

Multidimensional role of services in global value chains: Implications for theory and practice

Metka Stare

University of Ljubljana, Faculty of Social Sciences

The analysis throws light on multiple roles that services play in GVCs and in particular in value creation process of pure service GVCs. Based on cases studies of service companies the findings show that the highest value added in pure service GVCs are created in the phase of development, design, marketing and customer relationship management. These phases are complementary and tightly interlinked making it difficult to delineate value added of the single phase thereby questioning the applicability of the smiley curve model for the analysis of pure service GVCs. The paper contributes to theoretical advancement in respect of GVCs, brings more informed assessment of services role in GVCs that bears important implications not only for companies' business strategy but also for policy design.

1. Introduction

Last two decades have witnessed the expansion of global value chains (GVCs) owing to the synergy of interlinked trends, such as advances in information-communication technology (ICT) and its influence on the efficient coordination of production phases at distant locations; strengthening of linkages between goods and services production that result in integrated solutions for customers (Gallouj et al., 2015); liberalisation of capital flows and services trade, declining transportation costs and organisational innovations in business processes (Stehrer et al., 2012). GVCs are 'organisational systems' that operate across multiple nations, their global integration is complex and their technology base, or 'engine', is ICT (Brennan; Rakhmatullin, 2015). Fragmentation of production process and specialization in individual phases/functions performed at different global locations results in shifting the focus of competition from industries to phases/functions of production (Timmer et al., 2013; Cataneo et al., 2013). Specialisation in service functions and tasks is on the rise with the prominent role of knowledge based services that can be stored in digital form (Shepherd, 2013).

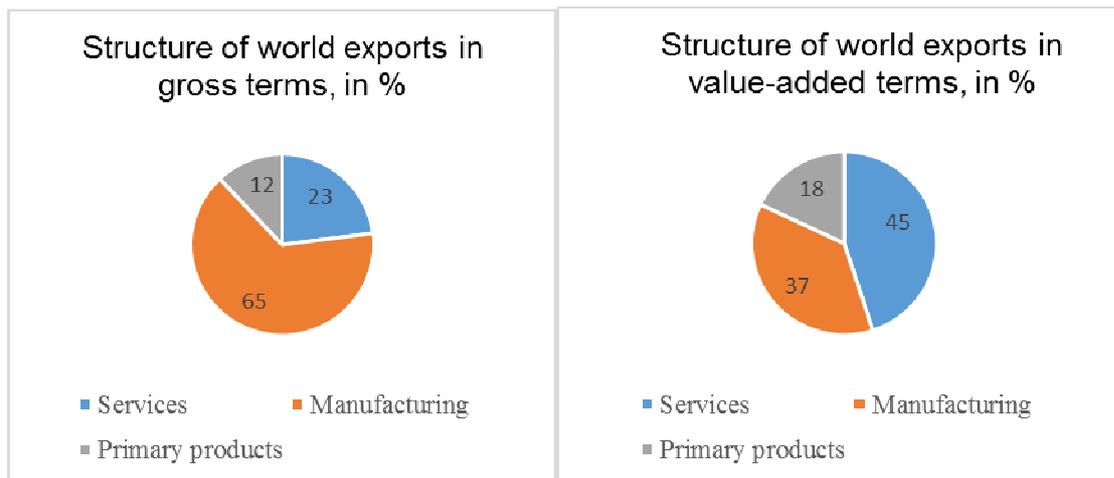
Rapid technological progress and adoption of new business models reinforce the complementarity of manufacturing and service activities in general and in GVCs. Yet, the analyses of GVCs remain focused on manufacturing, individual manufacturing industries or products produced within manufacturing companies GVCs (e.g. Nokia, Acer, Apple). Scholars acknowledge the facilitating role of services for the functioning and efficiency of GVCs (Backer, Mirodout, 2013; Low, 2013) arguing that without transportation, telecommunications, research, logistics, marketing, design and other services GVCs could not function (Stephenson, 2012). Nevertheless, most of the analyses concede to services primarily the enabling role in GVCs while the research on other dimensions of services integration in the global economy is largely missing (National Board of Trade, 2013; Stephenson, Drake-Brockman, 2014).

Data imperfections related to services trade (e.g. level of disaggregation of services, deficient data on bilateral trade flows in services)¹ hamper a more detailed analysis of services integration in GVCs. New methodology for measuring international trade enables to capture the value added of individual stages of the business process at different locations (concept of trade in value added)² at the same time providing new insights on the weight of individual sectors in world trade (Low, 2013). The bottom line is that the role of services in internationalization (and in GVCs) is significantly underestimated when traditional measurement concepts are applied (Figure 1).

Figure 1: Sectoral distribution of world exports on gross terms and value-added terms, 2008

¹ Trade statistics for goods are disaggregated to 8,000 products whereas OECD reports member states' trade in services for 11 service categories (Sturgeon, Gereffi, 2009).

² Traditional approach to measuring international trade is based on balance-of payment data that records trade flows in gross terms, allowing for double-counting of intermediate products and services.



Source: Low (2013).

Against the backdrop of partial treatment of services' role in GVCs in the analyses thus far the principal objective of the paper is to broaden the scope of research on services engagement in GVCs with a view to demonstrating multiple roles that they play. In particular, we aim to explore pure service GVCs, the characteristics and specificities of value chains where the production process is composed solely of services. There is ample evidence of service companies that outsource/offshore non-core activities or establish subsidiaries across global locations to source inputs with a view to optimize business processes and improve the performance (for example Deloitte, Generali, Google, CNN, etc.). It is no surprise though that 2/3 of foreign direct investment takes place in services (UNCTAD, 2013) confirming the structural shift to services in developed and developing economies. Moreover, due to the advances in ICT an increasing number of small service firms establish own GVCs as well. They can easily source different types of knowledge and skills from global locations to produce new services (e.g. mobile applications).

The paper is organized as follows. After the introduction we discuss theoretical and conceptual foundations underpinning the research of GVCs. Bearing in mind that the analyses so far centred on manufacturing GVCs we investigate whether these conceptual approaches can be accommodated for the analysis of services integration in GVC. The central part of the paper is based on case study methodology and qualitative analysis of five companies engagement in GVCs. The criteria for the selection of companies enable to capture different types of services (intermediate and final services), the companies that establish their own service GVCs and those that supply services to GVCs of other companies. The central part of the paper examines value chains of companies with a view to examine

relative contribution of individual stages of the business process to final value of the product. We discuss the applicability of the conceptual model of “smiley curve” for companies analyzed. Final section presents main findings of case study analysis and discusses their relevance for firms’ business strategies and for policy shaping of economies.

2. Theoretical and conceptual background for the analysis of GVCs

The complexity of the GVCs phenomenon is reflected in different perspectives that scholars take in research - from the definition of the phenomenon and its characteristics, identification of the determinants of companies' integration to GVCs and their effects, deconstruction of value added chain to identify relative contribution of individual sequence to the value of final product -to value chain management and analysis, etc... Conceptual roots of value chains discussion date back to the late 1970s highlighting that production processes of companies are not isolated from each other but interlinked through intermediates that participate in the commodity chain of final products (Hopkins, Wallerstein, 1977). Value added chain is considered as a series of activities performed by individual company at different stages of production and distribution of products to final consumers (Porter, 1985). In his view the value chain includes also the logistics performed by external suppliers which makes it an open chain coordinated by one company.

The debate on value chains re-emerged as a research topic in the 1990s and the concept was extended to embrace value chains at different global locations. Describing the production process in the apparel industry ranging from raw materials to final products the term global commodity chain was coined (Gereffi, 1994). In a more comprehensive way global value chain (GVC) is defined as a set of activities performed by several actors that deliver a product or service starting from development up to disposal after use (Kaplinsky, 2000). In the new millennium the term global value chain is referred to the chain of diversified activities carried

out by companies at different global locations³ and coordinated by the lead company (Park et al., 2013).

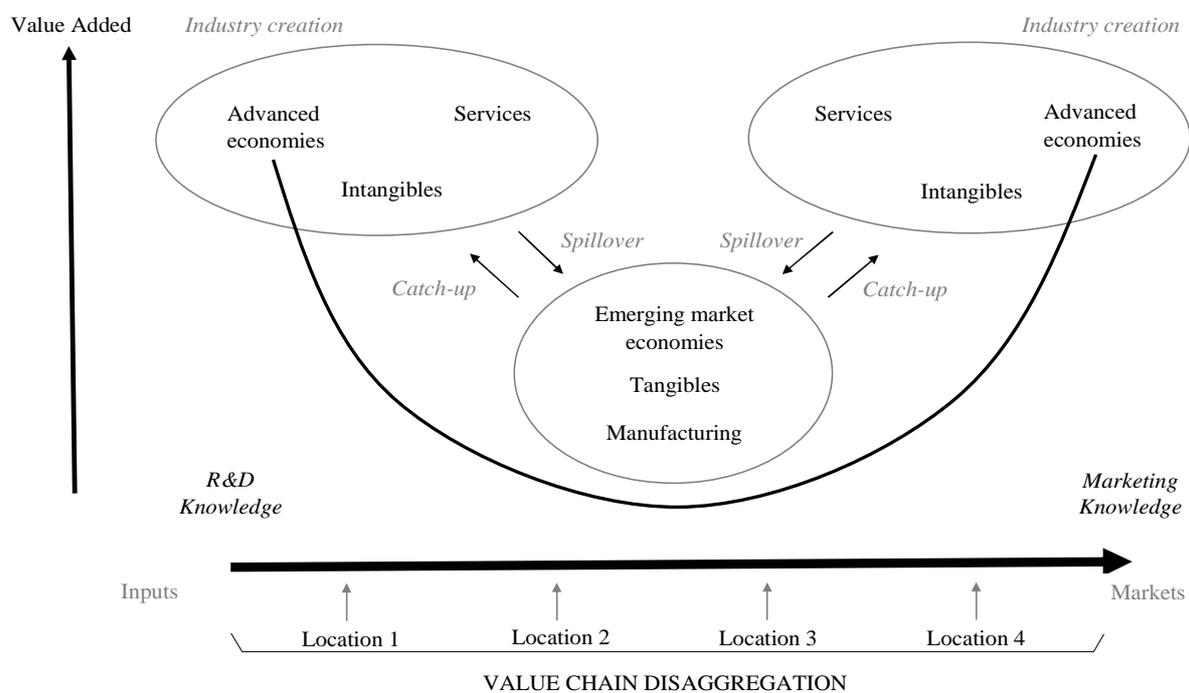
There exists a large body of *international business* literature on outsourcing and offshoring that could be considered as a predecessor of the discussion on GVCs. This literature deals with the offshoring of labor intensive stages of production processes to low cost locations where internationalisation concerns primarily companies' input side rather than sales and output side internationalisation (Schmeisser, 2013). The debate on GVCs points out both backward and forward dimensions of the phenomenon that are inextricably linked and complementary. Companies establish own GVC integrating value chain at different locations but can equally play a role of suppliers to other companies' GVCs. The complexity of GVCs relates further to the integration of trade, foreign direct investment, infrastructural services, coordination of dispersed production and growing share of knowledge intensive activities that locate globally (e.g. intellectual property protection, managerial and marketing knowledge, etc.) (Baldwin, 2012). Since value added of individual activities and their contribution to the value of final product differ the key decision of the companies engaged in GVCs relates to the selection of activities in the production process performed by themselves along with the coordination of those procured from other suppliers (Gereffi et al., 2005). In so doing companies combine comparative advantages of individual locations with own resources and competences to maximize their competitive advantages (McCann, Mudambi, 2005).

Based on the analysis of business processes within GVC of his company that produces computers the founder of Acer shaped the conceptual model of stylised »smiley curve« that depicts the phases of value creation (Shih, 2005) and is frequently used for the analysis of GVC in manufacturing. The position of phases along the »smiley« curve refers to the relative value added in individual phases. In line with this concept, pre-manufacturing phases (e.g. development, innovation, design) create high value added, the manufacturing itself brings low(er) value added while logistics, brand management, marketing and after-sales services contribute high value added. The model shows that various service functions/activities

³ According to the empirical analysis the term »global« value chains is misleading since international supply chains are mostly regional within what have been called Factory Asia, Factory Europe and Factory North America (Baldwin; Lopez-Gonzales, 2015).

located at the beginning and at the end of the production process are fundamental for the value creation and for the competitiveness of the final product⁴ (Figure 2). Mudambi proposed to supplement the model of smiley curve so as to integrate standardised services into the central phase of production (e.g. in manufacturing). The reasoning behind is that those services add lower value compared to knowledge-based services that are found at the beginning and at the end of the business process.

Figure 2: Global value chain in manufacturing companies



Source: Mudambi, 2008.

In addition, he attributed the location and country groups to phases where they are carried out most frequently. Figure 2 indicates that developed economies principally perform intangible tasks/service activities located in the beginning and at the end of value chain. Conversely,

⁴ The analysis of 45 GVCs confirms that the share of value added created in »tangible« phases of production is rather small compared to the share of »intangible« phases referring to various services and intellectual capital (Ali-Yrkkö, Rouvinen, 2013).

emerging market economies focus on manufacturing that results in tangible products. It is concluded that companies located in the middle of curve are motivated for catching-up via developing sources and competences that lead to higher value added creation and enable the shift to intangibles and knowledge intensive services (Mudambi, 2008).

As pointed out by Shih (2005) the smiley curve model does not necessarily apply to all industries and the shape of the curve and the distribution of value added between locations changes over time. In particular, it is questionable whether the smiley curve model illustrating linear chain is applicable to service companies' GVCs. At least, it needs to be taken into account that due to service characteristics value creation process differs from the one in manufacturing. Accordingly, GVCs in services may not function in a similar way as in manufacturing where research, production and consumption follow one after another. In fact, few studies that foregrounded on service GVCs establish that stylised smiley curve and the position of business phases are not suitable for the analysis of service GVCs where individual phases are tightly interlinked, such as for example development, innovation and design, and cannot be easily separated from services production (National Board of Trade, 2013;). Baldwin and Venables question the applicability of smiley curve model for pure service GVCs by arguing that the production process in services is composed of a network of activities that add value and not a linear value chain (Baldwin; Venables, 2010). Some scholars refer to »service networks« instead of service value chains to depict the process of fragmentation in services production (Stephenson, Drake-Brockman, 2014; Lanz; Maurer, 2015).

Our paper aims to shed light on the multiple role played by services in GVCs and to extend knowledge on the characteristics of pure service GVCs that challenges the applicability of smiley curve model for their analysis.

3. Methodological approach

The research on services engagement in GVCs is hindered by insufficient disaggregation of trade data by service categories as well as by poor availability of data on bilateral flows of services trade across countries. Such drawbacks render impossible firm level analysis of GVCs in services an approach often applied to explore GVCs in manufacturing. To overcome the imperfections of data for services trade at the company level that would allow to

empirically examine the characteristics of value chain fragmentation our methodological approach applies qualitative analysis based on case studies of firms that engage in GVCs with services. The relevance of case study analysis is of particular importance when data on a phenomenon is scarce and when the objective of the analysis is to highlight in detail the characteristics of a phenomenon. This approach renders possible to compensate the gap in data availability, obtain insight into the complexity of the topic and still reveal some common patterns (Hyde in dr., 2012; Yin, 2013). Even if case study methodology suffers from the lack of empirical analysis due to its descriptive nature its advantage is that it can lead to indepth understanding and qualitative assessment of the phenomenon.

Case study approach is often used to identify the contribution of individual phases in GVCs and their locations in the production of physical product. In the context of services engagement in GVCs it is of particular importance to refer to the case of the Finnish company GVC that produces bicycles. Irrespective of the location of the assembly of bicycle (Finland, Lithuania or Indonesia) services contribute the bulk of total value added. Logistics, branding and distribution alone account between 50% and 60% of value added (Kalm et al., 2013) emphasizing the enabling role of services in GVCs. There are very few analyses that decompose global value chain processes in services, partly also on account of their intangibility and invisibility. These cases mostly related to services that rely on ICTs and electronic communications to integrate several phases of splintered value chains. Film industry is an example of service GVCs where movies are increasingly produced as international collaboration. In the production process of the film *The life of Pi* a large number of companies and individuals from different countries cooperated and contributed specialised professional services and tasks (Lanz; Mauer, 2015). The case of video game Minecraft illustrates in detail how five phases of value process (innovations, R&D; production; distribution; marketing and branding; consumption) located all over the world are combined for the release of final product (National Board of Trade, 2013).

The selection of cases for our analysis enables to capture and illustrate the variety of roles and characteristics that services assume in GVCs and is based on the following criteria: company's activity (4 service companies and one manufacturing firm where services are essential for th functioning of their GVCs); type of services performed that takes into account the heterogeneity of services; type of services referring to consumption stage (intermediate vs. final services); degree of companies' integration into GVCs (firms with own GVCs, firms

participating in GVCs of other owners and combination of both modes). The following companies⁵ were included into case study analysis: 1) Iskratel group - manufacturing company producing telecommunication equipment whose sales crucially depend on related professional services; 2) Company A – producer of mobile applications; 3) Company B – direct to consumer electronic retail; 4) NiceLabel group – producer of software for labeling solutions; 5) Gigodesign company – supplier of design, consulting and visual communications. Interviews with firms' management were carried out on the basis of semi-structured questionnaire allowing to reveal both general and specific characteristics of each case. We summarize the main findings below.

4. Analysis of services' role in GVCs

4.1. Main features of companies' engagement in GVCs

The overview of five companies shows differences and similarities in their profiles as well as in the characteristics related to participation in GVCs (Table 1). Three companies have headquarters in Slovenia while Company A and Company B have subsidiaries in Slovenia. The latter perform strategic tasks that contribute high value added and are essential for the efficiency of the whole GVC. The size of companies ranges from micro to large company with tertiary educated employees accounting for the majority of manpower that could point to high productivity of companies⁶. All but one company are focused on external markets, their exports exceeding 80% of the total sales. The GVC of two companies rely on markets in East Europe; Company A is born global, it sources knowledge worldwide and has customers in approximately 230 countries; NiceLabel group sells to approximately 70 markets, USA and Germany accounting for the largest share.

The smallest company Gigodesign company enters GVCs indirectly as a supplier of design solutions, brand development and communication services to a number of Slovenian companies that are successful exporters. In this way Gigodesign brand is visible to consumers in foreign markets. Other companies from the sample established own GVCs composed of

⁵ Two companies prefer not to reveal the identity. We refer to them as company A and company B.

⁶ Value added per employee could not be checked as most companies opted not to provide data.

Table 1: Profile and characteristics of companies related to engagement in GVCs

Company	Group ISKRATEL (M)	Company A (S)	Company B (S)	NiceLabel Group (S)	GigoDesign (S)
Employment / in Slovenia	790/560	190/160	7.000/600	100/65	10
% of tertiary educated	67%	62%	50% (in Slovenia)	80%	95%
Type of service activity	Installation, maintenance and upgrade of software and hardware	Mobile applications	Direct to consumer electronic retail	Software for labelling solutions	Design, consulting and visual communications
Services by user type	Intermediate consumption	Final consumption	Final consumption	Intermediate consumption	Intermediate consumption
% of export in total sales	80%	100%	Dominant share	98%	5%
Own GVC, others' GVC; both types	Both	Both	Both	Both	Others' GVCs
No. of markets major markets	20-30/ Russia, Kazahstan, Turkmenistan	230/ China, USA	22/ Russia, Ukraine, Romania	70/ USA, Germany, United Kingdom	5-10 /Netherlands, Italy, Saudi Arabia
Number of subsidiaries and location	6	5	20	4	Contract partners Netherlands, Italy, Saudi Arabia, Hong Kong
	East Europe	Slovenia, United Kingdom, South Korea, China	Slovenia, East Europe, USA	Germany, China, Singapore, USA	
Phases with highest values added*	Adjustment of system to local customers; training of customers; after sales services and maintenance	Development, design and branding; animation and testing; cross marketing	Development, design and marketing concept; multi-channel distribution; customers relationship management	Software development; marketing and branding; customers relationship management	Research and development of project idea

* We asked the managers to identify three phases in GVC that contribute the most to value added. They pointed to interlinked functions as one phase.

parent company, subsidiaries and contract partners at different locations. In general, the number of companies' subsidiaries abroad depends on the characteristics of services they supply (whether these can be provided via electronic means or via local presence of suppliers) and degree of standardisation of services. On the one hand, Company A can reach consumers in almost every country of the world with only 5 subsidiaries thanks to internet distribution (app stores) and highly standardized service. NiceLabel group on the other hand delivers software for labeling to 70 markets via resellers that also provide technical support to customers. Company B and Iskratel group sell directly to consumers and need to have local presence in most markets (e.g. 20 countries) to manage the delivery, the accompanying technical services and aftersales services. The selection of the location of subsidiaries of five companies depends on diverse factors however it seems that in general market size, qualified labor force and favourable business environment are the key determinants along with specific requirements for individual company.

The analysis of companies with own GVCs shows that lead company controls overall business processes, monitors the quality and efficiency of the value chain. Lead companies closely cooperate with their subsidiaries in performing the key phases of the value chain. These relate to development and design of products and services, conceptualisation and implementation of marketing strategy, management of brands and customer relationship management. The companies also cooperate with contract partners who supply highly specialised services that require particular skills and knowledge (e.g. animation for mobile application) but also to procure a range of non-core services (e.g. logistics, advertising, accountancy, operational services, etc).

The companies from our sample that have their own GVC also participate in other companies' GVCs' as suppliers of products and services:

The Iskratel group whose GVCs is oriented to East Europe recently started to supply niche products to the GVCs of multinational companies in Germany, Austria and Italy. The aim is to lessen the dependence on markets in one region, to increase bulk sales but also to obtain knowledge on business models and marketing approaches applied in GVCs of multinational companies from developed economies. In addition to its main activity the Company A sells licences to over 100 companies for using the design of animated characters from their mobile applications for physical products (e.g. accessories, toys, school supplies). The integration into GVCs of licensee companies not only increases the the Company A revenue but also

promotes its global brand. Subsidiaries of Company B located throughout East Europe provide services of their call centres also to other firms selling at the respective markets. By entering GVCs of those firms as the supplier of intermediate services the Company B benefits from better utilization of its call centres' capacities that require extensive investment in equipment and training of employees. Apart for managing own GVCs NiceLabel group enters GVCs of companies that integrate NiceLabel software into printers they produce; GVCs of companies that use NiceLabel software for labelling of various products (e.g drugs); buyers of system solutions.

The examples of four companies reveal that the interlinkages between their own GVCs and GVCs of other companies bring complementarity and synergy concerning the market outreach, improved efficiency and increased brand value of the company. The discussion of the main features of selected companies' engagement in GVCs highlights multiple roles of services – from auxilliary functions, enablers and facilitators of GVCs to core functions in pure service GVCs. It brings new insights for understanding the phenomenon of GVCs, in particular bearing in mind the weight of services in value added and employment of advanced and emerging market economies.

4.2. Value added by stages in service GVCs

As pointed in the introduction of the paper we aim to explore not only diverse role services play in GVCs but also GVCs of service companies and characteristics of their value chains⁷. Similarly to GVCs of manufacturing companies also GVCs of service companies are composed of a range of phases/stages/functions that contribute different proportion to final value added and are performed at various locations. Interviews in companies addressed the issue of identifying the phases that bring the largest value to companies performance⁸ (see Table 1 for an overview).

The main activity of the Company A relates to mobile applications, a highly competitive industry that requires agile approach of actors, real-time monitoring of customers' behaviour

⁷ The analysis refers to three service companies with own GVCs. Iskratel group is a manufacturing company while Gigodesign does not have its own GVCs.

⁸ The questionnaire asked to identify three most important stages, however the respondents often quoted two or three interlinked functions as one stage.

and their purchasing patterns. According to the interviewed person the highest value added is created in three complementary phases that are very difficult to draw a time boundary between them. Within each of the phases specialised services are required and supplied in collaboration between the lead company and subsidiaries at global locations. The first phase consists of *idea generation, product development* (mobile application) and *branding* that are closely intertwined. Second phase relates to *animation and testing* of the product to accommodate it to perceived customers preferences (carried out by subsidiaries and individual professionals with specialised skills). The outlet for products are application stores where a number of new applications are published on a daily basis. Due to a tough competition and in order to secure market success with the new application the Company A applies *cross marketing* (third phase). Whenever the users start the existing application an ad for new application appears on their mobile for immediate download. Given the fact that Company A has 15 applications it is not surprising that cross-marketing brings high value added⁹

NiceLabel group on average invests 20% of revenue in *development of superior quality software* that is in the opinion of general manager a precondition for high value added and is performed by the lead company. Still, there are other activities that significantly contribute to market success of the company. Notwithstanding the fact that company's sales at foreign markets accounted for over 90% and was gradually increasing the breakthrough was reached only after the introduction of active *marketing and branding* of their services. As a matter of fact, a marketing professional from UK became a member of NiceLabel group management and induced strategic rethinking of the marketing role in value creation. Further, a subsidiary was established in the USA (largest market for the company) that took over the marketing of their services in North and South America. Both changes in marketing strengthened market position of the company and raised the price of their services. Finally, new approach to *customers' relationship management* was introduced to improve the communication and differentiate between three main types of customers. For example the company started to devote special attention to small contract partners (resellers) that is to about 1,000 firms. Training is provided on how to raise firms' sales by using NiceLabel software with concurrent positive impact on NiceLabel group.

⁹ In October 2015 three billion users downloaded their applications for mobile.

The Company B is direct-to-consumer electronic retailer of consumer goods that are procured from a large number of global suppliers. However these consumer goods are sold as brands of Company B. The manager of subsidiary in Slovenia considers that the most important phases in the business process of GVC are the following: *development and design* of products along with *marketing concept* implemented by company's agency for innovation in direct marketing; *multi channel distribution* of products that enables to accommodate to different buying habits of consumers¹⁰; customer relationship management via own call centres. The decision to keep the call centres in subsidiaries throughout Eastern Europe was rather risky in the time when the competitors largely outsourced/offshored them. The move was nevertheless helpful as it contributed to the increase of sales and customers' satisfaction with long term benefits.

In summary, the findings from the interviews in service companies regarding three most important phases of value creation in their GVCs show that development and marketing are identified as such by all three companies unanimously; two companies pointed out design and customer relationship management; one company singled out multi-channel distribution and another animation and testing phase (Table 1). It needs to be recalled that these phases cannot be ranked by the share of value added they contribute to final product. In each company the interview revealed that these phases are closely interlinked making it difficult to delineate value added of the single phase. This suggests that a bundle of services performed in these phases complement each other in value creation.

In spite of the limited number of sample companies, differences in types of services (final vs. intermediate) and scope of GVCs (global vs. regional) the cases illustrate that there is a large degree of similarity between the companies in respect of key phases that create the largest value added. The findings are relevant for conceptual approach to analysing GVCs in services as well as for companies' strategies and for policy makers.

4.3. The relevance of smiley curve concept for the analysis of GVC

As observed in section 2 the most frequent conceptual approach to analysing the fragmentation of value along GVCs in manufacturing is based on "smiley curve" model

¹⁰ TV sales with direct response, internet, printed catalogues, telemarketing via call centres, branded retail stores; network of partnership with biggest retail chains.

(Figure 2). In essence it shows that the phases at the beginning and at the end of the curve contribute the highest value added while the central phase of physical production is relatively much less important in value creation. How does this model apply to service companies' GVCs? The analysis in our paper referring to companies that participate in GVCs also with services or only with services demonstrates differences between them with respect to the relevance of the smiley curve model. These companies' GVCs¹¹ can be aligned in two groups – the one for which "smiley curve" model is relevant and the other where it fails to provide the conceptual underpinning for the analysis of GVCs. We refer to them below:

- a) *GVCs of manufacturing company Iskratel Group* fits well into the conceptual model of »smiley curve«. The value added and competitiveness of its GVC critically depends on enabling services (e.g. installation and testing of equipment; training of customers how to use it and related after sales services) that it supplies to customers to secure efficient functioning of telecommunication equipment. These services come after physical production and contribute high value added for the company similarly as research and development that are at the beginning of the business process;
- b) *GVC of Company B* (e-retailer of consumer goods) consists of a variety of service phases, however it also includes manufacturing of products carried out by contracting partners. Key stages such as development, design, branding, marketing and customer relationship management are performed by lead company and its subsidiaries. The latter create much higher value added compared to outsourced manufacturing. Pre-manufacturing service phases are tightly interlinked but delineated from manufacturing. It seems that the smiley curve model could be used for the analysis of GVC of the Company B only as a very loose interpretation. In essence, both sides of "smiley" are very steep while the manufacturing phase would be displayed on the curve as a very narrow space.
- c) *GVCs of two service companies (Company A and NiceLabel Group)* consist of service phases only (*pure service GVCs*). In the first case development phase is closely related to design, testing and branding that result in mobile application. The boundary between them is not clear making it difficult to determine when does development and testing end and when the production starts. On the other hand monitoring the users' experience with the applications brings additional information that feed into the business process. Similarly, in

¹¹ Company Gidodesign does not have its own GVC but is integrated into GVCs of Slovenian manufacturing companies as the supplier of design services that increase the competitiveness of GVCs owners.

the case of NiceLabel Group GVC the development of software for labelling overlaps with testing and development of support services that together produce solution for customers and high value added for the supplier. In GVCs of both companies different services are not performed in separate phases but but bundled together in a complementary way to co-produce value that cannot be attributed to individual phase.

The analysis of video game Minecraft and the fragmentation of its value chain to phases suggests that the trouble of finding the equivalent to physical production, assembly and logistics in services is sufficient reason to argue for the adjustment of the smiley curve model (National Board of Trade, 2013). Two cases of pure service GVCs in this paper confirm this finding leading to the conclusion that smiley curve model cannot serve to conceptually underpinn pure service GVCs. Rather than its adjustment there is a need for the design of new model for the analysis of pure service GVCs. Heterogeneity of services (e.g. level of digitalisation, knowledge intensity, degree of regulation, customers' involvement, etc.) brings additional complexity to the conceptualisation of GVCs in services that is much larger than we are able to illustrate in the paper. Several issuer arise in this respect – for example- how to conceptualise the model for the analysis of GVCs of low cost air company where customers co-create some phases of service delivery; or GVCs of hotel chains that supply a mix of services? It seems very likely that there might not be a single model for the analysis of pure GVCs.

5. Concluding remarks

Global value chains present the fundamental feature of international business development in the last two decades. They shift the focus of competition from industries to phases/tasks of production in which countries/companies outperform other actors (Timmer et al., 2013). Substantial body of literature deals with the phenomenon of GVCs however it remains centred on the characteristics of global fragmentation of processes in manufacturing industries and companies. Quite a few studies acknowledge the enabling role of services for the efficient functioning of GVCs along with the fact that intangibles (service functions) add the highest value to manufacturing GVCs and increase their competitiveness. Other dimensions of services engagement in GVCs are mostly overlooked even if services account

for the largest share of trade in value added and dominate in GDP and business activity of developed and emerging market economies.

Our analysis contributes to narrowing the gap by shedding light on multiple roles that services play in GVCs and by examining pure service GVCs. The findings of the paper bring insights into the functioning of GVCs and the interplay of business processes in phases carried out at global locations. The extended knowledge on GVCs is relevant from the perspective of theoretical advancement, practice of international business and policy design. Based on case study analysis of five companies we illustrate the diversity of services engagement in GVCs – from facilitating and supporting manufacturing companies' GVCs to performing all or most functions in service companies' GVCs. The overview of the phases that create the highest value added in GVCs of these companies shows that the interviewed managers frequently referred to development, design, marketing and customer relationship management as complementary and interlinked functions. These phases are mainly performed in cooperation between lead company and its subsidiaries while contract partners enter mostly as suppliers of highly specialised services that require particular skills and competences. Here, one can observe the difference in the outsourcing pattern compared to manufacturing GVCs. In service GVCs it is not only about outsourcing non-core service functions but also those with high value added that are increasingly specialised or are niche services. This is of particular relevance for GVCs of small service companies that lack the capacity to carry out all tasks with high value added..

The paper draws the attention to the need for lead companies to monitor thoroughly and coordinate all processes in value chain to ensure that customers get high quality services. Experiences of analysed companies are relevant for service companies that have the ambition and capability to upgrade their international business strategy by creating own GVC. For them the imperative is continuous innovation in products, processes and business models and the improvement in quality of services for customers. The companies that have limited capacity for the expansion of international business could benefit from increasing the participation in GVCs of successful exporters or in the GVCs of multinational companies with subsidiaries at the home market engaging thereby in a learning process of new knowledge and skills acquisition, introducing new business models that have the effect on innovation capability.

In spite of the limited number of cases the mapping of services integration in GVCs allows to consider their features in relation to the conceptual model of stylized smiley curve and point to dissimilarities and deviations from the model that is an added value of the paper. We have detected that smiley curve model is applicable to service companies' GVCs when manufacturing is a phase of their fragmented business process, similarly to manufacturing companies' GVCs. In the case of pure service GVCs (e.g. all phases of the business process are composed of services) the findings are based on GVCs of companies supplying ICT services. They reveal that there exists no separated phase of services production that would allow to demarcate it from others as in the manufacturing GVCs. The interlinkages and complementarities between the phases of development, design, testing and branding result in the "production" of services that are supplied to customers. On the other hand customer relationship management provides important feedback to suppliers regarding the potential for innovation in services, processes or business models. This makes it difficult to assess value added of individual phases of pure service GVCs.

The observed pattern of value creation leads us to conclude that a different model is needed for the analysis of pure service GVCs rather than a revision or adjustment of smiley curve model. It could be a network of functions of interlinked functions that create contribute to the final value services or nodes of key value adding functions. Owing to heterogeneity of services it might as well be that no single model could work for the analysis of pure service GVCs or should at least be very loose and flexible. Further studies are needed to provide insight into the patterns of value creation in GVCs of other services, such as for example logistics or health tourism where a mix of different services and service functions are needed to cater to customers' needs. These studies would bring additional information so as to better conceptualize the model for analysing pure service GVCs. There is ample scope for qualitative and quantitative study of services' role and their impacts for efficient functioning of GVCs both in manufacturing and services. Detailed disaggregation of data for services "trade in value added" database and availability of detailed data on bilateral flows of services between countries would enable to better quantify the importance of services in GVCs and their effects at the macro and micro level.

Finally, the paper brings more informed assessment of services role in GVCs that bears important implications not only for companies' business strategy but also for the shaping of policies that refer to the competitiveness of services. The simplicity and efficiency of regulatory framework importantly influences the competitiveness of services and the

capability of states to attract the suppliers of individual service tasks¹². Similar effects could be expected from the availability of highly educated and skilled workforce, modern research and ICT infrastructure that improve the innovation capability. Conversely, unstable and unfavourable business environment can cause the relocation of headquarters and other business functions abroad. States need to be mindful in particular that the relocation of high value adding functions consisting mainly of services could undermine the competitiveness of the whole economy.

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Metka, Stare, Research Professor
University of Ljubljana
Faculty of Social Sciences
Kardeljeva ploščad 5,
1000 LJUBLJANA
Slovenia
metka.stare@guest.arnes.si