Journal of Harbin Engineering University
ISSN: 1006-7043

Vol 44 No. 7
July 2023

Applying the BCG Matrix to classify the sub-sectors of Andhra Pradesh Food Processing Industry

Mrs. Niveditha Kondepudi[1], Dr. Vikas Saxena[2] and Dr. M. Sardar Baig[3]

[1]*Assistant Professor, Dept. of Food Business Management, College of Food Science & Technology, ANGRAU*

[2]*Associate Professor, Department of Food Business Management and E. D, NIFTEM – K*

Professor, Associate Dean, College of Food Science & Technology, ANGRAU

Abstract:

The food processing industry in Andhra Pradesh is one of the promising sectors and considered as sun-rising sector in India. Andhra Pradesh stands first in "Ease of Doing business" and govt has taken multiple steps to promote the sector for the overall development of the state's economy. The study uses secondary data published from Annual Survey of Industries from 2008-09 to 2018-19 (11 years) to study the growth rate and market share of the selected sub-sectors. The study is also extended to classify the sub-sectors into different categories namely; stars, cash cows, dogs and question mark and determine the potential strategies for their development.

Keywords: Sub-sectors, Andhra Pradesh, Food Processing Industry, BCG Matrix

I. Introduction:

The main goal of food processing is to transform uncooked food and other farm products into appealing, usable, and edible forms. It involves turning clean, freshly harvested, butchered, or killed ingredients into commercial food items with value addition to increase their quality, dependability, and shelf life. The most fundamental aspect of the food processing industry is food movement through commercial channels from field to fork [1]. In India, the food sector has emerged as a high-growth and high-profit sector due to its immense potential for value addition, particularly within the food processing industry. The food processing industry in India is profited from open trade and industrial policy, making it one of the fastest expanding industries in post-reform India [2].

As per the study conducted by ONICRA (2013), it is noted that demand-side drivers like fast-changing consumer profiles and tastes, product innovation, increased spending on healthy and nutritional foods, the advent of branded food and organized retail, rising export opportunities, and better preservation and packaging techniques; and (ii) supply-side drivers like an abundance of raw material, cost competitiveness, easier credit availability, and government policy support, significant challenges remain.

Food processing industries include several sub-sectors in India. Processing and preserving meat, fish, crustaceans and molluscs, fruits and vegetables, manufacturing of vegetable and animal oils and fats, dairy products, grain mill products, starches, and starch products, bakery products, sugar, chocolates, sugar confectionery, macaroni, noodles, prepared meals and dishes, other food products, animal feeds, and beverages, and so on. Andhra Pradesh, one of the most industrialized states in the nation, is situated in the south-eastern coastal region of India and one of the leading food producers in India. The "Rice Bowl of India" is Andhra Pradesh. With abundant natural resources, rich soil, and a diversified farming pattern, Andhra Pradesh is well-endowed. According to preliminary estimates, growth in 2019-20 was 8.16 %, much greater than the all-India GDP growth rate of 5.0 %. With a significant contribution to agriculture, horticulture, dairy, poultry, fisheries, and marine output, Andhra Pradesh ranks first in terms of the total amount of trade conducted on the *eNational Agricultural Market (eNAM)*. Food processing is one of the state's main focus areas because it employs 60 %

of the state's workforce in agriculture and allied industries.

Andhra Pradesh, which has become a state of abundance in terms of food production, is ideally positioned to lead in total prosperity by introducing an agriculturally based industrial revolution. To expedite progress and achieve this goal, the state government has prioritized the coordinated development of small-scale, large-scale, and medium-scale companies, as well as the harmonious development of the agriculture sector, which is the backbone of Andhra Pradesh economy. Recent governmental industrial policies have placed greater focus on the growth of agro-based food processing companies. Due to a well-developed farming sector, the destiny of Andhra Pradesh economic structure lies in the food processing industries, as these industries will alleviate the difficulties related to Andhra Pradesh agriculture.

After the economic reforms of 1991, the Indian economy concentrated on the manufacturing sectors success. Also, at the regional level, state governments enacted various policy initiatives to expand the food processing sector in Andhra Pradesh. Existing literature on expanding the food processing industry sub-sectors wise in Andhra Pradesh is limited. Consequently, this study attempts to analyze and classify the food processing industry of a rising state, namely Andhra Pradesh, making it an essential sub-sector wise. The study would extent to classify the, and propose a potential strategy to improve performance by making appropriate recommendations.

II. Review of Literature

Taking into account the rate of market growth and relative market share, **Mutandwa *et al*. (3, 2009)** used the BCG matrix to analyse the potential of the various markets to which Rwanda coffee brands marketed using secondary data from 2005 to 2008 and classify them accordingly. To ensure that the sector is turned into a star or a cash cow, additional marketing investment is necessary given the growing profitable business for Rwanda coffee in Asia, particularly Japan. On the other hand, markets in nations like Kenya, Israel, Morocco, and China have experienced relatively high growth over the last four years. They only account for a small portion of coffee export revenues.

The market for tea export in Sri Lanka was examined using the BCG matrix by **Jayaranjani & Dharmadasa (4, 2011)** over five years (2005-2009). According to the study, Sri Lankan tea has been marketed primarily to countries in the Middle East, such as the UAE, Kuwait, and Saudi Arabia, as well as Russia, Iran, Jordan, the Netherlands, and Syria. According to the BCG classification, the top markets for tea export are Kuwait, Jordan, Syria, Hong Kong, and Libya; these markets offer opportunities for business expansion and financial success. Russia, the United Arab Emirates, Turkey, Saudi Arabia, and Ukraine are other lucrative markets for Sri Lanka. The markets should be kept up because they are substantial sources of foreign currency exchange for Sri Lanka and are attractive based on two BCG matrix variables. It is necessary to comprehend the social, economic, cultural, institutional, and technological factors that influence the consuming subpopulations in these countries if the role of tea export to the country's economic vista is to be strengthened.

Joubert et al. (5, 2011) studied the development path of 44 agricultural sectors over the last ten years (1999-2009) to identify those subsectors that can significantly contribute to poverty reduction and national and household food security in South Africa. Nine out of the 44 agricultural sub-sectors exhibit negative growth. According to the results, sugar cane is a cash cow industry. The agricultural sector's stars are poultry, corn, beef, milk, vegetable, fruit, lemons, wheat, potato, hay, lamb, and bacon. Lentil, karakul, Lucerne seed, oats, nuts, wattle bark, rye, rooibos, other horticulture, other field crops, cereals, grain sorghum, dried legumes, peanuts, flower bulbs, wool, soya bean, subtropical fruit, other livestock products, and sunflower seed subsectors are the problem children of the agricultural sector. The sisal, cotton, tobacco, tea, chicory root, mohair, dry peas, and dried fruit subsectors seem to be the "dogs" or "pets" of the agricultural industry. Different levels of vulnerability in the subsectors, as indicated by the BCG matrix, indicate a pressing

need for collaboration and policy responses that are tailored to these needs. Rather, the government should foster a favourable environment for the sector through partnerships that emphasise knowledge management and policy actions that enable the private initiative to perform competitively.

Zheng et al. (6, 2011) aimed to analyse how to identify the leading industry in the service sector in the Xiacheng district using the BCG matrix and location quotient. The study uses the basic analysis structure of the Matrix to analyse the developing strategies of the eight service industry categories in Xiacheng District. Out of 8 service industries, "Financial Service" and "Culture & Innovation" are considered Star industries. The "Commercial Service" as cash cows. The question mark industries are "Intermediary Service", "Information & Software Service", "Modern Logistics", and Modern Logistics and Community Services as Dog industries.

Laosutsan et al. (7, 2017) used the BCG matrix method and tried to evaluate the relative market positions of Thai fresh vegetables products (Harmonized System 0701-0714) and preserved vegetable products (Harmonized System 2001-2009) of the 15 countries for the years 2004-2013 and to develop the corresponding strategic plans and actions in Thailand. Australia, China, Japan, South Korea, the USA, and nine ASEAN member countries for 14 fresh and nine preserved vegetable products are considered for the study. The study's findings also indicate that most ASEAN nations are located in the dog or question mark quadrants of the BCG matrix, which suggests that their vegetable exports are plagued by a dual-low dilemma in which both market share and market growth are modest.

Zin *et al*. (8, 2018) adapted the BCG matrix method to assess the performance of the sales teams of two companies from distinct industries and sizes: a furniture maker and a producer of speciality yarns for knitting and decoration. According to sales volume and profit margins, the classification was assigned to one of the Matrix's four quadrants based on performance. When examining the generated Matrix according to profit, it placed half of the sales teams in the "Dog" quadrant, one as a "Question Mark," three as "Stars," and five as "Cash Cow." First, products that the portfolio analysis classified as "Dog" should be withdrawn. However, when dealing with sales teams or regions, as it is in this study, this cannot be decided without a more thorough analysis that takes into account other factors, such as the impact on other areas when a small but positive contribution margin area is eliminated.

Amarildo et al. (9, 2018) studied the performance of the Brazilian pulp market in the international market by using the BCG matrix to propose strategies to maximise their performance using data from the United Nations Commodity Trade statistical database (COMTRADE, 2017) for five years (2010 to 2015). The different forms of pulp used in the study are harmonised with four-digit system codes. Product 4702 (Chemical pulp (for dissolution) has high growth and market share compared to the remaining seven products. The sectors for pulp products coded 4702 (Chemical pulp for dissolution) and 4703 (chemical pulp (dissolved with sulphate or soda) take part in high-investment markets. The author recommended a strategy - Maintain market leadership for pulp product 4703 and pursue market leadership for pulp product 4702. The author opined that the country sells its products on the international market at competitive prices, allowing it to maintain (4703) and or achieve market leadership 4702) if there are no quality differences between domestic and foreign products. The global market fact for products 4706 (paste obtained from paper) and 4707 (paper pulp, paper or cardboard, recycled) are markedly distinct. Both are categorised as low-growth businesses regardless of the market's low or high growth rate. The products in the bottom right quadrant typically generate negligible cash flows and do not permit high returns. However, the sector's slow growth does not necessitate large investments. The recommendation relates to restructuring the business. International market-operating companies should evaluate the gradual replacement of the production platform for folders 4706 and 4707 with folders 4702 and 4703.

Consideration can also be given to seeking out a new industry, such as an internal one.

Yahya et al. (10, 2020) attempted to analyse the business strategy of a fertilizer company that manufactures urea-based and organic fertilisers, the Boston Consulting Group (BCG) Matrix is used to analyse the company's position among its competitors to determine the optimal development strategy. According to the BCG Matrix, the corresponding fertiliser company is in the Question Marks position. The company has a low market share and a rapid market growth rate in this situation. Fertiliser sales are growing at a rate of 5.63%, which is quite high. As a result of the relative market share being less than one, it has a low market share compared to the first and second competitors, which are, respectively, 0.117 and 0.476. Since the company is currently in the Question Marks position, it must devise a new strategy to either advance to the Star position or fall to the Dog position. The company might sell or be strengthened through intensive strategies like product development, market penetration, and market development. The selected strategy might waste liquid resources if the goal is not achieved. According to the BCG Matrix, the build strategy is the best course of action for the business. During the expansion stage of a business unit in an industry, this building strategy aids in increasing relative market share.

With the help of secondary data from 2009 to 2019, **Prasannath (11, 2020)** sought to identify Sri Lanka's coconut export market based on market share and market growth and to categorise countries that import coconuts using the BCG matrix. Stars are nations with high export growth and export share. Cash cow nations are those with high export shares but low export growth. Question marks surround nations with low export share and yet rapid export growth. The exporting nations of dogs have low export growth and export share. The USA, Germany, the U.K., China, Japan, the Netherlands, and Australia are the top importers of coconuts and products made with coconuts from Sri Lanka. About 20% of coconut exports are consumed in the United States. The market share growth rate accelerated over the previous five years for India, Mexico, and Australia. The coconut market in Sri Lanka was categorised using the BCG matrix. The first two parameters, relative market share and rate of market growth, were used to express the market's position in the Matrix. The third parameter, revenue, was used to indicate the market's size in the Matrix. Stars markets include only the United States because of its higher relative market share and growth rate. More effort should be made to move most nations into the star or cash cow categories because they fall under the question mark. To raise the standard of the nation's coconut products and further encourage marketing, involvement in regional and international happenings should be encouraged. Sri Lanka needs to investigate the potential for international agreements to control the availability of coconuts for export and boost market prices.

Using the BCG matrix, **Islakaeva (12, 2020)** attempted to create corporate and governmental development strategies and divide the company's product portfolio into four categories based on growth rates and market share occupied. He tried to evaluate the company's product portfolio's diversification and effectiveness because all groups are displayed there. The study makes the case that by using the classification principles outlined in the BCG matrix, it will be possible to evaluate the region's sectoral structure's optimality from the perspective of growth prospects and revenue generation and, on this basis, formulate a plan for its further development. The study uses the sectoral structure of the regional economy as an example. The region's industry portfolio, which is diverse in terms of the presence of companies and divided according to their potential for growth and market share, will be the most advantageous. According to the study's findings, the optimality of a region's sectoral portfolio can be assessed based on how well-diversified it is; if it is not optimal, the region's sectoral portfolio income will likely grow slowly and be below the acceptable threshold in volume. This will allow one to obtain a contextual forecast of the prospects for budget revenue growth.

Using a modified BCG matrix, **Liashenko & Petrova (13, 2021)** researched and determined the smart priorities of the industry in the Prydneprovsk and

Donetsk economic regions, as well as the best methods for redistributing financial flows among different types of economic activity. The BCG matrix enables you to establish a strategic advantage for every type of economic activity within the sector and, based on the evaluation of this position, select a development strategy. The Strategic Leaders, Current Leaders, Prospective Leaders, and Depressive sectors are the strategic zones of the BCG matrix highlighted, allowing you to select an appropriate strategy for the advancement of industries. Determined that the strategy of sustaining leadership is used for Strategic Leaders; Current Leaders - a strategy of maximising profits directed at the development of new products for Promising Leaders and sustaining the products of the Strategic Leaders industries; Prospective Leaders a strategy of investment or selective development; Depressive sectors a goal strategy for depressed sectors; or the elimination of depressed sectors/exit from the market. The study concluded that the economic regions of Prydneprovsk and Donetsk should concentrate on such astute key objectives as strategic and Prospective leaders. A system of rewards and benefits, mandatory conditions, and restrictions are combined with balancing the interests of international aid, the state, and businesses to encourage financing in the regional economies. The introduction of a regulatory framework for global public-private partnerships is also outlined in an algorithm.

Jiaying (14, 2022) tried to analyse how to redesign the menu in a restaurant using the BCG matrix. Due to the poor design of the menu, it has been a long-standing occurrence in the restaurant that many customers choose unprofitable or even unavailable items, and many customers need clarification on the menu. So the study tried to analyse how a menu can be revised and re-engineered in terms of menu components, design, and physical characteristics to increase its popularity and restaurant profits. A two-dimensional, four-celled grid is present in the BCG Matrix (2 X 2 matrix). The Relative Market Share (RMS), a metric of product strength (competitive advantage) in the market, can be used to categorise all products into two groups. The other is the Market Growth Rate (MGR), which measures how attractive the market is by looking at how many products are sold. According to the collected information relating to the number of menu items purchased, cost, menu price, sales revenue and net margin per menu item are measured. Due to the restaurant's small size, RMS is represented by profitability, and MGR by Popularity. All 24 menu items at this restaurant can be divided into four groups based on popularity and profitability using the calculations mentioned above and the BCG Matrix:

- Four Stars (high popularity; high profitability)
- Three Cash Cows (high popularity; low profitability)
- Two Question Marks (low popularity; high profitability)
- Four Dogs (low popularity; low profitability).

And the remaining menu items, referred to as Normal items, display normal and non-prominent data, meaning that the displayed data has a value close to the average of both popularity and profitability. The general strategy entails maintaining Stars, reducing the menu item sizes of Cash Cows to cut costs, promoting Question Marks, and concealing Dogs. After redesigning menus, the final step is to test and evaluate the status.

Astriningsih *et al*. (15, 2023) aim to assess the market expansion rate, market share, and marketing tactics used by PT Putra Persada Nusantara company using BCG Matrix analysis. The executives of PT Putra Persada Nusantara company are personally interviewed and acquire the information directly from the subject to be studied and a method to locate information on the firm's site as a primary data source. Secondary data was gathered from data sales reports from PT Putra Nusantara Persada company and its rival, PT Sumber Mas Motor, to understand market growth and relative market share. The study reported that PT Putra Persada Nusantara's market growth rate is high, and its relative market value in the years 2008 and 2009 is positioned to display a quadrant of stars, which denotes high-growth markets with

a significant market share. Therefore, these businesses can employ strategies such as modal addition or modal multiplication of the manufacturing of motor units to increase their dominant position in the expanding market.

III. Methodology:

For the purpose of study, annual reports published by Annual Survey of Industry (ASI) were collected from the year 2008-09 to 2018-19. The sample for secondary data analysis is the food processing sectors as per four digit National industrial classification (NIC). All acts are classified into many "activity groups" or "tabulation categories" in a hierarchical order. Every section is divided into a 2-digit numeric coded "division", every division into a 3-digit numeric coded "group", "every group" into a 4-digit numeric coded "class" and every 4-digit Class into a 5-digit sub-class. Most previous studies in industrial sector have NIC values in the three-digit range. This study includes nine group of food processing industry illustrated in table no 1. All subsectors are considered for the study except subsectors 1075 (Manufacture of prepared meals and dishes) and 1102 (Manufacture of wines) due to inconsistent of data at four- digit level of classification.

The BCG matrix has two important dimensions (determinants of profitability):

(A) Growth Rate: The growth rate which attempts to capture the potential resource usage of a business (industry). A growth rate measures the percentage change in the value of a variety of markets, companies, or operations (a proxy for industry attractiveness). It is also more accurate when a comparison is done between entities to use a growth rate (than the actual numerical value), because the size of economies can be fastly different.

Brigham & Ehrhardt (16, 2005) explain that the capital gain through a specific year is the value it gains in a specific year and can be calculated as follows:

$$\boldsymbol{g} = \frac{(\boldsymbol{P_1} - \boldsymbol{P_0})}{\boldsymbol{P_0}} \qquad (1)$$

Where,

P_1 = Ending Price

P_0 = Beginning Price

The average growth rate for each subsector for the study period measured as follows:

$$\mathbf{g} = ((\boldsymbol{P}_{2009} - \boldsymbol{P}_{2008}) / \boldsymbol{P}_{2008}) + (\boldsymbol{P}_{2010} - \boldsymbol{P}_{2009}) / \boldsymbol{P}_{2009}) + (\boldsymbol{P}_{2011} - \boldsymbol{P}_{2010}) / \boldsymbol{P}_{2010}) + \ldots\ldots\ldots + (\boldsymbol{P}_{2019} - \boldsymbol{P}_{2018}) / \boldsymbol{P}_{2018})) / \boldsymbol{n} \qquad (2)$$

Where,

P_{2009} = Deflated subsector value for 2009

P_{2010} = Deflated subsector value for 2010, and so on…..

n = Number of years

(B) Relative Market Share: The second dimension is the relative market share, which is an indication of overall strength and hence the cash generation potential. The market share (a proxy for competitive advantage) of the each subsector was calculated as a percentage of the total value of output in food processing industry for 2009.

Market growth is illustrated on the vertical axis and Relative market share on Horizontal axis as in figure 1 and which divides the matrix into four quadrants.

Hanif & Abdul (17, 2020) described the components of the BCG growth sharing matrix. The BCG matrix classifies business products/firms/ subsectors/industries into four quadrants to further assist businesses in analysing their assets.

1. "Question Marks" is one of the quadrants where the products / firms / sub-sectors / industries are in markets with high growth and low market share.
2. The "stars" are those with the fastest-growing markets and the largest market share.
3. Cash Cows are the ones with low-growth markets and high market share.
4. "Dogs" in which both growth and market share are low.

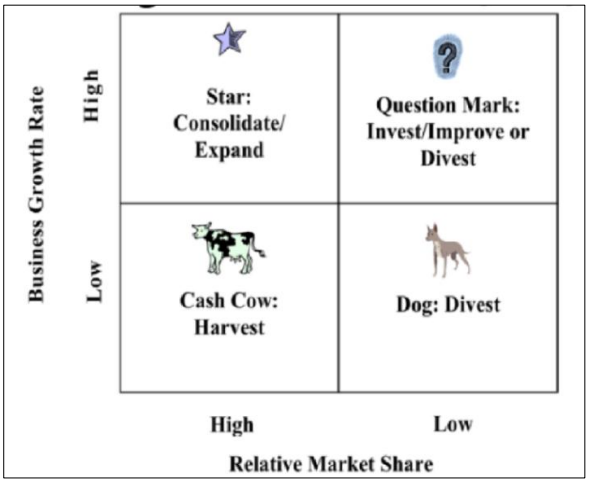

Figure 1 BCG Matrix and its components

BCG matrix necessitates a systematic classification rule, an interaction-based exploratory analysis tool to achieve manager consensus, and a customised categorisation scenario analysis for reasonable classification searching. In the BCG matrix, profits are generated for Cash Cows, which are used to transform Question Marks into Stars, which might ultimately become Cash Cows and prevent the emergence of Dogs. In the BCG growth concept, there is necessary to balance products to allocate funds from cash cows to problem children and star products, fund R&D activities, and enhance new product development. The Cash Cows products need to continue to generate the most cash possible and that cash should be invested in businesses with a higher growth rate, such as Question Marks and Stars. Low growth/low share Dogs are viewed as significant cash drains and should be threshed, liquidated, or divested as soon as possible.

Classifying the position of the subsectors in the BCG matrix must give way to decisions about what to do with them (Tutor2U, 18, 2011). Sub-sectors can move from problem children to stars if the necessary support and action plans to make them more competitive are implemented. Different levels of vulnerability in the subsectors, as indicated by the BCG matrix, indicate a pressing need for collaboration and policy responses that are tailored to these needs. Rather, the government should foster a favorable environment for the sector through partnerships that emphasise knowledge management and policy actions that enable private initiative to perform competitively.

IV. Results:

BCG matrix is regarded as one of the most well-known business strategies ever formed **(Ansoff, 19, 1987; Ansoff & McDonnell, 20, 1990).** It provides a simple two-dimensional analysis of Strategic Business Units (SBUs) in management, namely industry growth rate and relative market share. The industry growth rate is plotted along the vertical axis, while relative market share is plotted along the horizontal axis. The SBU has distinct goals and missions that can be arranged independently from those of other groups **(Temmerman, 21, 2011)**. It is the oldest and possibly most well-known of all the matrices. It is utilised extensively at the executive level to maximise benefits. Consequently, it is considered an effective company resource allocation tool.

Classifying the position of the sub sector in the BCG matrix must give way to decisions about what to do with them **(Tutor2U, 2011)** sub sector can move from problem children to stars if the necessary support and action plans to make them more competitive are implemented. Different levels of vulnerability in the sub sector, as indicated by the BCG matrix, indicate a pressing need for collaboration and policy responses that are tailored to these needs. Rather, the government should foster a favourable environment for the sector through partnerships that emphasise knowledge management and policy actions that enable private initiative to perform competitively.

The food processing industry is broadly divided into different sectors for easy monitoring and functioning. Table.1 illustrates the results regarding the market growth rate of the FPI sub sector in Andhra Pradesh. The market growth rate of all sub sectors calculated by using the mentioned formulae and compared the growth rate of respective sub sector in India wide. Out of all sub sector, the sub sector 1073 (29.66 %) has highest growth rate, followed by sub-sector 1010 (20.82 %), 1101 (19.02 %), 1020 (17.52 %), 1062 (14.86 %), 1074 (14.50 %), 1080 (12.84 %), 1103

(12.49 %), 1079 (8.43 %), 1072 (4.19 %), 1040 (3.71 %), 1030 (1.95 %), 1050 (0.81 %), 1061 (0.40 %), 1104 (0.24 %) and 1071 (-14.13 %). Out of all 16food processing sub sectors, one sub sectors show negative growth. Table.1 illustrate the results regarding the positioning of sub sector with comparison with India. Positioning represents the market share of the sub-sector of AP and national wide. Out of all sub sectors, the sub sector 1104 (26.34 %) has highest market share, followed by sub sector 1040 (21.70 %), 1061 (16.62 %), 1020 (10.46 %), 1050 (7.08 %), 1080 (5.98 %), 1072 (4.28 %), 1079 (3.19 %), 1030 (1.75 %), 1101 (1.16 %), 1103 (0.94 %), 1062 (0.70 %), 1073 (0.38 %), 1010 (0.20 %), 1071 (0.18 %) and 1074 (0.10 %).

Table 1: Market Share and Market Growth Rate of selected sub-sectors of FPI in Andhra Pradesh from 2008-09 to 2018-19:

SUB-SECTOR	MARKET SHARE	MARKET GROWTH
1010	00.20	20.82
1020	10.46	17.52
1030	01.75	01.95
1040	21.70	03.71
1050	07.08	00.81
1061	16.62	00.40
1062	00.70	14.86
1071	00.18	-14.13
1072	04.28	04.19
1073	00.38	29.66
1074	00.10	14.50
1079	03.19	08.43
1080	05.98	12.84
1101	01.16	19.02
1103	00.94	12.49
1104	26.34	00.24

On constructing the 2 X 2 BCG matrix with four quadrants are formed namely, Stars, Cash Cows, Dogs and Question Marks. Figure 2 illustrates the BCG matrix of various sub sector of FPI in Andhra Pradesh during the study period. The main purpose of BCG Matrix is to identify which sub sector to invest, to sell off and to shut down.

Stars are the high growth rate sectors in the market and need heavy investment to sustain their growth. Gradually their growth slows down and assuming they maintain their relative market share will becomes cash cows. The results indicate that no sub sector of FPI falls in the quadrant of Stars. The BCG matrix indicates that the manufactures of soft drinks (1104), oils (1040), grain mills (1061) can be seen as a "Cash Cow industry". This indicates that these sub sectors generate good cash flow. Its existing products have a strong market presence. If compared between the sub sectors, dairy and functional beverages, dairy products have higher retail sales and a higher market share.

Figure 2 illustrates the BCG matrix of various sub sector of FPI in Andhra Pradesh

These sub sectors are matured, successful with a relatively small need for investment. These sub sectors need to be managed for continued profit, such that they will generate strong cash flows and eventually becomes stars. The sub sectors processing of meat (1010), fish (1020), starch products (1062), cocoa & chocolate (1073), macaroni & noodles (1074), animal feeds (1080) and spirits and malt liquors (1103) shown low market share but have high growth rate and falls under "Question Mark (problem children or wild cats)" quadrant of BCG Matrix. The results suggest that they have enough potential, but require substantial investment in order to grow market share at the expenses of more powerful competitors. The "Dogs quadrants" of BCG matrix is occupied by the sub sectors processing of fruits and vegetables (1030), dairy (1050), bakery products (1071), sugar (1072) and other food products (1079) of food processing sector of Andhra Pradesh. These sub sectors have low relative share with low growth market. These sub sectors generate enough cash to break – even, but rarely worth investing in.

V. Conclusion:

Andhra Pradesh, which has become a state of abundance in terms of food production, is ideally positioned to lead in total prosperity by introducing an agriculturally based industrial revolution. To expedite progress and achieve this goal, the state government has prioritized the coordinated development of small-scale, large-scale, and medium-scale companies, as well as the harmonious development of the agriculture sector, which is the backbone of Andhra Pradesh economy. BCG matrix necessitates a systematic classification rule, an interaction-based exploratory analysis tool to achieve manager consensus, and a customised categorisation scenario analysis for reasonable classification searching. In the BCG matrix, profits are generated for Cash Cows, which are used to transform Question Marks into Stars, which might ultimately become Cash Cows and prevent the emergence of Dogs.

Stars are the high growth rate sectors in the market and need heavy investment to sustain their growth. Gradually their growth slows down and assuming they maintain their relative market share will becomes cash cows. The results indicate that no sub sector of FPI falls in the quadrant of Stars. In the BCG matrix, profits are generated for Cash Cows, which are used to transform Question Marks into Stars, which might ultimately become Cash Cows and prevent the emergence of Dogs. In the BCG growth concept, there is necessary to balance products to allocate funds from cash cows to problem children and star products, fund R & D activities, and enhance new product development. The Cash Cows products need to continue to generate the most cash possible and that cash should be invested in businesses with a higher growth rate, such as Question Marks and Stars. Low growth/low share Dogs are viewed as significant cash drains and should be threshed, liquidated, or divested as soon as possible.

The results indicate that no sub sector of FPI falls in the quadrant of Stars. The BCG matrix indicates that these sub sectors falls under "Cash Cow industry" generate good cash flow. Its existing products have a strong market presence. The sub sectors, dairy and functional beverages, dairy products have higher retail sales and a higher market share. These sub sectors are matured, successful with a relatively small need for investment. These sub sectors need to be managed for continued profit, such that they will generate strong cash flows and eventually becomes stars. The sub sectors under "Question Mark" have enough potential, but require substantial investment in order to grow market share at the expenses of more powerful competitors. The "Dogs quadrants" sub sectors generate enough cash to break – even, but rarely worth investing in.

VI. Reference:

1. Varshney, H. K., and Ghosh, D. (2013). "Employment Intensity of Output, An Analysis of Non-Agriculture Sectors Food Processing Sector". Institute of Applied Manpower Research (IAMR) Report No. 10/2013.

2. Bhavani, A., Gulati, A. & Roy, D. (2006). "Food processing industry: How have the reforms

affected its structure? Agricultural diversification and its implications for Smallholders". International Food Policy Research Institute, Washington DC and Institute of Economic Growth New Delhi, 20-21.

3. Mutandwa, E., Kanuma, N. T., Rusatira, E., Kwiringirimana, T., Mugenzi, P., Govere,. I & Foti, R. (2009). Analysis of coffee export marketing in Rwanda:Application of the Boston consulting group matrix. African Journal of Business Management. 2 (4), 210-219.

4. Jayaranjani, S. R., & Dharmadasa, R. A. P. I. S. (2011). A Study of Tea Export Marketing in Sri Lanka: Application of Boston Consulting Group Matrix. Proceedings of International Conference on Business Management 8.

5. Joubert, J. C. N. & Jooste, A. & Lotriet, R. (2011).The Cash Cows, Dogs, Stars and Problem Children of the South African Agricultural Sector. International Journal of Agricultural Management.Institute of Agricultural Management. 1(1), 1-6.

6. Zheng, J., & Han, J.,& Jiang, H. (2011). How to Identify the Leading Industry in the Service Sector for Xiacheng District of Hangzhou: Based on BCG Matrix and Location Quotient. 1-4.

7. Laosutsana, P. Shivakotib, G. P &Soni, P. (2017).Comparative advantage and export potential of Thai vegetable products following the integration into the ASEAN Economic Community. International Food and Agribusiness Management Review 20(4), 575-590.

8. Zin, R.A., Bombana L.P &Barcellos, P.B.P. (2018).Evaluation of two companies' sales teams with the BCG matrix using profit and contribution margin. Gestão&Produção, 25 (4), 1-13.

9. Amarildo, H., Silva, D., Carlos, J., & Junior, R. (2018). A Critical Approach to the use of the BCG Matrix: Portfolio Analysis of Brazilian Pulp Marketed in the International Market. Revista Árvore. 42.

10. Yahya, I., Anizar, A., Khatami, G.,& Khansa, T. (2020). Development Strategy Analysis of Fertilizer Company Using BCG Matriks Method. IOP Conference Series: Materials Science and Engineering. 851.

11. Prasannath, V. (2020). Export Performance of Coconut Sector of Sri Lanka. South Asian Journal of Social Studies and Economics. 6 (3), 35-43.

12. Islakaeva, G. R. (2020). Using the Boston Consulting Group Matrix In developing corporate and government development strategies. Bulletin USPTU Science education economy Series economy. 3. 116-122.

13. Liashenko, V. & Petrova, I. (2021) BCG-analysis of the Industry of the Prydneprovsk and Donetsk Economic Regions: Definition of Smart Priorities and Development Strategies. Herald of the Economic Sciences of Ukraine. 1(40), 35-46.

14. Jiaying, Y.(2022). Analysis of Menu Design in the Food and Beverage Industry using the BCG Matrix Method. Highlights in Business Economics and Management. 2. 333-340.

15. Astriningsih, I. M. S. (2010).BCG matrix analysis on product marketing strategy of Pt PuteraPersada Nusantara.

16. Brigham, E. F. & Ehrhardt, M.C. (2005) Financial Management Theory and Practice. Ohio: R.R. Donnelley Willard.

17. Hanif, H. & Abdul, K. (2020).An Analysis on BCG Growth Sharing Matrix. International Journal of Contemporary Research and Review. 11 (10), 21899−21905.

18. Tutor2u. (2011). Product Portfolio Strategy. http://tutor2u.net/business/strategy/bcg_box.htm

19. Ansoff, I. H. (1987).Corporate Strategy. London: Penguin Books.

20. Ansoff, I. H., & McDonnell, E. J. (1990). Implanting Strategic Management (2nd Ed.). Prentice Hall International (UK) Ltd: Cambridge, Great Britain.

21. Temmerman, R. (2011). Stars, Problem Children, Dogs and Cash Cows: Evocative Terminology. In Multilingual Business Communication, SYNAPS. Journal of Professional Communication, 26(2), 48-61.