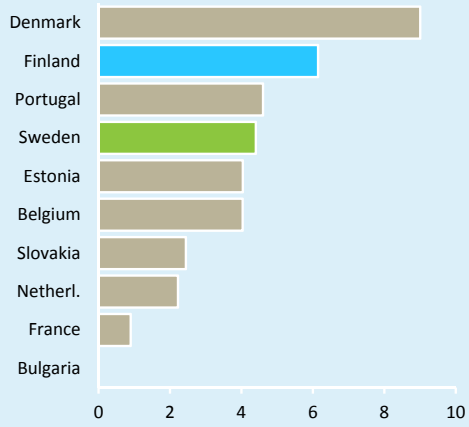
We find that in Finland 6.1% and in Sweden 4.4% of manufacturing firms offshore R&D. In both countries, the share of manufacturing firms that offshore R&D is above the sample average. However, the numbers are also low. In Finland, only one in sixteen and, in Sweden, one in twenty-three manufacturing firms perform R&D activities abroad.

The perspective changes slightly when we examine firms that already have offshoring activities – excepting offshoring R&D. Within firms that already offshore at least one business function, on average, 17.9% also offshore some R&D. Estonia leads with a share of 26.5% on this measure, and Denmark and Portugal take second and third place with 24.7% and 24.3% shares, respectively.

Figure 4.5

Share of manufacturing firms employing at least 100 workers that offshore R&D, %

Source: Eurostat, International Sourcing Survey 2012.



When we examine firms that offshore part of their activities, 20.6% in Finland and 23.4% in Sweden also offshore their R&D functions. We obtain a similar change for figures in most other European countries in our sample. Furthermore, the previously reported difference between Finland and Sweden in R&D offshoring vanishes from this viewpoint. The explanation is that Finland initially has a higher share of firms than Sweden has that offshore. However, the share of firms that are engaged in any type of international sourcing is similar in both countries. Within firms that already offshore any activities – that is, within global firms by this measure – it is not uncommon also to offshore R&D functions.

We have noticed that few European firms in our sample – not even Finnish or Swedish manufacturing firms – offshore R&D. To provide a broader picture of the size of the issue, how much employment is there in manufacturing R&D compared with the total employment in manufacturing? Recall that this measure includes both domestic and international R&D activity within the firm.

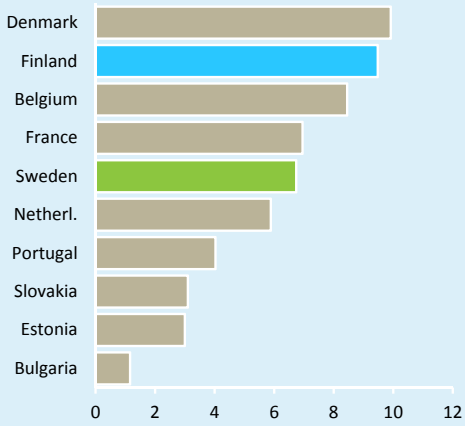
Figure 4.6 compares the R&D intensity in selected European countries covered in the survey. R&D intensity – employment in R&D functions as a fraction of total employment – within Finnish manufacturing firms is 9.5 per cent, and in Swedish firms, it is 6.7 per cent. Figure 4.6 shows that R&D intensity is typically higher in high-income countries.

In terms of volume, manufacturing firms with more than 100 employees have total employment of 193,000 in Finland and 251,000 in Sweden

Figure 4.6

R&D intensity among surveyed manufacturing firms employing at least 100 workers, %

Source: Eurostat, International Sourcing Survey 2012.



– 7.1% and 5.0% of the labor force, respectively.[5] From the Finnish and Swedish perspectives, our interest in this paper is focused on 18,300 Finnish and 16,900 Swedish manufacturing employees working in R&D functions. These numbers are slightly different from the conventional Labour Force Survey figures because we use a different survey.

As we said previously, the overall picture from our analysis is that the magnitude of R&D offshoring is small in the sample of 10 European countries, according to the Eurostat survey. Has this magnitude meaningfully changed recently? The answer is no. According to our analysis, which draws from the previous International Sourcing Survey published by Eurostat in 2007, on average, 4.9% of firms in the same pool of countries were offshoring R&D functions internationally from 2001 to 2006, compared with 3.4% from 2007 to 2011. If anything, the magnitude has become even smaller.

The decrease from 2007 data to 2011 – from 4.9 to 3.4% on average – might be explained by actual changes in firms' behavior. One plausible explanation is that the 2008 economic crisis might have reduced the investment in R&D and the amount of R&D offshoring. However, the decrease might also reflect changes in measurement. More than the average, the order of the countries with respect to the share of R&D offshoring has changed, with increases and decreases back and forth.

We acknowledge that although few European firms offshore R&D, the number of firms is not the only measure for offshoring's magnitude. For example, we do not possess data on transaction volumes concerning offshoring. Furthermore, we only measure the number of firms, and that number might provide a different picture of the magnitude than other measures do, such as employment in those firms. Nevertheless, few of the firms in our sample offshore R&D in Finland, Sweden, or Europe.

R&D Offshoring Mechanisms

Our survey data allow disentangling whether offshoring of R&D activities occurs within the same multinational enterprise group or is directed outside the enterprise. This disentangling helps shed light on the channel through which firms offshore their activities. Previously, in Finland, Deschryvere and Ali-Yrkkö (2013) emphasize the importance of the distinction between the two different, internal and external, channels of offshoring. Different channels can be used for different types of R&D activity, which can entail different effects (Deschryvere & Ali-Yrkkö, 2013).

Our analysis suggests that firms offshore R&D more often within the firm, for example, to their own plant or R&D center outside the country, than they do outside the firm. Of those firms that had offshored their R&D functions, 67.7% on average stated they had done so within their enterprise group; 24.8% reported R&D offshoring outside the enterprise group.

Note that these percentages need not add to 100 because some firms offshore both within and outside their enterprise group; conversely, the lowest percentages are not necessarily reported due to a privacy threshold in the data. Moreover, the non-response rate – which Eurostat, however, does not report – appears to be high for this question.

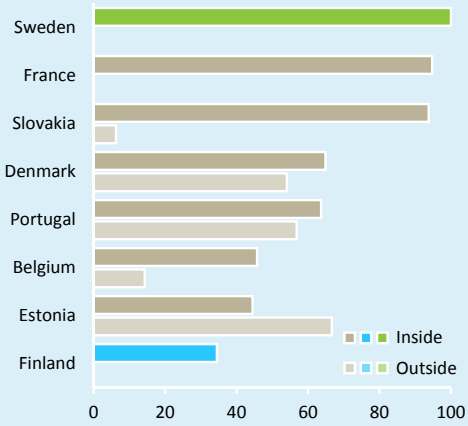
Figure 4.7 presents the share of firms that offshore R&D within and outside their enterprise group by country. Countries differ in this respect. Firms in several countries – Sweden, France, and Finland – report that they only offshored R&D within the enterprise group, whereas in Denmark and Portugal, the shares of internal and external offshoring are more even. In only one country, Estonia, do firms report offshoring more outside than within their enterprise group. We also find that the channel of offshoring – inside or outside the company – is only weakly if at all correlated with the magnitude of R&D offshoring in that country. However, country-level observations can hide firm-level associations.

The observation that offshoring occurs in many cases internally is not completely specific to R&D. Examining any offshoring activity shows that

Figure 4.7

The share of large R&D offshoring manufacturing firms that offshore R&D within and outside enterprise group, %

Source: Eurostat, International Sourcing Survey 2012.



in nine of twelve European countries, more offshoring is performed inside rather than outside the enterprise group. On average, 61.2% of the firms in our sample reported they had offshored any business functions within the enterprise group. Conversely, 41.0% of the firms had offshored activities outside their enterprise group. However, it appears that in most countries, R&D activities are more often offshored internally than are other activities in general.

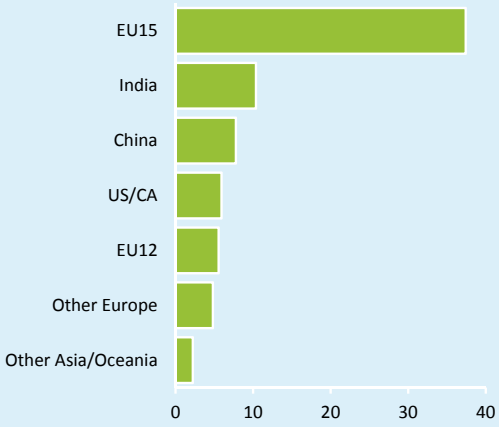
Where is R&D offshoring directed to from our sample of European countries? Figure 4.8 presents the geographical destinations of R&D offshoring from the countries covered in the survey. We measure popularity of destinations as a percentage of firms stating that they had offshored to that destination among the firms that had offshored R&D to any destination. It is equivalent to asking, if you offshored R&D, where did you offshore it?

Contrary to a belief common both in the academic literature and in the popular press, we find that the majority of R&D offshoring from Europe is directed to high-income countries in Europe. Of the firms that had initially offshored R&D, 37.4% reported that they had done so to high-income EU-15[6] countries. In comparison with high-income – and high cost – EU-15 countries, only 5.6% of firms indicated that they had offshored R&D to low-income EU-12[7] countries.[8] At least in Europe, firms offshore R&D to high-income countries such as Germany and France rather than to low-income countries such as Bulgaria and Romania.

Figure 4.8

Main geographical destinations of R&D offshoring from surveyed countries, percentage of large manufacturing firms offshoring R&D from Europe

Source: Eurostat, International Sourcing Survey 2012.



We believe that this observation is important. Our analysis, based on the large-scale firm-level survey, suggests that R&D offshoring from Europe does not appear to send jobs out of Europe. The jobs appear to stay largely within the EU. Specifically, the data suggest that high-income European countries are trading tasks (Grossman & Rossi-Hansberg, 2008) with other high-income European countries.

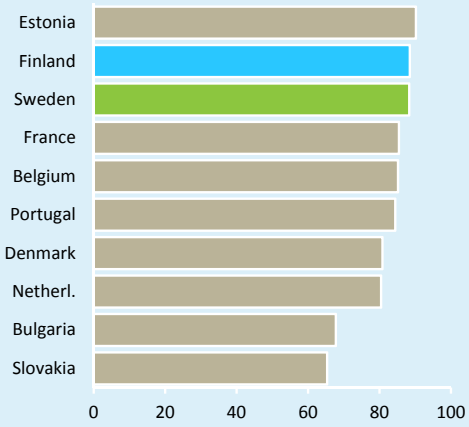
However, the second-most popular destination for R&D offshoring from 2009 to 2011 was India, with 10% of firms locating R&D activities there. China was the third-largest destination for offshoring R&D functions. Among the firms that had offshored R&D functions, 7.8% of firms had located those functions to China. However, Figure 4.8 shows that R&D offshoring does not appear to be directed to China or India.

Are these destinations different from where offshoring is directed in general? Yes and no. For all types of offshoring, the most popular destinations were the high-income EU-15 countries, with 34.6% of firms moving any of their function to these countries. The twist comes in the next figure. The percentage of firms indicating that they had offshored any activities to low-income EU-12 countries was quite high, 24.6 per cent, in contrast with only 5.6% offshoring R&D. In third place was China, which 15.9% of firms engaged in offshoring chose as their offshoring location. The United States and Canada are also not common destinations for European-based offshoring in general but especially for R&D.

Figure 4.9

Share of firms that report proximity as an important factor for offshoring decisions, %

Source: Eurostat, International Sourcing Survey 2012.



The point becomes clearer when we examine the share of R&D offshoring by destination. That is, we ask how many firms offshore R&D to these locations compared with the number of firms that offshore any activity to the same location. By this measure, R&D is comparatively directed to the United States and Canada and to high-income European countries. Within the firms that had offshored to the US and Canada, 17.0% had offshored R&D to either or both countries. This percentage is the highest among our destinations. In Europe, among those firms that had offshored to high-income EU-15 countries, 15.9% had offshored R&D. In contrast, in low-income EU-12 countries, the number was much smaller – 3.3 per cent.

The difference between China and India as offshoring locations also becomes apparent. The R&D offshoring share to China was 7.2%, whereas it was 15.1% to India – more than two times as much. China is a major destination for manufacturing offshoring in general, as noted in many previous studies, including Autor et al. (2013) and Autor et al. (2014), but R&D offshoring is more typically directed to India (Dossani & Kenney, 2007).

To explain the mechanism, is physical distance an important factor for firms' R&D offshoring decisions? Figure 4.9 shows that most firms report proximity as an important factor for their offshoring decisions. This point could explain why only a few firms offshore R&D.

A plausible explanation is that offshoring manufacturing activities might also induce offshoring R&D functions. Firms might need these functions close to each other (Dossani & Kenney, 2007).

Effect of R&D Offshorings

What has been the effect of R&D offshoring on domestic employment in Europe? Departing from the majority of the literature (Liu & Trefler, 2008, Becker et al. 2013, and Hummels et al. 2014), we provide an assessment on the employment effects by using a direct firm-level survey. The manufacturing firms were asked how many R&D jobs had been lost because of any offshoring activities from 2009 to 2011.

We do not claim that our approach is superior to that of the previous studies using register-based data, but it complements the previous analysis by providing evidence from a novel data source. We measure the direct job losses from offshoring that the firms report, but there might also be other effects. The reported amounts of jobs lost by country are presented in

Figure 4.10. Although a small proportion of firms offshore R&D, the firms do report negative employment effects. One possible cause of this effect is that it might be large firms offshoring R&D.

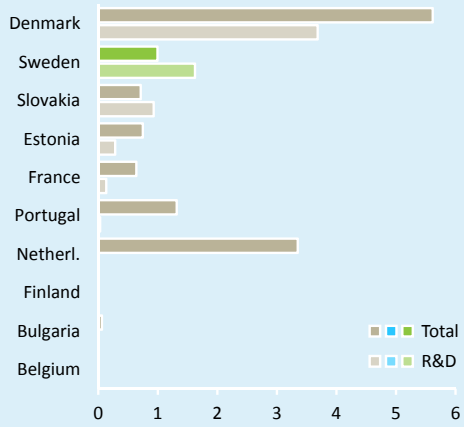
How do the reported first-order negative employment effects in R&D compare to the overall effect of offshoring on employment? In every country except for Sweden and Slovakia, firms reported fewer R&D jobs lost because of offshoring than they did in total when adjusted for the employment in R&D. In other words, the employment effects have been less negative for R&D jobs than for manufacturing jobs in general. A potential reason for this situation is the lower magnitude of R&D offshoring. However, in total, our findings imply that we must also consider other aspects. The findings on employment effects are confirmed by previous studies, including Deschryvere and Ali-Yrkkö (2013).

Sources other than the Eurostat International Sourcing Survey also provide information on offshoring activities. According to the European Labour Force Survey in 2007, 28.5% of the manufacturing firms in Finland offshored at least part of their activities. Of the firms that did offshore, 46.3% indicated that offshoring displaced less-skilled tasks from home to abroad. Conversely, 29.7% of the firms reported that offshoring of less-skilled tasks contributed to increased high-skill task employment within their company. Offshoring caused skill upgrading or polarization within firms, according to the firms' self-assessment. The reported numbers are greater for Fin-

Figure 4.10

Manufacturing job lost as a result of offshoring from 2009 to 2011, % of employment in surveyed firms

Source: Eurostat, International Sourcing Survey 2012.



land than they are for several other countries. Table 4.1 (abridged from Mitrunen, 2013) provides descriptive evidence for Finland and several other European countries indicating that, although offshoring moves jobs abroad, it also helps to create high-skilled jobs domestically.

Conclusions

This chapter has explored the offshoring of firms' business functions with Eurostat International Sourcing Survey. We find that nearly one-fifth of large firms in our sample of ten countries have been offshoring, on average. The proportion is the highest in Denmark, Finland, and Belgium. Finnish firms have been more active in offshoring in general than have Swedish firms. This point is evident in both high- and low-tech industries.

The magnitude of R&D offshoring is small. In Finland, only one in sixteen and, in Sweden, one in twenty-three manufacturing firms perform R&D activities abroad. A large majority of R&D is offshored within the enterprise group. Most R&D offshoring from Europe is directed to high-income European countries rather than to low-cost countries in Europe, China, or India. R&D jobs have been lost from offshoring; however, the negative employment effect has been moderate.

More generally, no longer is only low-skilled work, such as call center positions, subject to offshoring or being moved abroad. We document that high-value R&D work is also, in part, moving offshore.

Table 4.1 Descriptive statistics from the European Labor Force Survey

	Moving other jobs abroad (%)		Creating high skilled jobs (%)	
	Some effect	Substantial effect	Some effect	Substantial effect
Finland	46.3	9.1	29.7	3.0
Ireland	27.5	7.6	27.1	3.4
UK	7.4	8.6	23.0	2.9
Denmark	34.3	12.7	20.8	5.7
Norway	19.4	15.7	16.7	9.3
Germany	28.7	39.7	31.3	15.6

Source: European Labour Force Survey, Mitrunen (2013).

5 Prevalence and Characteristics of International Sourcing in Finland and in Sweden

Jussi **Heikkilä** (Tampere University of Technology), Miia **Martinsuo** (Tampere University of Technology), and Jan **Olhager** (Lund University)

Abstract

As part of our ROaMING project, we have surveyed medium-sized and large manufacturing companies in Finland and Sweden concerning their cross-border relocation decisions. We find that offshoring is clearly more common than backshoring in both Finland and Sweden. Production movements to both directions are more prominent in Sweden than in Finland. The flows into and out of the country are more balanced in Sweden.

Concerning the motivations for relocations, there is a clear difference between the drivers for offshoring and backshoring. Predictably, labor cost is the most significant driver for offshoring. The drivers for backshoring reflect Nordic strengths in innovation and in production – eminent factors for backshoring to Finland and Sweden are quality, flexibility, lead-time, access to skills and knowledge, access to technology, and production's proximity to R&D and product development.

Finland's and Sweden's strengths are related to their citizens' and organizations' skills and competences and the future of manufacturing in Finland and Sweden depends upon the vitality of the countries' innovation systems. However, policymakers also must keep a keen eye on cost competitiveness.

Introduction

The increased globalization and trade liberalization over the last 20 years have led manufacturing companies in high-wage countries to seek more cost-efficient options offshore to stay competitive. Many companies have relocated large or small parts of their production to low-wage countries, e.g., in Asia or Eastern Europe. However, many companies have failed to accurately weigh the costs against the benefits and have encountered difficulties with low quality, long lead-times or complications with communication and coordination of activities. These issues have led some companies to bring back once offshored manufacturing to the home region, i.e., from our perspective, back to the host country of Finland or Sweden.

Our research project *Reshoring of Manufacturing: Disruptive Innovations, Business Ecosystems and Performance Information as Key Enablers* (acronym: ROaMING), funded by Tekes, Vinnova, Tampere University of Technology, and Lund University, was performed in 2015–2017 to explore the extent of production movements across borders away from and back to Finland and Sweden. The research data were primarily based on a survey that was performed in the autumn of 2015. The survey was complemented with qualitative case data, particularly to obtain insight into manufacturing-related innovation and ecosystems. The targeted firms comprise all manufacturing companies with a minimum of 50 employees in all manufacturing industries (SI codes 10–33).

The total number of targeted companies was 949 for Finland and 1,637 for Sweden. The number of respondent firms was 229 in Finland and 373 in Sweden, amounting to 602 respondents for the two countries and an overall response rate of 23.3%. The sample represents a good cross-section of the manufacturing firms in Finland and Sweden in terms of size and industry, with some over-emphasis of large firms. The respondents had on average 15.8 years of experience in production and operations management, and 6.2 years in their current position. Therefore, we conclude that the respondents have firm knowledge of the issues in the survey. In this chapter, the results of the Finnish and Swedish manufacturing relocation were also compared with previously published research results from other countries.

Extent of Relocations

The respondent firms were grouped according to their experience with relocations: companies that have only offshored manufacturing in the last five-year period, those that have both off- and backshored, those

that have only backshored, and those manufacturing firms that have not moved production during this period (see Figure 5.1).

As seen in Figure 5.1., both offshoring and backshoring are more prominent in Sweden than in Finland. In Finland, 26% of the sample companies have offshored (including companies that have also backshored); in Sweden, the corresponding share is 36%. In Finland, offshoring is approximately twice as common as backshoring. In Sweden, the share of offshorers is only approximately one-third greater than the share of backshorers.

Drivers of Relocations

The respondents were given 21 drivers of manufacturing relocation to consider. They were asked for the importance of each factor in their firm's recent relocation decision. The same set of drivers was given for both the offshoring and backshoring decisions. A five-point scale was used, ranging from "very low" (1) to "very high" (5).

Figures 5.2–5.5 show the results concerning the importance of various factors as drivers for relocation decisions. There is a clear difference between

Figure 5.1

The share of Finnish and Swedish manufacturing companies engaged in offshoring and backshoring

Source: ROaMING survey. Note: Years 2010–2015. Refers to companies with a minimum of 50 employees in all manufacturing industry categories (SI code 10–33).

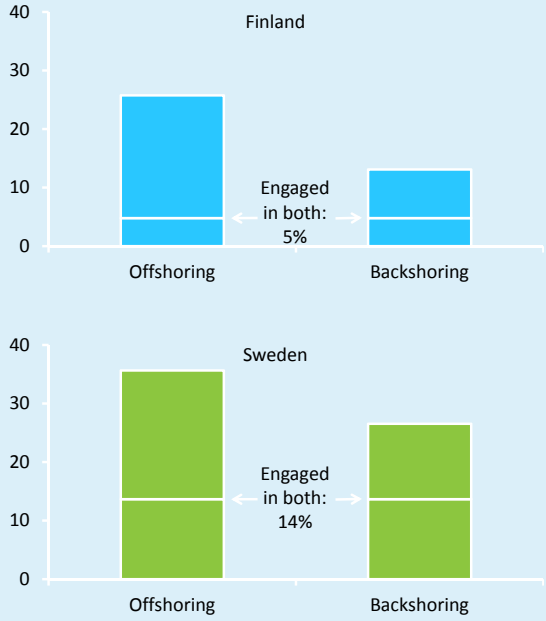


Figure 5.2

Drivers of *offshoring* among *Finnish* manufacturing companies

Source: ROaMING survey. Note: Refers to companies with a minimum of 50 employees in all manufacturing industry categories (SI code 10-33). Mean values of answers on a five-point scale from 1 (very low importance) to 5 (very high importance).

Figure 5.3

Drivers of *backshoring* among *Finnish* manufacturing companies

Source: ROaMING survey. Note: Refers to companies with a minimum of 50 employees in all manufacturing industry categories (SI code 10-33). Mean values of answers on a five-point scale from 1 (very low importance) to 5 (very high importance).

Figure 5.4

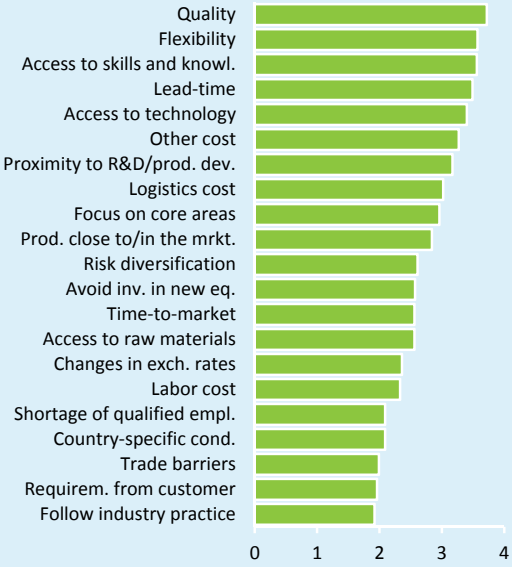
Drivers of *offshoring* among *Swedish* manufacturing companies

Source: ROaMING survey. Note: Refers to companies with a minimum of 50 employees in all manufacturing industry categories (SI code 10-33). Mean values of answers on a five-point scale from 1 (very low importance) to 5 (very high importance).

Figure 5.5

Drivers of *backshoring* among *Swedish* manufacturing companies

Source: ROaMING survey. Note: Refers to companies with a minimum of 50 employees in all manufacturing industry categories (SI code 10-33). Mean values of answers on a five-point scale from 1 (very low importance) to 5 (very high importance).



drivers for offshoring and backshoring. Labor cost is the only factor that is significantly more important for offshoring than for backshoring. The other cost factors were very similar across all groups. There are multiple significant drivers for backshoring decisions: quality, flexibility, lead-time, access to skills and knowledge, access to technology, and proximity to R&D and product development. In summary, it becomes clear that offshoring has one logic and that backshoring has a different logic.

Finland and Sweden vis-à-vis Other Countries

Surveys that have captured similar types of data have been performed in New Zealand (Canham & Hamilton, 2013), Europe (a mix of European countries, by Dachs & Kinkel, 2013), and Germany (Kinkel & Zanker, 2013). First, we review the extent of backshoring relative to offshoring (Table 2).

Note that the level of reshoring appears to be higher in Finland and Sweden than in other regions and that the proportion of backshoring to offshoring is higher – 51% in Finland and 74% in Sweden. However, the overall result remains a net outflow of manufacturing in all countries that have been included in these studies.

Let us now turn to the characteristics, drivers, and future expectations. Table 3 shows the results from the study in Finland and Sweden, with comparisons with the same set of regions as in Table 2, i.e., New Zealand, "Europe", and Germany.

Labor cost is the dominating factor for offshoring in Finland and Sweden and in other regions. However, multiple factors are important for the decision to bring manufacturing back, particularly in Finland and Sweden. The

Table 5.1 Comparison of the extent of off- and backshoring with other regions

Geographic region Period	New Zealand 2001–11	Europe 2007–09	Germany 2010–12	Finland 2010–15	Sweden 2010–15
Offshoring (%)	44	10–22	8	26	36
Backshoring (%)	7	3–7	2	13	27
Backshoring / Offshoring (%)	16	31	25	51	74

factors that are relevant for backshoring are quality, lead-time, flexibility, access to skills and knowledge, access to technology, and proximity to R&D and product development. These six factors top the list of backshoring drivers in both Finland and Sweden; the order differs only slightly between the countries.

Note that a downward trend is reported for Germany; i.e., fewer manufacturing relocations and, consequently, more stability in the manufacturing base are expected in the future. New Zealand expects that fewer firms will offshore in the future. In Finland and Sweden, the perception is largely that firms will continue to move production in the same direction as they have in recent years. The results indicate that production relocations will continue in the future and that expected future activity depends upon the type of company. Companies that have not moved production in the past also expect to remain passive in the future. "Offshorers" will continue to move production abroad more than others do, and the "backshorers" will continue to move production back to the Nordic region.

Table 5.2 Comparison of characteristics, drivers, benefits and future expectations with other regions

Geographic region Period	New Zealand 2001–11	Europe 2007–09	Germany 2010–12	Finland and Sweden 2010–15
Characteristics:				
– Offshoring	Consumer and industrial goods	Clothes, leather	Standard products	Work intensive production
– Backshoring	Consumer goods	Clothes, textiles	–	Complex production
Drivers:				
– Offshoring	Labor cost	–	Labor cost	Labor cost
– Backshoring	Quality, lead-time and flexibility (QLF), "Made in NZ"	QF	FQ	QLF, access to R&D, knowledge, technology
Future expectations	18% expect offshoring	–	Downward trend for off- and backshoring	Continue with similar relocations as previously

Innovation and Relocations

Manufacturing innovation and relocating a firm's manufacturing operations are significant investments that are characterized by novelty and uncertainty to the firm. They both also influence stakeholders in the business ecosystem other than the manufacturing firm: customers, the supply and delivery network, technology suppliers, potential financiers, partners, consultants, research institutes, and many more. The ecosystem's interactions with manufacturing-related investments are significant.

The study of manufacturing innovation revealed that Finnish manufacturing firms' recent experience with manufacturing innovation is not particularly substantial. This lack is likely to cause barriers to initiating, creating, and implementing manufacturing innovation. We also found that Swedish manufacturing firms showed more activities towards innovation than did Finnish firms and appeared to experience business benefits, particularly in terms of improved cost efficiency. Differences in country policies, support mechanisms and practices might be relevant.

Our study treated manufacturing innovation as a multi-dimensional concept, thereby drawing attention to the many ways in which manufacturing can be renewed. Investment in innovation might well relate to relocation choices. The results showed that active backshorer firms tend to be more active in manufacturing technology innovation and process innovation and have achieved improved cost efficiency better than other firms have. We must research and develop processes and procedures that broadly promote success in manufacturing investments – be they innovation or relocation.

The results revealed barriers and success factors for radical manufacturing technology innovation. Novelty, lack of previous experience and knowledge, and risk avoidance indicate a strong need for cross-company learning and cooperation. Policymaking should consider how the barriers can be removed and success factors can be enhanced in manufacturing firms of any type and size.

Conclusions

In 2010–2015, manufacturing firms' pursuit of offshoring has exceeded backshoring in Finland and Sweden. The dominant reason for offshoring is labor cost. However, multiple reasons are quoted for backshoring: quality, flexibility, lead-time, access to skills and knowledge, access to technology,

and proximity to R&D and product development. Manufacturing firms that have backshored production also appear more active in manufacturing technology innovation, and they appear to have a higher score in performance in terms of quality, delivery capability and flexibility than do the other companies.

This study raises the following policy implications:

– The most important factor for offshoring is labor cost. Therefore, policymakers should address the cost competitiveness of Finland and Sweden as a manufacturing location in relation to their reference group in competition. The need for cost competitiveness also places pressure on productivity improvements, particularly through technological advances and process improvements.

– Access to skills, knowledge and technology are important factors for Nordic manufacturers to reshore production. In addition, manufacturing firms that have backshored production are active in pursuing manufacturing innovation and more inclined to backshore again. Policymakers must address the innovation systems in Finland and Sweden to ensure that the manufacturing industry environment in Nordic countries remains attractive for knowledge, investment, and employment.

6 Offshorability of Jobs in Finland and in Sweden

Hans **Lööf** (KTH), Ali **Mohammadi** (KTH), Mika **Pajarinen** (ETLA), Petri **Rouvinen** (ETLA), and Joonas **Tuhkuri** (MIT)

Abstract

Our findings suggest that a relatively large fraction of jobs is offshorable, i.e., they face direct international competition. We find that innovator jobs are particularly offshorable. However, in our previous work, we have found that little offshoring of these jobs has actually occurred. We have also seen some insourcing of these jobs. It appears that business executives, policymakers and, often, researchers fail to acknowledge the granularity of the phenomenon and only partially consider the "total long-term cost advantages" of the seemingly high-cost locations of Finland and Sweden.

Introduction

In this chapter, we study the offshoring of jobs. By offshorability of a job, we mean that a job can be moved abroad; it thus faces international competition. In the waves of globalization, many tasks in manufacturing have been offshored (Goos, Manning, & Salomons, 2014). However, advances in information and communication technology are also making many services tradable. Thus, currently an increasing number of workers face potential competition from people in other countries who could perform the same task.

The dispersion of production across the globe has both direct and indirect consequences for national labor markets, which can call for adjustments in related policies and institutions. Such responses are better informed when there is at least a rough understanding of the magnitude of jobs and tasks that are potentially offshorable. Blinder (2009) provides one such estimate for the United States; he finds that some one-fourth of the US labor force is offshorable. In this chapter, we discuss the corresponding estimates for Finland and Sweden.

The consequences of offshoring (and globalization, more generally) are related to those of digitalization (and technical change, more generally). Although digitalization and globalization are quite distinct from each other both as concepts and as phenomena, they are interwoven and have somewhat similar consequences for jobs. In this chapter, we also discuss the extent to which the two concepts overlap with respect to the potential re-allocation of jobs (when considering digitalization, we follow the example of Frey & Osborne, 2013).

From a macroeconomic point of view, globalization and offshoring can also be beneficial. Bloom, Draca, and Van Reenen (2015) provide evidence that trade with China was directly responsible for 15% of European technological upgrading in 2000–2007. The idea is that firms innovate in response to competition from lower-wage countries and that employment reallocates towards technologically more advanced firms and industries. Easier access to imported inputs – that is, globalization – promotes innovation and, ultimately, technological change and productivity (Bøler, Moxnes, & Ulltveit-Moe, 2015). These productivity gains support people's buying power and can even eventually increase domestic employment (Grossman & Rossi-Hansberg, 2008).

Measuring Offshorability

Blinder (2009) provides an index that ranks the offshorability of 817 occupations in the US; Frey and Osborne (2013) provide a corresponding index for computerization. We adopt these two indices as a starting point and apply them to the Finnish and Swedish occupational classifications and employment numbers (please find further details in our companion work, Pajarinen & Rouvinen, 2014; Pajarinen, Rouvinen & Ekeland, 2015; Tuhkuri, 2016).[9]

The idea in this approach is to determine for each occupation, based on the composition of the task that it embodies, how susceptible it is to offshoring/computerization. After deriving these indices across occupations, the remaining task is to decide on a suitable threshold and to calculate what fraction of workers fall into the "most threatened" category. When considering globalization, the key is to determine the intensity and amount of face-to-face interaction; in the case of digitalization, the primary focus is to map technological trajectories to tasks that they will influence.

Specifically, Blinder (2009) constructs an offshorability measure based on whether work can be performed remotely or whether the job must be performed on site. Offshorability is measured between 0 (not at all offshorable) and 100 (highly offshorable). An example of a highly offshorable job is software and application developers. That occupation receives an offshorability index of 90. An example of a clearly non-offshorable task is primary school teachers – with an index of 0. Somewhere in between are mechanical engineers, who are not easy to offshore, although so remains possible.

Following Blinder (2009), we aggregate the offshorability index values into four categories: non-offshorable (0–24), difficult to offshore (25–50), offshorable (51–75), and highly offshorable (76–100). Thereafter, we compute the share of the workforce that is employed in these categories using register-based labor force data from Statistics Finland and Statistics Sweden.

Approximately One-Fourth of Jobs Are ffshorable

Figure 6.1 depicts the overall results. In the figure, we indicate offshorable jobs as those whose index value is over 50; i.e., the reported percentages have been calculated as a sum of the two rightmost bars in each figure. We find that 26% of Finnish and 23% of Swedish jobs are offshorable. Off-

shorability is more prominent in manufacturing, as seen in Figure 6.2. In total, 51% of Finnish and 43% of Swedish employment in this sector are at risk of offshoring. Most services are necessarily provided and consumed in the same geography. Thus, the risk of offshoring is lower in services. In private services, somewhat more than one-fourth of jobs are offshorable in both countries (26% in Finland and 28% in Sweden). Both countries have a large public service sector that reduces the overall results because most occupations in this sector are difficult to offshore.

We next group occupations by education level and types of task. Our measure of high-education jobs is the sum of those workers who have at least a bachelor's academic level degree, corresponding to ISCED 2011 levels 6–8. In addition, we measure "innovation jobs" based on the list provided by Bagger et al. (2016). Innovators in their list are senior officials and employees in research and planning occupations, such as chemists, electronics engineers, and physicists.

At first glance, it might appear counter-intuitive that the jobs that are mostly performed by highly educated workers are more offshorable (Figure 6.3), albeit considerably so only in the case of Finland (30% *vs* 24% among lower skilled; 24% *vs* 22% in Sweden). This observation is driven by the fact that these jobs often involve considerable amounts of abstract thinking but relatively little face-to-face interaction. Furthermore, as Goos et al. (2014) note, many low-skilled jobs have already been offshored.

When we specifically examine innovators, who are largely highly educated workers, the difference is striking; 61% of Finnish and 49% of Swedish innovator jobs are highly offshorable (Figure 6.4). The explanation is again in the relative lack of face-to-face contact in the "customer interface". Even when an innovator's work involves interaction among his/her development team, it might not hinder offshorability, because a high share of this interaction virtual. It should be emphasized that in our previous analysis (see chapter 4 in this book), we showed that the actual offshoring of innovator jobs from Finland and Sweden to elsewhere in the world is rather small. Mere feasibility does not imply realization.

Figure 6.1

Offshorability and employment (1000 workers), overall

Data sources: Statistics Finland, Statistics Sweden and Blinder (2009). Offshorability index over 50 means that the job is offshorable.

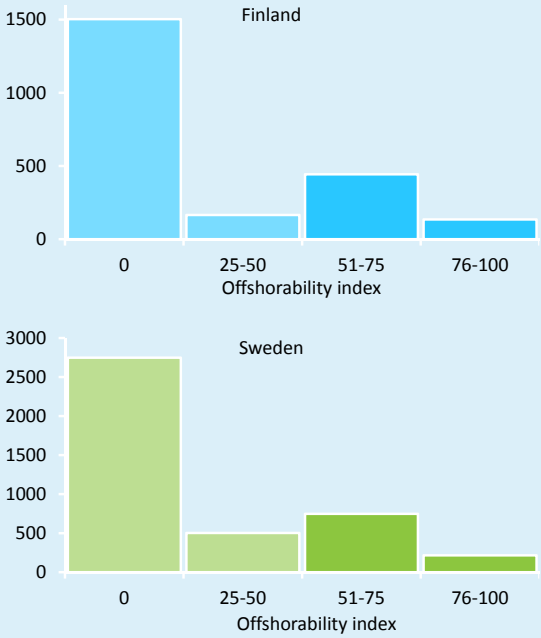


Figure 6.2

Offshorability and employment in manufacturing, construction, and energy (1000 workers; NACE Rev. 2 10–43)

Data sources: Statistics Finland, Statistics Sweden and Blinder (2009). Offshorability index over 50 means that the job is offshorable.

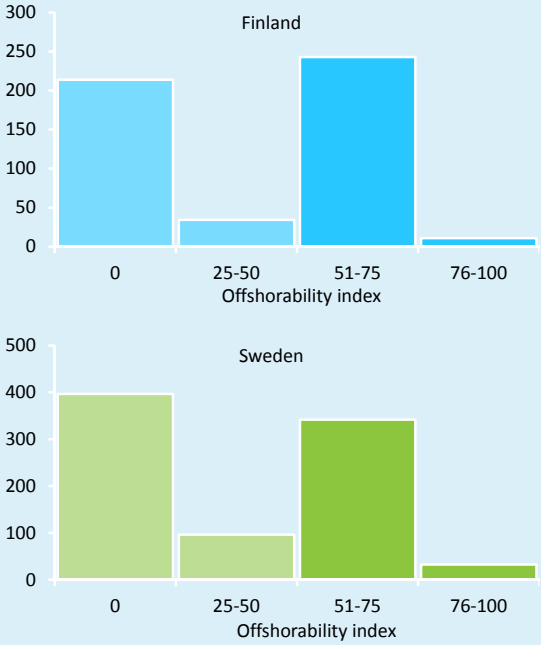


Figure 6.3

Offshorability and employment, high education

Data sources: Statistics Finland, Statistics Sweden and Blinder (2009). Offshorability index over 50 means that the job is offshorable. High education refers to ISCED 2011 levels 6–8.

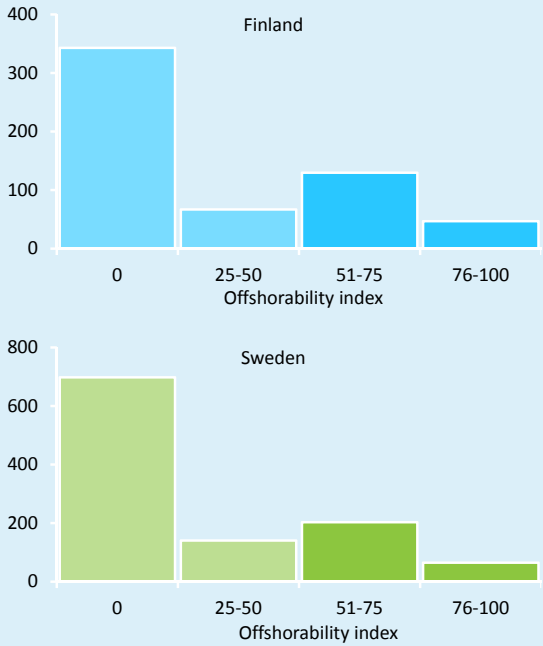
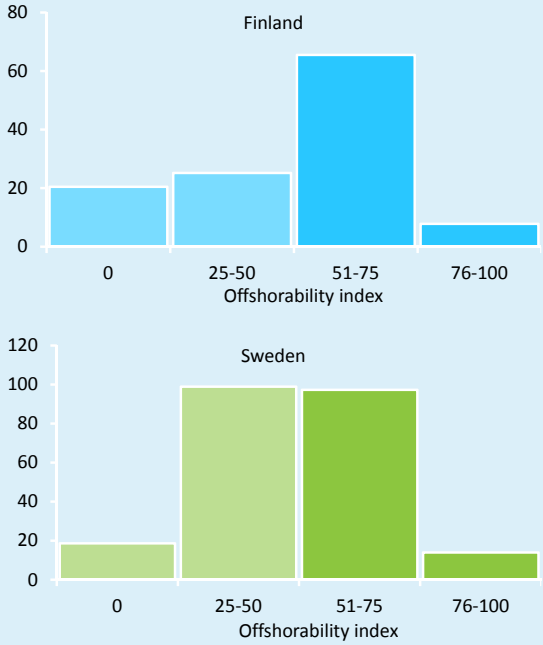


Figure 6.4

Offshorability and employment, innovators

Data sources: Statistics Finland, Statistics Sweden and Blinder (2009). Offshorability index over 50 means that the job is offshorable. The definition of innovator occupations has been captured from Bagger et al. (2016, table A.1).



Jobs Susceptible to Offshoring *vs* Computerization

As discussed previously, globalization and digitalization are overlapping but distinct forces. According to Blinder (2009), offshoring mostly affects jobs that do not require face-to-face contact. Autor et al. (2003) suggest that digitalization (including robotics) mostly affects routine jobs. Another key distinction between globalization and technology is that technology can replace human labor, whereas globalization primarily changes the location at which the work is done.

Globalization and digitalization occasionally refer to the same jobs – but occasionally, they do not. Shop sales assistants or taxi drivers, for example, are more likely to be replaced by technology than to be offshored. Conversely, innovation tasks are difficult to automate but often relatively easy to offshore. If we examine the two phenomena in tandem, we find that the two dimensions agree approximately two-thirds of the time on whether a job is "threatened".

Conclusions

Our findings suggest that a relatively large fraction of jobs are offshorable; in other words, they face direct international competition. A loss in quality-adjusted global cost competitiveness of the workers performing those jobs increases the probability that the jobs are actually offshored. Obviously, many other factors enter the calculation. However, it is nevertheless true that the overall competitiveness of people performing these jobs must be addressed.

We find that innovator jobs are particularly offshorable. However, we have found in our previous work (see Chapter 4 in this book) that little offshoring of these jobs has actually occurred. We have also seen some insourcing of these jobs. It appears that business executives, policymakers, and often researchers fail to acknowledge the granularity of the phenomenon and only partially consider the "total long-term cost advantages" of the seemingly high-cost locations of Finland and Sweden.

Ultimately, offshoring is about where people and their jobs are located. Florida (2010; 2012) and related literature indicate that more than economic reasons define where people choose to live. From a policy perspective, it is not only about attracting firms and capital but also about attracting people.

In the long term, a wide array of factors makes a country a good place to live in and do business. It is a question of the quality of life, education, technology, infrastructure, and government. The combination of these factors makes people and businesses stay. Countries that have these qualities tend to be successful over long periods and can avail themselves of the opportunities of the new economy.

7 Observations and Implications

Jyrki **Ali-Yrkkö** (ETLA), Hans **Lööf** (KTH), Ali **Mohammadi** (KTH), and Petri **Rouvinen** (ETLA)

Abstract

Deepening globalization and increasing prevalence of global value chains have made competition more intense. At the same time, opportunities to compete internationally have multiplied and the bounty for succeeding in competition has grown. Both countries and corporations have become more specialized (on average). At least up until recently, both Finland and Sweden has benefitted greatly from these developments and there is every reason to believe they continue to do so in the future.

As for policy, in the case of Finland and Sweden, we see no viable alternative to full engagement in globalization and in global value chains. Also in years to come, the basic policy premise includes heavy investment in citizens' skills and competences and multilateral minimization of hindrances to cross-border interaction.

A New Globalization Policy Framework

An obvious lesson from the previous Chapters is that each individual person must ultimately be globally competitive in the tasks she performs – particularly in innovator jobs – but with two important caveats: (i) competitive in tandem with persons and tasks with which she is co-located, and (ii) competitive after considering the support she gains from her immediate and broader operating environment. The first caveat (i) relates to firm boundaries, inter-organizational networking, and the formation and functioning of work organizations and teams. The second caveat (ii) concerns how well her local professional ecosystem and her living environment – which is often, in practice, the city she is located in – function (including the prevailing level of mutual trust and other forms of social capital among the inhabitants).

The OECD (2013) resorts to the Schumpeterian new-new growth theory (Aghion & Howitt, 2009) and suggests that the New Globalization policy tasks of a nation-state are to

- promote market competition;
- encourage creative destruction/renewal;
- make public investments in education, research, and infrastructure; and
- foster a financial and business environment that is conducive to private investment in tangible and intangible assets.

With respect to the labor market, the factors delineated above point towards ease of hiring and firing suggesting a relatively high labor market turnover.[10] Since the impacts of globalization tend are unpredictable, sudden, and individualistic, relatively freewheeling labor markets need to be combined with sufficient social safety nets and support for life-long learning and re-skilling when necessary. Social transfers should provide sufficient carrots and sticks for individuals to improve themselves and to seek better, new employment while simultaneously guarding against adverse effects of globalization.

The easiest approach for national actors to gain prominent positions in the most desirable GVCs is to create them, which points towards both entrepreneurial and ownership engagement in ventures spanning new GVCs. If the national business environment is dynamic in the sense that

– there is plenty of entry,
– selection among entrants is intense, and
– the surviving (high-productivity) entrants can scale quickly,

then the national interest is in nurturing new ventures with radical new ideas because, if selection and scaling works, poor implementations are pruned and the expansion of good implementations compensates for the high failure rate.

The penetrating characteristic of global value chains is their circular nature. Thus, the primary objective in trade policy is to multilaterally reduce hindrances for virtually all cross-border flows (Blanchard, Bown, & Johnson, 2016, suggest that GVCs are already shaping trade policy in this direction). In fact, in the context of GVCs, any market malfunctioning becomes a trade policy issue. The rationale stems from both domestic MNE global competitiveness and the country's attractiveness for foreign MNE activities. A good rule of thumb is to treat domestic and foreign provenances equivalently with respect to the cross-border flows of goods, services, investment, capital, ownership, technology, and workers.

Innovation Policy Considerations

GVCs have made firm-specific knowledge and skills internationally mobile. The knowledge created via innovative activity not only spills over globally (from the emitting country's point of view, unintentionally) but is also actively transferred across the different worldwide locations of multinational enterprises. Because nationally localized knowledge externalities are the main rationale for the public support of private innovative activity, the motivation for at least some innovation policy measures is reduced. At the same time, the share of innovative activity in GVCs' overall value added has been elevated, and innovation and other intangible aspects often largely determine the distribution of value added across countries. Furthermore, innovation is clearly a two-way street – in imposing any hindrances on international knowledge flows, most likely Finland or Sweden would be a net loser.

In thinking of broadly defined innovation policy in the presence of GVCs, the role of the educational system, which enhances the abilities of individuals, can gain in importance over enterprise-side innovation policy. More broadly, the role of individuals' skills and competences can hardly be overstated in this context.

In the GVC world, the government wishes to promote private innovative activity, which

– would not be conducted on the same scale and scope without public intervention;
– provides the highest national social returns (the sum of private returns and net externalities); and
– is nationally appropriable to a reasonable degree.

The first two points above have not changed. The third point is new and brings about overwhelming, new informational requirements in policy-making – driven by the elusive nature of corporate nationality, increasingly global knowledge flows, the common disconnect between nurturing and using knowledge, and hard-to-detect value added within GVCs.

As suggested previously, a direct implication of GVCs' ever-finer resolution is that individuals, companies, and regions increasingly specialize in certain tasks. Conversely, in innovation policy, it might therefore be more difficult to define national focus areas. If these areas were to be defined, they would most likely cluster around competences rather than around industries. At the level of specific innovation activities, novelty, global applicability, market potential, and alignment with global megatrends might be among the "discriminating" dimensions in defining national areas of emphasis.

Ultimately, a country wants to build and sustain an entire ecosystem that can absorb internationally available spillovers and combine/complement received fragments of knowledge to create something altogether new and ingenious. This system thinking gives rise to additional policy considerations. Are there sufficient factors and institutions that can perform the following:

– Nurture and retain domestic individuals and attract talented foreign individuals (i.e., increase the supply of brain power),
– Improve the performance of multinational enterprises' innovative activity in Finland/Sweden vis-à-vis competing locations (i.e., create a demand for brain power)?

Because the aim of any innovative activity lies in the future and because its aim is invariably to capture lucrative new markets, one should also ask whether Finland or Sweden is actively engaged in researching yet-

to-emerge value domains. If so, is the country able to acquire "control points" in those domains via securing intellectual property rights and/or building complementary assets?

Policy Practice?

The previous section suggests that the basic policy premise is roughly as follows:

- *Laissez-faire* enterprise policy supported by labor and social policies that do not hinder re-allocation.
- Trade policy extending to all types of cross-border exchanges and aiming at minimizing frictions multilaterally.
- Defining the double focus of education and innovation policy appears relatively straightforward: (i) individuals' skills, competences, motivations, and interests to stay (regardless of nationality), and (ii) ecosystem elements (perhaps in particular universities) and dynamics (perhaps at the level of city-sized urban concentrations).

If (i) other countries do not attempt to bend the rules of international engagement, (ii) enterprises are profit-seeking and socially responsible, (iii) individuals' more-or-less share Nordic basic values, and (iv) relevant markets are established and function well, applying the above set of policies worldwide would most likely maximize global welfare. However, a country's optimal strategy becomes ambivalent when any of other underlying conditions (i)–(iv) do not hold.

We suggest two specific policy measures that are consistent with our analysis: first, any direct public support for private innovative activity could be tied to having at least some of the activity performed by individuals residing in Finland/Sweden, using fair corporate policies for transfer pricing, and perhaps also having Finland/Sweden among the company's primary tax jurisdictions. Second, Finland/Sweden could consider measures targeted towards attracting and retaining high-potential innovators currently residing outside their national borders (these measures should include the minimization of any associated bureaucracy and time delays).[11]

Concluding Remark

In the case of Finland and Sweden, we see no viable alternative to full engagement in global value chains. It appears equally pointless to argue about the basic policy premise, which should be as follows: heavy invest-

ment in skills and competences within national borders and symmetry between domestic and foreign provenances equivalently, which – in our opinion – *is* consistent with explicitly favoring certain activities within Finland or Sweden, e.g., by measures such as “invest in / source to Finland/ Sweden”. Conversely, offshoring from Finland/Sweden does not require Finnish/Swedish public support.

Endnotes

1 The classification of products into intermediates and final products is based on the Broad Economic Categories () classification (BEC, Revision 3, Dietzenbacher et al., 2013, p. 84). Based on this classification, however, diesel engines and many other business-to-business products are also defined as intermediates although they are rarely perceived as such. Although the classification is not perfect, it is the best international categorization that can be used to separate intermediates from final goods and services.

2 In Finland, this estimate is more or less in line with the indicator for the domestic value-added content of exports as reported in the OECD Tiva database. This Finnish figure for 2011 was 35%. However, in the TiVa database, the Swedish figure is surprisingly low (27%).

3 Based on TiVa data, the EU average is 60%.

4 For further details of industry groupings, see, e.g., http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf

5 Source: World Bank, Labour force total, and Eurostat International Sourcing Survey.

6 EU-15: Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, and the United Kingdom.

7 EU-12: the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovak Republic, Bulgaria, and Romania.

8 Volumes of EU15 and EU12 exclude the country of origin itself.

9 Several other studies have also provided methods for estimating the potential for offshoring: Acemoglu and Autor (2011), Blinder and Krueger (2013), Firpo, Fortin, and Lemieux (2013), as well as Goos, Manning, and Salomons (2014) have made important contributions.

10 GVCs make setting wages increasingly global, which poses a challenge for existing wage-setting mechanisms, not least because it has simultaneously become more difficult to form sensible unions on both sides of the labor market.

[11] A further pragmatic observation/suggestion is offered: reductions in transportation costs have been a key necessary condition of the industrial revolution since the early 1800s. This point represents Baldwin's (2006, 2016) *first unbundling*, which made it possible to produce and consume in different locations. Baldwin's *second unbundling* was driven by reductions in the costs of transferring coded information, the outcome of which was the New Globalization. In terms of both money and time, international movement of people remains costly *and* central to the operation of the most knowledge-intensive parts of GVCs. Thus, to be a major hub in an MNE's network of active innovation locations, a city needs an internationally well-connected airport (one can obviously speculate on a still-fictitious *third unbundling* that might be induced by, e.g., a combination of convincing telepresence and supporting robotics, after which needs for physical presence might be reduced).

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Finland and Sweden are deeply engaged with *New Globalization*, which is characterized by geographically fragmented production and intense cross-border knowledge flows. Although a popular uproar has brought the steady deepening of this phenomenon to a halt, it is not about to reverse.

The consequences of this new era are not well understood due to the complexity of both its actual operations, global value chains, and its key actors, multinational enterprises. The flows and structures of this new era are deeply interconnected in ways that are often uncovered only when they are disrupted by, e.g., natural catastrophes or sudden policy changes. New Globalization both underlines the importance of the age-old principles of good policy conduct and bring about new challenges.

Tekes, the Finnish Funding Agency for Innovation, and its Swedish sister organization VINNOVA joined forces in 2014 to study the renewing manufacturing industries. Under this umbrella, Tekes and VINNOVA supported half a dozen international research projects, including our *Intangibles and International Sourcing* (acronym: InSource). This book is the final report of our InSource project. We wish to thank Tekes and VINNOVA for their support!

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