

Identification and reduction of the major factors of demand uncertainty on supply chain network

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Abstract: Nowadays rapid change in business process, the availability of internet facilities, and e-commerce have made supply chain management (SCM) a burning issue for a consumer product manufacturing industry. Supply Chain Management has become a solution in improving competitiveness as well as reducing uncertainties. In a complex hierarchical network, SCM links upstream to downstream firms. In this research, demand uncertainties that influence supply chain performance have been identified and effective supply chain network works in an uncertain environment has been developed. This would help an organization to face the competitive business environment offering reduced demand fluctuation rate. A survey research has been conducted in a leading conglomerate in Bangladesh. Data have been collected by formal and informal interviews & fill up survey questionnaire. It is found that there are three major factors for demand uncertainties- availability of the Product in market, affordability of the customers, seasonal Effect. These factors affect business performance significantly. These also seriously affect the successful meet to demand. The study suggests that the studied company needs to apply Sell product in due payment method, creating new volume pack with reducing price, giving discount on off peak season for reducing demand fluctuation. The new framework of business process developed by this research will be helpful for similar organization in consumer product manufacturing industry.

Keywords: Demand Uncertainty, E-Commerce, Supply Chain Management.

I. Introduction

The advantages of supply chain management (SCM) lie in its improvement of all the operational processes in a supply chain network. The motivation to make such improvements leads large companies to build their supply chain network and cooperate with their upstream suppliers and downstream customers to obtain a large overall benefit. Managing supply chains effectively is a complex and challenging task. Because of environmental changes, the variety of products, shortening of product life cycles, the complexity of partnerships and the constant changing of customer's requirements. These factors represent sources of uncertainty and become major problems in supply chain management. In light of the significant impact of uncertainty, understating and controlling the factors that govern supply chain uncertainty are important for supply chain management.

II. Background

Supply Chain Management has attracted much attention since its first appearance in the 1990s. Many authors have attributed its growing popularity to driving forces such as global <http://sourcing>.an emphasis on time, quality-based competition and many others. The concept has since been subjected to many definitions. One of the acceptable definitions has been given by Mentzer, DeWitt, Keebler, Min, Nix, Smith and Zacharia (2001) as:

The systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business functions within the supply chain, for the purpose of improving the long-term performing of the individual companies and the supply chain as a whole.

The traditional business functions mentioned in the definition may include marketing, sales, production, purchasing etc. These basic functions are coordinated to achieve customer satisfaction, value, profitability, and competitive advantage for individual companies and the entire supply chain. Mentzer et al. (2001).

The subject of uncertainty is widely researched. Several authors have come up with contextualized definitions, categorization as well as sources and types of uncertainty. Gelderen, Frese and Thurik (2000) assert that firm's actions and decisions are affected by their environments and these environments create different types of uncertainties. Some sources of uncertainty elude lack of perfect information, newly emerging or complex technologies and lack of historically proven record of the supplier (Slack and Michael, 2002).Other

sources include language and cultural issues.

Brindley (2004); Ford (1990) and Van Week (2000) among others have confirmed the impact of uncertainty in business. Brindley (2004) states that uncertainty affects the supply chains through firm's individual actions termed internal uncertainty, the external environment and relations between firms and their customer called network uncertainty.

III. Analysis

3.1 Introduction

As per discussion on literature review & from the primary discussion with Manufacturer, Wholesaler, Distributor, Retailer the below factors for demand fluctuation are related with research concern product (Basic spices).

- 1) Quality of the product of competitors
- 2) Price of the product of competitors
- 3) Affordability of the customers
- 4) Up- coming Product
- 5) Availability of the Product in Market
- 6) Variation of Lead time
- 7) Seasonal Effect

3.2 Source of data collection:

As shown below data are collected from Manufacturer, Distributor, Wholesaler, Retailer, Expert's opinion & Researcher Opinion by using the survey

Manufacturer: A person or business concern that manufactures goods or owns a factory is known as Manufacturer.

Distributor: A channel who supply consumer products from manufacturer to wholesaler in supply chain network.

Wholesaler: A channel who supply consumer products from distributor to retailer in supply chain network

Retailer: A channel who supply consumer products to consumer in supply chain network.

Expert: Here we mean by expert who are 22 years experienced person on related field.

Data scale:

For finding the major factors of demand uncertainties we collect data under 7 scales by using survey. Where, 1 to below 2 means very low, 2 to below 3 means pretty low, 3 to below 4 means low, 4 to below 5 means average, 5 to below 6 means high, 6 to below 7 means pretty high and 7 means very high. From below we treat top 2 ratings (pretty high & Very high) as major factors.

For finding the solution against major factors of demand uncertainties we collect data under 5 scales by using survey, 1 means very low, 2 means low, 3 means average, 4 means high, 5 means very high. From below we treat top 2 ratings (high & Very high) as proper solution.

3.2.1 Manufacturer:

Collected data persons are included Marketing Executive, Brand Executive, Brand manager etc.

Factor	Manufacturer(7 person)	Total	Average
Quality of the product of competitors	1+1+1+2+1+2+1	9	1.2
Price of the product of competitors	4+5+4+5+4+4+5	31	4.4
Affordability of the customers	6+7+7+6+7+6+7	46	6.6
Up- coming Product	1+1+2+1+2+2+1	10	1.4
Availability of the Product in Market	7+6+6+7+7+6+7	46	6.6
Variation of Lead time	1+1+2+2+1+1+2	10	1.4
Seasonal Effect	7+7+7+7+7+7+7	49	7.0

Table 1: Collected data from Manufacturer

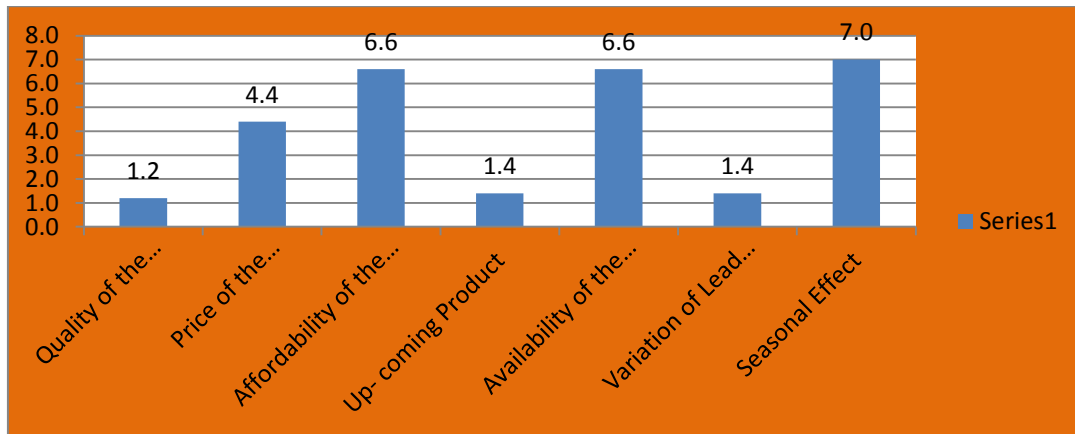


Fig.1: The responses of manufacturers

Size of data: 7 person

Under scale of 7 the above chart shown that, Availability of the Product in Market, affordability of the customers, seasonal Effect factors are in top 2 ratings. Which indicates those factors affects more significantly the demand uncertainty.

3.2.2 Distributor:

A channel who supply consumer products from manufacturer to wholesaler in supply chain network

Factors for demand uncertainty	Distributor(14 Person)	Total	Average
Quality of the product of competitors	2+2+1+2+2+1+2+2+2+1+2+1+2	24	1.7
Price of the product of competitors	5+4+4+5+6+5+4+5+4+4+5+6+5+4	66	4.7
Affordability of the customers	7+6+7+7+7+6+7+7+7+7+7+7+7+7	96	6.9
Up- coming Product	1+1+1+1+1+1+1+1+1+1+1+1+1+1	14	1.0
Availability of the Product in Market	6+7+7+6+7+6+7+6+7+6+7+6+7	92	6.6
Variation of Lead time	1+2+1+1+2+1+2+1+2+1+1+2+1+2	20	1.4
Seasonal Effect	7+7+7+7+7+7+7+7+7+7+7+7+7+7	98	7.0

Table 2: Collected data from Distributor

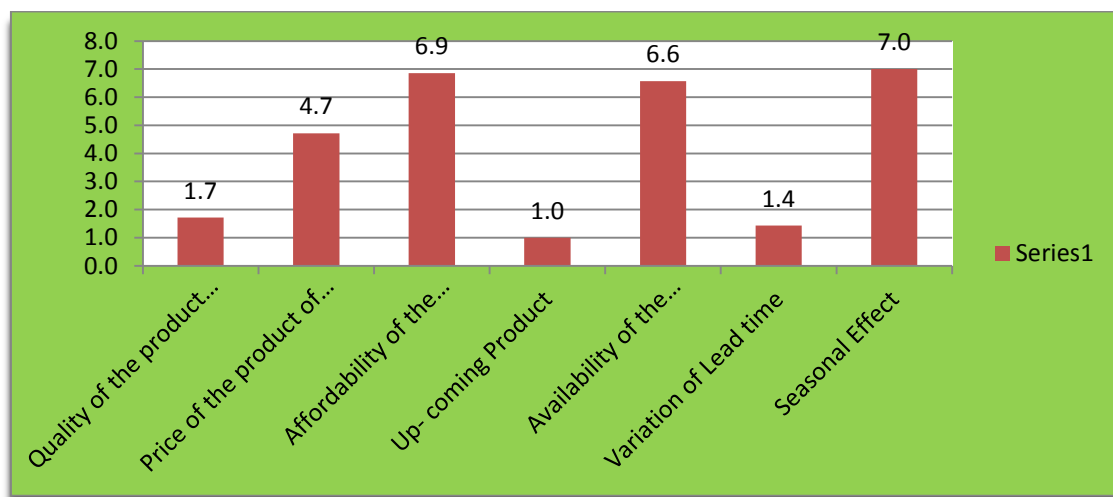


Fig.2: The responses of Distributors

Size of data: 14 person

Under scale of 7 the above chart shown that, Availability of the Product in Market, affordability of the customers, seasonal Effect factors are in top 2 ratings. Which indicates those factors affects more significantly the demand uncertainty.

3.2.3 Wholesaler:

A channel who supply consumer products from distributor to retailer in supply chain network

Factors for demand uncertainty	wholesaler (28 P)	Total	Average
Quality of the product of competitors	2+1+1+1+2+1+2+2+1+1+1+2+1+1+2+1+2+1+2+2+1+2+2+1+2+2 +1+1+2+1+1	40	1.4
Price of the product of competitors	4+5+4+5+4+5+4+5+5+4+4+4+5+4+5+5+4+4+5+4+5+4+5+4+5 +5+4+4+4+4	124	4.4
Affordability of the customers	6+7+6+7+6+7+7+7+6+6+7+7+6+7+6+7+6+7+7+6+6+6+7 +6+7+7+7+6	184	6.6
Up- coming Product	1+2+1+2+1+2+1+2+1+2+1+1+2+1+1+2+1+1+2+1+2+1+2+1 +2+1+2+1+1	40	1.4
Availability of the Product in Market	6+7+6+7+7+6+7+7+6+7+6+6+7+7+6+7+7+6+6+7+7+6+7 +7+6+7+7+6	184	6.6
Variation of Lead time	1+1 +1+1+1+1+1	28	1.0
Seasonal Effect	7+7 +7+7+7+7+7	196	7.0

Table 3: Collected data from Wholesaler

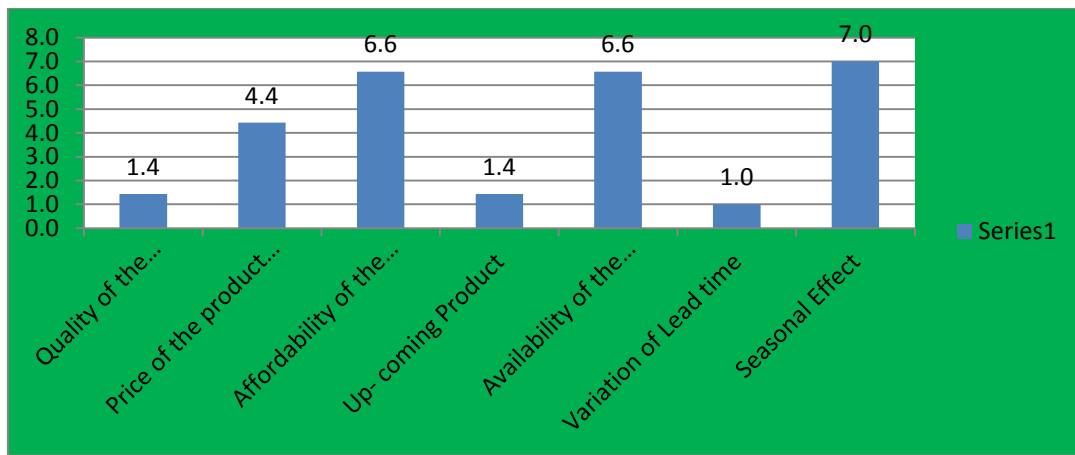


Fig.3: The responses of Wholesaler

Size of data: 28 person

Under scale of 7 the above chart shown that, Availability of the Product in Market, affordability of the customers, seasonal Effect factors are in top 2 ratings. Which indicates those factors affects more significantly the demand uncertainty.

3.2.4 Retailer:

A channel who supply consumer products to consumer in supply chain network

Factors for demand uncertainty	Total (63 person)	Average
Quality of the product of competitors	99	1.6
Price of the product of competitors	270	4.3
Affordability of the customers	405	6.4
Up- coming Product	99	1.6
Availability of the Product in Market	423	6.7
Variation of Lead time	81	1.3
Seasonal Effect	423	6.7

Table 4: Collected data from Retailer

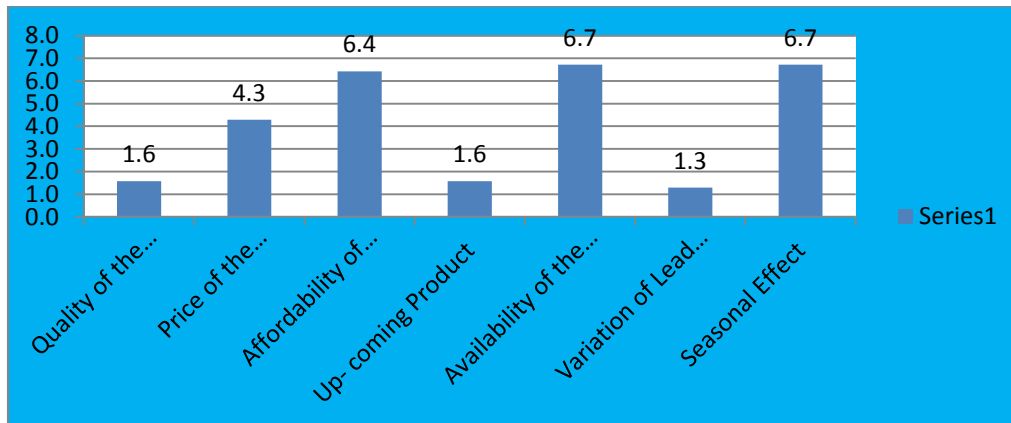


Fig.4:The responses of retailer

Size of data: 63 person

Under scale of 7 the above chart shown that, Availability of the Product in Market, affordability of the customers, seasonal Effect factors are in top 2 ratings. Which indicates those factors affects more significantly the demand uncertainty.

3.2.5 Experts opinion:

22 years experienced person on related field.

	Expert opinion
Quality of the product of competitors	1
Price of the product of competitors	3
Affordability of the customers	7
Up- coming Product	2
Availability of the Product in Market	6
Variation of Lead time	1
Seasonal Effect	7

Table 5: Collected data from Experts opinion

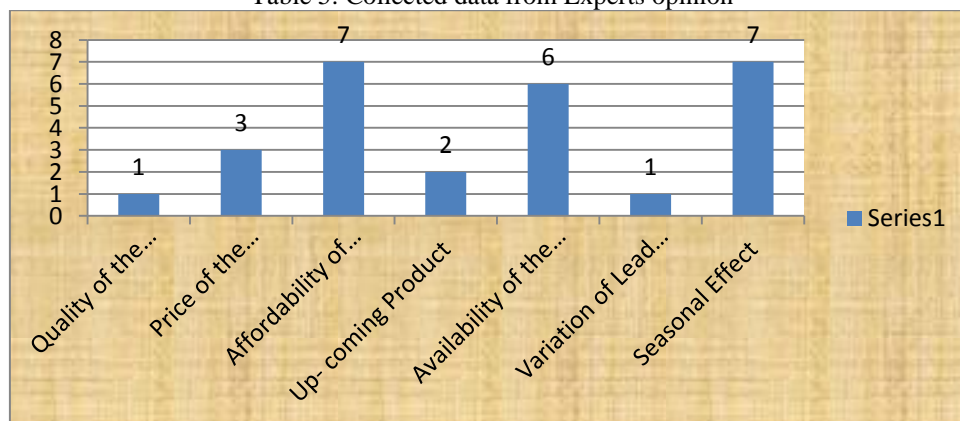


Fig.5:The responses of Expert

Size of data: 1 person

Under scale of 7 the above chart shown that, Availability of the Product in Market, affordability of the customers, seasonal Effect factors are in top 2 ratings. Which indicates those factors affects more significantly the demand uncertainty.

All though all of 7 factors affect the fluctuation of demand, as from above collected data comparison it have been shown that only below three factors effect more significantly on demand fluctuation of the product:

- A. Affordability of the customers
- B. Availability of the Product in Market
- C. Seasonal Effect

3.3.1 Affordability of the customers: For this factor to reduce the uncertainty in demand the possible solution in economical point of view would be:

- 1) Creating new pack with reducing price
- 2) Creating new pack with reducing volume

Creating new pack with reducing price:

If the price increases of 100gm pack from 31tk to 35tk, then create new pack to 80gm as well as reducing price to 27tk.

Creating new pack with reducing volume:

If the price increases of 100gm pack from 31tk to 35tk, then create new pack on same price 31tk with reducing volume to 90gm.

Combine solution chart as per collected data by using survey from Manufacturer, Distributor, Wholesaler, Retailer, Expert's opinion & by survey from consumers.

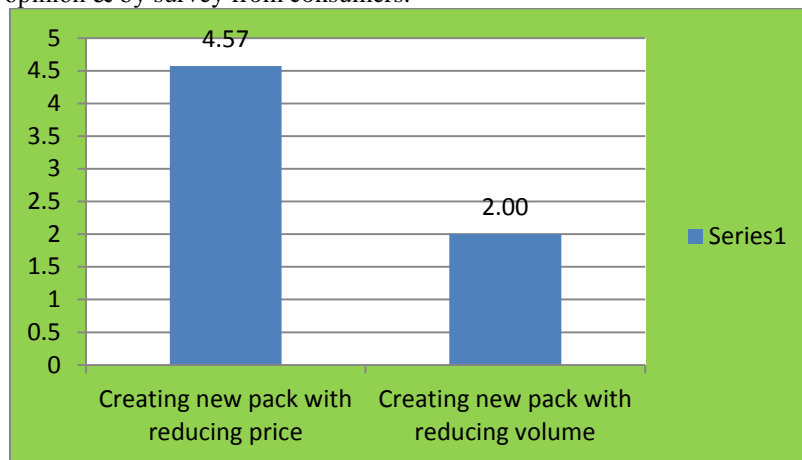


Fig.6: The combined responses of Manufacturer, Distributor, Wholesaler, Retailer, Expert & Consumer

Size of data: Manufacturer (7), Distributor (14), Wholesaler (28), Retailer (63), consumers (91) & Expert opinion (1).

Under scale of 5 the above chart show that, Creating new pack with reducing price are in top ratings. Which indicates this solution is more applicable for related factor affordability of the customers.

3.3.2 Availability of the Product in Market: For this factor to reduce the uncertainty in demand the possible solution in economical point of view would be:

- 1) Give discount offer for specific region
- 2) Give gift offer for specific region
- 3) Sell product in due method

Give discount offer for specific region: To encourage the Wholesaler/ Retailer give discount Offer for those specific regions where the product is unavailable.

Give gift offer for specific region: To encourage the Wholesaler/ Retailer give gift Offer for those specific regions where the product is unavailable.

Sell product in due method: To encourage the Wholesaler/ Retailer sell product on due payment method for those specific regions where the product is unavailable.

Combine solution chart as collected data from Manufacturer, Distributor, Wholesaler, Retailer, consumers, Researcher Opinion & Expert opinion is below.

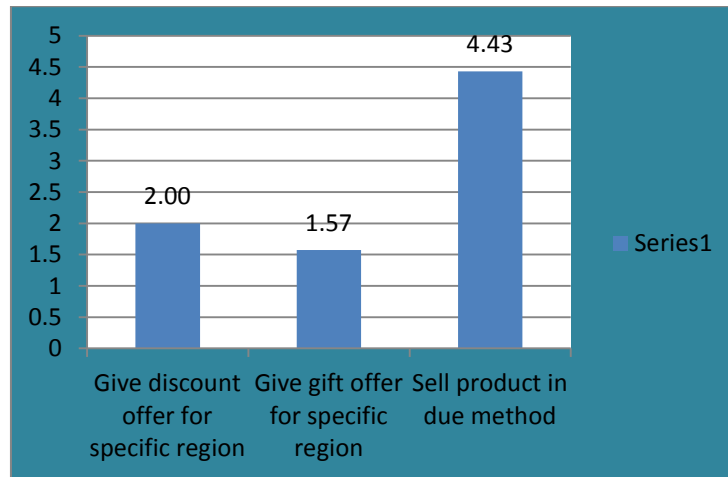


Fig.7: The combined responses of Manufacturer, Distributor, Wholesaler, Retailer, Expert & Consumer

Size of data: Manufacturer (7), Distributor (14), Wholesaler (28), Retailer (63), consumers (91) & Expert opinion (1).

Under scale of 5 the above chart show that, *Sell product in due method* are in top ratings. Which indicates this solution is more applicable for related factor Availability of the Product in Market.

3.3.3 Seasonal Effect: For this factor to reduce the uncertainty in demand the possible solution in economical point of view would be:

- 1) Giving discount on off peak season
- 2) Giving subcontract
- 3) Increasing safety stock

Giving discount on off peak season: To reduce the extra demand pressure by giving discount on off peak season would be effective tools.

For example: If Eid festival in November, then generally demand increased in October. For that situation if a discount offer is announced on September, then extra demand of October can be splitted.

Giving subcontract: To reduce the extra demand pressure company can use subcontract method.

Increasing safety stock: To meet success fully the extra demand pressure company can increase safety stock of the products.

Combine solution chart as per collected data from Manufacturer, Distributor, Wholesaler, Retailer, consumers, Researcher Opinion & Expert opinion is below.

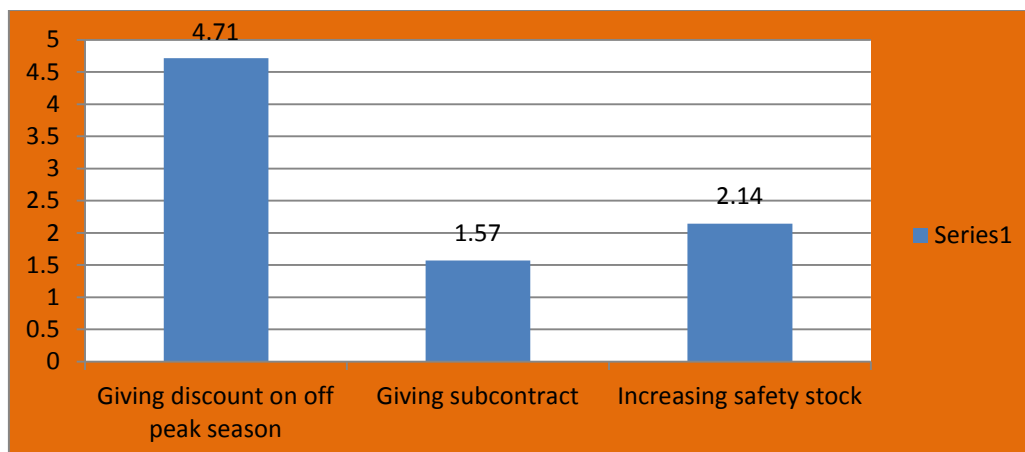


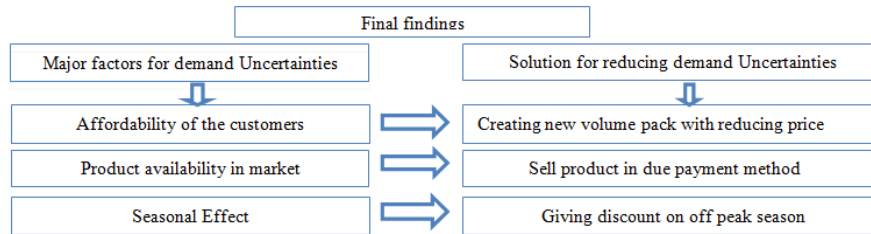
Fig.8: The combined responses of Manufacturer, Distributor, Wholesaler, Retailer, Expert & Consumer

Size of data: Manufacturer (7), Distributor (14), Wholesaler (28), Retailer (63), consumers (91) & Expert opinion (1).

Under scale of 5 the above chart show that, giving discount on off peak season are in top ratings. Which indicates this solution is more applicable for related factor Seasonal Effect.

IV. Result

From our Analysis chapter finally we got below solution for demand fluctuation;



V. Conclusion

The presence of flexibility, trust and commitment in both parties helps a supply chain relationship succeed. From our survey research, we have found the factors which influencing the demand fluctuation. For this type company, three major factors for demand uncertainties are availability of the Product in market, affordability of the customers, seasonal Effect. The uncertainties create negative impacts on the business process of the manufacturer. Information visibility and collaboration provide a great amount of reduction on uncertainties. But it requires a well organized set of structure for the company and good knowledgeable persons at the top position. Planning for entire supply chain is one of the tough works in actual practice. In this research we recommend to apply Sell product in due payment method, creating new volume pack with reducing price, Giving discount on off peak season for reducing demand fluctuation.

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