

FORMALIZED PLANNING AND ITS CONNECTION WITH THE DEVELOPMENT OF REVERSE LOGISTICS: THE CASE OF SERVICES

Radoslav Škapa¹

¹ Department of Corporate Economy, Faculty of Economics and Administration, Masaryk University, Lipová 41a, 602 00 Brno, Czech Republic

Abstract

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The best-in-class companies are able to retrieve 64 per cent of the original value of reverse flows, whereas it is only 12.5 per cent in average companies. Thus, reverse logistics is a challenge that may bring additional benefits. The article analyzes the planning range of reverse logistics in the Czech service companies, and it further notes the relations between planning and other characteristics of a company. Our results indicate that the ability to recognize different connections of reverse flows in business (opportunities, threats as well as strengths and weaknesses) is one of the important factors that affect the advancement of reverse logistics in companies.

Keywords: planning, formalization, performance, reverse logistics, services, empirical research

INTRODUCTION

Reverse flows is an umbrella term for the flow of returned products, end-of-use products, recycled by-products, commercial returns (damaged products, recalled products, excess inventory etc.), packaging and other different kinds of “waste”. The word reverse has a metaphorical character: the above mentioned materials do not always move in the opposite (reverse) way, which is typical in business relations, i.e. from a customer to the producer. When the reverse flow is sold in the business-to-business environment, it transfers from a seller to a buyer. However, the word “reverse” refers to the whole (closed loop) supply chain perspective.

Reverse flows are a natural part of the economy and even if they trigger extra cost, it is impossible to avoid them completely. On the contrary, there are several reasons that nowadays increase the impact of reverse flows on the business environment. To name a few, it is the lack of resources and environmental concerns (De Brito and Dekker, 2003), the emergence of the corporate citizenship concept (Jayaraman and Luo, 2007), or

an implementation of liberal return policies in retail that were supposed to support customer satisfaction and loyalty (Rogers and Tibben-Lembke, 1999), which was eminent and typical in the expanding e-commerce sector (De Brito, 2003).

At the same time, more and more companies perceive reverse flows as a potential for value recovery and the source of competitive advantage. However, additional benefits (profits) generated from reverse flows do not occur as a matter of fact; companies need to pay attention to them and to design effective systems for re-processing of reverse flows (in other words – to establish reverse logistics that enables effective recycling, re-manufacturing as well as other forms of value retrieval from reverse flows). According to an empirical study by Gecker and Vigoroso (2006), there are remarkable differences between the best-in-class and average firms in terms of reverse flows re-processing (reverse logistics). The best-in-class companies are able to retrieve 64 per cent of the original value of reverse flows, whereas it is only 12.5 per cent in average companies. The best performers also keep the cost of reverse logistics lower – in their estimation the cost reaches up to 9 per cent of revenues,

whereas the cost of the average firms amounted to 12 per cent. All in all, reverse logistics is a challenge that may pay in the end.

It is the issue of the internal operations – reverse logistics organization – that this text focuses on. Specifically, it examines one aspect, which is the planning range of reverse logistics, and it further notes the relations between planning and other characteristics of a company.

The text is structured as follows: in the beginning, the objective of the research is introduced, followed by the explanation of the importance of planning in the reverse logistics context. The third section describes the research design and in the fourth section the results are presented and interpreted. Finally, managerial and theoretical implications are formulated in the conclusions.

Research Objective

The main objective of this paper is to describe the advancement of reverse logistics system planning on a sample of Czech service companies, and explore the connections to strategic motivations and perception of barriers and profitability of reverse flows. The main objective is decomposed into the three research questions:

Most businesses face reverse flows, or their processing, respectively. We can note on the basis of foreign and domestic empirical observations that the extent of interest in reverse flows (here rather attention paid to reverse flows planning) differs a lot. Are there therefore strategic, long-term motives of interest in reverse flows, which are typical (i.e. occur more often) in enterprises with advanced planning? In other words, is it possible to find a connection between a certain type of motivation and maturity of (formalized) reverse flows planning? If so, this would be one of the indicators of the fact that a certain type of motives leads to the development of reverse logistics more than the other. The word *indicator* is mentioned because obviously, such a connection cannot be completely proved using a cross-sectional study (see used research design). This leads to the RQ1: *Where do the motives of interest in reverse flows in enterprises with more developed planning differ?*

The second research question rather turns its attention from the causes (motivation) to the consequences: a created planning system is a mechanism that helps to solve certain problems and seeks to facilitate and streamline the control of reverse flows. If the company implemented such a control system, it can be assumed that it also affects the efficiency of reverse logistics as well as its character. Therefore, it is realistic to expect that it (more or less) eliminates some of the barriers associated with the development and operation of reverse logistics (or it can also create new barriers). Identification of differences in barriers can thus help to reveal aspects that eliminate or enhance the introduction of the system

of reverse flows planning. We can thus indirectly assume the consequences of formalized planning. Therefore the RQ2 is introduced: *What do the perceptions of barriers to the development of reverse logistics in enterprises with more developed reverse flows planning differ in?*

The consequences of formalized planning are also related to the third research question, namely whether it is possible to find a connection between the level of planning development and profitability of reverse flows. RQ3 is defined as follows: *What is the connection between the level of planning development of reverse flows and perceived profitability of reverse flows, or reverse logistics, respectively?*

Literature Review

Planning can be understood in a broader context as one of the methods / tools for control system formalization (Genchev *et al.*, 2011; Bowersox and Daugherty, 1992). It is formalization in the area of logistics that is considered a crucial attribute of progressive enterprises (Autry, 2005), which can reduce costs, streamline operations and improve overall efficiency and effectiveness of logistics; even though it entails negative consequences, its overall effect in logistics is positive (Bowersox *et al.*, 1992, cited by Genchev, 2012). This positive correlation was demonstrated directly even for reverse logistics (see Autry, 2005).

The very existence of planning (as a tool of formalization) in the company naturally does not mean “progressivity of companies”, or economic success, respectively. Many empirical investigations conclude that formalized planning is associated with the performance of the organization; on the contrary, a considerable number of studies refute such a connection (Lyles *et al.*, 1993). Richey *et al.* (2005) may serve as an example of the latter group as they did not prove a connection between formalization and efficiency of reverse logistics.

However, ambiguities in the research conclusions are often related to their precise targeting and methodology used: e.g. Baird *et al.* (1994) did not find a connection with performance as long as it was measured as ROA and ROE, but they found a connection with the rate of sales increase (and similarly did Robinson and Pearce (1983)).

It should also be noted that the effectiveness of planning enhances mainly the range of resources that a company will provide for planning, (low) level of resistance of an organization to planning as such, or the ability to take into account trends around the organization – the so-called external orientation in planning (Ramanujama and Venkatramana, 1987): effectiveness is thus related to the scope and content of planning.

Based on these arguments, we can provisionally accept the idea that formalized planning has a positive correlation with the performance, and try to find other connections, as defined by RQ1 to RQ3.

MATERIALS AND METHODS

Research Design

The following analysis is based on data from wider reverse logistics research in Czech enterprises, whose part it is. Character of the research and this study is exploratory and partially overlaps with a descriptive one. This corresponds even to the method of data collection: interviewing took place using a structured questionnaire in 2012. The obtained data were of a subjective nature, since most of the questions examined data enterprises do not follow (in a formalized way). Therefore, the data indicate the ideas and opinions of the respondents. Hard data was restricted only to identifiers of companies, which the respondents talked about. One respondent was always talking about one (unique) company.

The questionnaire contained 27 questions, of which approximately one third were open questions; this article, however, is based only on 4 questions that were closed (or semi-closed). The content and wording of the questions were adopted from research papers of De Britto and Dekker (2002), De Britto, Dekker and Flapper (2005), Gecker and Vigoroso (2006) and Klapalová (2007). The answers are evaluated quantitatively here – the frequency counts and the following tools of bivariate statistical analysis were employed: Spearman rank correlations and Mann-Whitney U tests. The non-parametric instruments were chosen because of the ordinal nature of variables. All calculations were conducted in the SPSS v. 21).

The Research Sample and Its Justification

Because the broader research, whose part is also this text, deals with reverse logistics especially in the service sector, even the presented study is based on data for businesses providing services: the research sample consists of 146 companies (most often restaurants and hotels). The absolute majority of the businesses are small (78%), while 14% of them are medium, and there are only 8% of large companies in the sample.

Selection of companies was based on the existence of direct and mediated personal contacts with representatives of businesses (convenience sampling). This procedure partially broke the random selection rule with all its negative consequences; in this situation, however, it was the only feasible way to obtain a sufficient number of respondents. With regard to the prevalent exploratory focus of the research, it does not represent a problem which completely rendered the obtained data worthless, and therefore the researchers accepted this procedure.

Services were chosen for two reasons: firstly, reverse logistics is very industry-specific (Rogers and Tibben-Lembke, 1998); therefore it is more likely to uncover new correlations and connections if we work with a more homogeneous sample.

The second and more important reason is the fact that companies providing services are neglected in research related to reverse logistics, or logistics in general or the issue of supply chain management in services is out of the main interest of researchers, respectively. Nevertheless, it is clear that even though we follow the traditional definition of reverse logistics ("The process of planning, Implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal." Rogers and Tibben-Lembke (1998, p. 2)) and do not include information (e.g. complaints – feedback) in reverse flows, we can still find reverse flows in services, and it is then clear that these companies have to deal with them to some extent. E.g. Fitzsimmons and Fitzsimmons (2011) called the material flows in services as facilitating goods, and they are one of the five components of the service package.

RESULTS

The main investigated variable is the range of reverse flows planning. The subsequent analysis uses a procedure that expresses the extent of reverse flows planning on the basis of data on whether the reverse flows are planned on the individual planning levels (in each case a dummy variable), i.e. at the level of a strategic corporate plan, a strategic plan for a function / company department, a tactical and operational plan (see Tab. I). Using these data, an index reflecting the degree of "inclusion" of reverse flows in the planning mechanism of a specific firm was established. The index originated as a weighted sum where the higher planning levels had higher weight (set arbitrarily): the existence of the plan for reverse flows was assigned the value of 1 (for operational planning) to 4 (presence in the strategic plan). The resulting value was determined for each company as the sum of these values (1–4) depending on which planning levels were present in the company. This indicator, whose value ranges from 0 to 10, is also labeled as planning index (for the distribution of its values see Fig. 1).

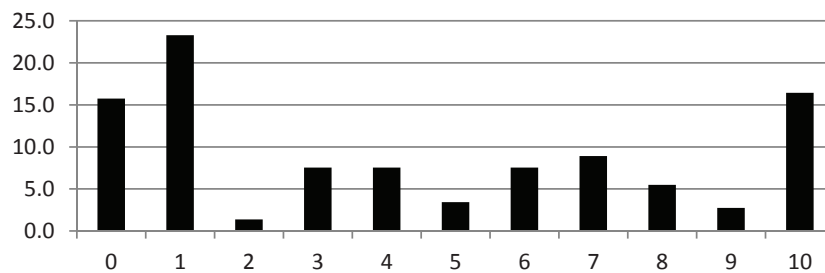
Results of the poll showed that the majority of companies plan reverse flows to some extent: only 16% stated that they do not plan reverse flows at all (index value 0). The index shows another two extremes – value 1 (only operational planning) and 10 (planning at all levels). These data are very similar to the findings concerning Czech manufacturing companies in the years 2009–2010 (see Škapa and Klapalová, 2011); the only exception is operational planning, which had been claimed by 69% of businesses (which is two times more).

RQ1 followed the connection between the reasons for interest in reverse flows and the degree of their planning; the extent of planning can be considered as an indicator of the degree of formalization

I: *Share of the companies planning the reverse flows (n = 146)*

Planning level	%	Weight in index calculation
Corporate strategy plan	55	4
Function/department strategy plans	65	3
Tactical plans	58	2
Operational plans	32	1
No plans – managed ad hoc	50	0

Note: The question was formulated as a multiple choice. Therefore, the choice of “no plans” together with other answers means that a company partly combines planning and ad hoc decision making. Companies most frequently combine the ad hoc and operational planning level.

1: *Distribution of planning index in per cent (n = 146)*II: *Reasons of interest in reverse logistics (n = 144)*

Reasons	yes in %	PI median	no in %	PI median	Mann-Whitney U	p
Customer satisfaction	90	4	10	1	672.5	.051
Competitive reasons	83	4	17	2	1127	.09
Government requirements	83	4	17	4	1417.5	.709
Customer loyalty	81	4	19	3	1127	.019*
Customer service	80	4	20	4	1535	.504
Cost reduction	72	5	28	1.5	1616.5	.036*
Image	72	4.5	28	1	1426	.003*
Differentiation	72	5	28	1	1562.5	.014*
Customer demand/pressure	61	4	39	3	2038.5	.078
Value retrieval	58	5	42	3	1942	.016*
Productivity increase	49	5.5	51	1	1862	.003*
Supplier demand/pressure	33	6	67	3	1808.5	.042*
Environmental issues	26	5	74	3	1536.5	.04*
Corporate soc. resp.	21	6.5	79	3	1096.5	.002*
Community	14	6.5	86	3	808.5	.012*

Note: * – statistically significant results. The items are ranked according to frequencies of “yes” answer. PI median – Median of planning index.

of reverse logistics, and thus an indicator of the level of interest in this area. Out of 15 different reasons (compiled based on a literature review, see Škapa and Klapalová, 2011), 10 reasons occur more frequently in companies with more developed planning (i.e. businesses that gave these reasons have a statistically higher value of the planning index, in this case measured by the median value) – see Tab. II. Moreover, even customer satisfaction is at the commonly accepted threshold of reliability; in fact, we can talk about 11 rather than 10 reasons. Generally, the companies that plan reverse flows more thoroughly give or are able to identify more

reasons (the correlation between the number of reasons and the planning index is Spearman $\rho = 0.345$; $p = 0.000$).

We can make a preliminary conclusion from this result that the ability to recognize different connections of reverse flows in business (opportunities, threats as well as strengths and weaknesses are expressed here as reasons of interest) is one of the important factors that affect the advancement of reverse logistics (here measured according to the level of planning development).

RQ1 examines the connection between the advancement of planning and barriers to further development of reverse logistics; in its background there is the assumption that planning and the associated formalization of reverse logistics removes some of the barriers to the development of reverse logistics, or certain barriers become irrelevant due to circumstances related to planning development.

The evaluation procedure was the same as in the previous case: dummy variables (that are indicative of the perceived barriers to the development of reverse logistics in a company) were correlated with the planning index. We can see from Tab. III that there is a connection between planning and the perceived barriers to the development of reverse logistics for 5 out of 17 barriers (if we would accept lower statistical significance – $\alpha = .055$, the number of these distinguishing barriers would be even 7).

The most important difference can be seen in the barrier concerning the importance of reverse flows (unimportance of reverse flows compared to other activities): companies that created a planning system report unimportance less often as a barrier to further development; if these companies invested energy in developing plans (they considered such an investment as relevant), it is natural that the opinion regarding unimportance will occur less frequently here. Similarly, the barrier of “unclear policy for reverse flows” is less frequent ($p = 0.052$); it is the existence of plans (or their contents) articulates / defines this policy. In addition, the idea that the insufficient performance measurement

of reverse logistics constitutes a barrier is less frequent ($p = 0.051$), which probably means that when defining their plans businesses also create (more or less sophisticated) ways to monitor whether the plans are implemented; thus they create a system performance measurement of reverse logistics.

On the other hand, they often consider the lack of funding for further development of this area, “Lack of technical equipment”, “legislation” and “inattention to environmental aspects of business activities” as a barrier – see the higher median values of the companies that reported these barriers. The barrier associated with finances may be based on the fact that companies know how to improve their reverse logistics and they hit just their financial possibilities. The “Lack of technical equipment” can be justified similarly: companies are familiar with the technology of processing reverse flows and they realize their technological obsolescence. To justify the influence of legislation, a further analysis would be needed, as well as in the case of inattention to environmental aspects, which is a surprising result.

To answer research question 3, a correlation between the planning index and the perceived profitability of reverse logistics was calculated, and it was expressed as a percentage by which reverse logistics increases or decreases the overall profit of the company. The Spearman correlation was positive and statistically significant ($\rho = 0.195$; $p = 0.046$). Businesses therefore seem to perceive the connection, or the planning effect, on the profitability of reverse logistics. The idea that the causal link would be reversed (i.e. that

III: Barriers to reverse logistics ($n = 133$)

Barriers	yes in %	PI median	no in %	PI median	Mann-Whitney U	p
Lack of staff resources	46	5	54	3	1729	.069
Lack of systematic management	44	3	56	4	1969.5	.346
Lack of know-how	41	3.5	59	4	2044	.68
Financial resources	38	6	62	3	1548.5	.013*
Insufficient performance measurement of reverse logistics	36	3	64	5	1627.5	.051
Unimportance of reverse flows compared to other activities	35	1	65	4	1520.5	.021*
Product nature	34	3	66	4	1596.5	.065
Power of customer	30	4	70	4	1721	.49
Legislation	23	6	77	3	960	.001*
Indefinite policy for reverse flows	22	1	78	4	1419.5	.052
Strategy /corporate policy	21	4	79	3	1222.5	.167
Lack of technical equipment	16	7	84	3	812.5	.023*
Inattention to environ. aspects of business activities	16	7	84	3	859	.048*
Insufficient support of IS	15	7	85	3	863.5	.09
Character of supply chain	14	3.5	86	4	901	.373
Character of market	9	3	91	4	725.5	.997
Restrictive policy for reverse flows	8	9.5	92	4	439	.129

Note: PI median – Median of planning index

the profitability of reverse logistics is the cause or condition of its planning) is very questionable. In fact, it is not clear how would a company achieve reverse logistics profitability without formalized management (i.e. planning), and even if it succeeded, why would it decide to increase its cost by making plans of an area that works well by itself.

CONCLUSIONS

The purpose of planning (and, more generally, formalization) is to align the business operation with the stated strategic objectives (Autry, 2005). Our empirical data show that companies try to achieve this compliance; however, reverse flows planning is not developed at all levels of the planning hierarchy in most companies, which is indirectly evidenced by lower interest of businesses in reverse flows. The result is thus similar to findings by Mollenkopf *et al.* (2007). Moreover, these authors confirmed a positive connection between planning (formalization) and reverse logistics efficiency. Further recent studies confirming this connection include e.g. Pfohl *et al.* (2012), and Škapa (2012) in the Czech environment. These listed studies can be supplemented by the presented study that also identified the mentioned connection in reverse logistics ($\rho = 0.195$; $p = 0.046$).

However, the main benefit of the study should be seen elsewhere: firstly, the study demonstrates that rules and experience applicable to reverse logistics (the contribution of planning in this case) will be at least partially relevant even to the service sector, despite the fact that the material dimension of the provided product is smaller in service, i.e. that the scope and importance of reverse flows is lower here than in manufacturing companies, and the fact that providing services is a process often involving customer participation; the difference lies in what is processed and also how it is processed.

Secondly, the study does not examine the connection between planning and relatively general constructs (such as resource commitment, supply chain orientation, or functional orientation, which are examples of constructs used in the studies cited), but it tries to identify in detail relationships concerning various motives and barriers. The result is a finding (RQ 1) that there is a correlation

($\rho = 0.345$; $p = .000$) between the extent of planning and the number of different motives (reasons) that businesses are able to recognize. If we generalize this finding, we can see that it is important that the companies realize different connections of reverse logistics, and especially their positive impact on the companies. It is the awareness of the diversity of motives can have a significant correlation with the level of reverse logistics development, and subsequently with the positive effects of reverse logistics on company profitability.

The analysis of barriers (RQ 2) then showed that a more sophisticated planning system is connected to other barriers: instead of barriers such as “unimportance of reverse flows ...”, or “Indefinite policy”, the focus of companies is shifting more to the lack of funds, “inattention to environmental aspects of business activities”, “legislation”, or “technical equipment”. These changes can be interpreted similarly: advanced planning is an indicator of higher interest in reverse flows. We can assume that such businesses have a larger know-how (due to higher interest and experience with more formalized procedures), and they are able to recognize opportunities to technically streamline their reverse logistics – this is why they also “hit” financial, technical or legislative barriers more frequently.

The word knowledge/know-how was mentioned here several times: managers’ knowledge of reverse logistics, and this is the area that further research could focus on because the interpretation of the results suggests that this variable can be in the background of the identified relationships (as a confounding variable).

Finally, we should mention limitations associated with this research: namely the scope of planning is described using the planning index (a one-dimensional construct). This becomes problematic in situations where planning is identified with a degree of formalization, which is a wider, multidimensional construct. It then results in a certain inaccuracy. In relation to the research design applied, limitations also involve the fact that data about a company come from one respondent (a single informant problem), which allows some data to be significantly influenced by the perception of a concrete individual.

SUMMARY

The paper describes the advancement of reverse logistics system planning on a sample of 146 services companies operating on Czech market, and further explores the connections to three variables: motivation for reverse logistics, its barriers and perceived profitability.

The data shows that reverse logistics planning is not developed at all levels of the planning hierarchy in most companies, which is indirectly evidenced by lower interest of businesses in this field. Similarly to other studies, the data supports the idea about relationship between planning (or formalization in broader terms) and profitability/effectiveness of reverse logistics. Thorough analysis of reasons (motives) of and barriers for reverse logistics suggests that managers’ knowledge of reverse logistics might play important role in advancement of reverse logistics in companies. Second, the study demonstrates that rules and experience applicable to reverse logistics is (at least partially) relevant

even to the service sector, which is characterized by intangibility of most of their products (i. e. by limited extent of material reverse flows used in the operations).

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Contact information

Radoslav Škapa: skapa@econ.muni.cz