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HABILITATION THESIS REVIEW

Title of the habilitation thesis: *Reverse logistics of defective products in management of manufacturing enterprises* (Scientific monograph, 2nd edition)

Author: **Dr. Marta Starostka-Patyk** - assistant professor at the Faculty of Management, Czestochowa University of Technology in Poland

This habilitation thesis is presented in the form of the scientific monograph published by Marta Starostka-Patyk with the title „*Reverse logistics of defective products in management of manufacturing enterprises*“.

The scientific monograph was standard reviewed by three European universities professors:

- Prof. Mourad Abed, University of Valenciennes, France,
 - Prof. Juan Moreno Gutierrez, University of Cadiz, Spain,
 - Prof. Virgil Popa, University of Targoviste, Romania,
- and published by WYDAWNICTWO NAUKOWE SOPHIA, ul. Mickiewicza 29, 40-085 Katowice, 2017, ISBN (print): 978-83-65929-00-6, 201 p.

Author of this monograph states, that he content of this scientific monograph poses one of the main results of the project entitled “*Logistics management of defective products in Polish manufacturing enterprises*” financed by National Science Centre with the decision no. DEC-2012/07/D/HS4/02071, under implementation between years 2013 and 2017, a manager of which was the same person as the author of this monograph Dr. Marta Starostka-Patyk.

The presented scientific monograph deals with highly current issues in management and logistics of manufacturing enterprises. From the submitted thesis it is evident that its main objective is to present a comprehensive set of proposals, models and recommendations in this field. The issue is also important in contemporary conditions in terms of environmental and sustainable development.

I state, that this scientific monograph is processed at a very good level of elaboration. The main chapters are organized in logical order. The monograph includes the introduction, six main chapters and conclusion. The theoretical part of this scientific book contains 2 main chapters (Chapter 1 - Logistics aspects in contemporary management purpose, Chapter 2 - Reverse logistics of defective products). The empirical part then contains other 4 chapters (Chapter 3 - Reverse logistics practice of defective products, Chapter 4 - Organization and functioning of reverse logistics, Chapter 5 - Interdependence of determinants in reverse

logistics management of defective products, Chapter 6 - Relationships of reverse logistics processes and differences in their Management).

a) Suitability of the research issue

The selected issue is sufficiently relevant and brings more significant scientific benefits in the field of management and logistics of manufacturing enterprises. This extensive research on this issue also brings practical and social benefits in terms of the environmental imbalances and in the context of sustainability. The presented scientific monograph provides a comprehensive view of the issue. We can assume that the importance of the issue is crucial. The realities of current global economy force the enterprises to consider the sustainable development concept as well. The concept of the reverse logistics precisely is enclosed into the concept of sustainable development of enterprises as an environmentally-oriented logistics concept. Nowadays with the highest priority it is significant within the strategy and strategic operations carried out by the enterprises to develop and maintain the competitive advantage, to bring higher business performance to the owners but on other hand to limit the negative environmental impact and reduce the consumption of materials and energy and decrease the amount of waste and emissions. But we can ask ourselves, it is not contradictory? Based on the results of my own extensive empirical research that was realized in recent years, as well as the research results other researchers worldwide and also research results presented in this scientific book published by Marta Starostka-Patyk, we can say, it is not contradictory, we can do it. Therefore I believe that it is possible to apply to the business strategy the slogan: "Save the planet and keep your business performance".

b) The research objectives fulfillment

The author defined the following main research goal: "to carry out an analysis and evaluation of the reverse logistics processes in the scope of the defective products' flows management in the Polish manufacturing enterprises". In addition another 5 partial goals were also set. I consider for the most important and valuable the partial goal: "Development of a descriptive model of reverse logistics of defective products, and its verification in the researched manufacturing enterprises".

I state, that this main and partial research goals were fulfilled through the scientific and extensive empirical research and its results are presented in this scientific monograph.

c) Methodology and own research results

The research results can be considered adequate in relation to the research goals defined. In general it can be stated that the presented scientific book provides benefits both from the point of view of theory as well as management and logistics practice. For the most valuable research results can be considered as the results achieved in the extensive empirical research realized in Polish manufacturing enterprises, as well as the proposal of methodical procedure and model of reverse logistics of defective products, and its verification in the researched manufacturing enterprises and also some specific recommendations for this process, which are based on the experience acquired.

This scientific book is divided into 2 main sections:

1. Theoretical part – pp. 9-62 (Chapter 1, Chapter 2),
2. Empirical part - pp. 63-165 (Chapter 3, Chapter 4, Chapter 5, Chapter 6).

- **The theoretical part** provides extensive literature analysis of the issue. Author used 347 scientific literature sources that were cited directly in the text of the book. The literature is recent and includes both scientific books and journals registered in the Web of Science and Scopus databases.

- **The empirical part** of the issue was based on an analysis of primary data acquired from the questionnaire survey research and on own observations and direct interviews carried out with representatives of the manufacturing enterprises. Scientific research was performed in the first quarter of 2014 on a representative sample of 302 Polish manufacturing enterprises from various manufacturing sectors characterized with some high potential for occurrence of defective products. On other hand I should declare, that the structure of the research sample according to the size of the enterprise is not well performed, because participants of the research were mainly the representatives of manufacturing enterprises employing from 1 up to 9 persons (micro-sized enterprises) - they were more than a half of the respondents (54.1%) also due to the fact that 2 large and 2 medium-sized enterprises and only 1 small enterprise were selected for the verification of the model proposed (see Chapter 4). The research results of the questionnaire survey are extensively described in Chapter 3 (pp. 65-90).

In the **Chapter 4** are presented own and the most valuable research results in the form of development of a descriptive general model of reverse logistics of defective products (Figure 4.2., p. 96), and its verification in a selected manufacturing enterprise and compared to real processes in manufacturing enterprises. This general descriptive model is then also in a wide form characterized on pages 97-103. The presented general reverse logistics model of defective products was also verified in manufacturing enterprises from a five different manufacturing sectors in Poland (e.g. manufacturing household appliances, manufacturing baby strollers, furniture manufacturing, manufacturing male clothing, automotive) to obtain information about adequacy of the described process in the economic practice (Chapter 4.3. - Verification of procedures in reverse logistics of defective products and Figure 4.3., Figure 4.4, Figure 4.5, Figure 4.6, Figure 4.7, pp. 105-109). I would to appreciate this methodical procedure of the author and the results of this qualitative research. The verification carried out in five manufacturing enterprises different in terms of parameters proved that the general form of the model allows any configuration of actions related to the reverse logistics processes in different sectors of manufacturing that would be individual and unique for each manufacturing enterprise. As the general model presents a general structure, each manufacturing enterprise must adapt this model to their operational conditions.

In the **Chapter 5** are presented own research results of the quantitative research concerning to the analysis of the interdependencies between factors that determined defective products' flows management in Polish manufacturing enterprises. The same research sample was used in the analysis of the interdependencies. For the statistically significant determination of the interdependencies between variables selected were used the Contingency tables and the Yule's correlation coefficient (statistically significant values on the level of $\alpha = 0.05$). I consider this chosen statistical methods to be correct and relevant to the research aim. The statistically significant correlation (measured by Chi-square test and Yule's correlation coefficient) between variables are presented in the Tables (pp. 122-138).

In the last **Chapter 6** are presented the statistical simulations of relationships between the reverse logistics processes in the defective products' flows management, employing the distance weighted least squares smoothing method. Author states some findings that by employing the statistical Mann-Whitney U test there were also certain differences between the returns categories and actions in the scope of the defective products' reverse flows management pointed out among groups of the Polish manufacturing enterprises. The manufacturing enterprises that took part in the research were divided into groups

regarding the employment level - i.e. micro, small and medium-sized enterprises. There were no large enterprises considered in the research because the share of their representative taking part in the survey was too low. Therefore, the performed test compared:

- micro and small enterprises,
- micro and medium-sized enterprises,
- small and medium-sized enterprises.

I have already above mentioned regarding to the inappropriate structure of the research sample according to the size of the enterprise (in the part of the verification of the model proposed in a five different manufacturing sectors in Poland - see Chapter 4), because participants of this questionnaire research were mainly the representatives of manufacturing enterprises employing from 1 up to 9 persons (micro-sized enterprises) - they were more than a half of the respondents (54.1%). However 2 large and 2 medium-sized enterprises and only 1 small enterprise were selected for the verification of the model proposed (see Chapter 4). In case of the research characterized in Chapter 6, the 3 size groups of enterprises (micro, small and medium-sized enterprises) were already selected correctly in relation to the questionnaire research sample structure. On other hand, the research result obtained can be generalized only specifically for micro and small-sized enterprises (probably also medium enterprises), but don't for the large enterprise. And this fact should be included explicitly into the main title of the monograph. And also the selection of enterprises for the verification of the reverse logistics model of defective products (Chapter 4) should be more correct regarding to the size of the enterprises selected.

d) Questions for the discussion

I have the following two questions for the final discussion:

1. The author could explain how they were the individual specific models for the reverse logistics of defective products in different sectors of manufacturing in Poland designed (see Chapter 4)?
2. Could the author to explain why they were selected just only medium or large-sized enterprises for the verification of the reverse logistics model of defective products in different sectors and enterprises of manufacturing in Poland (see Chapter 4)?

e) Final statement and recommendation

I declare that the habilitation thesis (scientific monograph) meets all requirements and therefore *I recommend it to its final defense.*

After a successful defense in the Scientific board of the Faculty (Obchodně podnikatelská fakulta v Karvině), *I recommend Dr. Marta Starostka-Patyk to award* the title "**Associate Professor**" /docent/ in the Study programme "**Business Economics and Management**" /Podniková ekonomika a management/.

Zlín, August 24, 2018



assoc. prof. Ing. Rastislav Rajnoha, Ph.D.