

Key Success Factors of drug Supply Chain Performance

Mahdiah Sheikhi

International Marketing Department, faculty of Business Administration, Qeshm International Branch, Islamic Azad
University, Iran
mahdiesheikhi@ymail.com

Maryam Goodarzi*(Corresponding Author)

Technology Management Department, Faculty of Management and Economy,
Science and Research Branch, Islamic Azad University, Tehran Iran
m-goodarzi@farabi.tums.ac.ir

Mohammadmehdi Shabani

CICECO-Aveiro Institute of Materials, Materials and Ceramic Engineering Department (DEMaC),
University of Aveiro, Aveiro, Portugal
m.shabani@ua.pt

Abstract

Regarding to the appropriate drug delivery to patients, optimum performance of drug supply chain is very important for health care systems. Determining suitable supply chain performance needs indicators which can facilitate the assessment of supply chain activities in all steps and furthermore, these kinds of indicators improve effectiveness and efficiency of supply chain and drugs can distribute more sufficiently. The results of this research seem that the type of technology, information sharing, variety of products and the average of inventory can affect the performance of supply chain and furthermore, the drug supply chain performance is partly measureable and it can be used in comparing conditions and different states of drug supply chain ensuring that changes' different states covers different variances contribute in outputs and inputs of drug supply chain and reflect them in achieved numbers. The purpose of this paper is to design a framework for defining key success factors which affect drug supply chain. So, firstly, dimensions of supply chain in drug industry are surveyed and then, main indicators which are necessary to evaluate the performance of drug supply chain are provided.

Keywords: supply chain, drugs, efficiency, indicators, information sharing

1. Introduction

Due to the fast changing needs of customers and dynamic environment that organizations face, supply chain management is very important (Gamme, Johansson.2014). Drug supply chain management can integrate all actives of medicine supply and help patients to access good drugs in suitable time. Drug supply chain in some developing countries deals with difficulties such as unsuitable management, low costs (Chukwu.2016). The drug sector plays an important role in the health and medical system. In most countries, the drug market is hardly regulated due to the unique nature of drug supply and demand. Depending on the competition in drug market, the governments need to regulate both economic and clinical side (Yu, et al.2010). The drug supply chain guarantees availability of drugs appropriate for individuals in the right time. This availability is a big challenge, unless it becomes simple and effective on the basis of customers' needs and demands (Chandrasekaran, Kumar.2009). Recent studies indicate that a main part of expenses of supply chain in health care can be diminished through an effective supply chain (Burns.2002).

This paper focuses on essence and elements of drug supply chain with noticeable attention on key success factors of it which can assist the managers to improve the performance of supply chain.

2. Drug Supply Chain

Health care supply chain includes various functions which are related to patients care, drugs, providers and medical tools (Gupta, Ramesh.2015). Supply chain includes costumers, providers, retailers and manufacturers which involve a process from suppliers to provide products and services to customers and stakeholders (Dittmann.2015). The process of drugs supply chain includes new product expansion, manufacturing, wrapping, and delivery to hospitals, pharmacy and patients. Furthermore, companies through supply chain move products from expansion phase to the market (Pharma 2020).

2.1 Measuring Drug Supply Chain Performance

Drug supply chain consists of different sections that begins from raw material supplier and ends in final consumers, whereas in an outgoing or output supply chain. Each chain will be used in other section and for preserving comprehensive ness in calculations related to measuring output performance of total chain supply it is consisted of total output in all groups that is shown as sum of outputs value in each group and enters in calculation in the same sequence for measuring drug supply chain performance, at the first step it is necessary to reduce outgoing or output constituent items as follows: (National Iranian Productivity Organization.2016)

1. Output value of each constituent section of drug supply chain must be provided separately.
2. Output in sections of chain supply that plays supporter role for the other sections is consisted of sum of manpower compensating value, inter mediator expenses and fixed capital.
3. Output of companies that directly work in drug producing must be consisted of all items that are produced in the company and presents it to the market. moreover it includes produced items on its own account (such as capital formation on its own) according to this, services that produced in a section of company and are used by another section of the same company as inter mediator expenses are not accounted in calculations. In this respect, values of final products are calculated.
4. Companies output values are acquired as follows:

Net sale: cost of purchased stocks for sale + ending inventory – beginning inventory + selected items from the other income such as rent of building and equipment. After computation of output, at the next step intermediate consumption will be computed as follows: Intermediate consumption is goods and services values that are used or transformed in producing process.

In measuring amount intermediate consumption, bellow items must be considered:

Intermediate compose is consisted of consuming raw materials for producing products, consuming of energy carriers (electricity, gas and all types of fuel) other consuming materials (all types of papers and stationary, devices that their useful life are less than one year and the other materials and essential consuming), cost of renting location and equipment, cost of building and equipment minor repairs, cost of staff education, services (such as outsourcing contractual cleaning building services...) and so on.

Third step of specifying added value is as follow:

- For support sections : added value = compensating staff services including produce staff cost + consumption of fixed capital such as producer and office's capital including machinery, equipment, building and installations + undivided profits – receivable assets income (payout, interest, rent) + payable assets income + payable current transfers (such as non-life insurance compensation, income tax and net assets sales tax) - receivable current transfers – sale of assets' net profit + inventory devaluation
- For sections that produce directly : added value = output value – intermediate consumption Supply chain performance index

These indexes are used for analyzing supply chain performance. Method of calculating and other explanations related to supply chain performance indexes are presented in table 1.

Table 1: Method of calculating and other explanations related to supply chain performance indexes

| Row | Index name | Calculating method | Scale commentary | Scale strengths and weaknesses |
|-----|-----------------------------|--|--|---|
| 1 | Profit margin | Before tax deduction profit/ total operating incomes | Ability to create high output from specified amount of sales | Because of homogeneity of included items, scale is able to evaluate the situation precisely |
| 2 | Added value to sale ratio | Added value/ total operating incomes | Revenue operation utility of raw material and proper inventory controlling | Because of homogeneity of included items, scale is able to evaluate the situation precisely |
| 3 | Stock profit of added value | Before tax deduction profit/ added value | Allocated stock profit to capital suppliers from institution added value | Because of homogeneity of included items, scale is able to evaluate the situation precisely |
| 4 | Staff sales per capita | Total operating incomes/ staff number | Proficiency and effectiveness of marketing strategy | It is not suitable in inflation conditions |
| 5 | Staff profit per capita | Before tax deduction profit/ staff number | Proficiency and effectiveness of manpower in creating profit | It is not suitable in inflation conditions |
| 6 | Wages efficiency | Added value/ compensation | Proficiency and effectiveness of institution compared to paid wages | Because of homogeneity of included items, scale is able |

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|---|-----------------------------------|----------------------------|---|--|
| | | | | to evaluate the situation precisely |
| 7 | Manpower efficiency | Added value/ staff number | Proficiency and effectiveness of manpower in creating added value | It is not suitable in inflation conditions |
| 8 | Per capita compensation | Compensation/ staff number | Average of staff compensation | It is not suitable in inflation conditions |
| 9 | Compensation share of added value | Compensation / value added | Compensation share of chain added value | Because of homogeneity of included items , scale is able to evaluate the situation precisely |

3. Key Success Factors of Drug supply chain

Since one of the components of supply chain strategy is indicators, if performance indicators of supply chain are defined truly and tally with its activities, can control the performance and achieve to objectives (Dittmann.2015, El Sayed.2013). Furthermore, the assessment of supply chain performance can provides the comprehensive perception from dimensions of supply chain and illustrates in which part of supply chain, there is a problem. According to the survey of Gamme and Johansson(2014), variety of products, the average of inventory, access to inventory, the range of sale price and forecasting the errors of supply chain performance were addressed as the indicators of supply chain performance (Dittmann.2015). The level of technology can affect the efficiency of supply chain. Moreover, distribution channels, transport infrastructures, staff training and their sufficient knowledge impact the performance of supply chain (Kanda, Iravo.2015, Fasanghari, et al. 2008).

The complexity of technology used, the existence of different partners, dynamic internal and external environment and unique characteristics of health care processes may preclude the suitable function of supply chain (Burns.2002). Recent studies show that the important part of costs in health care supply chain can be reduced through an appropriate supply chain (Green, Shaw.2002). Also, information sharing can decrease the costs in supply chain (Marinagi, et al.2015). Information sharing is a key components of each supply chain management that its quality can grow the costumers satisfaction (Abdullah, Musa. 2014).

The application of information technology in supply chain management can help the integration of supply chain and in addition, it leads to customer's satisfaction (Tseng, Nguyen.2011). Factors which link to supply chain success can assist manager in strategic planning or analysis different situations. The communication between customer and provider, commitment of senior management, capability of execution team, advisor skills and quality of information sharing have been presented as critical success factors of supply chain management (Talib, Abdul Hamid. 2014). Some of the significant factors in drug supply chain are suitable cost of R&D, strong commercialization particularly for new drugs supply chain and beneficial development of trials via clinical trial supply chain (Mayer.2012). Drug supply chain is one of tools for providing products to market through advantageous manner (Shah.2004). According to various studies related to the main factors which can cause the successful supply chain, some of these key success factors have been summerized and generalized to drug supply chain based on their domain of supply chain (table2).

Table2:Some of Key Success Factors in Drug Supply Chain

| Row | Key Success Factors in Drug Supply Chain | Domain of Supply Chain | Author-Year | |
|-----|---|-----------------------------|---|--------------|
| 1 | variety of products | Supply Chain Performance | Gamme, Johansson(2014) | |
| 2 | access to inventory | | | |
| 3 | range of sale price | | | |
| 4 | forecasting the errors | | | |
| 5 | level of technology | | | |
| 6 | Channels of distribution | | Kanda, Iravo(2015), Fasanghari,et.al(2008), Burns(2002) | |
| 7 | transport infrastructures | | | |
| 8 | staff training | | | |
| 9 | the existence of different partners | | Supply Chain Performance | Burns (2002) |
| 10 | dynamic internal and external environment | | | |
| 11 | Information sharing | Integration of supply chain | Abdullah,Musa(2014) Tseng,Nguyen(2011) Talib, Abdul Hamid(2014) | |
| 12 | communication between customer and provider | Supply chain management | Talib, Abdul Hamid(2014) | |
| 13 | commitment of senior management | | | |
| 14 | capability of execution team | | | |
| 15 | advisor skills | | | |
| 16 | suitable cost of R&D | | Mayer(2012) | |
| 17 | strong commercialization | | | |
| 18 | beneficial development of trials | | | |

4. Conclusion

According to mentioned points and factors, it seems that the level of technology and information sharing can affect the performance of supply chain and furthermore, the drug supply chain performance is partly measurable and it can be used in comparing conditions and different states of drug supply chain ensuring that changes' different states covers different variances contribute in outputs and inputs of drug supply chain and reflect them in achieved numbers.

It must be notified that in addition to the point that were considered as input and output for each level of supply chain, there are other factors that affect performance of total drug supply chain but are not shown in presented indexes in this article, or they are not included in numerical

value of index, because quantitative and numerical measurement of them was impossible. It is suggested that for future research, these mainly quantitative factors could be recognize more and if possible enter numerically in performance assessment indexes calculations.

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Biography

Mahdieh Sheikhi is a Ph.D. candidate in International Marketing Department, Qeshm International Branch, Islamic Azad University, Iran. She received her M.Sc. degree in Industrial Engineering- system management and productivity from Tarbiat Modares University.

Maryam Goodarzi is a Ph.D. candidate in Technology Management Department at Science and Research Branch, Islamic Azad University, Tehran, Iran. She received the M.Sc. degree in Industrial Engineering- system management and productivity from Tarbiat Modares University. Currently, she is expert of Innovation Initiative in Tehran University of Medical Sciences.

Mohammadmehdi Shabani is a Ph.D. holder of Materials Science and Engineering at University of Aveiro in Portugal. He was studying on the copper-based metal matrix composite processing and characterizing for the structural applications during his M.Sc. at Shiraz University in Iran. After his M.Sc., he was working as the welding and corrosion engineer of the pipelines in oil and gas industry. Prior to starting his Ph.D., he was investigating the nanocrystalline ceramic oxide coating growth on titanium-based alloys for the dental and biomedical applications. His research interests during his Ph.D., were on the growth, processing, characterizing and applications of nanocrystalline superhard diamond coatings on the ceramics for heavy-duty machining of the difficult-to-cut materials and the sealing improvement purposes.