

Ali-Yrkkö, Jyrki; Rouvinen, Petri

**Research Report**

## Implications of Value Creation and Capture in Global Value Chains – Lessons from 39 Grassroots Cases

ETLA Report, No. 16

**Provided in Cooperation with:**

The Research Institute of the Finnish Economy (ETLA), Helsinki

*Suggested Citation:* Ali-Yrkkö, Jyrki; Rouvinen, Petri (2013) : Implications of Value Creation and Capture in Global Value Chains – Lessons from 39 Grassroots Cases, ETLA Report, No. 16, The Research Institute of the Finnish Economy (ETLA), Helsinki

This Version is available at:

<https://hdl.handle.net/10419/201298>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# Implications of Value Creation and Capture in Global Value Chains

## Lessons from 39 Grassroots Cases

Jyrki Ali-Yrkkö\* – Petri Rouvinen\*\*

\* Etlatieto Oy and ETLA – The Research Institute of the Finnish Economy, [jyrki.ali-yrkko@etla.fi](mailto:jyrki.ali-yrkko@etla.fi)

\*\* Etlatieto Oy and ETLA – The Research Institute of the Finnish Economy, [petri.rouvinen@etla.fi](mailto:petri.rouvinen@etla.fi)

This paper extends the discussion in Ali-Yrkkö (2013). This work relates to two projects at Etlatieto Oy, SUGAR and BRIE-ETLA. The authors would like to thank the following persons for comments, discussions, and suggestions: Emilie **Anér** (Kommerskollegium), Richard **Baldwin** (The Graduate Institute, Geneva), Dan **Breznitz** (Georgia Tech), Koen **De Backer** (OECD), Patrick **Donnelly** (Univ. of California, Berkeley), Gary **Gereffi** (Duke Univ.), Olle **Grünwald** (Kommerskollegium), Matias **Kalm** (Etlatieto/ETLA), Martin **Kenney** (Univ. of California, Davis), Christian **Ketels** (Harvard Business School), Mikko **Ketokivi** (IE Business School, Madrid), Greg **Linden** (Univ. of California, Berkeley), Gianmarco **Ottaviano** (Bocconi Univ.), Mika **Pajarinen** (Etlatieto/ETLA), Timo **Seppälä** (Etlatieto/ETLA), Vesa **Vihriälä** (ETLA), Pekka **Ylä-Anttila** (Etlatieto/ETLA), and John **Zysman** (Univ. of California, Berkeley).

ISSN-L 2323-2447

ISSN 2323-2447 (print)

ISSN 2323-2455 (online)

## Contents

	Abstract	2
	Tiivistelmä	2
<b>1</b>	<b>Executive summary</b>	<b>3</b>
<b>2</b>	<b>Who captures value?</b>	<b>4</b>
<b>3</b>	<b>The relative unimportance of assembly location in the case of the Nokia N95 smartphone</b>	<b>6</b>
<b>4</b>	<b>Evolution of value capture in “dumb” mobile phones</b>	<b>7</b>
<b>5</b>	<b>The impact of transfer pricing on value added capture</b>	<b>9</b>
<b>6</b>	<b>The Journey of a bicycle from Finland to Asia and then back to Europe</b>	<b>10</b>
<b>7</b>	<b>Manufacturing location matters in engineering</b>	<b>12</b>
<b>8</b>	<b>The distribution channel plays a significant role in textiles and foodstuffs</b>	<b>14</b>
<b>9</b>	<b>Other cases</b>	<b>15</b>
<b>10</b>	<b>Discussion and conclusions</b>	<b>16</b>
	References	19

## Implications of Value Creation and Capture in Global Value Chains

### Lessons from 39 Grassroots Cases

#### Abstract

This report summarizes 39 detailed ETLA case studies of global value chains (GVCs). The findings suggest that the value added in global value chains is less tied to their tangible aspects than what conventional wisdom suggests. Intangible aspects of GVCs tend to be more important, but their poor measurement in available statistics misguides. With the rise of GVCs, interests of governments and multinational enterprises operating within national borders are increasingly at odds, *e.g.*, when it comes to transfer pricing practices. The evidence from Finland shows that misinterpreted (or ignored) transfer pricing rules have significant impacts on GDP and other macroeconomic measures. Since multinational enterprises, and GVCs they operate, have grown to dominate international trade, the focus of national policymakers should shift from *companies* and *industries* to *tasks* and *functions* that are conducted within national borders.

**Key words:** Global value chains, Finland, transfer pricing, case studies, economic policy

**JEL:** F23, L14, M11

## Johtopäätöksiä lisäarvon luonnista ja nappaamisesta 39:n yksityiskohtaisen tapaustutkimuksen perusteella

#### Tiivistelmä

Tässä raportissa tutkitaan globaalien arvoverkostojen toimintaa ja arvonalisän globaalia muodostumista tuotetasolla. Tulokset osoittavat, että erityisesti kulutustavaroissa aineeton omaisuus ja palvelutoiminnot luovat yhä suuremman osan tuotteiden arvosta. Brändi, tuotemerkit, patentit ja muu aineeton omaisuus sekä jakelukanavat ovat oleellisessa roolissa arvonalisän synnyttämisessä. Toinen keskeinen tulos koskee siirtohintojen merkitystä. Kun yhä useammat yritykset toimivat kansainvälisesti, arvonalisän maantieteellisen jakauman sekä eri maiden BKT:een vaikuttaa oleellisesti yritysten käyttämät siirtohinnat. Niiden tärkeyttä korostaa se, että valtaosa maailmankaupasta syntyy nykyisin monikansallisten yritysten sisällä. Kolmas keskeinen löydös koskee elinkeinopolitiikkaa. Sekä suurissa maissa että erityisesti pienissä maissa vain osa tuotteiden arvoketjusta sijaitsee yhdessä maassa. Tästä johtuen politiikantekijöiden tulee kiinnittää huomiota työtehtäviin ja toimintoihin enemmän kuin toimialoihin ja yrityksiin.

**Asiasanat:** Globalisaatio, arvoketju, arvoverkosto, toimitusketju, tuotanto, arvonalisä, lisäarvo

**JEL:** F23, L14, M11

## 1 Executive summary

An increasing geographic and organizational dispersion of production raises the question of where value added is created and by whom. To answer the question, this report summarizes 39 detailed cases studies of global value chains (GVCs), which ETLA has conducted in the last few years.

We find that value creation and capture in global value chains is less tied to tangible aspects, such as the assembly location, than what conventional wisdom suggests. Intangible aspects, both market and internal services as well as creation and appropriation of intellectual property, are often more important. Since these aspects are not captured well in available statistics, conventional measures of globalization are misleading.

There seems to be three ways to capture “over-sized” wages and profits in GVCs: it pays to be the orchestrator and/or brand owner of a value chain, to control the customer/user interface, and/or to retain a “gate-keeping” position in the chain, *e.g.*, via cornering the market for a key input. In terms of job assignments, these value chain positions imply high-level service tasks that are typically considered to have a “supporting role” as well as to the creation and management of intangible assets.

GVCs lead to deepening specialisation, which in turn leads to global welfare gains. It remains unclear, however, how these gains are distributed. National policy choices greatly influence a country’s involvement, positioning, and ability to create and capture value in GVCs.

Governments’ and multinational enterprises interests do not always coincide. For instance, currently relatively uncontrolled transfer pricing practices of multinational enterprises have direct consequences on GDP (Gross Domestic Product). Especially larger companies stand to benefit from GVCs, whereas many public institutions are challenged by them.

The desire of all countries, individuals, and organisations is to shift to higher value-added activities in GVCs and to create higher GDP per capita, wages, and profits. At least from the viewpoint of small open economies, policymakers should focus more on the range of *tasks* and *functions* within national borders instead of *companies* and *industries*. The focus should be on relatively less mobile factors of production.

Some of the advantages of popular offshoring destinations have been eroding (or were not actually there in the first place). Furthermore, companies have grown wiser in evaluating the *total cost* of outsourcing and off-shoring rather than just direct cost of (manual) labor. Dispersion of global value chains at ever-finer resolution is, however, not disappearing: it is just becoming more precise and smarter. After overall longer-term costs and benefits have been evaluated, seemingly high-cost locations, such as Finland, appear quite competitive in many cases.

## 2 Who captures value?

An increasing geographic and organizational fragmentation of production processes, as suggested by Gene Grossman and Esteban Rossi-Hansberg (2008) and Richard Baldwin (2006), raises the question of where value added is created and by whom. As Breznitz *et al.* (2011, p. 205) note, *supply chains of multinational corporations are starting to resemble sliced carrots. For each slice, managers tirelessly ask the “make or buy” question, which is then followed by “by whom” and “where”.*<sup>1</sup> Consequently, outsourcing and off-shoring have become topical issues of political debate worldwide.

The viewpoints of companies and governments with respect to this fragmentation differ. Multinational companies are primarily interested in their own global ability to capture corporate profits, a component of the total value added, but are largely indifferent with respect to the geographical dispersion of those profits and value added otherwise. However, national governments adopt a different position on this issue. As GDP (Gross Domestic Product) is the sum of value added (including profits) captured within national borders, policymakers focus on the geography of value added, not on its organizational breakdown. In the current era of globalization, it is increasingly the case that the interests of multinational corporations and their host countries diverge.

This divergence is important, because intra- and inter-firm Global Value Chains (GVCs) of multinational enterprises account for as much as 80% of global trade (UNCTAD, 2013, p. iii). In addition, GVCs are responsible for significant double-counting in global trade figures. GVCs make extensive use of both market and internal services (UNCTAD, 2013), both of which continue to be poorly measured.

A joint initiative of the OECD and WTO aims to produce international trade statistics on a value added basis (OECD, 2013),<sup>2</sup> but even these improved trade statistics fail to describe how global value chains operate in practice and how their economic gains are distributed across geographies.

To enhance our understanding of these issues, this paper builds on 39 detailed case studies of individual product or service offerings (listed in Table 1) by firms residing in Finland (*cf.* Ali-Yrkkö, 2013, and references therein provide further discussion in Finnish).<sup>3</sup> These cases enable us to analyze issues that would be difficult, if not impossible, to examine using secondary sources.

---

<sup>1</sup> For an earlier discussion of this problem, see Kenney (2004).

<sup>2</sup> OECD-WTO Database on Trade in Value Added. First estimates: 16 January 2013.

<sup>3</sup> Due to confidential company information, in most cases we cannot reveal the names of the case companies or exactly identify the products in question.

**Table 1**      **The case studies this report builds on**

<i>Case #</i>	<i>Product / Service</i>	<i>Key finding</i>
1	<i>Nokia N95</i>	For a smartphone manufactured in Finland and in China, the actual location of final assembly makes little difference to the value added captured in the host country.
2–4	<i>Nokia 3310, Nokia 1100, and Nokia 1200</i>	From 2000 to 2007 the value-added geography of a “normalized” feature phone shifts from Europe to Asia.
5–8	Consumer electronics (other than phones)	Due to misinterpreted transfer pricing rules, the home country's share of total value added remains drastically too low.
9	A bicycle by <i>Helkama</i>	When assembled and sold in the home country, Finland accounts for 67% of the total value added. When assembly is off-shored in Baltia or Asia (but the bike is still sold in Finland), the share of home country is 58–59%.
10–19	Mechanical and precision engineering products	When assembled in home country (and sold abroad), the home country's share ranges from 31% to 90% across the ten cases. With assembly outside home country, the share of home country ranges from 2% to 55%.
20–27	Foodstuffs	Wholesalers and retailers create on average 38% of the total value added.
28–31	Textiles	Wholesalers and retailers create on average 50% of the total value added. In our case, the brand owner had outsourced production to a contract manufacturer (CM). The share of CM is 7% of the total value added.
32	Sawn wood (two-by-four inch timber)	Because the entire value chain is located in home country, 100% of the value added is created in Finland. If tree trunks were imported, the share of home country would drop to 55%.
33–34	Non-woven products	When manufactured and sold abroad, the share of the home country is on average 27%. When the case product is manufactured abroad and sold in the home country, the share of the home country is 33%.
35–36	Packaging board	When manufactured in home country and sold abroad, the share of home country is 51%. With manufacturing outside home country, the share of home country is 43%.
37	A forest tractor by <i>Ponsse</i>	<i>Ponsse</i> has decided not to offshore assembly and component sourcing. The company develops continuously its in-house manufacturing operations and cooperates closely with its suppliers located mostly nearby. When the product is assembled in the home country and sold abroad, the home country accounts for 48% of total value. A significant share of this is created by suppliers located in the home country.
38	A web-based service by <i>Whitevector</i>	Due to the digital nature of service, marginal costs of each service provided to customer are very low. Thus, <i>Whitevector</i> creates approximately 90% of the total value. Finland (the headquarter country) receives nearly 95% of the value added.
39	Translation and localization service	When translation work is done in home country (Finland), the home country accounts for 88% of the total value added. When translation work is off-shored, the home country's share is still 68%.

For details, see Ali-Yrkkö, 2013.



### 3 The relative unimportance of assembly location in the case of the *Nokia N95* smartphone

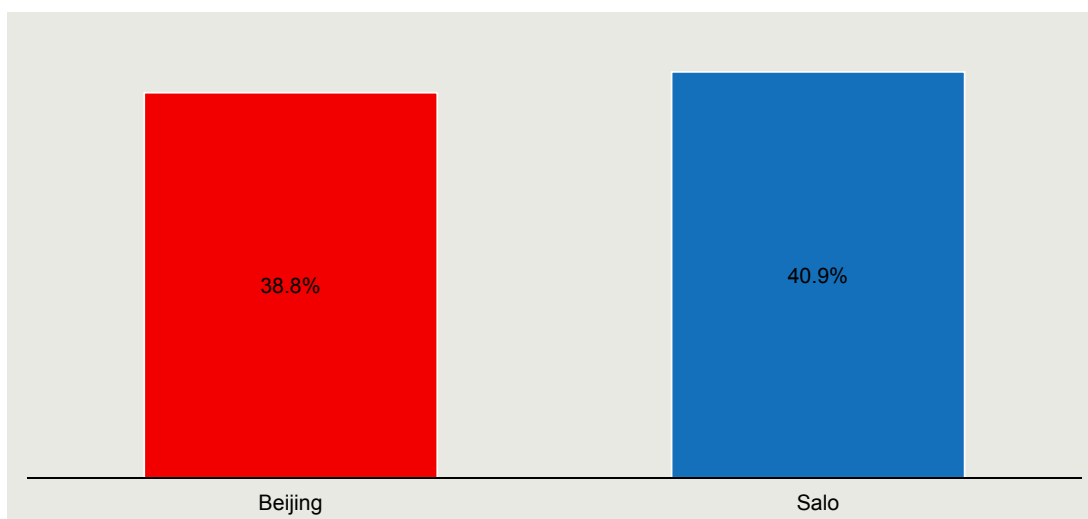
Our original case study of global value chains – inspired by the famous iPod case by Dedrick, Linden, and Kraemer (2009; 2010; 2011) – concerned a *Nokia N95* smartphone (Ali-Yrkkö, Rouvinen, Seppälä, & Ylä-Anttila, 2011). In 2007, the unbundled pre-tax retail price of the phone was €546, which represents the total value added of the product.

In our analysis, we individually evaluated all 600 of the phone's components, as well as the software and intellectual property it embodies.<sup>4</sup> We determined value added by actors, functions, and geographies – separately for all direct and indirect (including capital expenses and contributions of supporting functions such as top management) tangible and intangible inputs – from raw materials and idea generation to a consumer's final purchase of an *N95* phone at a retail store. Depending of the input, there were 1–8 stages before the final assembly by *Nokia* and 2–4 stages after it.

*Nokia* assembled the phone in two locations, in Beijing (China) and in Salo (Finland). In addition to the assembly location, the country of final sale influenced the geography of value added, as the value added attributable to distribution arises in the country of final sale.

Our results revealed that the assembly location had little impact on the value captured by Finland, the country hosting *Nokia*'s headquarters (Figure 1): for phones assembled in Beijing (and sold outside Finland), the headquarter country captured 39% of the value added, whereas for the *Made in Finland* phones assembled in Salo, it captured 41%, *i.e.*, only two percentage points more.

**Figure 1** The 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).

<sup>4</sup> For example, the phone's main processor was provided by *Texas Instruments* (TI). The processor's hardware was designed in Dallas and Nice (France). Its software design and integration with the hardware were conducted in India. Its fabrication took place in Dallas and Japan. In addition to this information, we estimated the contribution of TI's headquarters in the United States, etc.

The smartphone case suggests that value creation and capture are largely detached from the physical flows and that the location of final assembly is sometimes nearly irrelevant. Internal services returns on intellectual property rights, and other intangible aspects of the global value chain largely determine where value added was created and captured.

## 4 Evolution of value capture in “dumb” mobile phones

Our smartphone case study provided insights for *a point in time*. However, how does the provision of mobile phones evolve *over time*? To study the issue, we considered three other “dumb” or feature phones developed by *Nokia* at different points in time.

Seppälä and Ali-Yrkkö (2013) considered phone models that embodied identical technologies, features, and functionality, although the timing of commercial availability, the actual model numbers, and the target markets changed.

The approach was identical to the aforementioned case of the *N95*. Seppälä and Ali-Yrkkö analyzed the *Nokia 3310* in 2000 (with an unbundled pre-tax retail price of €78.60),<sup>5</sup> the *Nokia 1100* in 2003 (€62.70), and the *Nokia 1200* in 2007 (€27.00).<sup>6</sup>

The value added created and captured by *Nokia* fell from over €30 per *3310* to less than €6 per *1200*;<sup>7</sup> the value added attributed to assembly, in this case by *Nokia* rather than by an outsourcing partner, fell from over €7 to €1. While outside vendors faced similar price erosion, their share of the value added increased over time (Figure 2).<sup>8</sup> Price erosion was the least rapid in the service stages of the value chain, *i.e.*, in distribution, logistics, trade, and warranty provision. *Nokia*’s share of the total value added declined from approximately 40% to 20%.

*Nokia* assembled the *3310* in various locations affecting the geographical breakdown of value added. When the phone was manufactured, for instance, in Bochum, Germany, and sold outside Finland, the headquarter country (Finland) captured 26% of the total value added. For *3310* phones assembled in Finland (for export), Finland captured 39%, *i.e.*, 13 percentage points more. Thus, the assembly location had a greater impact here than in the case of the *N95* for two major reasons. First, the relative share of the assembly costs of the *3310* exceeded that of the *N95*. Second, the assembly location of the *3310* also affected the sourcing of some components and parts (reflecting *Nokia*’s manufacturing strategy at around year 2000). Thus, when the *3310* was assembled in Finland, some components were manufactured in Finland, whereas when the phone was assembled in other locations, the manufacturing locations of these components also changed.

<sup>5</sup> Year 2000 refers to the initial market introduction. The core features of the value chain were determined at that point in time. The reported euro amount at the value added distribution refers to year 2003.

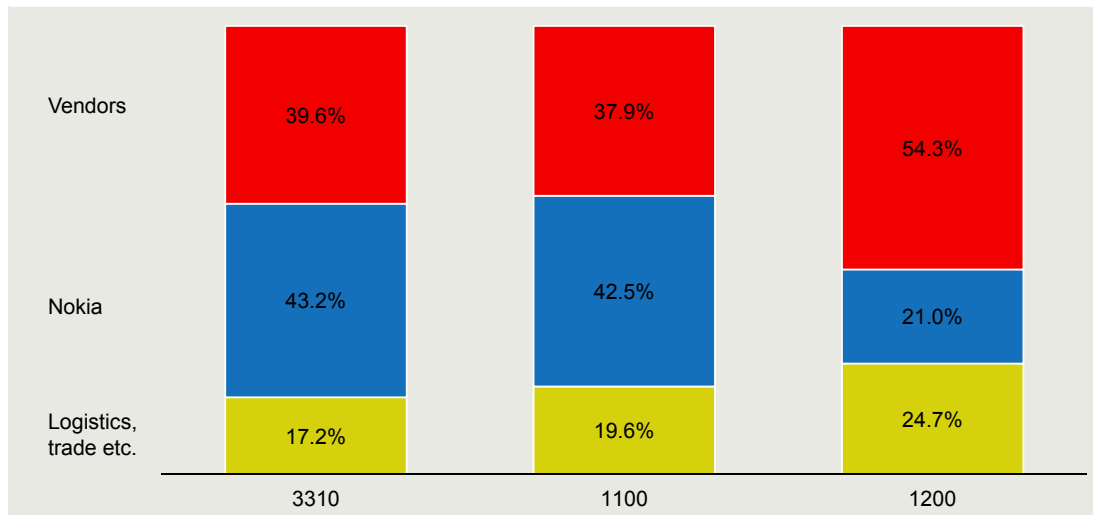
<sup>6</sup> At the time of its introduction, the *Nokia 3310* was a mid-price phone for advanced markets, whereas the *Nokia 1200* was clearly an entry-level phone for first-time users in developing markets. These phones comprise 250–400 physical components. *Nokia*’s proprietary operating system is the primary piece of installed software. Much of the intellectual property in these phones is embodied in the employed radio interface and telecommunications standards.

<sup>7</sup> Allocated to direct and indirect in-house labor costs, including assembly, R&D, marketing, sales, sourcing, management, the depreciation of tangible and intangible assets, investments, and operating profits.

<sup>8</sup> Often this has also meant shifting from premium to secondary vendors. For instance, the displays in the *Nokia 3310* and the *Nokia 1100* came from *Samsung*, whereas the displays in the *Nokia 1200* were provided by *Wintek* and other Taiwanese vendors.

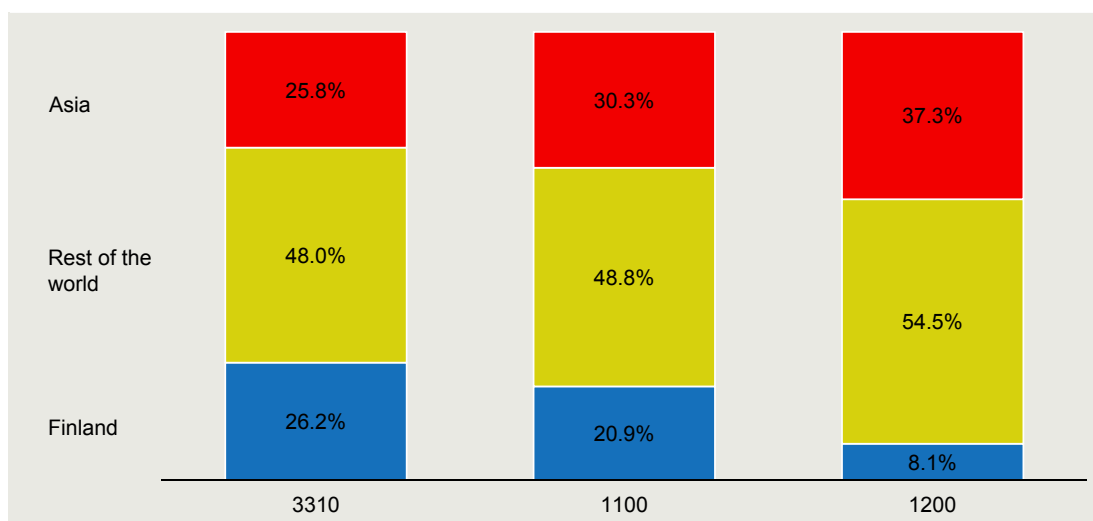
Accounting for various assembly locations and the global distribution of sales, Finland initially captured one-fourth of the total value added of the 3310 (Figure 3). It should be noted that the assembly and final sales locations vary between models. While the *Nokia 3310* was manu-

**Figure 2** Value-added shares by participant/function in the case of three “dumb” phones



Source: Seppälä and Ali-Yrkkö (2013).

**Figure 3** The geography of value added in the case of three “dumb” mobile phones



Note: Since both the location of assembly and the country of final sale have consequences on the geographical distribution of value added, the above calculations reflect the average of the following four combinations (and are thus roughly comparable across models/time): (1.) assembled and sold in the EU (but not in Finland), (2.) assembled and sold in Americas, (3.) assembled and sold in Asia, and (4.) assembled in Asia and sold in the EU (but not in Finland).

Source: Seppälä and Ali-Yrkkö (2013).

factured and sold in Finland, the *Nokia 1200* was neither manufactured, nor sold in Finland. Due to these differences between the three models, we normalized assembly and sales locations (see note in Figure 3). Ultimately, for the *1200*, Finland captured less than one-tenth of the value added. The value captured in Asia increased from 26% to 37%.

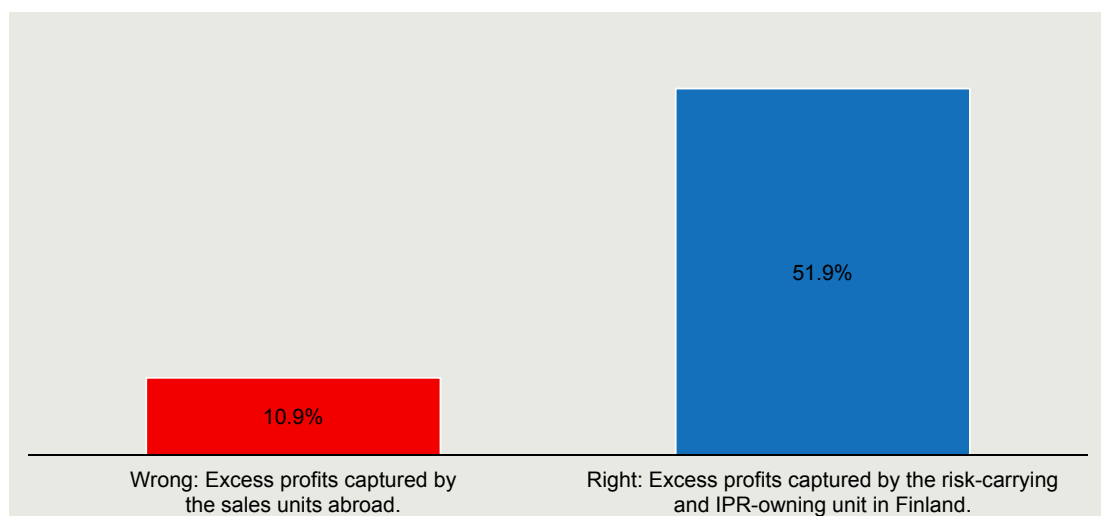
The analysis of three similar phones over time illustrates both the rapid decline in price of a given feature set and the gradual shift of tasks towards developing countries. This shift concerns not only physical components and assembly but also design and other intangible aspects of the value chain. For instance, the *Nokia 3310* was designed end-to-end in Denmark and Finland. The *Nokia 1200* was designed in China, although Denmark still assumed responsibility for the hardware and software platforms. Thus, over time, China's role increased substantially from being simply an assembly location.

It is worthwhile to note that the most recent of the three “dumb” phones, the *Nokia 1200*, and our smartphone case correspond to the *same point in time*. Thus, within one multinational enterprise, there are simultaneously seemingly incompatible value chains with different divisions of labor between developed and developing countries; *Nokia* leverages its firm-specific advantages across multiple geographies. *Nokia's* actions and those of its competitors make initially closely held expertise more readily available in new locations, including developing countries, which then become progressively more advanced and thus more attractive for further, more sophisticated activities.

## 5 The impact of transfer pricing on value added capture

In addition to mobile phones, our 39 case products include four other consumer electronics products by the same company. These cases revealed the significant role of transfer pricing (see also Seppälä & Kenney, 2013, discussing precision machinery).

**Figure 4** The impact of incorrect transfer pricing on the value added captured in Finland (an average of four electronics products)



Source: Ali-Yrkkö (2013).

We found that, while the brand and relevant patents were owned by the parent company in the host country (in this case, Finland), the vast majority of the profits were shown in company's sales units in other countries. As a result, when the products were assembled and sold abroad, only 5–17% of the total value was created in the home country.

However, according to tax officials, this company misinterpreted the transfer pricing principles established by the OECD (2010). Because the parent company carried most of the risks and owned relevant intellectual property, the parent company should have captured any “excess profits.” Thus, the price that the parent company charged its sales subsidiaries should have been significantly higher. When we recalculated the geographical breakdown of value added using appropriate transfer prices, the value-added share of the home country increased to 42–66% (Figure 4 refers to an average over the four products), with direct consequences on measured GDP.<sup>9</sup> In addition to this impact, higher transfer prices would also increase Finnish exports and imports of the countries where the sales units are located.

The above analysis provides new insights, but are electronics a special case with respect to the unbundling of GVCs? To answer the question, we studied other goods and services.

## 6 The Journey of a bicycle from Finland to Asia and then back to Europe

One of these other goods was a women's bicycle produced by a 100-year-old Finnish family-owned company, *Helkama Velox* (Kalm, Pajarinen, Rouvinen, & Seppälä, 2013; Kalm & Seppälä, 2012). In 2007, *Helkama Velox* re-located the production from Finland to Asia.

In 2011, this bicycle model was assembled in Indonesia by an outsourcing partner. However, due to increases in both assembly and transportation costs, *Helkama Velox* decided to explore other options. As part of this effort, it calculated the costs of in-house assembly in Finland and determined the costs of an outsourcing partner in Lithuania. In Lithuania and Indonesia, assembly was found to account for only 2% of the total value added of the product (Figure 5). In Finland, however, its share jumped to 16% (Kalm & Seppälä, 2012).

Focusing on assembly alone is, however, an excessively narrow perspective on manufacturing. While outside vendors account for 33% of the value added in Finland, this share is 37% in Indonesia and over 40% in Lithuania. Furthermore, logistics absorbs 9% of the value added when the product is assembled in Indonesia; in the Lithuanian case, the corresponding share is 3%. The non-assembly value added of the brand holder and coordinator *Helkama Velox* is highest when the bicycle is assembled in Lithuania and lowest with assembly in Finland. But because the shares of vendors and logistics vary by locations, the difference between 28% and 20% is not nearly as drastic as the direct assembly cost would seem to suggest.<sup>10</sup>

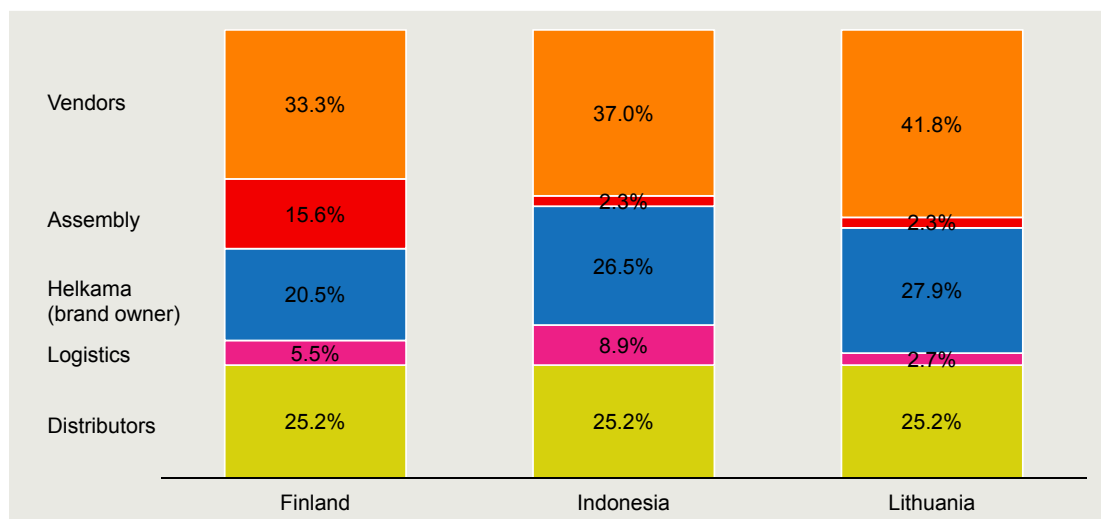
Around the same point in time, the same model had three alternative assembly locations for final sales in Finland by *Helkama Velox*'s distributors. With local assembly, Finland captured

<sup>9</sup> Our recalculations were based on comments that we obtained from the Finnish tax officials specializing in transfer pricing issues.

<sup>10</sup> Furthermore, this calculation ignores any extra coordination and other costs that may be associated with outsourcing.

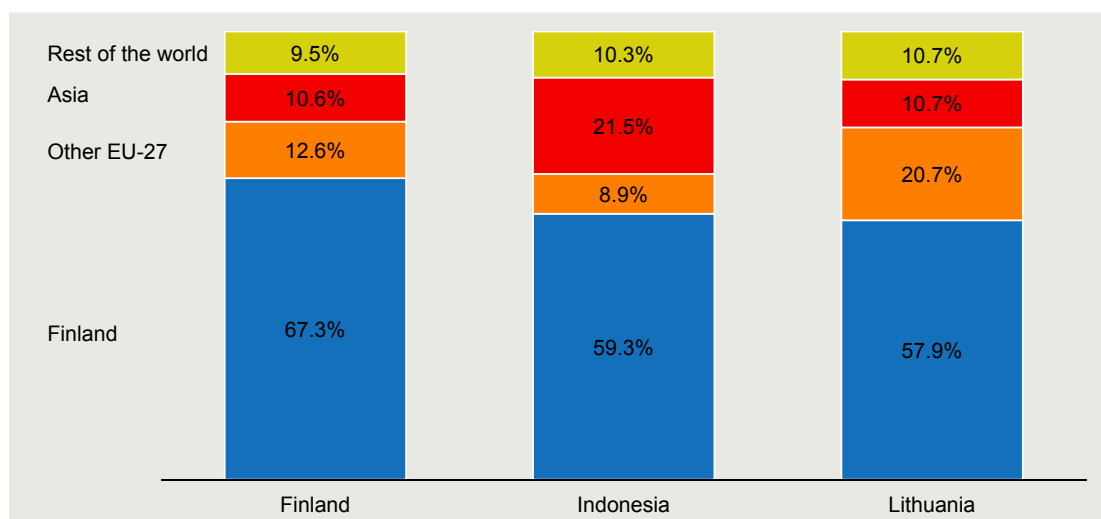
two-thirds of the value added (Figure 6). However, for a *Made in Lithuania* or *Made in Indonesia* bicycle, Finland captured as much as 58% of it. This difference is due to both *Helkama*'s key role (brand holder, designer and coordinator) and local distributors' significant contribution (25%), regardless of the bicycle's country of origin.

**Figure 5** Value-added shares by participant/function in the case of a bicycle across three assembly locations in 2011



Source: Kalm and Seppälä (2012).

**Figure 6** The geography of value added in the case of a bicycle across three assembly locations in 2011



Source: Kalm and Seppälä (2012).

Our calculations suggest that the Asia's original cost advantage was eroded in just a few years. After outsourcing to Asia, *Helkama Velox* discovered another disadvantage: lengthy shipping and delivery times from Asia-Pacific to Europe. In 2013 the assembly of this model was transferred from Asia to Europe, albeit not to Finland but rather to the Baltic region (another model was, however, re-shored to Finland).

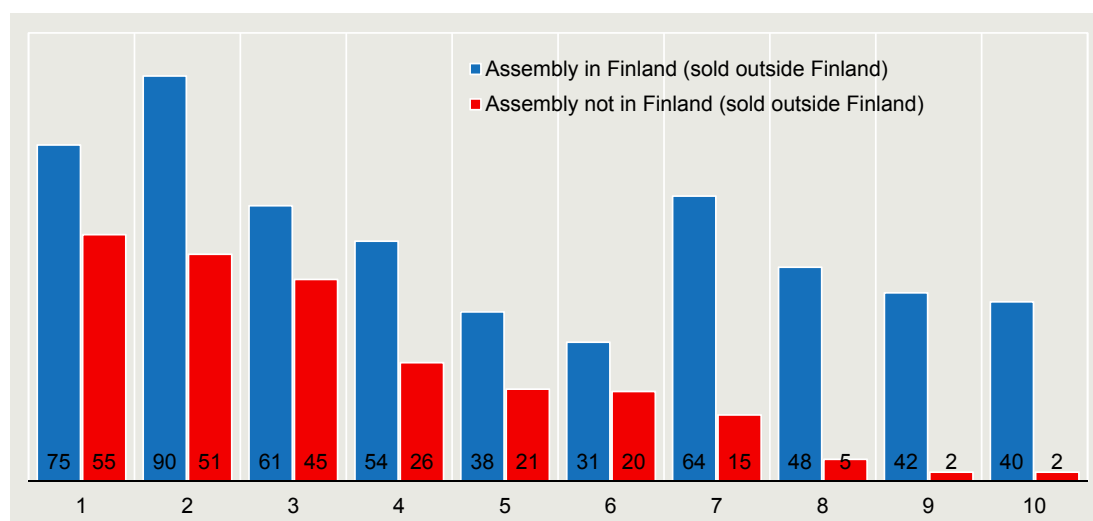
The case of the bicycle emphasizes the role of the brand holder and coordinator of the value chain. It also draws attention to the considerable roles of logistics and local sub-contracting. The roles of intellectual property and internal (*Helkama Velox's* management, *etc.*) and external services (primarily distribution) remain considerable but somewhat less important than in the mobile phone cases described above.

## 7 Manufacturing location matters in engineering

In addition to the bicycle, we analyzed ten other *mechanical and precision engineering products*, primarily targeting global business-to-business markets. In these cases, the roles of wholesalers and retailers were often non-existent.

In what follows, we briefly comment on these ten cases that were assembled by the same company in multiple locations: in Finland and in a lower-cost location, typically China. We wish to emphasize that, except for location, the other aspects of the value chain remained intact. The firm and product remained the same. We also standardize the target market in each case and consider deliveries outside Finland. Our analyses reflect transfer pricing and other practices *actually employed* by the case company, which may or may not conform to international tax treaties and/or optimizing behavior on behalf of the firm.

**Figure 7** Value added capture by Finland across the ten engineering cases (%), when final assembly is performed in Finland and in a lower-cost location (in most cases China)



Source: Ali-Yrkkö (2013).

Here, we consider just one aspect of the ten cases: the value-added share of Finland, when final assembly takes place in Finland *versus* abroad. With Finnish assembly, the country's share of the overall value added ranges from 31% to 90% across the ten cases (Figure 7). With assembly outside Finland, the share ranges from 2% to 55%. With an off-shore assembly location, Finland's share thus declines by between 11 and 49 percentage points.

Several findings are noteworthy:

- *First*, in contrast to the *N95* case, off-shoring had a considerable negative impact on the home country (Finland) in most cases.
- *Second*, the value added captured in the home country often remained quite large despite off-shoring: in three cases, it was larger than in the case of the *Nokia N95* smartphone, even though assembly was more important in these cases and the products involved fewer formally recognized intellectual property rights.
- *Third*, there was a large case-by-case variation with respect to the impacts on the home country.

The substantial variation between products deserves special attention. We found four factors that explain it:

- *First*, unlike in electronics, a large fraction of outsourcing takes place near the assembly location. This is also true for some supporting service functions. In some cases, the firms employ local sales and marketing staff and perform location-specific R&D due to, e.g., national idiosyncrasies in building codes. Furthermore, assembly and other functions, particularly R&D, are frequently interrelated. The final refinements in a product design are often made interactively on the factory floor.
- *Second*, the role of intellectual property (IP) varies. While some products or their production processes are patented, others did not embody formal IP rights, even if *per se* they may well be very knowledge-intensive products.
- *Third*, for better or worse, multinational enterprises have a considerable scope in determining their transfer pricing practices and related monetary amounts. Our analysis reveals that firms were typically *not* tax-minimizers but rather *either* tried to behave correctly, which was surprisingly difficult due to the vagueness of international principles and their interpretation (OECD, 2010), *or* used simple rules-of-thumb, regardless of whether they were correct or minimized taxes.
- *Fourth*, the location of the profit center varied. According to international treaties, the firm's risk-carrying unit should be its *profit-and-loss center*, and the remaining units should generate a going market profit. Some firms used their assembly units as profit centers (generally incorrectly). In these cases, re-locating assembly also meant re-locating profits. More appropriately, some firms used their headquarters or parent companies as profit-and-loss centers. In these cases, the parent company typically owned most intellectual assets and bore most of the risks. In these cases, re-locating assembly had less impact on the home country.

The last two points echo the findings that we obtained when considering the electronics products discussed above.

A few additional remarks should be made with respect to the ten cases: Despite substantial differences in manual labor wages, in some cases, total costs were identical in China and in Finland, which was attributable to the additional layer of management required in Chinese operations, among other factors. In most cases, logistics and inventory carrying costs, for inputs



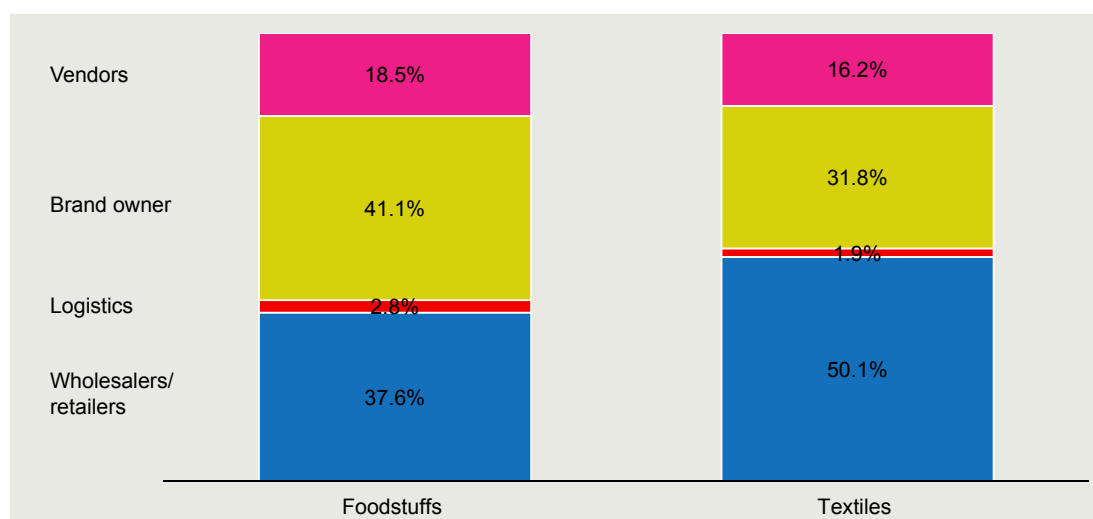
and outputs and for semi-finished goods in process, were lower in the Finnish operations. In addition to the cost of (manual) labor, China has two persistent advantages: deliveries to the huge Chinese market and a locally available cluster of potential outside suppliers in certain industries, particularly in electronics.<sup>11</sup> When these factors are not binding, Finland is a surprisingly competitive assembly and manufacturing location.

One of the ten case products is a simple steel product consisting of only three components. The company providing this product manufactures it in the home country (in Finland) and in eastern Central Europe. When the product is manufactured in Finland and exported to Sweden, the home country's share of the total value added is 48%. However, when the company manufactured the product in Central Europe and sold it in the local market, the home country share falls to 5%. At first glance, off-shoring manufacturing seems to have a significant, negative impact on the home country. However, due to logistical costs and delivery time, it would be impossible to manufacture the product in Finland and export it to Central Europe. Without production in close proximity to Central European customers, the company would not be able to sell to these customers. Thus, in this case, the alternative to 5% (manufacturing abroad) would be *zero*, not 48% (manufacturing in Finland).

## 8 The distribution channel plays a significant role in textiles and foodstuffs

In addition to the electronics and engineering cases, we analyzed over twenty other products, *e.g.*, foodstuffs and textiles.

**Figure 8** Value-added shares by participant/function in the cases of foodstuffs (left) and textiles (right)



Source: Ali-Yrkkö (2013).

<sup>11</sup> For instance, in high-end mining equipment, the density of potential suppliers may be higher in the Nordic countries.

A chocolate bar and a bag of rye bread are among the eight analyzed foodstuffs. These cases highlight the considerable role of wholesalers and retailers, capturing on average 38% of the total value added (Figure 8, left), which is approximately the same as the brand owner's share.

In the case of the four textile products (by the same company), the brand owner outsources production to a contract manufacturer capturing 7% of the total value added (Figure 8, right). Wholesalers and retailers capture half of the value added, and the brand holder captured one-third of it.

## 9 Other cases

Our remaining cases are one-offs. Below, a few remarks on each of them.

A piece of two-by-four inch sawn timber is interesting in two respects. First, 100% of the value added is created and captured in Finland. If the tree trunks were imported from Russia, a common practice in the early 2000s, Finland's share would decline to 55%. Second, the sawn timber itself is provided at a loss; saleable side-products, such as woodchips, make the process economically viable.<sup>12</sup>

Our cases also include other wood-based products. The analyses of these products reveal that the value created in physical activities, including raw material supplies and processes towards the final product, varies between 56% and 67% of the value added, whereas the value created in the remaining, more intangible activities varies between 33% and 44%. Thus, although Finland's involvement in the physical aspects of the forest sector is declining (particularly in printing papers), it may still obtain a substantial share of the value, provided that Finnish multinationals in the sector continue to be administered and headquartered in Finland. Nevertheless, the value capture in forest-based products is driven by raw materials and related processing to an exceptional degree.

*Ponsse* is a listed company manufacturing forest machines such as harvesters and forwarders. In order to secure quality, *Ponsse* has kept its assembly in Finland, and a large share of components are manufactured by local companies or companies located in Western Europe. Our analysis of forest tractor by *Ponsse* reveals that nearly 50% of product's total value is created in Finland (sold outside Finland). The significant share of the value added captured in Finland is created by local suppliers. If *Ponsse* offshored its final assembly, it would most probably off-shore also its sourcing. Thus, the location of final assembly has multiplier effects that have impacts both home and host countris.

*Whitevector* is a social media monitoring and research company headquartered in Finland. It has minor equipment and rent expenses, and its sales are almost equal to its value added, virtually all of which is captured in Finland.

Another analyzed service case concerns a translation and localization service. Although the company in question employed freelance translators located outside Finland, the home country's share of value added exceeded two-thirds.

---

<sup>12</sup> The refinement of wood raw materials has a 500-year history in Finland (Hernesniemi, Lammi, Ylä-Anttila, & Rouvinen, 1996), and the system has been honed to economize on the use of the country's "green gold."

Both of the above-mentioned service companies are small. At least in Finland, the survey that is used to obtain official international trade statistics for services primarily covers large- and medium-sized companies. Thus, it is probable that these statistics have a downward bias.

## 10 Discussion and conclusions

Our cases studies suggest that value creation and capture is not directly tied to tangible flows in GVCs. Also in the case of (advanced) manufactured goods, both internal and market services as well as the creation and management of intangible assets are important. And while assembly has often moved to lower-cost locations in developing countries, the developed countries often capture a considerable share of the value added generated globally.

In today's world, traditional international trade statistics, with an emphasis on measuring the *gross value* of goods exports and imports, can be very misleading. Trade in intangibles, both services and intangible assets, is the core aspect of modern global economy, even though their cross-border flows are measured very impartially. As far as measurement is concerned, the ultimate goal should be value-added based trade statistics of all cross-border flows.

*The Economist* (2013)<sup>13</sup> notes that “... offshoring in its traditional sense, in search of cheaper labour anywhere on the globe is maturing, tailing off and to some extent being reversed. Multinationals will certainly not become any less global as a result, but they will distribute their activities more evenly and selectively around the world, taking heed of a far broader range of variables than labour costs alone.” On the basis of our case studies, we echo these observations. After an off-shoring “gold rush” particularly to China in the early 2000s, firms have gotten smarter in operating their GVCs.

Our case studies suggest that there are three basic ways to capture “over-sized” wages and profits in GVCs:

- It pays to be the orchestrator and/or brand owner of a value chain. All forms of intellectual property rights (IPRs) appear to earn good returns. It should be noted, however, that IPRs are also costly, risky, and time consuming to nurture and/or to acquire.
- Controlling the interface to the immediate customer and to the ultimate user creates negotiation power, which is evidenced in how monetary rewards are distributed. On the other hand, these activities can require substantial capital, for example maintaining a chain of retail locations.
- In several cases, we are able to identify so-called “gate-keepers” that earn well; such entities may provide a key input or control a crucial raw material, for example.

In terms of job assignments, the above positions translate to high-level *service tasks* that are typically considered to have a “supporting role” (such as finance) and to the creation and management of intangible assets (such as R&D and legal functions). Indeed, particularly in advanced countries, high-end manufacturing increasingly consists of both internal and market services (Lodefalk, 2010; Pajarinen, Rouvinen, & Ylä-Anttila, 2013).

<sup>13</sup> *The Economist* (2013) also compiles a revealing statistic about the future tendencies in outsourcing that is based on studies by three consultancies. Although approximately one-fourth of multinationals are planning to move activities to a low-cost country and another one-fourth are moving activities between low-cost countries, another one-fourth are either returning to or moving between high-cost countries. The remaining companies are presumably staying in their current locations.

GVCs lead to deepening specialisation, which in principle increases overall well-being. It remains unclear, however, how these gains are distributed. The desire of all countries, individuals, and organisations is to shift to higher value-added activities in GVCs and to create higher GDP per capita, wages, and profits. National policies that support this endeavour include the following: extensive investment in education and social well-being that is designed to incentivise the population to seek new economic opportunities, fostering intense competition (and creative destruction) among businesses and organisations within the country; a keen focus on developing infrastructure and other indirect conditions that support businesses and citizens in their day-to-day activities; and sensible and efficient regulation and taxation.

At least from the viewpoint of small open economies, policymakers should focus more on a range of *tasks* and *functions* within national borders instead of *companies* and *industries*. Our analysis of global value chains has the following policy implications:

- *First*, due to the international mobility of production factors, globalization presents a challenge for national economic policy. As Baldwin and Evenett (2012) correctly note, policymakers should distinguish between internationally mobile (e.g., financial capital) and less mobile factors (e.g., land, infrastructure, and certain human capital). The fruits of less mobile factors are more likely to remain within national borders and are thus more attractive policy targets.
- *Second*, intangible assets and other service aspects of value chains increasingly dominate value creation and capture. Traditionally, innovation policy has focused on research and development (R&D) and other inputs in creating intangible assets. Some of these assets are, however, highly mobile, and the associated benefits easily spill over to other geographies (Dischinger & Riedel, 2011; Grubert, 2003). Thus, from a national perspective, it is not sufficient to emphasize R&D and other inputs. With respect to welfare implications, the location of the headquarters and particularly broadly understood headquarters functions are crucial, not least because they often relate to highly paid jobs and to ownership of intellectual capital.
- *Third*, transfer pricing practices by multinational enterprises drastically impact both welfare allocations and recorded export, import and thus, GDP figures. The magnitude of impact is potentially large as the following example from Finland shows: in 2012 Finland lost €320 million due to improper transfer pricing practices (HS, 9 Aug. 2012), which translates to €1.3 billion in misallocated corporate profits (with 24.5% corporate tax rate); the “operating surplus” recorded in Finnish national accounts is too low by the same amount. With appropriate transfer prices, Finnish GDP would be 0.6% higher.<sup>14</sup>

OECD (2013) discusses many other policy implications of GVCs, such as the role of openness and international trade agreements, which we do not touch upon here. *Kommerskollegium* (National Board of Trade in Sweden) has also made excellent work in this domain (<http://v.gd/IlfDf>).

GVCs raise normative and positive issues for nation-states and regions (Ottaviano, 2013). National, EU, and other cross-national policies partly determine the country’s involvement, positioning, and ability to create and capture value in GVCs.

<sup>14</sup> We have calculated the effect as follows: missing profits / Finnish GDP in market prices in 2012: €1.3 bn / €196 bn.

Governments' and multinational enterprises interests do not always coincide. Especially larger companies stand to benefit from GVCs, whereas many public institutions are challenged by them.

As far as measuring and understanding GVCs and their societal implications, we have barely taken the first steps. Empirical work across the three main lines in inquiry – case studies, inter-country input-output tables, and disaggregated enterprise and establishment datasets – should continue both separately and in tandem.

## References

- Ali-Yrkkö, J. (2013). *Mysteeri avautuu: Suomi Globaaleissa arvoverkostoissa*. Taloustieto (ETLA B257).
- Ali-Yrkkö, J., Rouvinen, P., Seppälä, T., & Ylä-Anttila, P. (2011). Who Captures Value in Global Supply Chains? Case Nokia N95 Smartphone. *Journal of Industry, Competition and Trade*, 11(3), 263–278. <http://dx.doi.org/10.1007/s10842-011-0107-4>
- Baldwin, R. (2006). Globalisation: The Great Unbundling(s). *The Economic Council of Finland, Prime Minister's Office Publications*. <http://v.gd/nM0Oow>
- Baldwin, R., & Evenett, S. (2012). Value Creation and Trade in 21st Century Manufacturing: What Policies for UK Manufacturing? In D. Greenaway (Ed.), *The UK in a Global World: How can the UK focus on steps in global value chains that really add value?* (pp. 71–128). Department for Business, Innovation and Skills (BIS), Centre for Economic Policy Research (CEPR), The Economic and Social Research Council (ESRC).
- Breznitz, D., Kenney, M., Rouvinen, P., Zysman, J., & Ylä-Anttila, P. (2011). Value Capture and Policy Design in a Digital Economy. *Journal of Industry, Competition and Trade*, 11(3), 203–207. <http://dx.doi.org/10.1007/s10842-011-0108-3>
- Dedrick, J., Kraemer, K. L., & Linden, G. (2010). Who Profits from Innovation in Global Value Chains?: A Study of the iPod and Notebook PCs. *Industrial and Corporate Change*, 19(1), 81–116.
- Dischinger, M., & Riedel, N. (2011). Corporate Taxes and the Location of Intangible Assets within Multinational Firms. *Journal of Public Economics*, 95(7–8), 691–707.
- Grossman, G., & Rossi-Hansberg, E. (2008). Trading Tasks: A Simple Theory of Offshoring. *American Economic Review*, 98(5), 1978–1997.
- Grubert, H. (2003). The Tax Burden on Cross-Border Investment: Company Strategies and Country Responses. *CESifo Working Papers*, 964.
- Hernesniemi, H., Lammi, M., Ylä-Anttila, P., & Rouvinen, P. (ed.) (1996). *Advantage Finland: The Future of Finnish Industries*. Taloustieto (ETLA B 113, Sitra 149).
- HS (9 Aug. 2012). Veromenetyksistä uusi tulkinta. *Helsingin Sanomat* (the widest circulating daily newspaper in Finland), A6.
- Kalm, M., & Seppälä, T. (2012). Palaako tuotanto Aasiasta Suomeen? Case Polkupyörä. *ETLA Discussion Papers*, 1287.
- Kalm, M., Pajarinen, M., Rouvinen, P., & Seppälä, T. (2013). The Rise of Baltic Sea Value Chains – A Bicycle Producer's World Tour. In C. Ketels (Ed.), *State of the Region Report* (pp. 126–135). Baltic Development Forum.
- Kenney, M. (2004). Introduction. In M. Kenney & R. Florida (Eds.), *Location Global Advantage: Industry Dynamics in the International Economy* (pp. 1–20). Stanford University Press.
- Linden, G., Dedrick, J., & Kraemer, K. L. (2011). Innovation and Job Creation in a Global Economy: The Case of Apple's iPod. *Journal of International Commerce and Economics*, 3, 223–240.
- Linden, G., Kraemer, K. L., & Dedrick, J. (2009). Who Captures Value in a Global Innovation Network? The Case of Apple's iPod. *Communications of the ACM*, 52(3), 140–144.

Lodefalk, M. (2010). Servicification of Swedish Manufacturing. *Kommerskollegium, National Board of Trade*, 1.

OECD (2010). *Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations*. Organisation for Economic Cooperation & Development.

OECD (2013). *Interconnected Economies: Benefiting from Global Value Chains*. Organisation for Economic Cooperation & Development.

Ottaviano, G. (2013). European Competitiveness and Global Value Chains (Presentation). *Austrian Economic Association Meeting, Innsbruck, May 10-11*.

Pajarinen, M., Rouvinen, P., & Ylä-Anttila, P. (2013). Services: A New Source of Value. *ETLA Briefs*, 11.

Seppälä, T., & Ali-Yrkkö, J. (2013). The Changing Geographies of Value Creation in Global Value Chains: Evidence from Mobile Telecommunications. *Mimeo, ETLA, The Research Institute of the Finnish Economy*.

Seppälä, T., & Kenney, M. (2013). Where is the Value Created and Captured in Manufacturing Firms? Case Precision Machinery Product. *ETLA Briefs*, 9.

UNCTAD (2013). *Global Value Chains and Development: Investment and Value Added Trade in the Global Economy (A preliminary analysis; Advance unedited version)*. Geneva: United Nations Conference on Trade and Development.





Aikaisemmin ilmestynyt ETLA Raportit-sarjassa (ennen ETLA Keskusteluaiheita)  
*Previously published in the ETLA Reports series (formerly ETLA Discussion Papers)*

- No 1 *Nuutti Nikula – Markku Kotilainen, Determinants for Foreign Direct Investment in the Baltic Sea Region.* 6.11.2012. 30 p.
- No 2 *Olavi Rantala, EU:n ilmastopolitiikan talousvaikutukset vuoteen 2020.* 26.11.2012. 44 s.
- No 3 *Jukka Lassila – Tarmo Valkonen, Julkisen talouden rahoituksellinen kestävyys.* 21.1.2013. 26 s.
- No 4 *Jukka Lassila – Niku Määttä – Tarmo Valkonen, Kuntaeläkkeiden rahoitus ja kunnalliset palvelut.* 30.1.2013. 30 s.
- No 5 *Niku Määttä – Tarmo Valkonen, Asunnot eläkkeiksi?* 18.2.2013. 26 s.
- No 6 *Ville Kaitila – John McQuinn – Iulia Siedschlag – Xiaoheng Zhang, International Investment and Firm Performance: Empirical Evidence from Small Open Economies.* 1.3.2013. 40 p.
- No 7 *Paavo Suni – Vesa Vihriälä, Euro – How Big a Difference: Finland and Sweden in Search of Macro Stability.* 4.3.2013. 14 p.
- No 8 *Ville Kaitila – Markku Kotilainen, EU:n ja Yhdysvaltojen mahdollisen kauppajoinnituksen vaikutuksia suomalaiselle elinkeinoelämälle ja yhteiskunnalle.* 5.3.2013. 57 s.
- No 9 *Mika Maliranta – Vesa Vihriälä, Suomen kilpailukykyongelman luonne.* 11.4.2013. 21 s.
- No 10 *Mika Pajarinen – Petri Rouvinen, Nokia's Labor Inflows and Outflows in Finland – Observations from 1989 to 2010.* 3.5.2013. 20 p.
- No 11 *Tuomo Virkola, Rakenteellinen budjettitasapaino.* 14.5.2013. 33 s.
- No 12 *Antti Kauhanen – Martti Kulvik – Sirpa Maijanen – Olli Martikainen – Paula Ranta – Silja Kulvik, Selviytymistä vai suorituskykyä? Terveystieteiden tutkimusorganisaation, tiedonhallinnan ja henkilökunnan kannalta.* 23.5.2013. 150 s.
- No 13 *Tarmo Valkonen – Jukka Lassila, Työeläkejärjestelmän sopeuttaminen pysyvään kasvun hidastumiseen.* 17.6.2013. 37 s.
- No 14 *Esa Viitamo, Servitization as a Productive Strategy of a Firm. Evidence from the Forest-Based Industries.* 7.8.2013. 30 p.
- No 15 *Olavi Rantala, Kilpailukykyyn mittaamisen teoriaa ja käytäntöä.* 14.8.2013. 29 p.

Sarjan julkaisut ovat raportteja tutkimustuloksista ja väliraportteja tekeillä olevista tutkimuksista.

Julkaisut ovat ladattavissa pdf-muodossa osoitteessa: [www.etla.fi](http://www.etla.fi) » julkaisut » raportit

*Papers in this series are reports on research results and on studies in progress.*

*Publications in pdf can be downloaded at [www.etla.fi](http://www.etla.fi) » publications » reports*

**ETLA**

Elinkeinoelämän tutkimuslaitos  
The Research Institute of the Finnish Economy  
Lönnrotinkatu 4 B  
00120 Helsinki

Puh. 09-609 900  
Fax 09-601 753  
[www.etla.fi](http://www.etla.fi)  
[etunimi.sukunimi@etla.fi](mailto:etunimi.sukunimi@etla.fi)

ISSN-L 2323-2447, ISSN 2323-2447, ISSN 2323-2455 (Pdf)