

# **Servitization and deservitization effects in three southern European countries**

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## **Abstract**

Looking through Knowledge Based View (KBV) posed by Valtakoski (2017) we analyse the deservitization effect mentioned by current literature in three Southern European countries. KBV postulates that if a company does not possess necessary knowledge it will outsource this knowledge from another company. However, due to high competition and leaking of knowledge, manufacturers of complex product will tend to servitize with their own resources thus not deservitize or outsource service provision. The analysis is performed through two step OLS regression. Results confirm hypotheses and the model is significant.

**Keywords:** Servitization, Deservitization, Manufacturing survey

## **Introduction**

Faced with low cost competition and commoditisation many manufacturers started to servitize Benedettini et al. (2017). Servitization in Europe in 2014 was as high as 86,5 % based on European Manufacturing Survey (EMS) (Dachs et al., 2014). Most of the cases cited in the existing body of literature were Rolls-Royce (Neely, 2008; Neely et al., 2011; Bustinza et al., 2015), German manufacturer of trucks MAN, ABB, Toyota and the warehouse management and Xerox and office document management (Baines et al., 2007), IBM transformed itself form IT equipment manufacturer to systems solution provider (Oliva and Kallenberg, 2003.) However, Benedettini et al. (2017) list several examples where companies start withdraw rather than extend their service offering. They list Johnson Controls, Voith and ABB as disengaging from facilities and maintenance management contracts. Kowalkowski et al. (2017) list Xerox as an example of deservitization where Xerox in 2016 withdraw their service offering and formed an independent company Conduent for the service part of their provision; that are the same cases that were used as prime successful examples. Brax (2005), Gebauer et al. (2004) and Neely (2008) wrote about the service paradox, where investment into services failed to generate corresponding returns. Those were the early warnings that servitization

strategy is far from straight forward. Benedettini et al. (2017) even showed that wrong servitization leads to bankruptcy. Antioco et al. (2008) were among the first to differentiate services on product-related and customer-related services and showed that they have different outcomes on servitization strategy. Erkoyuncu et al. (2013) listed all the risks that manufacturer has to take if they offer advanced service contracts, and because of these high risks manufacturing companies withdraw from offering advanced services.

Starting with Oliva and Kallenberg (2003) who argued that manufacturers have to reorganise for provision of service and that more employees with technical as well as people skills are needed in order for the manufacturer to successfully offer service to, more recently, Josephson et al. (2016), who argue that insufficient resources lead to unsatisfied customers, add to a point that resource based view might be the proper lens for investigating the servitization/deservitization phenomenon. According to Valtakoski (2017), the most appropriate theoretical lens for understanding servitization/deservitization effect is KBV derived from Resource Based View (RBV). Our main research question is thus:

What determinants, in terms of manufacturer's characteristics, will influence a servitization/deservitization decision?

In this study, three Southern European countries are researched, all with the approximately same level of servitization and deservitization and through the lens of KBV we aim to prove that because of lack of knowledge resources manufacturing companies tend to outsource part of their service offering.

A large database consisting of 296 companies from Spain, Slovenia and Croatia, obtained through European Manufacturing Survey in 2015 is used in our analysis with the objective to shed light on deservitization effects as well as contextual factors that emerged in literature as determinants of servitization/deservitization (Valtakoski, 2017).

The remainder of this paper is organised as follows: Section 2 gives an overview on the relevant literature on KBV and servitization/deservitization. In Section 3 we develop our research hypotheses. In Section 4, we describe our data and research methodology. Section 5 presents results of our OLS regression analysis. In Section 6, research results are discussed and finally, the limitations and directions for future research are specified.

### **Knowledge based View and servitization/deservitization**

Knowledge is often valuable, rare and hard to imitate (Grant, 1996). Unlike the RBV, where resources are static, KBV posits that knowledge is a dynamic resource. The value according to the KBV will be a combination of customer's and solution provider's knowledge that together bundle in a solution and a value offer for the both parties (Valtakoski, 2017). Valtakoski (2017) specifically points out that the more complex is the system, the larger amounts of knowledge bundles will be needed to reach a satisfactory level of solution to both sides.

In that sense, servitization will be the case where the manufacturer who is also a solution provider is able to provide all necessary knowledge bundles (tangible and intangible) to the customer for a value enhancing proposition that is beneficial to both sides. Because the manufacturer, who is also a solution provider, is able to provide all necessary knowledge bundles, it is not needed to outsource any part of service offering and the whole solution can be provided with own resources. This is specifically pronounced in complex product-service systems, where reproduction of knowledge is difficult, particularly if a system has to be adapted to some specific circumstances. Because of already large knowledge base for producing complex systems, the producer and also a solution provider will more easily provide the whole solution by himself and the make-

to-buy decision is in favour of make-decision. Thus, according to Valtakoski (2017), producers of complex systems are more likely to offer the whole solution and thus servitize. Another issue raised by Valtakoski (2017) in complex systems is the leakage of knowledge, which is a serious issue in highly competitive markets of complex systems. In that case, the customer of the solution prefers to deal with as few parties as possible to avoid the technical knowledge leakage.

Deservitization, on the other hand, is a situation when the manufacturer and also a solution provider does not possess all the necessary knowledge and is unable to provide a successful service offer. Because of lack of knowledge to offer the whole solution, the manufacturer contracts with a third party for the knowledge that is lacking to provide the complete solution. In this way, the manufacturer outsources part of service provision to the third party to offer a satisfactory solution to the customer.

Yet, according to Valtakoski (2017) and Laursen (2012) other companies are a significant source of external knowledge and it is usual that companies engage in co-creation of value for all collaborating parties. This further means that the manufacturer who is also a solution provider, makes a make-or-buy decision to determine is it more beneficial to develop all necessary knowledge in-house or buy missing knowledge at the market. According to Valtakoski (2017) these collaborations happen more often than not, especially because of today's dynamic markets.

Deservitization can be explained by KBV as a move from solution to close relationships with customers towards a transactional product base business (Valtakoski, 2017; Finne et al., 2013; Kowalkowski et al., 2015). Especially with information technology (IT) advancements, manufacturers seek contracting parties especially in this digital knowledge domain, where make in-house might be too costly and yet there are reliable partners with this knowledge whom the manufacturer can contract with the aim to provide a complete solution to the customer.

### **Hypotheses development**

Eggert et al. (2014) have shown that R&D activity positively moderates servitization revenues. That is, innovation activities will be more prone to servitization than to deservitization effect because larger revenues can be obtained. However, according to Josephson et al. (2016) with increasing innovation activity, risks also rise. Similarly, Eggert et al. (2011) provide empirical evidence that innovation activity has an effect on service provision, but this effect is different depending on the service in question. That is, the authors divided services into product-related services and customer-related services and found out that only on customer-related services there is a positive effect. Benedettini et al. (2017) provide a list of product- and customer-related services in their appendix. The most common product-related services are maintenance and repair, installation, product upgrade, while customer-related services would be finance, logistics, IT development, and end of life services.

Product-related services will use already possessed knowledge of the manufacturer who is also the service provider and thus is able to provide the service without having to contract with some third party. Thus, we hypothesize the following:

*H1: For product-related services the degree of service outsourcing will be lower than for customer-related services.*

By contrast, services that are unrelated to the product, and are more customer oriented services, different knowledge necessities arise, possibly not already possessed at the manufacturers' site. For marketing purposes the manufacturer wants to enter into that contract but due to missing knowledge, a third party is contacted. Those services are according to Benedettini et al. (2017) finance, logistics, IT development, and end of life

services (those are only some examples) that will also include innovative solutions, thus according to Eggert et al. (2011, 2014) these customer-related services bring better servitization revenues, but the outsourcing might be higher because the provider does not have all the knowledge. Thus the hypothesis 2 is:

*H2: For customer-related services the degree of service outsourcing is higher than for product-related services.*

According to Valtakoski (2017), producers of complex systems are more likely to offer the whole solution and thus servitize, meaning the more complex is the product the manufacturer makes, more knowledge is necessary and thus the manufacturer performs the whole solution proposition from in-house resources,. Thus, Hypothesis 3 is:

*H3: For complex products, the degree of service outsourcing is lower than for medium and low complexity products.*

Complex systems and products are usually produced in small batches according to the Hayes and Wheelwright (1984) process matrix. Therefore, we hypothesise that:

*H4: For smaller production batch, the degree of service outsourcing is lower than for medium and large batch production.*

The hypotheses can schematically be represented by the model in Figure 1.

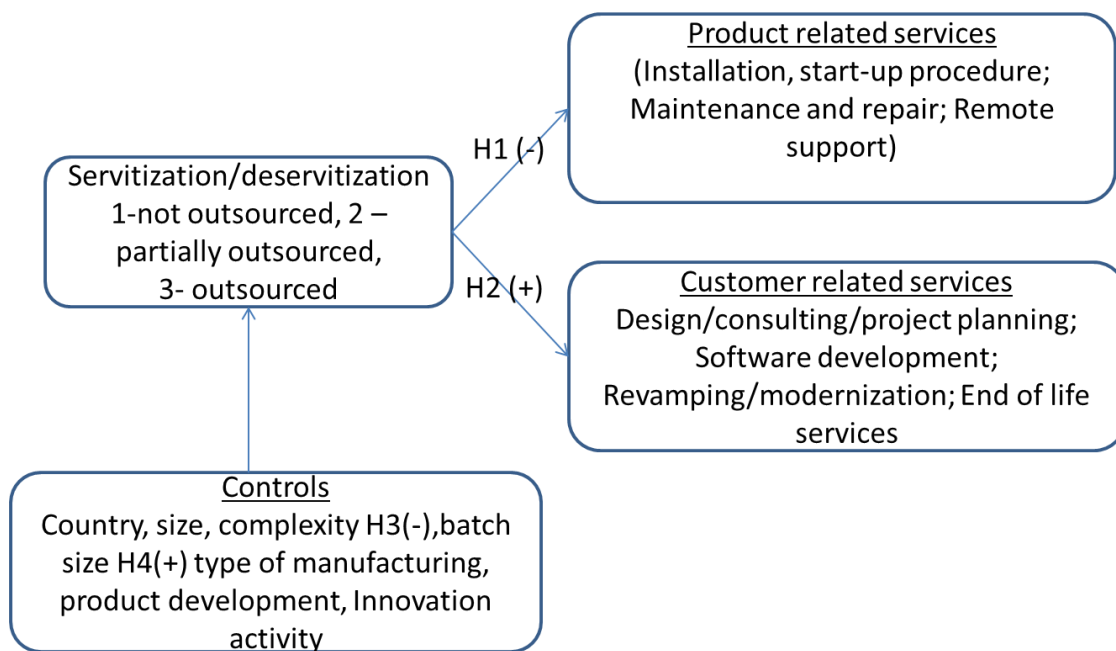


Figure 1 – Proposed model

### Design/methodology/approach

The research data was collected using the European Manufacturing Survey (EMS), coordinated by the Fraunhofer Institute for Systems and Innovation Research – ISI, the largest European survey of manufacturing activities (ISI, 2015). The survey’s questions deal with manufacturing strategies, application of innovative organizational and technological concepts in production, cooperation issues, production off-shoring, servitisation, and questions of personnel deployment and qualification. In addition, data on performance indicators such as productivity, flexibility, quality and returns is collected. The survey is conducted among manufacturing companies (NACE Revision 2 codes from 10 to 32) having at least 20 employees. The EMS project researches the whole manufacturing sector through a condensed 8 pages questionnaire. The questionnaire has 21 sections and covers technology, organizational concepts, innovation, servitization and

other topics. To collect valid data permitting international comparisons, the EMS consortium employs various procedures recommended by the Survey Research Centre designed to avoid problems arising from the use of different languages and specific national terminology. First, a basic questionnaire is developed in English, which is then translated to country language and then back to English to check consistency. Second, in each participating country pre-tests are conducted. Third, identical data harmonization processes are applied (Bikfalvi et al., 2014). The sample was collected in 2015, and all together consists of 296 companies, 105 companies from Croatia and 91 companies from Slovenia and 100 companies from Spain.

### ***Measures***

For the purpose of this paper several variables from the EMS questionnaire were used:

Dependent variable:

1. Level of outsourcing of services- measured by a three item scale where 1 denotes dominantly performed in house, 2 partially outsourced and 3 totally outsourced.

Independent variables:

2. Services: measured by a dichotomous variable – 1 if the company offers the service and 0 otherwise. Service that were included were:

- a. Product-related services (installation, start-up procedure; maintenance and repair; remote support)
- b. Customer-related services (design/consulting/project planning; software development; revamping/modernization; end of life services).

3. Complexity measured by a three item scale where 1 – simple products, 2 – medium complexity products, 3 – complex products.

4. Batch size measured by a three item scale where 1 – small batch, 2 – medium batch 20 to 1000 products in a batch, 3 – large batch more than 1000 products.

Control variables:

5. Country;
6. Size of the company (depending on number of employees).

The analysis is performed through OLS regression where first the control variables were entered to obtain the size of the effects of contextual variables on outsourcing. In the next phase all other independent variables (services) were entered to detect which service is more prone to outsourcing and which is not. Before showing the analysis' results, the sample is presented.

### ***Descriptive data***

66% of companies in our sample are servitized (meaning they offer at least one service to their customers). More precisely, 60% of Croatian manufacturing companies are servitized, 58% of Spanish manufacturing is servitized, while in Slovenia 82% of companies are servitized. Even though Slovenia exhibits a higher percentage of servitization, the Chi-Square Tests did not reveal significant differences among the distribution of servitized and unservitized companies. Table 1 describes distribution of NACE codes by countries. There seem to be differences in the samples, but the Chi-Square Tests again showed non-significant differences.

*Table 1 – Description of the sample by industry*

NACE	Croatia	Slovenia	Spain	Total
Manufacture of food products	11	0	24	35
Manufacture of beverages	2	0	2	4
Manufacture of textiles	10	2	4	16
Manufacture of wearing apparel	2	2	2	6
Manufacture of leather and related products	3	2	1	6
Manufacture of wood etc. except furniture; manufacture of articles of straw and plaiting materials	5	0	5	10
Manufacture of paper and paper products	4	0	4	8
Printing and reproduction of recorded media	5	0	2	7
Manufacture of chemicals and chemical products	1	0	8	9
Manufacture of basic pharmaceutical products and pharmaceutical preparations	0	0	1	1
Manufacture of rubber and plastic products	3	13	9	25
Manufacture of other non-metallic mineral products	8	3	7	18
Manufacture of basic metals	0	1	5	6
Manufacture of fabricated metal products, except machinery and equipment	26	28	6	60
Manufacture of computer, electronic and optical products	1	8	2	11
Manufacture of electrical equipment	4	8	3	15
Manufacture of machinery and equipment n.e.c.	13	14	10	37
Manufacture of motor vehicles, trailers and semi-trailers	1	8	2	11
Manufacture of other transport equipment	2	1	2	5
Manufacture of furniture	4	0	0	4
Other manufacturing	0	1	1	2
	105	91	100	296

EMS (CRO; SLO; ES, 2015)

Table 2 presents companies' share according to their size size distribution in the three countries and in total. Once again the Chi-Square Tests again showed non-significant differences according to company size.

*Table 2 – Description of the sample by size*

	Croatia	Slovenia	Spain	Total
<50	30%	23%	45%	33%
50-249	44%	53%	36%	44%
>=250	25%	20%	18%	21%
Total	105	91	100	296

Figure 2 shows higher percentage of Slovenian companies that offer services in line with the first result that looked at the number of companies that are servitized and it was shown that 82% of companies in Slovenia are servitized, but the Chi-Square Tests showed non-significant differences.

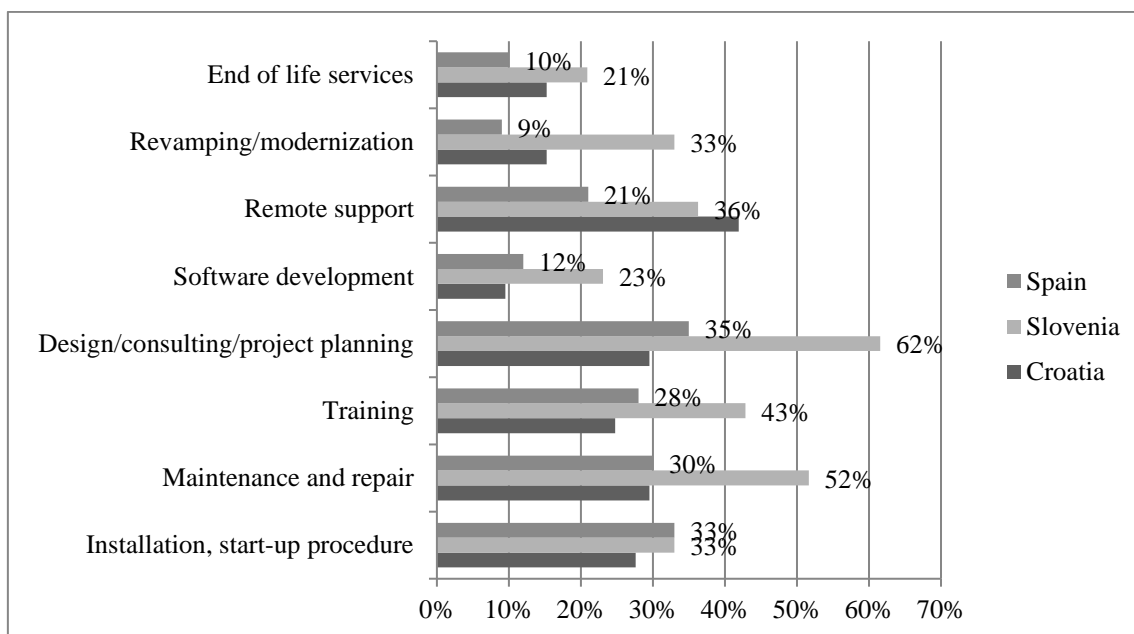


Figure 2 – Offered services by country

Level of service outsourcing again shows differences, but again but the Chi-Square Tests showed non-significant differences between proportions, even though as presented in Table 3 around 50% of Slovenian companies provide services from in house, while almost 50% of Croatian and Spanish companies outsource services.

Table 3 – Level of service outsourcing by country

Level of service outsourcing	Croatia	Slovenia	Spain	Total
Great extent done in house (86-100%)	34%	55%	15%	35%
Partially outsourced (25 - 85%)	20%	22%	38%	26%
Mostly outsourced (0 - 24%)	45%	23%	47%	39%
No. of companies	88	77	74	239

## Results

The output of the OLS regression is presented in Table 4 and it was computed in a two-step procedure. First the control variables were entered and then the independent variables of different types of services were added. The dependent variable was level of outsourcing.

Table 4 – Regression results

Model	R	R Square	Adjusted R Square	Change Statistics				Durbin-Watson
				R Square Change	Sig. F Change	F	Sig.	
Controls	0,485	0,236	0,148	0,236	0,003	2,698	0,003	
With services	0,514	0,264	0,112	0,028	0,88	1,737	0,040	1,924

It can be seen from Table 4 that 23,6% of service outsourcing is described solely by control variables. Adding services only slightly increases explanatory power of the model although the  $R^2$  change is significant. Finally the whole regression analysis is shown in Table 5.

Table 5 – OLS regression results

	Standardized Beta	Sig.	Tolerance	VIF
(Constant)		0,009		
Product development	0,005	0,966	0,612	1,634
Type of manufacturing	-0,043	0,666	0,768	1,302
Batch size	-0,251	<b>0,04</b>	0,523	1,913
Size of the company	0,008	0,938	0,76	1,316
Complexity	-0,215	<b>0,023</b>	0,867	1,154
Country 2015 (Croatia=1, Slovenia=2, Spain=3)	0,264	<b>0,013</b>	0,703	1,422
Expenditures on R&D as share of turnover 2014 [%]	-0,072	0,483	0,728	1,373
Share of inputs from abroad in 2014 [%]	0,186	0,069	0,741	1,349
Share of products sold abroad in 2014 [%]	-0,047	0,63	0,792	1,263
Share of turn-over generated by new products [%]	0,326	<b>0,005</b>	0,602	1,661
New products	-0,101	0,401	0,534	1,873
Continuous R&D in 2012-2014 (internal/external)	0,111	0,344	0,56	1,786
Installation, start-up procedure	<b>-0,003</b>	0,979	0,481	2,077
Maintenance and repair	<b>-0,049</b>	0,687	0,525	1,904
Training	0,072	0,51	0,647	1,545
Design/consulting/project planning	<b>-0,066</b>	0,547	0,644	1,553
Software development	0,016	0,89	0,591	1,691
Remote support	<b>-0,136</b>	0,211	0,65	1,539
Revamping/modernization	0,082	0,512	0,491	2,035
End of life services	0,092	0,368	0,728	1,374

It can be seen from Table 5 that all four hypotheses are confirmed. Indeed smaller the batch less likely is the company outsourcing services. Same is with the product complexity. More complex is the product less likely is the manufacturing outsourcing the provision of services.

Country seems to matter, and it seems that Slovenia and Spain with are more likely to outsource. Finally, there is the interesting result that was explored on the basis of Eggert et al. (2011, 2014) how innovation affects outsourcing of services. It seems that higher are revenues from new products, more likely manufacturer outsources its services.

Services that are dominantly done in house are installation and start-up procedure, maintenance and repair, design/consulting/project planning, remote support, services that are directly related to the product sold. Even though the differences are not statistically significant, the whole model is (Table 4) so at least according to the sign of the beta coefficients we can affirm that these product-related services are less likely to be outsourced or deservitized, equivalent to the fact that these services tend to be servitized. On the other hand training, software development, revamping/modernization and end of life services are more customer-oriented and by the sign of the beta coefficients we can assume that those services tend to be more outsourced or deservitized.



## Discussion and conclusion

In this work KBV was used as a theoretical lens proposed by Valtakoski (2017) to explain the servitization and deservitization effect of a group of three Southern European countries. The main premise of KBV and Valtakoski (2017) on grounds of (Grant, 1996) is that if a company does not possess the necessary knowledge the manufacturing company will tend to outsource part of service provision. However, services directly related to products are less likely to be outsourced because the company already has the know-how and does not need outside knowledge to provide these product-related services. On the contrary, customer-related services tend to be outsourced but there are several contingency factors that have to be taken into account. For example, the more complex is the product less likely will the company outsource service provision (both product- and customer-related services) because of the complexity of the product the manufacturer who is also the solution provider will have the necessary knowledge to provide the service along the product. Other benefit for not outsourcing provision of services in complex products is knowledge leakage raised by Valtakoski (2017). Usually, complex systems and products are done in small batches according to the Hayes and Wheelwright's (1984), so in a way this is the confirmation of their process matrix that complex products are done in small batches and both small batch and complexity of the product show low degree of outsourcing.

The contribution of this work is looking at servitization and deservitization from KBV, which is only theoretically proposed by Valtakoski (2017), but in this paper his propositions are empirically proven on a large European Manufacturing Survey database consisting of 296 cases of three Southern European countries: Spain, Slovenia and Croatia.

This is also the limitation of the study as it should include more countries with different manufacturing characteristics as it was seen in the results that production characteristics (in our case considered as control variables) show explanatory power of R Square = 0,236.

## Acknowledgement

This work is supported by funding of **Croatian Science Foundation O-1861-2014 – 3535 Building competitiveness of Croatian Manufacturing.**

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