Research paper on managing the pharmaceutical supply chain

Business, Marketing

Abstract

The increasing risks prevalence in the pharmaceutical industry supply chain has increasingly emerged to be a significant issue. This issue has forced the researchers, policy makers and other concerned parties to come up with a strategy through which the supply chain in the pharmaceutical industry can be smoothly managed. In this paper, the researcher comprehensively analyses the pharmaceutical supply chain risk management. In order to ensure that this is eventually accomplished, the Analytic Hierarchy Process (AHP) model has been adopted in quantifying the risks in the pharmaceutical supply chain of firms that are operating in this industry.

Key words: Analytic Hierarchy Process, pharmaceutical, supply chain, risk management.

In the pharmaceutical industry, supply chain represents a process through which organizations are successfully involved in production, distribution and management of the pharmaceuticals. These pharmaceuticals standards have to been met, in addition to, exceeding the customers' expectations. Although the modern day global market place provide the pharmaceutical firms reduced costs for numerous services and commodities, they face numerous undoubting challenges when it comes to the management of the of their supply chains. These supply chains are characterized by complexity and convolutions. As a result of the complicated nature of the pharmaceutical supply chain management, the industry has increasingly been exposed to foreseen and unforeseen risks. The risks portfolio is manifested within the supply chain or various companies marketing. Therefore, the organizations

are always exposed to these risks wherever they are seeking goods and services through which they can be able to meet their overall objectives and goals.

As a way of ensuring that the differentiated competitive advantage is achieved and continuously sustained, the organizations have continuously emphasized on risks management. This is enhanced by development of responsive and flexible supply chains. Such marketing supply chains are capable of sensing and responding to continually transforming business environment. The sequence in the pharmaceutical supply chain is characterized by risks as well as increasing pressure and influence from the regulatory policies. This is, in addition to, the influence from the customers, changing legislations and cutthroat rivalry. These forces are increasingly forcing the forward looking pharmaceutical to implement an effective supply chain management (Asamoah & Annan 50).

When the risks are not properly managed, the result is delays in the production and distribution process. These delays have a high likelihood of taking a significant toll on the profitability of the pharmaceutical market, confidence in the market supply chain, as well as the shareholders wealth. In the long run, risk management in a supply chain has increasingly been emphasized in many organizations. As a result of risk management implementation, greater opportunities emerge through which the organizations can eventually improve their comprehension on the latent risks sources as well as how these risks results in disruption of the marketing supply chain. 1 Hence, if the organizations are striving towards optimizing

their eventual performance, the emphasis has to be drawn towards continuous analysis of the main risks in the entire marketing risks. This ensures that organizations are capable of understanding how the manufacturers, retailers, distributors, customers and suppliers are affected by the supply chain management in the pharmaceutical industry.

In this paper, the AHP is adopted, which is an approach in Sensitivity Analysis (SA).

Hence, this paper adopts the AHP-based sensitivity analysis (SA) through which supply chain management is explored in the pharmaceutical firms. SA is one of the approaches through which sensitivity to the different variants is examined from the objective perspective. SA is asserted to be a significant tool when it comes to alternatives elimination, safeguarding the process of group decision making while availing the actionable information in relation to the decision robustness. Therefore, SA is used when it comes to testing of the model results responsiveness to likely parameter values responsiveness. It, therefore, provides significant information through which relative risks can be managed among various course of actions. 2

The remaining part of this research paper is arranged as follows. There is a section two where a literature review is comprehensively presented. In this review, sensitivity analysis and the supply chain management is presented. Thereafter, the next section is a research methodology. This is followed by research findings presentation and discussion. The conclusion and future research is based on the results unfolded from this research.

Literature review

Various studies have been conducted focusing on management of supply chain risks (Bhattacharya et al. 22; Enyinda et al. 202). 3 Based on the appropriate literature review, legislation and regulation, reputation, operation, market, financial counterfeit relationship, regulation agencies, currency fluctuation, intellectual property infringement, supplier failure, exchange rate, legal liability and underdeveloped product pipeline are some of the significant risks increasingly disrupting performance of pharmaceutical supply chain (Enyinda et al. 2002). Enyinda et al. (202) unfolds that the main management components are inclusive of identification, analysis, reduction, acceptance, transfer, and monitoring of the risks. In pharmaceutical organizations, mitigation strategies of the supply chain risks are inclusive of mitigating, avoiding, retaining as well as sharing the risks (Asamoah & Annan 50). In order to ensure that a pharmaceutical firm can continuously remain viable in the ever increasing risks, in the business environment, it should imperatively apply supply chain risk management. Asamoah and Annan (50) has highlighted the benefits of the supply chain risk management. According to Asamoah and Annan (50), these benefits are inclusive of better decision making, improvement in the balance between the threats (risks) and opportunity, improvement in viable position, achievement of a greater mutual understanding of interests and supply chain problems. Though, Asamoah and Annan (50) highlight that lack of appropriate risk management has a high likelihood of diluting the confidence and reputation from the customers' perspective. This eventually results in reducing the shareholders' value due to reduced profits.

Sensitivity Analysis (SA)

As Enyinda et al (203) unfold; SA is used when it comes to the determination of whether the overall priorities are sensitive to changes in criteria importance. As the alternatives ranking become increasingly stable and insensitive, the decision makers' confidence increases in the proposed selection. 4 Enyinda et al (203) terms SA as local disconcertion effect over stability and results analysis. SA is, therefore, approach incorporated when it comes to investigation of the reasonable changes effects in base-case assumption. It is alternatively an approach through which decision makers are allowed to explore the effects of ideal decisions and potential changes in any of the variables.

Enyinda et al (203) has additionally analyzed various SA uses. These uses are inclusive of defining the effects on ranking of the alternatives or changes in several model suppositions, improved decisions, and deciding on the definition of the data estimates before a decision can eventually be made. This eventually ensures that the management is assisted to focus their attention on most significant elements when implementing a decision.

Based on the imperativeness of SA in decision making, it has continuously been applied in areas such as medicine, pharmaceutical, civil engineering, computer science and political science (Enyinda et al. 203). Enyinda et al (203) emphasize that based on the uncertainty and risks, organizations are left to answer the recurring question. This question bases on " what if". The ' what if' evaluation (also referred to as the SA) is a method where organizations are able to assess how changes in parameter values affect the

model output. It, therefore, ensures that organizations are clearly able to understand the supply chain risks affecting them. Essentially, the SA is employed when it comes to examination of the models responsiveness to the changing parameter values. Therefore, it avails valuable information through which the relative risks can be appraised among alternative courses of action. Essentially, SA " tests the responsiveness of model results to possible variations in parameter values. It thereby offers valuable information for appraising the relative risks among alternative courses of action.

Research methodology

In the decision making environment, various criteria are incorporated. These criteria are referred to as MCDM. The supply chain management in the pharmaceutical industry involves a characteristic MCDM problem. This problem incorporates various quantitative and qualitative criteria. AHP is a basic model selected in global pharmaceutical risk management. This model was developed by Saaty (Enyinda et al. 202). 5 Selection of AHP bases on the understanding that it ensures that decision makers are successfully able to model a multifaceted problem in a hierarchical structure. In such a structure, the relationship of the overall criteria, goal, objectives and alternatives is portrayed. The usefulness of AHP is portrayed by its incorporation to various researches. The researches in which AHP is used are inclusive of supply chain management and operations, pharmaceutical supply chain management, and marketing (Enyinda et al. 202). For the pharmaceutical case, risk criteria and sub-criteria were identified. From the

risk management policies and risk criteria, pharmaceutical supply chain risks management is developed.

The supply chain management for the pharmaceutical organization using AHP model

In the risk mitigation, four components are incorporated. These components are inclusive of definition of the problem, criteria identification, highlighting the measures of risk control and selection of the best policy for risk management. The alternatively considered risk management policies are evaluated on the basis of a multi-criteria approach. Using the AHP methodology, a problem is decomposed followed by performing pairwise evaluation of all the rudiments. In the pharmaceutical supply chain, risk management is a multi-criteria problem. This problem incorporates the quantitative and qualitative variables. When it comes to AHP incorporation in decision, the following stages are employed: (a) clear statement of the decision statement as well as the overall objective, and (b) structuring the ladder from the top to the lowest levels. The first goal (level) involves mitigation of the risks in the supply chain. The main benchmarks to the supply chain management are enclosed in the second level. The third level is where the sub-risks in the supply chain are reported. The alternate strategies in risk management are incorporated in the final level. As Enyinda and colleagues clearly highlights, risk response strategy is achieved when the risks are reduced, avoided, transferred or retained (p. 202). 6

The final stage involves constructing a pairwise set of matrices. This comparison is developed in such a way that it enhances ranking of the trait

raw to each of the attributes that n columns presents. This is followed by expression of these judgments as an integer value between 1 and 9.

Discussion

For the main criteria in supply chain with respect to objective, RLR is highly considered. Closely following RLR are the OPR and RR. For every sub-criterion, disclosure and social responsibility are upheld as the most significant benchmark. In relation to the sub-criteria, the composite results highlight risk management as the best strategy in a supply chain. In order of importance, this is followed by risk reduction, risk sharing, risk retention and risk transfer.

In sensitivity analysis, reduction of the priority risk of regulatory approval is a clear indication that the risk management alternatives are not changed. This is, therefore, used to imply that the alternative options of risk management remained stable or robust. In Rossetti (612) study, no ranking changes were experienced after an increase of the legislation change. 7 Rossetti (602) also highlighted that the reduction in the R&D risk importance had no effect on the ranking. In addition, the rankings remained at the same position after increasing the priority of distribution risk.

Conclusions and implications

The importance of taking advantage of the cost opportunities and new markets has resulted to stretching of the pharmaceutical supply chain more than ever before. This stretch has eventually resulted in equal production of marketing supply chains, in addition to, being exposed to increased risks.

The risk management in the pharmaceutical marketing supply chain management is a significant problem. This problem emerges when it comes to identification and mitigation of the risks. As this paper unfolds, supply chain management is a multi-criteria and multi-person decision problem. Improvement of the decision making procedure can be enhanced through a logical and systematic method in evaluating the risk management priorities. This takes place on the basis of supply chain managers' opinion judgment. This is also enhanced by the effort of officers in charge of supply chain risks in the pharmaceutical firms. Therefore, this paper has introduced and incorporated AHP in the analysis. This is a MCDM methodology labeled significant. It involves the supply chain risk management with various conflicting objectives as a way of eventually reaching a unanimously agreed decision.

In this paper, AHP-based Sensitivity Analysis (SA) is leveraged to examine comprehensively how it can be applied in the pharmaceutical firms supply chain management. As the paper eventually proves, the AHP-based Sensitivity Analysis model is significant when it comes to group decisions making. The model is also useful when it comes to identification and determination of the best policy that can be adopted in risk management. As the results clearly indicate, legislation and regulation are the most significant risks. These are closely followed by the operational risks. For the policies in risks management, the reduced risk policy was highlighted to be closely followed by risk avoidance strategy.

This paper contributes towards identification of the most significant risks as well as the best strategy in supply chain management. Another significant contribution of this paper is connected to the incorporation of the AHP model to perform SA in respect to the marketing supply chain management portfolio. Certainly for various firms operating in the pharmaceutical industry, management of their supply chain has been increasingly prominent in the marketing process agenda. As a way of ensuring that regulatory compliance is eventually met, the consumers' safety and health should be ensured. This should be accompanied by growing profits and ensuring its pharmaceuticals long-term accomplishment. This is a way of eventually ensuring that the supply chain management becomes imperative.

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