

# Preface

## INTRODUCTION

The global economy is a network of connections between different national economies, but also individual sectors. The proof of these strong relations was the reactions of individual ones to global, regional and local economic crises, which - as in the case of the last major crisis in 2007-2009 - significantly worsened their economic situation, forcing some companies even to declare bankruptcy.

Today's competitive advantage is not shaped by individual organizations, but by entire supply chains. Only the cooperation of suppliers of all chain tiers (especially 2nd Tier and 1st Tier suppliers), producers, wholesalers and retailers can provide an advantage over competitors. Therefore, the competitive struggle takes place between supply chains. Understanding this basis of functioning today's global business ecosystem allows for the design of chain structures (taking into account the use of appropriate technologies) so that, first and foremost, the information flow, then other resources, proceed efficiently, effectively and advantageously. The key to success is to understand that the information flow in today's supply chains is the primary one to the flow of other resources kinds (work, materials, money, capital).

The pharmaceutical industry has been described as one of the most innovative industries in the world. The reason for such a grading was the specificity of this sector - large expenditures on research and development, groundbreaking discoveries, inventing medicines for incurable diseases, etc. Also, it is influenced by a high level of quality management in industry, forcing supply chains to invest in the latest information technologies, a measurement of the quality of materials and finished products, transport and storage (especially in the case of cold chain management). That is why nobody is surprised today about the use of RFID or blockchain at a similar level to, for example, the one in the automotive industry, recognized for many years as the most innovative industry worldwide.

Nevertheless, there is easy-to-notice regionalization in this industry. It is divided into three parts: Big Pharma, Pharmerging and others. Big Pharma companies, originally from Western Europe, the USA and Japan, dictate the conditions of competition in the global market and are the best in research on primary drugs (brand drugs). Pharmaceutical companies in most cases do not have such significant amounts of money for business development, therefore they focus mainly on the development of generic medicines, also for their citizens, because generic drugs are usually cheaper. Other countries play a small role in shaping the global pharmaceutical sector.

Another reason to recognize that the pharmaceutical industry is unique is the fact that this industry shapes the state of the global society, especially the widely understood healthcare. The impact on public health in the pharmaceutical industry is undeniable. Therefore, it is subjected to a series of analyzes and criticisms, not only noticing its business but also its ethical character. This results in numerous reports and papers, mainly concerning: ethics in testing of substances and drugs on animals and people, ethics in the pricing of medicines for individual regional markets, dual patenting of medicines, generic drugs production, and finally - sustainable management, Corporate Social Responsibility (CSR), access to drugs of given brands in various parts of the world and charity activities. Therefore, this industry is particularly exposed to public dissatisfaction and criticism, which definitely inhibit the aspirations only to achieve high financial results. It is impossible to implement only business rules in this industry, but without including them, this industry could not carry out above all costly research in the framework of the drug development process. It should be mentioned that a very small number of research and experiments, and then testing of drugs, brings a positive result. Therefore, this industry has to be viewed holistically, trying to reconcile all the goals of all stakeholders, which seems to be a completely unachievable goal.

However, some of these goals can be implemented through logistics, focused primarily on providing the right resources at the right time, in the right place at the right acceptable cost. This is not usually the case, as is often mentioned in the literature, the provision of resources in the shortest time or at the lowest cost - it is about balancing all these goals to finally achieve the synergy effect, the overall best effect by combining them together. Supply chains will not avoid the necessity of solving classical logistic problems, such as make-or-buy (produce on their own or buy) as well as many conflicts of goals (tradeoffs) in different places of both single organizations and supply chains.

The basis for understanding logistics is understanding the specifics of the basic and logistic process, supporting. The basic process is usually the transformation of input resources (materials, knowledge and skills of employees, money, fixed assets) into output resources (finished product: good or service). The supporting process, referred

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to as the logistics process, includes everything that supports the implementation of the basic process: planning, forecasting, procurement, warehouse management, inventory management, sales and distribution, human resources management, information systems, etc. Understanding this foundation guarantees proper planning of logistics activities, also within the scope of supply chain management.

In view of the above considerations, the problems that many researchers and managers have been trying to solve for years remain valid, only the methods and tools for solving them are changing. However, despite their constant improvement, there are new conditions, variables that must be taken into account in these efforts, which compensate for the development of technology and make the same problems are insurmountable.

## **CAUSES OF PUBLISHING THE BOOK**

Considering the above problems, and taking into account the small number of literature on global supply chains in the pharmaceutical industry, we decided together with the Publisher that we will try to create a book that will combine the logistics and the basic process dimension in the pharmaceutical industry.

The literature on supply chain management in the industry chosen by us is quite modest. Search engines of scientific literature currently point to about 200 articles similar to this topic (example EBSCOhost, 24/07/2018), but mainly focused on risk management in these chains, i.e. on a part of supply chain management (SCM), very important from the point of view of the need of cold chain management, but however, it is a partial subject that does not reflect the specifics of the entire SCM in the pharmaceutical industry. Also many studies concern outsourcing in the production processes of this sector, which in turn refers to the problem of make-or-buy.

In turn, EBSCOhost indicated three books on a similar topic (as at 24.07.2018), and Google Books on eight (the others referred to fragmentary topics, as well as scientific articles), so the publication of a book similar to ours has become, in our opinion, justified.

Numerous, dynamic changes have supported this need both in the pharmaceutical industry itself, which is a natural thing in highly innovative industries, but also in the field of changes in technologies used in logistics. Updating the literature in terms of their use is necessary because they are being developed implemented very quickly and information from 10 or 20 years ago is no longer valid.

These reasons led us to start a book design project that ended one year after it began. Now we can offer this book for the Readers.

## **ORGANIZATION OF THE BOOK**

The book is organized into five sections and 14 chapters. A brief description of each of the chapters follows:

### **Section 1**

Section 1 contains the definitions of logistics, logistics support, supply chain, supply chain management, and description of the basic functions of them. The section indicates also the role of the information systems in creating the success of supply chains

#### **Chapter 1**

Chapter 1 reviews and presents the basic definitions in the topic of the book. Global supply chains are mainly focused on optimizing their business processes and there is no alternative but to go towards logistics management. The chapter identifies the basic elements of logistics and their functions in the supply chain management. It also highlights the importance of logistics support system in supporting the primary (production) process, and – in this way - creating the success of the individual organization and the whole network, including the supply chain.

#### **Chapter 2**

Chapter 2 establishes the need for an information flow strategy and presents sample structures of this flow. The authors of this chapter contend that by investing in the development of the information systems, the organizations and supply chains can achieve better competitive advantage and improve their processes and the business itself.

### **Section 2**

Section 2 contains the description of the global pharmaceutical industry, megatrends, and macro trends in the global economy influencing its development, and many other issues allowing for the general analysis of the current state of this sector.

#### **Chapter 3**

Chapter 3 presents an analysis of the current state of the global pharmaceutical industry. It concerns in managing those supply chains and their characteristics, for

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example, sustainability and CSR activities. The author describes the pharmaceutical global ecosystem and mentions the biggest market players, their characteristics, but also global trends creating the broader context of the development of the pharmaceutical market.

## **Chapter 4**

Chapter 4 takes theoretical and practical orientation and debates about the macroeconomic trends in the mentioned sector. It examines some challenges in supply chain operations as results of the global economic environment state. The overall aim of the chapter is to consider the issues related to launching new kinds of drugs, new ways of product procurement and distribution, but also embedding those into the global market changes.

## **Section 3**

Section 3 presents the details of the production process (the primary process) in the pharmaceutical industry and the chosen functions of the support (logistics) process in this sector (product development, sales, and distribution).

## **Chapter 5**

Chapter 5 reviews the whole product lifecycle and at the same time, it is the introduction to the subsequent chapters. It mentions the particular stages of developing, launching, producing and distributing the drug. The authors describe in detail each step of those processes and highlight the main milestones allowing to achieve the goal, which is launching a successful drug, what is the big challenge in the industry.

## **Chapter 6**

Chapter 6 describes more in detail the drug development process. The author focuses on the processes of laboratory experiments and drug testing, also indicating the important issues of ethical testing policy. She also highlights the difficulties in developing an effective drug - very few experiments and tests are successful and allow the drug to be marketed.

## **Chapter 7**

Chapter 7 addresses the issue of the primary process in the pharmaceutical supply chain, which is the production process, including, drug formulation, powder mixing,

granulation, compression, hot melt extrusion etc., so very technical issues of the mentioned process. The author describes also the packaging as the crucial element of the production process, especially in the field of the quality management procedures.

## **Section 4**

Section 4 provides the enhanced knowledge about the supply chain management in the global pharmaceutical industry. It allows for a detailed analysis of all functional areas related to the pharmaceutical supply chains including the newest solutions and current problems.

## **Chapter 8**

Chapter 8 reviews issues surrounding pharmaceutical supply chain functioning. It mentions supply chain challenges, structures, organization, operation, fragmentation, and also the emerging field of the reverse logistics operations. The author describes also the future challenges influencing the strategies of global supply chains and possible future scenarios.

## **Chapter 9**

Chapter 9 discusses in detail supply chain management practices, taking into consideration a high specific level of the pharmaceutical industry. Those areas include customer service policy, forecasting, planning, procurement and distribution. The approach presented by the author is made on the process-based approach. The last part of the chapter highlights the risks in the current pharmaceutical supply chain management.

## **Chapter 10**

Chapter 10 presents the best practices in the supply chain management, mentioned in the previous chapter. It presents all of the possible supply chain operations and describes the best solutions, also in cold chain management. This builds a set of the practices with high usefulness for managers.

## **Chapter 11**

Chapter 11 describes in detail the similar topic to this mentioned in chapter 2, which is related to the information flow. The authors present the blockchain and

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RFID technologies, their characteristics, a way of implementing, usefulness for the industry, including the pharmaceutical sector. They also provide a specification of the augmented reality environment, indicating the future challenges and possible development scenarios for the mentioned technologies.

## **Chapter 12**

Chapter 12 addresses the issue of knowledge sharing in the global supply chains. The authors indicate the role of knowledge sharing systems in creating the supply chain success, including performance indicators. They present the wide approach to set, measure, interpret, correct, optimize and control the performance indicators in the field of knowledge sharing, very popular today, in the era of learning and self-learning organizations.

## **Section 5**

Section 5 contains a detailed description of the current issues in the pharmaceutical sector: one about national and one about company's perspective

## **Chapter 13**

Chapter 13 analyses a case study of one of the biggest pharmaceutical company in Poland and Europe – Polpharma. The author focuses her thoughts on the sustainability and Corporate Social Responsibility issues by analyzing the policy of this company from many perspectives (economic, social, environmental). This case study, very valuable for managers and CSR researches, provides many instructions helpful in the process of developing the company's strategy.

## **Chapter 14**

Chapter 14 is also based on the case study, not on a single company, but the whole country. The authors describe the usefulness of the collaboration in creating a competitive advantage of the whole country's economy. They provide the theoretical and practical analysis of the Mexican pharmaceutical industry with taking into account the functioning of the global market players and their subsidiaries.

## **CONCLUSION**

To conclude, this book was aimed to provide a wide range of topics and knowledge about the global pharmaceutical industry. This is the reason why we wanted to describe both general and detailed issues regarding this broad topic. We hope we succeeded, at least to some extent, and respond to this challenge by providing a valuable position on the market of scientific books.

I hope that this book will meet the expectations of dear Readers and will allow them to gain broad knowledge in the field of supply chain management in the pharmaceutical industry. With great apprehension, concerns, but also with hope, I give you this book counting on positive reception and constructive comments on the topics we have touched on.

Best regards,

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