Muistio • Brief
ISSN-L 2323-2463, ISSN 2323-2463

27 • 18 June 2014

Who Captures Value in Digital Services?

Matias Kalm is a Researcher at Etlatieto Oy, a subsidiary Of ETLA (matias.kalm@etla.fi).

Timo Seppälä is a Researcher at Etlatieto Oy, a subsidiary Of ETLA (timo.seppala@etla.fi).

Jyrki Ali-Yrkkö is a Research Director at Etlatieto Oy, a subsidiary Of ETLA (jyrki.ali-yrkko@etla.fi).

This brief is a part of the ongoing research project 'Value Creation and Capture – The Impact of Recycling and Global Dispersion of Intangible Capital' funded by PALTA (Service Sector Employers) and TEKES (the Finnish Funding Agency for Innovation).
The authors also wish to thank the case companies and their representatives for their valuable collaboration.

Suggested citation: Kalm, Matias, Seppälä, Timo & Ali-Yrkkö, Jyrki (18.6.2014). "Who Captures Value in Digital Services?". ETLA Brief No 27. http://pub.etla.fi/ETLA-Muistio-Brief-27.pdf

In this study, we explore who creates and captures value in digital services by analyzing four such services. Our results show that there are notable variations in both value creation and value capture between the services. Similar variations are also observed in the geographical distribution of value added. The study also highlights variations in economies of scale in digital services. In some services, there are almost no variable costs, and hence, the economies of scale are very high. In other services, the economies of scale are significantly smaller. The difference in economies of scale between services partially arises because a physical product is delivered in conjunction with the digital service for some services.

Introduction

While the majority of trade previously consisted of the exchange of goods, currently, parts of production processes or tasks are internationally traded (Campa and Goldberg, 1997; Grossman and Rossi-Hansberg, 2008). A glue that previously kept the majority of tasks in close geographical proximity has now loosened (Baldwin, 2006, 2012). This new phase of globalization concerns not only physical goods but also services. The major enabler of globalization has been digitalization. Thus, an increasing number of goods and services are digitized and sold in digital form.

This transformation from atoms to bytes also affects value chains and national economies. Because of the intangible nature of digital offerings, the value chains of digital goods and services differ from those of traditional goods and services. As a result, the roles of participants in digital value chains and their abilities to capture value potentially differ from those of participants in goods value chains. This geographic and organizational scattering raises the question of where value added is created and by whom. From the viewpoint of national economies, the geography of value added is particularly relevant because GDP (gross domestic product) is the sum of value added that is created within national borders.

However, owing to the limited availability of aggregate statistics, an increasing number of detailed case studies have focused on value creation at the product level (see Linden, Kraemer and Dedrick, 2009; Ali-Yrkkö, Seppälä, Rouvinen and Ylä-Anttila, 2011; Kalm, Pajarinen, Rouvinen and Seppälä, 2013; Dedrick, Kraemer and Linden, 2010; Seppälä and Kenney 2013; Seppälä & Kalm, 2013; Kalm & Seppälä, 2014; Seppälä, Kenney & Ali-Yrkkö, 2014 forthcoming).

The great majority of existing value chain studies has focused on tangible goods; only few studies have examined services (see, e.g., Kommerskollegium, 2013; Bockstedt, Kauffman and Riggins, 2005). Although these studies thoroughly describe the specific aspects of digital

value chains in the case of the video game industry and the digital music industry, they do not answer the questions of where value added is created and by whom.

In what follows, we continue grassroots investigative work examining value creation in four digital services. Our findings reveal great variation in value creation between them. In addition to a value added breakdown by value chain participants and regions, we also examine variation in economies of scale between the services.

Data and methods

We analyze value creation in four digital services. Because of the confidential company information that we employ, we cannot reveal the names of the case of companies or provide certain details of the analyzed services. However, the main characteristics of our case services can be described as follows (the value chains of these services are presented in the Appendix):

Service 1 is b-to-b software platform consisting of two components. The first component is sold as a traditional software product, and the second component is licensed, with its revenue stream depending on the sales of the product in which the component is embedded. In addition to the actual software platform, the case firm also provides consultation services for companies utilizing its platform. Currently, the company generates an substantial part of its revenues through these consultation services. The case firm is mid-sized and heavily venture backed.

Service 2 is a digital consumer service. Because the service highly depends on a physical distribution network, entry costs are substantial in its operating market. However, the case firm utilizes an existing network for the service that is also used to deliver other digital services for both consumers and companies. The revenue model of S*ervice 2* is twofold: the monthly fee provides the majority of the revenue, but consumers are able to also buy additional amenities. The case firm is rather large, and it operates in several countries.

Service 3 is a traditional digital service relying on a physical distribution network. For this service, an existing network is utilized by the case company to provide the case service and several other services for numerous customers. Revenue is based on a monthly fee in addition to a small, one-time fee.

Service 4 is software as a service (SaaS) analytics. The customer pays a monthly fee for the use of the service. Service provision entails almost no costs; hence, the marginal costs are almost non-existent. The case firm is small and heavily venture backed.

Our analysis is based on three data sources. *First,* we have conducted interviews in our case firms to collect quantitative and qualitative information on services (2–4 interviews[1] in each case[2]). This information includes all purchases, the prices, and the names of the vendor companies. Moreover, the data also include firms' internal costs and profit related to the case services. *Second,* we have examined the financial reports of the companies within the value chains of these services. *Third*, we have collected further supplier information from Asiakastieto Oy and other databases including financial statement and balance sheet data.

In our terminology, the total value of any service (or good) is the pre-tax price paid by the final customer. By analyzing our data, we are able to do breakdown calculations of our case services (the method is described in detail in Ali-Yrkkö et al. 2011). We calculate the analogs of the so-called bill-of-materials (BOM) of our case services. In addition to direct purchases related to these services, our data also include indirect (overhead) purchases, whose costs are allocated to each service produced by the case companies. By combining this information with our other data, we are able to breakdown the total value added by geography and by value chain participants.

Findings

Value added by participants

We start our analysis by considering the value added by value chain participants. The sales price of the product is divided between the value chain participants according to the data received from the case company and the data collected regarding suppliers.

The breakdown by participants reveals that the distribution drastically varies between our case services (Table 1).

Table 1 **Value added by value chain participants, %**

	Digital service 1	*Digital service 2*	*Digital service 3*	*Digital service 4*
Case company	28.8	30.4	81.0	93.2
Vendors providing services	32.6	21.1	6.4	3.7
Vendors providing physical goods	0.1	2.8	1.6	0.0
Vendors of vendors	38.6	45.8	11.0	3.0

ETLA

While the case firms create approximately 30% of the total value in *Service 1* and *Service 2*, the shares are significantly higher in *Service 3* and *Service 4*. No single reason can explain these differences. In the case of *Service 1*, the case company purchases a substantial amount of overhead services (such as law, travel, and consulting services), which constitute a large share of its vendors and their vendors. In *Service 2*, a large share of the external vendors are more directly related to the case service. Instead of creating digital content itself, the case company purchases digital content from external vendors. *Service 4* shows almost the opposite behavior: the case company obtains its 'raw' content data free of charge via social media and then refines these data by using its in-house processes. In this service, the case firm creates as much as 93% of the total value itself.

The geography of value added

In Table 2, we shift our focus from firms to national economies by examining the breakdown of value added by region. It should be noted that the location of the final customers varies between the companies. While customers are located outside Finland for Service 1, they are located in Finland for Services 2–4.

For all four services, the shares of value added from the home country are remarkably high. In most cases, these shares exceed the corresponding figures of physical goods reported in Ali-Yrkkö and Rouvinen (2013).

In the *Service* 4, the Finnish share is as high as 97%. The bulk of this value added is created by the case company itself. Because all in-house operations of the case company are located in Finland, the value added of the case company nearly entirely created in the home country.

Two major implications can be drawn from the geographical breakdown of total value of digital services. First, the home countries of digital service companies substantially benefit from those companies. Second, digital services are linked to global value chains, but the role of downward and upward linkages varies between different services.

Table 2 **Geographical distribution of value added, %**

	Digital service 1	*Digital service 2*	*Digital service 3*	*Digital service 4*
Finland	61	56	72	97
Other EU area	10	14	19	1
North America	11	10	4	1
Asia	10	10	3	1
Others	8	10	3	1

ETLA

Table 3 **Scalability of the four services (operating margin), %**

	Digital service 1 (R)	*Digital service 2 (V)*	*Digital service 3 (D)*	*Digital service 4 (W)*
Current net sales	-390	-17	23	-58
2 x current net sales	-167	11	37	19
4 x current net sales	-55	25	48	57

ETLA

The scalability of digital services

In contrast to tangible goods, some digital services can be reproduced with nearly zero cost. In such cases, no raw materials or assembly functions are needed to reproduce the service. This costless reproduction represents a fundamental difference between services and goods.

In principle, the lack of marginal costs in the short run generates large economies of scale, as unit costs decrease at the same rate as sales increase, which, in turn, raises profitability. To analyse this scalability, we examine the impact of an increase in sales on the operating margin of one unit in three different cases (Table 3)[3]. The first row shows the operating margin of one unit based on current sales volumes. Then, we calculate the expected operating margin if sales double or quadruple.

Before we discuss the scalability of the services, one should note that three of four cases generate losses at the current sales volume (row 1 in Table 3). Service 1 suffers the most severe losses, where the losses substantially exceed current sales. The losses of Service 1 and Service 4 are explained by the fact that both companies are still in the start-up phase and thus are substantially investing in their future growth.

The scalability analysis (rows 2–3 in Table 3) reveals that the scalability of our four analyzed digital case services varies. In *Service 1,* doubling sales would reduce the loss by approximately half, and if sales quadrupled, the loss would be roughly one-eighth of the current loss. Thus, this service scales well, but with the current cost structure, sales will need to more than quadruple before the service can break-even. Let us compare this service to *Service 3. Service 3* is profitable at its current sales volume, but it does not scale as well as *Service 1*. If the sales of *Service* 3 quadrupled, its operating margin would only double.

Discussion

In this study, we examine the value creation of digital services by analyzing four digital services.

Our empirical analyses reveal three main findings.

First, our analyses show that the home countries of digital service companies substantially benefit from these services. The shares of value added from the home country for digital services are similar to, if not higher than, the shares of value added for physical goods.

Second, the value chains of some digital services considerably differ from those of physical goods. In contrast to goods, pure digital services require neither logistics nor transportation. Another difference between goods and services concerns the nature of digital services. While each unit of any physical good requires intermediate or raw material inputs, extra unit of a digital service does not require such inputs for reproduction. However, digital services are not identical. Some services are linked to physical goods, or they have other features, such as licensing payments, that directly increase with the addition of extra units.

Third, and related to previous finding, the extent of economies of scale varies between digital services. On one extreme, these scale advantages are extremely large because the digital nature of services makes the cost of reproduction virtually zero. However, not all services enjoy such scale advantages. Digital services

may require additional work for each customer, may be linked to physical goods, or may require licensing of digital inputs on a per-unit-sold basis.

Finally, the economy is becoming increasingly digitized. For instance, music, games, pictures, and films that have traditionally been sold as physical goods are sold in digital form today. However, national statistics likely do not reflect all these transactions, leading to biased export, import, and GDP figures. Moreover, this bias is likely increasing because individuals are directly importing an increasing number of digital services via Internet. Furthermore, in the future, an increasing number of services will be sold in digital form.

Appendix

Figure A. 1. The value chain of Service 1

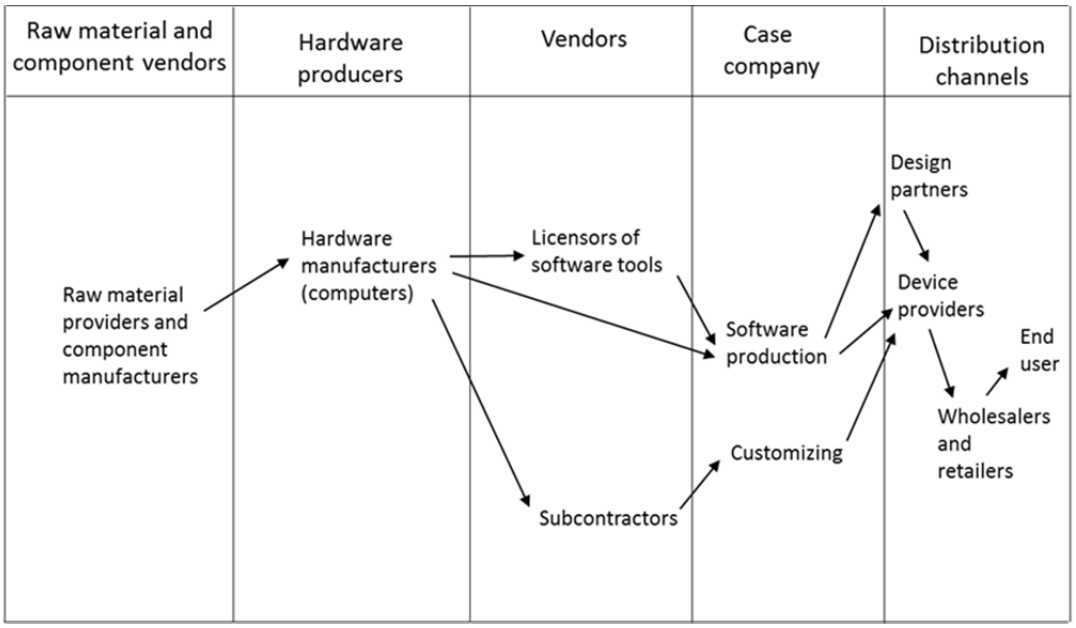


Figure A. 2. The value chain of Service 2

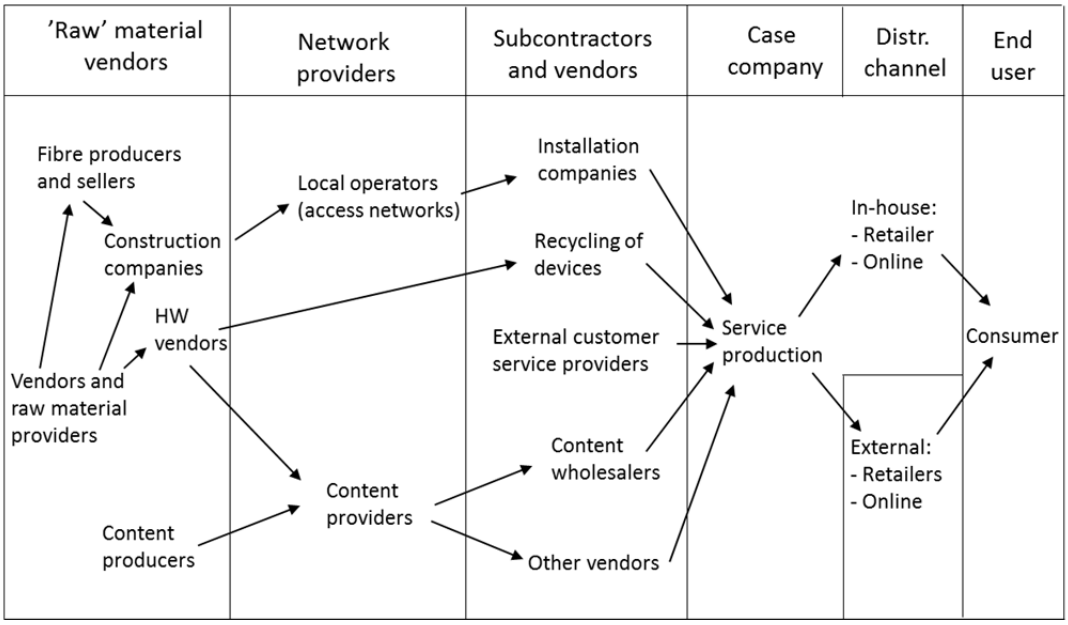


Figure A. 3. The value chain of Service 3

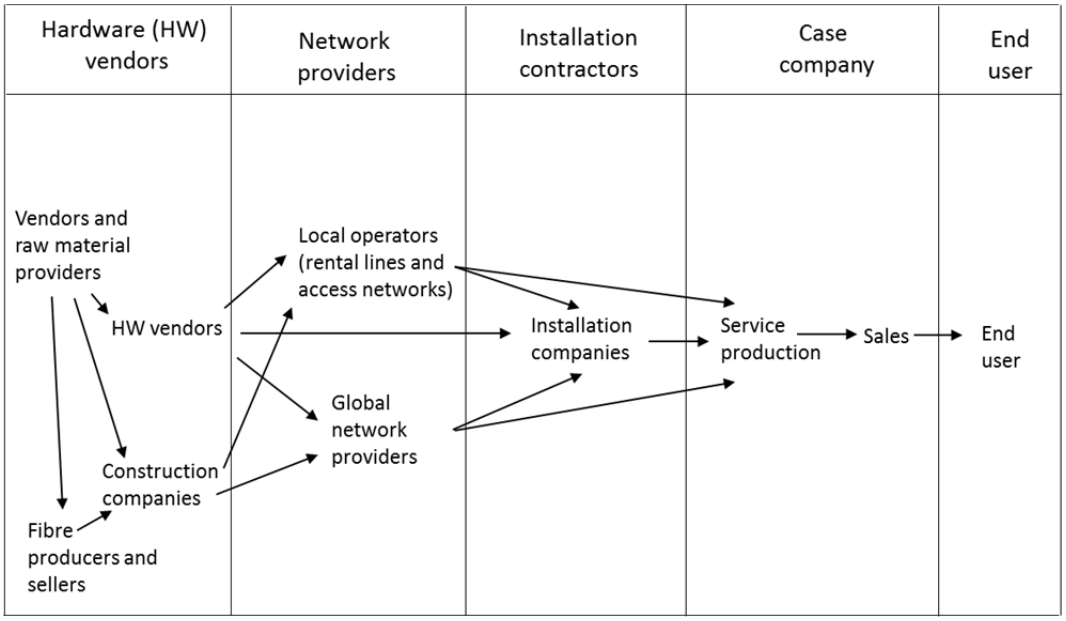
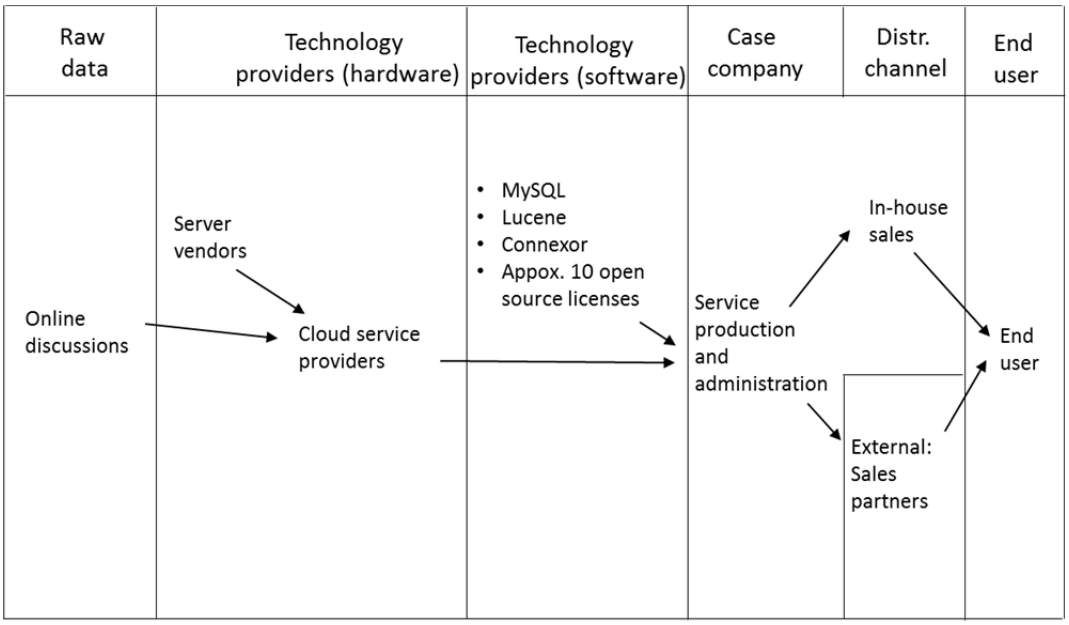


Figure A. 4. The value chain of Service 4



Endnotes

[1] In all case services, we interviewed a controller or CFO. In some cases, we also interviewed managers who are responsible for the service. The interviews were conducted between May 2013 and November 2013. In addition to these meetings, we obtained further internal financial information via e-mail.

[2] Service 4 is an exception: its analysis is based on work that has been published earlier (Rummukainen 2011). We used the original data that were collected for that study.

[3] The profitability figures are mostly based on information that we obtained from the controllers or CFOs of the case companies.

References

Ali-Yrkkö, J. & Rouvinen, P. (2013). Implications of Value Creation and Capture in Global Value Chains: Lessons from 39 Grassroots Cases. ETLA Reports 16, http://pub.etla.fi/ETLA-Raportit-Reports-16.pdf. The Research Institute of the Finnish Economy, Helsinki.

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

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

Bockstedt, J., Kauffman, R. J., & Riggins, F.J. (2005). The Move Artist-Led Onbline Music Distribution: Explaining Structural Chenges in the Digital Music Market. Proceedings of the 38th Havaii International Conference on System Sciences.

Campa, J. & Goldberg, L. (1997). The Evolving External Orientation of Manufacturing: A Profile of Four Countries. *Federal Reserve Bank of New York Economic Policy Review, 3*, 53–81.

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.

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). Copenhagen: Baltic Development Forum.

Kommerskollegium (2013). Minecraft Brick by Brick. A Case Study of a Global Services Value Chain. Kommerskollegium, Stockholm, Sweden.

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.

Rummukainen, M. (2011). Where is value created within the global value chain? Case: Whitevector Ltd. Master's Thesis, Aalto University, International Business.

Seppälä, T. & Kenney, M. (2013). Where Is the Value Created and Captured in Manufacturing Firms? Case Precision Machinery Product. ETLA Brief No. 9. http://pub.etla.fi/ETLA-Muistio-Brief-9.pdf