

Determinants of Selam Bottled Water Company Supply Chain Management (A Case of Shashemene City, Ethiopia)

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Abstract-*The purpose of this research is to find out the determinants of Selam bottled water company supply chain management in Shashemene city, Ethiopia. Both qualitative and quantitative research design was followed. A quantitative and research design was followed by using survey. 142 respondents were selected by using stratified random sampling technique. The T- test analysis indicated that the mean value of the determinant factors (Customer perceived value, infrastructure, technological, logistic, marketing, and management skill) is greater than the test value. The findings also indicated that the factors mentioned above influenced the supply chain management of the company. Besides, the interview with the management body supported the quantitative result. Hence, the management, responsible body of the government, and stake holders need to take action in order to alleviate the bottle necks of the company's supply chain management process.*

Key Word: Determinants, Supply chain management, Selam Bottled Water Company, Shashemene City

I. INTRODUCTION

Supply chain management (SCM) has received in recent years a great deal of attention by researchers and practitioners. Effective SCM will lead to a lowering of the total amount of resources required to provide the necessary level of customer service to a specific segment and improving customer service through increased product availability and reduced order cycle time (Banomyong & Supatn, 2011); engage in information exchange (forecasting techniques, inventory management, delivery) and structural collaboration (just-in-time system, outsourcing, vendor-managed inventory and co-locating plants) (Henry & Barro, 2009; Raja, Mazlan & Ali, 2006); relationships with downstream supply chain partners to create end-customer value (Iyer, 2011), maximize benefits, and minimize costs along the supply chain (Chima, 2007). According to Jain, Wadhwa and Deshmukh (2009), a supply chain process involves the constant flow of information, materials, and funds across multiple functional areas both within and between chain members. Members in the chain need to cooperate with their business partners in order to meet customers' needs and to maximize their profit. However, it is a very difficult task in managing the multiple collaborations in a supply chain because there are so many firms involved in the supply chain operations with its own resources and objectives. The interdependence of multistage processes also requires real-time operation and decision making across different tasks, functional areas, and organizational boundaries in order to deal with problems and uncertainties. The strategic move of focus for mass customization, quick response, and high quality service cannot be achieved without more complex cooperation and dynamic structure of supply chains.

In the natural spring water industry, the supply-chain network is composed of shipping via vessel, water tankers, and pipelines that may run across multiple distances. This network is used to transport water from wellhead to refinery for processing, to transport intermediates between multi-site refining facilities, and finished products from product storage tanks to filter centers and finally supply to the customers. Any disruptions arising in the supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to uncertainty in supply of natural spring water, demand, transportation, market volatility, incompetent in channel selection, inefficient in selection of intermediary, incapable of distribution root development, management of marketing element, logistics management, application of technology, and infrastructure. Today, there are many opportunities for the coordination of activities across the supply chain even in the ever complex natural spring water industry. This is largely due to the development of information systems and manufacturing machine technologies within the sector. Integrating supply management with other factors of operations allows all functions to be involved in the management decisions (Chima, 2007). The complexities in natural spring water marketing and supply chains management imposed enormous challenges. Hence this study aims to assess the determinants influencing supply chain management in selam natural spring water plc. The research has the following research objectives:

- To identify the determinants of supply chain management in Selam bottled Water Company

- To compare the influence of factors on the supply chain management of the company
- To suggest ways to improve the supply chain management process.

II. LITERATURE REVIEW

Kaipia (2008), examined the effects of delivery speed on supply chain planning in commercial banks in Europe; It was concluded that supply chain planning was a key component in achieving improved delivery speed. Lee and Kim (2002), investigated on the influence of production distribution planning on performance of manufacturing firms in UK. A causal study was conducted in a sample of 55 manufacturing firms. The findings indicated that there existed a positive correlation between production distributions planning and performance of manufacturing firms. Lockamy and McCormack (2004), carried out a study on supply chain planning and performance of manufacturing firms. A cross sectional survey was carried out; The results of the analysis found that supply chain planning contributed to efficiency in the supply chain. Pauline Mumbi (2015), also investigated the supply chain planning and performance of water bottling companies in Nairobi city county, Kenya. The study concluded that supply chain performance of the water bottling firms has improved because of supplier integration. Suppliers have the free hand to make inventory replenishment decisions and have linked their customers with distributors to enhance delivery and location flexibility.

Matiwos (2014), studied trends in Bottled water Use Survey in Addis Ababa: Implication on Reverse Logistics of Bottled Water Manufacturing in Ethiopia. The empirical survey revealed that bottled water sale like any type of product is a successful business venture which can be extended to international marketing based on the available international marketing strategies of standardization, adaptation or combination of the two if international water quality standards are met like any product traded in the international market. Also the disposal of empty bottled water users anywhere on the streets of the city is environmentally unfriendly as all of the packaging of the bottled water is plastic. The study suggested that to cope up with this problem Reverse Logistics of the plastic of Bottled Water is advised. This study addresses specifically the determinants of Selam bottled Water Company supply chain management by focusing on the major areas of supply chain management process: Extraction, input supply, and processing the inputs to distribution of the finished product.

III. METHODOLOGY

The current study employed both quantitative and qualitative research design. The study conducted survey with structured research questionnaire in the form likert scale (1strongly disagree, 2 disagree, 3 neutral, 4 agree, and 5 strongly agree). Also the qualitative research method key informant interview carried out with company managers.' The interview took 45 minutes.

The population of the study comprised employees of the company in different positions and external clients like agent, contracted whole seller, retailers, and stockiest. And the management bodies who have direct or indirect influence on the supply chain management of the company

The sample size for this study is taken by using Yamane (1967:886), simplified formula: $n = \frac{N}{1+N(e)^2}$

Where **n** is the sample size,
N is the population size, and
e, is the level of precision.

Thus from a total number of 220 population 142 sample size was selected for this study.

TABLE I. SAMPLE DISTRIBUTION

| Name of sample distribution | Number of population in each strata | Calculation of sample size from the strata | Sample Size of the strata |
|-----------------------------|-------------------------------------|--|---------------------------|
| Employees | 100 | (142/220)*100 | 65 |
| Agents | 20 | (142/220)*20 | 13 |
| Contracted whole sellers | 30 | (142/220)*30 | 19 |
| Contracted retailers | 40 | (142/220)*40 | 26 |
| Stockiests | 30 | (142/220)*30 | 19 |
| Total | 220 | | 142 |

Source: Field survey (2018)

III-A. Validity and reliability test

Validity refers to the extent to which a measure adequately represents the underlying construct that it is supposed to measure (Bhattacharjee, 2012). Content validity was checked through getting the questioners reviewed by the expert in the field. Moreover the researchers conducted pilot test by selecting 20 respondents. Some modifications on wording were made on the questionnaire.

Reliability is the measure of the degree to which a construct is consistent or dependable. It is a measure of consistency between different items of the same constructs. In this research cronbach alpha was used to evaluate the reliability of factors (infrastructure, customer perceived value, marketing element, logistic, management skill, and technology) there is no specific rules about numbers of the item to be used. Hinkin, tracey, and enz (1977), suggested that the minimum number of quality scale could comprise four to six items. Accordingly, all the factors stated above have six items. Bhattacharjee(2012) &George and Maller (2003), stated that the reliability score 0.9 above is excellent, 0.8 is good ,0.7 is acceptable, 0.6 is questionable, 0.5 is poor and less than 0.5 is unacceptable. Table II, below shows the reliability result of each item in the survey.

TABLE II. RELIABILITY OF THE QUESTIONNAIRE

| Variable | Cronbach alpha | Number of item | Level as to Bhattacharjee(2012) & George and Maller(2003) |
|--------------------------|----------------|----------------|---|
| Infrastructure | .978 | 6 | Excellent |
| Customer Perceived Value | .953 | 6 | Excellent |
| Marketing Element | .928 | 6 | Excellent |
| Logistic | .970 | 6 | Excellent |
| Management Skill | .946 | 6 | Excellent |
| Technology | .978 | 6 | Excellent |
| Overall reliability | .985 | 36 | Excellent |

Source: Field survey(2018)

The reliability for each scale is measured using cronbach alpha. According to Bhattacharjee(2012) &George and Maller (2003), the results of the factors above are Excellent.

III-1): DATA COLLECTION TOOLS & METHODS: The primary data were collected from sample respondents by using self administered questionnaire. Four data enumerator was recruited; training was given to the data enumerator on the method of data collection and interviewing technique. The questionnaire were prepared in English and translated in to Amharic(official language of Ethiopia) to make the communication easy during primary data collection the content of the questionnaire were refined on the basis of results obtained from the pilot survey of the pilot test. Close ended questions were scheduled by five point likert scale type question. The scale consists: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5 strongly agree, while secondary data were obtained from Selam bottled water company reports, published and unpublished research works, and on line sources.

IV.METHOD OF DATA ANALYSIS

The study used a cross sectional survey analysis. Descriptive analysis such as mean and standard deviation values are used to describe the influence of factors and inferential analysis: one sample T-test employed to compare whether the overall mean result is greater or less than the test value. The following section consists of the analysis and discussion of demographic characteristics of respondents, descriptive, inferential, and interview results.

The following diagrams shows sex, age, and educational experience of respondents.

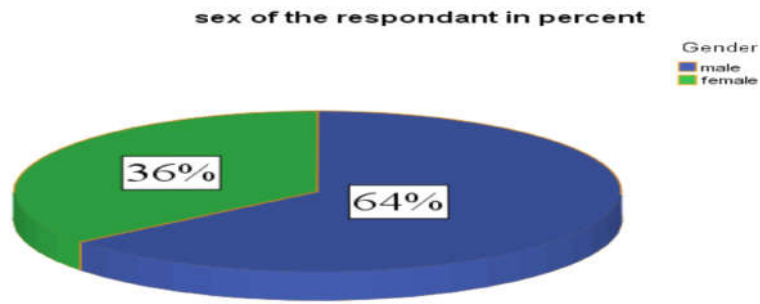


FIG:1 SEX OF THE RESPONDENTS

Source: Field survey(2018)

As shown in the figure above, 64 percent of the respondents were male and female constitute 36percent, this implies that the majority of the respondents are male

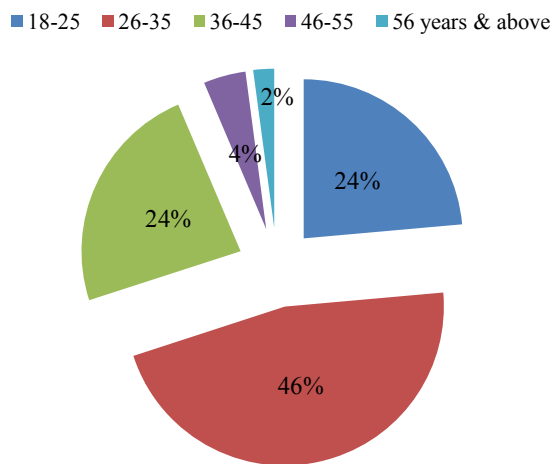


FIG 2: AGE RANGE OF THE RESPONDENTS (%)

Source: Field survey(2018)

As shown in the above figure most of the respondents (46%) were found in the range of 26 -35 age. The second largest (24 %) of respondents were in the range of 36-45 age. Age group 18-25 constitutes 24 percent. Age group 46 - 55 consists of 4 percent of the total respondents and age group 56 & above comprises 2 Percent.

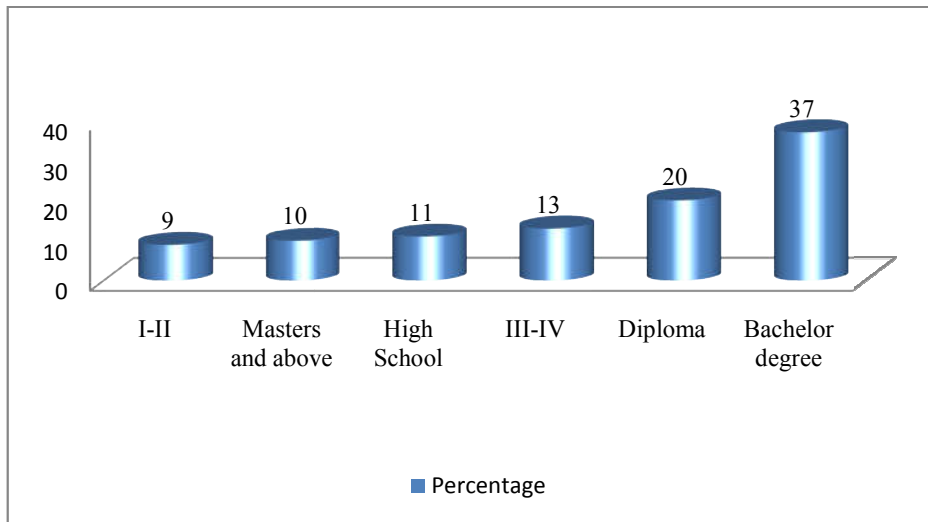


FIG3. EDUCATIONAL QUALIFICATION OF RESPONDENTS
Source: Field survey, 2018

As shown in figure 3 above from the total of the respondents 37 percent were bachelor degree holder, 20 percent were diploma holder, 13 percent of the respondents were level III-IV graduate, 11 percent of respondents were high school graduate, 10 percent of the respondents were masters and above and 9 percent of the respondents have certificate in level I-II

TABLE III. RESPONDENTS WORKING EXPERIENCE WITH THE COMPANY

| Item | Percent % |
|-------------------|-----------|
| Less than 6 years | 64.3 |
| 6 -10 years | 35 .0 |
| 11-20 years | .7 |
| Total | 100.0 |

Source: Field survey (2018)

As shown in table above 64.3 percent of the respondents have been working for less than six years, 35 percent of them have been working from 6 - 10 years, the rest (0.7 %) of the respondents have been working with the company from 11 to 20 years.

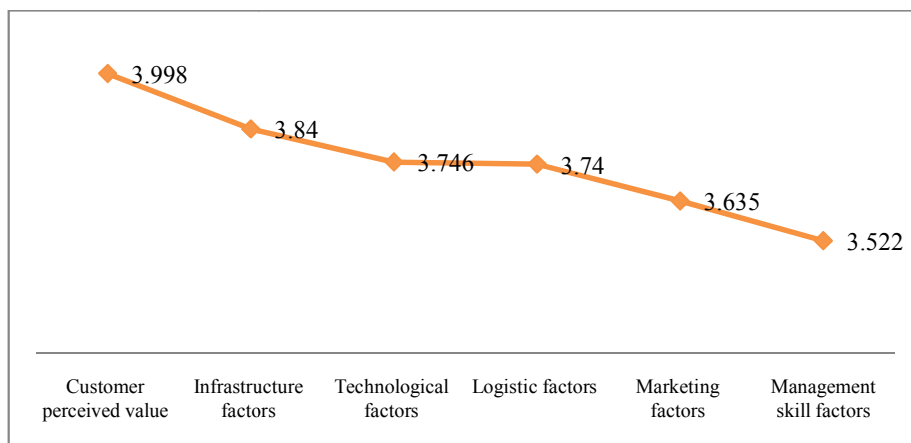


FIG 4. COMPARISON OF THE MAJOR FACTORS.
Source: Field survey(2018)

It can be seen from the figure 4 above that Customer perceived value and Infrastructure factors have the biggest potential(M=3.998,M=3.84) to influence supply chain management , followed by Technological factors(M=3.746), Logistic factors (3.74), Marketing factors(3.635), & Management skill factors(M=3.522),. In another words, the mean results in the figure showed that customer perceived value and Infrastructure factors are the two important factors that influence supply chain management performance of the company.

TABLE II. MEAN AND GRAND MEAN VALUE OF THE FACTORS

| No | Factors | Mean |
|----|----------------------------------|-------------|
| 1 | Customer perceived value factors | 3.998 |
| 2 | Infrastructure factors | 3.84 |
| 3 | Technological factors | 3.746 |
| 4 | Logistic factors | 3.74 |
| 6 | Marketing factors | 3.635 |
| 6 | Management skill factors | 3.522 |
| | Grand mean | 3.75 |

Source: Field survey (2018)

One sample *t*-test is a statistical procedure often performed for testing the mean value of a distribution. It can be used under the assumption that sampled distribution is normal. For large samples, the procedure often performs well even for non-normal populations (Winthrop University, 2006). In a One Sample *t* Test, the test variable's mean is compared against a "test value"(Kent state university, 2021) which is a known or hypothesized value of the mean in the population. Based on the mean results of the factors (customer perceived value, Infrastructure, technological, logistic, marketing, and management skill) in table 1 above, one sample t-test is conducted to compare whether the hypothesized mean is different from the sample mean.

IV-A Research Hypothesis

H₀. The average mean of factors influencing supply management is greater than the hypothesized mean of the factors

H₁. The average mean factors influencing supply management is lesser than the hypothesized mean of the factors

TABLE III. DESCRIPTIVE STATISTICS

| | N | Mean | Std. Deviation | Std. Error Mean |
|--|---|--------|----------------|-----------------|
| Factors influencing supply chain management of Selam bottled Water | 6 | 3.7480 | .16412 | .06700 |

Source: Field survey(2018)

The mean value (3.75) and the standard deviation (.16412) in table III above indicated that respondents agreed on the factors (customer perceived value, infrastructure, technological, logistic, marketing, and management) influenced the supply chain management of the company

TABLE IV. ONE-SAMPLE TEST

| | Test Value = 3 | | | | | |
|--|----------------|----|-----------------|-----------------|---|-------|
| | t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| Factors influencing supply chain management of Selam bottled Water Company | 11.164 | 5 | .000 | .74800 | .5758 | .9202 |

Source: Field survey (2018)

VI-B. Summary of the analysis (Table III&IV)

$$t=11.164/2 = 5.582(\mathbf{1-tailed})$$

Reject H_0 $t(5)=5.582, p \leq .05$

The research hypothesis was supported. The average mean of the factors ($M=3.75$) was significantly greater than the stated mean ($M=3$), $t(5)= 5.582, p \leq .05$. The result shows that factors (customer perceived value, Infrastructure, technological, logistic, marketing, and management skill) highly influence supply chain management of Selam bottled Water company.

IV-1).Results of Interview: The interview conducted with top management of the company, revealed that infrastructure factors, Lack of communication facility with internal and external customers, road access to reach customers easily, and power interruption make the company to incur high cost. Shortage of finance availability & expensiveness of cost of capital influenced the company's supply chain performance. In addition, lack of appropriate machinery, equipment to control inventory, order process, and information from customer & partner, lack of skills to operate in new technology, and low level of IT staff significantly hindered the overall supply chain management in the company. The interviewees also added that the logistic function of the company is very weak to support the chain management performance. The logistic function of the company lacks efficiency because of low percentage of production cost which is allotted to raw material & parts. Furthermore, lack of marketing skill in searching new markets, market information, and demand forecasting techniques greatly affected the supply chain management of the company. Low level of customer relationship management, lack of development center to cope up with the changing nature of consumer demand and preference, insufficient knowledge in customers' complaints handling techniques contributed to the low performance of supply chain management. Finally, as they explained, lack of managerial skill in managing the supply base, selection techniques of associates, and strategic business planning impaired the supply chain management of Selam bottled Water Company.

V. CONCLUSION

The study conducted to find out the determinants of supply chain management in Selam bottled Water Company. The descriptive and qualitative results indicated that respondents agreed on the influence of the factors: Customer perceived value, infrastructure, technological, logistic, marketing, and management) on Selam bottled water supply chain management. The t-test analysis also found that the mean value of the factors is greater than the test value. Hence, it is concluded that the factors explained above seriously affected the overall process of the supply chain management of the company. Therefore the study recommends the company management, members in the chain, and the responsible bodies should work together to reduce the influence of the factors above in order to facilitate the supply chain management process, improve customer service, and maximize the profitability of the company.

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