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Optimization of the Supply Chain of Aromatic and Medicinal Plants (AMP): Challenges and Strategies

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ABSTRACT

This article describes the main challenges that affect the flow of the aromatic and medicinal plants (AMP) chain. Some of the area highlighted in the article include supplier management, production, processing, customization, meeting the standard and the regulation, acquiring and procuring, transportation, and marketing. It also identifies the main challenges facing this chain and proposes several avenues to improve the competitiveness and sustainability of the AMP industry: concentrate scientific information, utilize such tools as management of growth cycles with the help of modern technologies, and develop various supplies as well as transport facilities. The ultimate strategy is to enhance the concepts of sustainable growth and improve the opportunities for economic and social gain.

Keywords: Aromatic and Medicinal Plants (PAM), Supply Chain, Supplier Selection, Production and Processing, Marketing.

1. INTRODUCTION

Plants used in aromatics and medicine commonly referred to as AMP's' have always been of utmost significant importance in the domain of traditional medicine and pharmacy, cosmetics as well as cooking spices. AMPs are now required in various fields of the economy thanks to their uses in treatment and aromatics. However, managing supply chain in these items is not without its difficulties some of which affect their availability, quality and price in the market [1].

They differ from the tradition by being composed of phased AMP logistics process that includes collection of raw material, transforming these into products, producing, distributing and marketing them. All the steps should be taken with a consideration of final products' quality and how they would meet consumers' expectations. However, there are numerous barriers that continue to occur at all forms; this makes the management of this supply chain to be extremely hard [2].

One of the critical issues remains the absence of the proper and effective access to the scientific data concerning AMPs and their updated information. A lot of information that would help in enhancing the therapeutic and olfactory qualities of plants is provided in literature which makes it hard to access the

required information from different sources and there are no compendiums that compile such resources. Furthermore, minimal knowledge as well as insufficient funds and equipment to conduct extensive research concerning these plants greatly limits any advancements within the sphere of innovations and steady development of products.

Another essential factor that influences the supply chain is the variability of AMPs that occurs within a specific period of the year. Some factors have to do with production, where factors such as growth and surge in different seasons as well as changes in weather may make the raw material to either become scarce or abundant, thus leading to instability in the market. In order to reduce such risks and ensure that SC is not interrupted throughout the year, good and effective planning and inventory management should be carried out [3].

Besides, when it comes to suppliers, it is necessary to focus on the choice to ensure the non-acceptance of any low-quality raw materials. A major characteristic of AMP suppliers is that they can be geographically dispersed and this results in a wonderful variety in the growing conditions and techniques of harvesting. They can thus lead to rather dramatic differences with regard to plant quality issues. Many firms face other challenges in the supply chain management due to the nature of contracts as well as absence of transport networks.

The processing and production of AMPs also has some specific issues. Due to the expanding market competition it is crucial to always meet the high production rate by maintaining quality standards. Nonetheless, they may not satisfy the current economic demands for processing even though they have several benefits. For a number of products to become efficient and of high quality, certain investments into modern technology and processes must be made.

Other important issues are related to the production of goods tailored to conjugate requirements, and strict adherence to legal requirements. Customization of the product and compliance issues can complicate the production and distribution processes in terms of management and may entail a need to frequently monitor changes in the law [4].

Thus, it is imperative to develop the Word of Mouth of the advantages of AMPs for their marketing. Therefore, to help AMPs providers succeed in their commercialization quests, it will be important to address other application challenges such as competition from other similar products and, market channel distribution.

The general goal of this article is to explicate specific logistical concerns and analyze practical counterparts in relation to the supply chain of AMP. Our objectives are to know the main challenges and study approaches in enhancing competitiveness of this industry, as well as optimizing AMPs' prospective for sustainable growth and achieving the highest economic and social gains.

2. CHALLENGES IN SUPPLIER SELECTION

Organizations must challenge themselves to deliver excellence whilst being located in the ecological hole.

Supplier selection is critical in the AMP logistics since it determines the quality of the materials used in the products and their availability. However, the following are some of the major challenges that are still evident in this area. Here often the supplied raw materials possess the problems of quality variation. Climate factors, methods of reaping or picking and handling of the harvested AMPs after they are cut influences their therapeutic and aromatic qualities. These factors when varied significantly affect the quality of the plants, thus affecting the reputation of the products in the market.

The transport management of AMP suppliers is commonly intricate because such suppliers are frequently geographically dispersed. Lack of transportation network hinders the supply of plants, because plants are harvested in certain regions. In addition to this, it also has the loophole of possibly bringing a factor of increasing transportation costs and thus reducing on the net profits [5].

Bargaining with suppliers can be time consuming thus take many years before an agreement is arrived at. Cultural differences, differences in expectations, norms, and regulation concerning business work together to make negotiations even more challenging, and this leads to the delay of contracts 'close' as well as disruptions in supply chain. To boost the process of selection of suppliers, it is possible to develop definite requirements to quality and perform periodic inspections. It's hence possible to reduce geographical dependence when the company successfully creates links with a local as well as other suppliers located in other countries. In order to preserve the access to negotiations and to ensure that supply deals stay on the market, it is most advisable to develop clear and reasonable contractual relations as well as cooperation with partners based on trust and openness.

3. OBSTACLES IN PRODUCTION AND PROCESSING

Of course, when it comes to the concept of excellence and commercial scope we cannot but mention the Center for International Private and Business Law of the National University of Singapore (CIL).

Thus, evaluating the phase of production and processing is crucial to guarantee the quality and efficiency of business operations. Still, she encounters the following major challenges. The seamless delivery of quality services in large quantities is almost impossible. There must be a guarantee of the strong control over the change processes in the sense that the final products meet the stipulated levels. Alternatively, the efforts to raise yield reduce the quality of the end products as stated in the following passage.

While the traditional processing methods are packed with the lovely cultural practices, they are normally time-consuming and expensive. To bring a change in these aspects and enhance the working activity, it is necessary to update such techniques that helps in cutting costs. Applying the manual and artisanal approaches result into inefficiency that may contribute the high cost of production hence limit the supply in the market.

Correspondingly, the properties of plants must be retained during the process of transformation. Thus, it can be concluded that in order to preserve the unique fragrance as well as the medicinal properties inherent in the complete set of AMPs, it is vital to adjust the methods of processing these molecules. Depending on conditions if they are not suitable temperature, humidity or some other factors can change these characteristics and affect the quality of the final product [6].

Presumably, by introducing advanced technologies in operations and fine-tuning of the processing procedures, one is able to enhance both quantity and quality of the products produced. The operator training is required to be constant and quality control measures should be implemented to make sure that the quality benchmarks are being followed. Additionally, the adaptability of such conversion procedures enhances the capacity productivity of AMPs without straying far from their essence.

4. COMPLEXITIES OF ADDITIONAL TRANSFORMATION

The two major trends identified include customization and compliance to standard.

Adapting AMPs to the particularities of a particular market entails extra expenses and, at the same time, represents a complicated exercise in terms of regulatory compliance. By meeting the consumers' demands by developing products to suit them, firm may end up experiencing higher costs. Customizing a good and service can complicate manufacturing processes and therefore negatively influence organisational processes for production functions in consideration of requisite alterations, including the adaptation of tools and quality assurance measures.

The processing procedure is made even more intricate by most of the strict regulations that must be met. The cosmetic or medically employed AMPs are under intense environmental and health laws. Basically, for any change to be made on the products, it is mandatory to adhere to these regulations. This entails extra evaluation, safety trials and getting of license from the relevant regulatory authority.

As for the possible actions to minimize costs connected with customization, it is necessary to ask for an increase in differentiation efficiency and application of flexible managing methods. To address the issue of regulation, organizational leadership should endeavor to be familiar with the adjustments in legislation, as well as implement proper use of methods of compliance management. Thus, compliance with standards can be achieved in cooperation with the regulation specialists and with the help of tracking tools.

5. SUPPLY DIFFICULTIES: NATURE OF RESOURCES AND SEASONAL FLUCTUATIONS

In its current state, AMP supply has several problems attributed to fluctuation in the numbers and types of plants and unknowns with the natural resources. The raw materials which are used are affected by plant growth cycles. Furthermore, supply planning has to be very flexible and thorough because AMPs are used in natural cycles that have specific seasons. Failure to plan on the cycles for harvest will lead to establishment of improper large quantities or small quantities, thus emphasizing the balance in the supply chain [7].

There is a problem with the weather instability that can lead to unsuitable working conditions, for example, shortage of water, increased precipitation or important changes of temperature affecting negatively on supply chain. Adverse events related to climate can affect plant growth and thereby the quality of raw materials and therefore the planning of supplies in the chain.

These elements include soil, water and biological diversity are known to affect major atmospheric activities. These are certainly subject to environmental influence, soil deterioration and other situations that may cause disruptions in resource accessibility.

To eliminate the effect of risks associated with seasonality these aspects can be solved in the following ways; Weather prediction technologies can be adopted Weather prediction technologies can be adopted Flexible systems of stocks management can be implemented. There is better weather to get a higher amount of energy and to satisfy the demands of consumers; besides, diversifying the supplies can help to avoid the negative influence of severe weather conditions. Linking with the local and international farmers guarantees supply all the year round to cater for the available demand [8].

6. TRANSPORT PROBLEMS: RISK AND EXPOSURE OF PRODUCTS AND STRUCTURES

This is mainly because most of the products are fragile and the transport networks are relatively inadequate, the question of how to transport AMPs arises. There is usually a high susceptibility to environmental factors because AMPs are generally fragile. Accompanying their transportation, it is vital to maintain special conditions in handling, storage, and packaging in order to maintain quality on the product. If products are submitted to intemperate conditions they may spoil and reduce their quality and marketability [9].

Problems of inadequate transport are also felt by AMPs because they are often established in rural areas and they can receive a slow response in terms of delivery since they may not be financially capable of affording better transport. The supply of finish consumer goods could become a problem because of the roads which may be impassable or completely lacking, inefficient and unreliable public transport and a weak logistics base [10].

In today's context, they should include suitable transport structures and organizing mechanisms that enable control over the current conditions of transport. The quality of the AMPs can also be maintained by employing transport means that suits the attributes of the peptide through use of refrigerated vans and well-packaged grains. Thus, applying specialized logistics services could be a solution when it is impossible to overcome the identified limitations due to infrastructure deficiencies.

7. CHALLENGES IN MARKETING: AWARENESS AND DISTRIBUTION

Managing the marketing for AMPs comes with some challenges some of which include; Consumer awareness, competition and mode of sale. It is here again that AMPs are unknown in most cases by consumers who are relatively unaware of the benefits tied to such organizations. However, to increase the demand, there is a need to effectively market the AMPs together with their properties and uses. Nonetheless, since health and wellness appear to be attractive concepts, low demand could be attributed to people's ignorance of the matter [11].

AMPs are more likely to be consumed by patients along with other products and services such as food supplements, herbal remedies, and medical therapies. It can complicate the process of comparing AMPs and how they need to be positioned in the market individually. To effectively target the potential audience, it is essential to determine the most suitable methods of distribution for the outcomes of the work. There are several channels through which the intended AMPs could be marketed and made available for purchase, these include; wholesale/retail markets, cosmetic shops, pharmacies, and e-commerce. Costs, reach and visibility are the three factors that differ from one channel to another as each has its own strength and weakness. It was also established that there is a need to identify the right channels to target the consumers who may be interested in the commercial use of AMPs [12].

Nonetheless, the following awareness strategies should be put in place in order to educate the consumers on the importance of AMPs as well as their usefulness. This means that one has to develop unique brands and distinct market techniques in order to attract the attention of the public. In view of this, we will ensure that in our distribution channels, we make extensive uses of both the traditional and the advance electronic media.

8. CHALLENGES OF FRAMEWORK AND LEGISLATION

However, in relation to the use of communication as a strategy for compliance with the rules it was found out that it was widely used by the authorities.

Supervision and legislation thus assume the core place in the supply chain in relation to AMP. To this extent, it becomes possible to set up direct, no-holds-barred communication with consumers in an aim of facilitating a healthy rapport to be able to sway their opinion. At present, AMPs are quite popular, and many consumers trying to get accurate and specific information about the characteristics, advantages and uses of AMPs. Through communication, there are abilities to educate the consumer on the probable gains of using the AMPs hence enhancing their decision making process.

Manufactured Food Products (MFPs) have to adhere to severe food safety, health and environment standards. Adhering to these regulations is usually a challenge and costly. Another has to do with ensuring that there is a very efficient compliance management where key changes in regulations defining product safety and quality are monitored. At the same time, cooperation with regulatory specialists and the utilization of the traces of tracking technologies will also help with the standards compliance [13], [14].

CONCLUSION

Due to this the supply chain of AMP, the aromatic and medicinal plants must be enhanced since its supply, quality and access in the market must be assured. Evaluating the outlined issues in detail, it is possible to distinguished several key problems of the logistic system which will require further enhancement in order to elevate the effectiveness of this critical sector. Therefore, if the necessary strategic measures are taken and paths aimed at improving the identified aspects are launched, it is possible to create a more sustainable supply chain.

Due to the dearth of accurate scientific information on AMPs, the advancement of research and innovation is significantly affected. A process of creation of centralised and easily available databases must be initiated with investment on researchers for obtaining better quality data for optimising therapeutic and olfactory characteristics of plants. From the findings, if adequate investment would be made in the research skills development in the future, there will be improved knowledge pool on AMPs and development innovations.

The last critical challenge relates to availability of plants; most of them are occasionally available due to seasonality. Optimizing such aspects as renewing phases by using modern technologies like sensors and informational logistics based on artificial intelligence could be beneficial. At the same time, risks related to the seasonal and climatic fluctuations can be minimized with the help of the diversification of supply sources and developing relations with local and foreign farmers.

Another factor that needs to be given satisfactory attention is supplier selection in a bid to enhance the quality of raw materials being procured. To manage the variations in the quality of the materials supplied it is possible has set favorable standard of quality, conduct regular check on the supplies, and suppliers can be checked and hired to produce proper qualities. For integration of the supply chain management, the contracts should be easily understandable for the two parties to engage, and most of the time, there should be existing trust between the two parties.

It is crucial to implement advanced forms of production and processing, or, in other words, acquire and improve the production efficiency in the volumes corresponding to its readiness to provide for high-quality products. The important characteristics of AMPs shall be maintained, and the performance of the operators is improved; this is where experience in continuing education of the operators and using new methods of processing can be very beneficial.

Other issues involve products' differentiation and the question of compliance with the existing legislation. Thus, these expenses must be controlled through the intensification of production management and the creation of flexible business structures. This way, it is possible to realize compliance with standards for legislative changes and cooperate with the regulatory specialists that will guarantee the safety and quality of the product.

As a result of the delicate constructs and scarce fundamental structure techniques, one must pay particular attention to the moving of AMPs. It is also possible to enhance mechanisms for the administration and the preservation of the current condition of products by providing necessary investments in the development of transportation infrastructure and engaging suitable technologies, as well as by forming mutually beneficial relations with specialized providers of logistic services.

Further, awareness creation need to be made in order to create market for AMPs and let the consumer know of the many uses of these plants. In this regard, it is necessary to indicate that marketing strategies should be unique and exclusive and the distribution of materials, information and products should be carefully designed to reach the defined target audience.

Therefore, supervision and legislation are the supply and demand drivers in the AMP supply chain. In order to build the agreed consumer trust and guarantee that all products are safe; compliance reporting and management must be integrated into the system.

Thus, in general, this article has outlined major issues related to the subject of the AMP industry and the key logistical problems affecting it. These challenges hinder the efficiency and competitiveness of this supply chain; therefore there is a need to come up with specific and innovative solutions to such problems. In order to overcome these challenges and achieve the greatest economic and social impacts it is crucial that future works center on investigating the key strategies for the efficient improvement of the AMP supply chain. Of these solutions, the following will promote sustainability: Finally, by raising its awareness and taking necessary actions in identifying these issues, the AMP industry will be able to improve its operations, results and, thus, be a contributive influence on the society.

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