

Bioenergy Supply Chain Resilience

Subjects: Others | Operations Research & Management Science

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Definition

Learning about the new concept of bioenergy supply chain resilience is necessary to have continuous development in renewable energy industries. In this regard, realizing the relevant research gap(s), suggestion(s), future directions, etc. play the undeniable roles in optimizing the quality and quantity of managerial and non-managerial performance in the relevant fields.

1. Bioenergy Supply Chains (SCs)

Bioenergy SCs can be defined as the network among the bioenergy producers, distributors, and final consumers. It covers various individuals, organizations, resources, software and hardware technologies, and all of the physical and non-physical routes, procedures, and outcomes to obtain the relevant products or services ^[1]. Understanding the SCs is a vital issue in implementing a reliable framework based on a strategic planning process and efficient activities to reach the strategic targets. Hence, the continuous improvement of organizations working on the bioenergy sectors remarkably lies at the back bone of the situation of their SCs' structures. In fact, the bioenergy SCs provide the opportunities for producers, distributors and consumers to better understand the targets, plans and activities that are incorporated in the whole network, leading to more efficiency and competitiveness of the relevant industries in the present and future. Diversity and changeability within this type of SCs, mostly due to the features of the raw material, the economic situation and demand fluctuation, has impact on the energy generation and consumption levels ^[1]. As such, the extensive bioenergy SCs that include the various components influenced by uncertainty increase the instability in the costs and revenues more than other types of energy ^[1]. Somehow, it plays a significant role in generating extra revenue streams for the renewable energy industry by regulating the supply demand rates and organizing the operations ^[2]. It is necessary to investigate the environmental, economic, social, technical and strategic potentials of the relevant industries in order to achieve an efficient and prospective structure ^[2]. However, the question is "How can such an efficient structure be developed for the bioenergy SCs?" Indeed, answering this question is the key prerequisite to continuous improvement in this scope.

2. Bioenergy Supply Chain Resilience (SCR)

Resilience is defined as the capability to enhance the potentials of systems or individuals to perform their functions optimally and continuously, in line with predetermined goals and plans, during various situations ^{[3][4][5]}. For this reason, the development of resilient structures has attracted much interest in recent years.

In this regard, bioenergy SCR is defined as "the capability of bioenergy supply chain network (SCN) to return from sustained difficulties, for sustainable development during and after a foreseeable or unforeseeable event in a short period of time, by an efficient preventive-progressive procedure and with high performance quality, in keeping with environmental, economic, social, technical, and strategic standards" ^[6].

This type of SCN can play a significant role in the consumption of more clean energy within the industrial and non-industrial environment, through the timely and adequate supply of bioenergy ^[7]. Therefore, in order to achieve environmental, economic, social, technical and strategic advantages, improving the resilience level in this sector should be considered as a forward-looking issue. Numerous components affect the resilience capability in bioenergy SCs, some of which have a negative impact and some of which have a positive impact. According to empirical evidence, the identification and evaluation of the impact of the components are associated with optimization of the resilience capability at the micro and

macro levels.

By reviewing the literature on the application of resilience in the bioenergy SCs, a critical research gap can be recognized, which includes the determination of the resilience definition and components of this type of SCN at different levels. Fortunately, in June 2021, a research-review article authored by Mosayeb Dashtpeyma and Reza Ghodsi was published in the journal of sustainability ^[6], providing comprehensive information in this area for the first time. This article as the first valuable reference in the field of biomass and bioenergy SCR can play a key role in assisting researchers in advancing relevant research works.

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Keywords

Bioenergy; Bioenergy supply chain network; Bioenergy supply chain management; Bioenergy supply chain resilience